

SELF-FOCUS AND PSYCHOLOGICAL DISTRESS  
IN ADOLESCENTS AND YOUNG ADULTS  
WITH LONG STANDING ASTHMA

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## NOMENCLATURE

<i>M</i>	Mean
<i>SD</i>	Standard Deviation
$\alpha$	Cronbach's Alpha
<i>t</i>	Value of the test statistic for an independent samples t-test
$X^2$	Value of the test statistic for a chi-square analysis
<i>F</i>	Value of the test statistic for ANOVA (Analysis of Variance)
<i>p</i>	Statistical significance level
PEFR	Peak Expiratory Flow Rate
AS	Asthma Group
HC	Healthy Control Group
BDI	Beck Depression Inventory
BAI	Beck Anxiety Inventory
BSI	Brief Symptom Index
GSI	Global Severity Index
MUIS-C	Mishel Uncertainty in Illness Scale – Community Form
MAACL	Multiple Affect Adjective Checklist
SCS	Self-Consciousness Scale
VAS	Visual Analog Scale
SAS	Situational Self-Awareness Scale
GPA	Grade Point Average

## CHAPTER I

### INTRODUCTION

Asthma is widely recognized as the most common chronic illness of childhood (Creer & Bender, 1995). According to the National Center for Health Statistics (1996), 4.4 million individuals under the age of 18 have asthma. Many pediatricians, general practitioners, and researchers have traditionally viewed asthma strictly as an illness of childhood, holding the belief that children outgrow the disease as they age (Perez-Yarza, 1996). However, increasing numbers of studies have found that asthma is almost as common in adolescents as it is in young children, and is more prevalent in adolescence than adulthood (Price, 1996). Specifically, epidemiological studies have found that asthma symptoms persist in 30-80% of adult patients with childhood onset asthma (Roordan, 1996). Although individuals with childhood onset asthma may experience a reduction or remission of asthma symptoms during the second decade of life, researchers have increasingly recognized that this pattern does not occur as frequently as previously thought. Further, some researchers argue that while adolescents may appear to be symptom free, asthma may remain present in these individuals in the form of sub-clinical, but significant, airway obstruction and bronchial hyperresponsiveness (Roordan, 1996).

Despite the fact that many individuals with childhood onset asthma continue to experience symptoms during adolescence and young adulthood, these age groups have largely been ignored by medical and research communities (Perez-Yarza, 1996). After

providing a brief review of the nature of asthma in general, the present paper reviews literature related to the medical and psychological impact of the persistence of childhood onset asthma into adolescence and young adulthood. Ultimately, it will be argued that specific aspects of the experience and treatment of asthma are associated with a tendency for adolescents and young adults with asthma to be dispositionally self-focused and that this heightened level of self-focus may account for many previously observed findings related to asthma in adolescents and young adulthood.

Dispositional self-focusing, also known as self-consciousness, refers to an individual's tendency to direct his attention towards or away from the self. An individual high in dispositional self-focusing tends to take himself as the focus of his attention more frequently than an individual who is low in dispositional self-focusing (Carver & Glass, 1976; Fenigstein, Scheier & Buss, 1975; Scheier & Carver, 1977, 1982; Smith & Greenberg, 1981). Dispositional self-focus can be further broken down into private self-consciousness, which reflects the individual's tendency to focus on inner thoughts, feelings, and physical sensations, and public self-consciousness, which refers to the individual's tendency to think about himself in relation to the external environment (Ingram & Wisnicki, 1999). Measures of private self-consciousness have been found to correlate with measures of depression (i.e., Smith, Ingram, & Roth, 1985) and measures of public self-consciousness have been found to correlated with measures of anxiety (i.e., Ingram, 1990). Because asthma management necessitates a high degree of self-focus on both internal states and aspects of the external environment (e.g., Priel, Heimer, Rabinowitz, & Hendler, 1994), across time individuals with asthma may become more likely to be higher in both private and public self-consciousness than individuals who do

not have asthma. The tendency for individuals with asthma to be highly privately and publicly self-consciousness may account in part for the higher rates of psychological distress observed in adolescents and young adults with asthma compared to same-age healthy peers (e.g., Silverglade, Tosi, Wise, & D'Costa, 1994) and normative samples (e.g., Mullins, Chaney, Pace, & Hartman, 1997). Further, research regarding the nature of asthma suggests that self-focused attention may serve as a mediator in the often observed relationship between heightened illness uncertainty and elevated levels of psychological distress (e.g., Van Pelt, Mullins, Carpentier, Belden, & Chaney, 2003). Finally, increased levels of self-focused attention amongst individuals with long-standing asthma may also account in part for observed deficits in school performance and school attendance (e.g., Van Pelt, 2002) as well as problem-solving performance and internal attributions for failure that have been observed among adolescents and young adults with asthma (e.g., Chaney et al., 1999). Thus, self-focused attention may prove to be a key cognitive appraisal variable in the psychological adjustment of adolescents and young adults to long-standing asthma.

The purpose of the current research is to determine if individuals with a history of long-standing asthma evidence higher levels of dispositional self-focus than same age peers without a chronic illness history, and to determine the potential effects of heightened levels of self-focus on the psychological functioning of individuals with long-standing asthma. The following questions will be addressed: (1) Do individuals with long-standing asthma evidence higher levels of psychological distress than age- and gender-matched healthy peers? (2) Do individuals with asthma evidence higher levels of dispositional self-focus than age- and gender-matched healthy peers? (3) Does self-focus

mediate the often observed relationship between illness uncertainty and psychological distress? (4) Do college students with asthma have lower semester and cumulative grade point averages and more days missed from class and work for health reasons than college students without a chronic illness history? (5) Do individuals with long-standing asthma respond differently to experimentally-induced failure compared to age- and gender-matched peers without long-standing asthma? (6) Do individuals with asthma evidence more situational self-awareness following experimentally-induced failure than individuals without asthma? (7) Do individuals with asthma make more internal attributions for experimentally-induced failure than college students without asthma?

## CHAPTER II

### REVIEW OF LITERATURE

#### The Nature of Asthma

##### *Disease Characteristics*

##### *Physical Characteristics*

Asthma cannot be defined in terms of its etiology, as the cause of asthma is unknown. Rather, asthma generally is defined in terms of its hallmark characteristics, which include intermittency, variability, and reversibility (Creer & Bender, 1995). Intermittency refers to the notion that the number of asthma attacks a person experiences varies from individual to individual, and may also vary within the individual across time. Individuals with asthma may have a series of attacks within a short time period, but then may not experience another attack for a significant amount of time (Creer & Bender, 1993, 1995; Young, 1994). The frequency of attacks an individual experiences is a function of numerous variables, including the number and diversity of stimuli that trigger an attack, the degree of hypereactivity of the individual's airways, the degree of control established over the disorder, healthcare variables (e.g., access to asthma specialists), and patient variables (e.g., medication compliance) (Creer & Bender, 1993, 1995).

Variability refers to the overall severity of an individual's asthma as well as the severity of an individual attack (Creer & Bender, 1993, 1995). Currently, there is no

agreed upon standard for classifying discrete attacks or an individual's asthma in general as mild, moderate, or severe (Creer & Bender, 1993). The lack of a standard for classifying the nature of an individual's asthma makes it difficult to track changes in the severity of the disease over time (Creer & Bender, 1995). Although physicians and scientists may not have an agreed upon standard for classifying the variability of asthma, individuals with asthma may indeed develop expectations about the severity of their asthma. If the individual has had mild attacks throughout the course of the disease, he may be unprepared to cope with a severe attack. An isolated, severe attack may result in psychological and behavioral reactions that both exacerbate the attack and influence the individual's expectations for future attacks (Creer & Bender, 1993, 1995). Thus, the variable nature of asthma makes the disease difficult to predict in both short- and long-term time frames.

Reversibility refers to the fact that the acute airway obstruction associated with asthma can remit either spontaneously or with treatment. Although most patients demonstrate complete reversibility of airway obstruction following proper treatment, this is not necessarily the case for all individuals with asthma. The reversible nature of asthma is what separates it from other respiratory disorders such as emphysema, where the airway obstruction is permanent (Creer & Bender, 1993, 1995).

Creer and Bender (1995) note that two other characteristics of asthma, airway hyperresponsiveness and airway inflammation, are of increasing interest to physicians and behavioral scientists. Airway hyperresponsiveness refers to an exaggerated airway response to a number of different stimuli. In asthma, this response takes the form of a reduction in small airway diameter due to muscle spasm, mucosal edema or swelling,

mucosal inflammation, or increased mucus secretion. The inflammation of the airways associated with asthma is believed to be caused by a complex reaction between tissues and cells present in the airways and inflammatory cells and mediators (Creer & Bender, 1995; National Heart, Lung, and Blood Institute, 1997; Sheffer, 1991).

#### *Asthma Prevalence, Morbidity, and Mortality*

According to data from the 2001 National Health Interview Survey, 31.3 million Americans, or 113.4 individuals per 1000, have been diagnosed with asthma by a health professional during their lifetime. Between 1997 and 2001, children between the ages of 5- and 17-years had the highest prevalence rates such that 144.2 per 1000 children had been diagnosed with asthma in their lifetime (American Lung Association, 2003). The prevalence of asthma has increased during the past twenty years in the United States and other western countries, which, in turn, has been associated with an increase in morbidity and mortality (Creer & Bender, 1993, 1995). In 2000, 4,487 people in the United States died from asthma, with sixty-five percent of these individuals being women. The death rate from asthma was three times higher amongst African-Americans compared to Caucasian Americans. Although deaths due to asthma are rare among children, in 2000, 223 children between the ages of 0- and 17-years died from asthma (American Lung Association, 2003). Between 1980 and 1993, the death rate from asthma doubled for individuals between 15 and 24 years of age (American Family Physician, 1996). The increasing morbidity and mortality associated with asthma is surprising given that the medical treatment of asthma has advanced considerably (Creer & Bender, 1993, 1995). Gatchel and Oordt (2003) note that researchers' endeavors to explain this paradox have

failed to yield any definitive explanations, but increasing amounts of evidence point to poor adherence with medical regimens as the culprit.

In terms of economic impact, the total estimated costs of asthma are substantial. In 1990 estimated costs were 6.2 billion dollars (Weiss, Gergen, & Hodgson, 1992), with more recent data suggesting that health care expenses due to asthma in the United States are approximately 14 billion dollars annually (American Lung Association, 2003). Direct medical expenditures, including inpatient hospitalization and prescription medication, account for the largest proportion of the cost of asthma. Indeed, the estimated number of physicians' office visits related to asthma care doubled between 1975 and 1995 from 4.6 million to 10.4 million. In 1995, an estimated 1.8 million emergency room visits occurred as a result of asthma (Mannino et al., 1998). Individuals with asthma collectively have approximately 470,000 hospitalizations per year (National Heart, Lung, and Blood Institute, 1997).

Each year individuals with asthma have approximately 100 million days of restricted activity (National Heart, Lung, and Blood Institute, 1997). Asthma accounts for an estimated 14.5 million lost workdays for adults (American Lung Association, 2003). Indeed, Taitel, Allen, and Creer (1998) noted that asthma is the third leading cause of missed days from work. The authors also note that a large, longitudinal study of children in Great Britain found that by the age of 23, young adults with current or past asthma were more likely to have been unemployed, had spent less time employed, had had more employers, and had spent less time in their most recent full time job than same-age peers without a history of asthma. These results suggest that childhood asthma, even when symptoms may not be present in the young adult, can continue to have an impact

on employment in adulthood. Asthma further impacts work performance in an indirect way due to working parents staying home from work to attend to a child with asthma (Weiss et al., 1992).

Collectively, children with asthma miss approximately 14 million school days annually (American Lung Association, 2003). School absenteeism due to asthma has been postulated to be the result of frequent doctor visits, symptoms that restrict activity, and psychosocial problems brought on by the disease, such as a parent's perception that the child is too vulnerable to participate in certain activities (Taitel et al., 1998). Despite the high number of missed school days, children and adolescents with asthma are not more likely to have academic problems (e.g., lower scores on academic achievement and IQ tests) than those without asthma (Lemanek & Hood, 1999; Lemanek, Trane, & Weiner, 1999). However, a study of college students with asthma revealed that students missed, on average, 2.8 days of class during a semester and were expected to miss 5.6 days of class throughout the academic year (Jolicoeur, Boyer, Roeder, & Turner, 1994). Although data has suggested that school age children and adolescents with asthma do not evidence greater academic difficulties than their healthy counterparts, a study of college students with and without asthma found that those with asthma had lower semester and cumulative grade point averages compared to healthy controls matched for age and gender (Van Pelt, 2002). These latter findings, coupled with the previously mentioned work impairments, suggest that adolescents and young adults with asthma continue to experience functional impairment and restricted activity after childhood.

Clearly, asthma has an impact on the daily activities and financial well being of individuals and families who attempt to manage this capricious disease. Unfortunately,

given recent data suggesting that asthma persists into adolescence, many of these individuals and their families will potentially face continued psychosocial and economic effects of asthma well beyond childhood.

#### *Nature of Asthma in Adolescence and Adulthood*

The progression of childhood asthma into adolescence and young adulthood is not well understood (von Mutius, 1996). However, some research suggests that the severity of asthma in childhood may predict the persistence of asthma into later life (Roordan, 1996). For example, a prospective study conducted on 323 British children who wheezed in childhood found that half of the participants with a minor wheeze in childhood had stopped by the age of 21. In contrast, only one-quarter of participants with frequent wheezing in childhood were no longer wheezing at age 21. Finally, only 10% of participants with persistent asthma in childhood did not wheeze at 21 years of age. The authors of the study concluded that individuals with persistent asthma in childhood are likely to continue to suffer from asthma in young adulthood, and that the prognosis for young adults who experienced mild asthma in childhood may not be as favorable as previously thought (Kelly, Hudson, Phelan, Pain & Olinksy, 1987).

Despite the fact that adolescents and young adults continue to suffer asthma related symptoms, medical care for individuals in this age group is frequently inadequate. Perez-Yarza (1996) notes that adolescents frequently are viewed as “no man’s land” (p. 1) in the medical community because they are viewed as too old to be seen by a pediatrician and too young to be treated by a general practitioner who specializes in adult medicine. Consequently, adolescents and young adults with asthma may not receive sufficient medical care. In a review of the literature, Roordan (1996) notes that 80% of

adolescents with asthma do not receive regular medical supervision of their disease despite experiencing numerous symptoms. A study of forty-six adolescents with asthma in the United Kingdom revealed that only two of the participants were being treated at a pulmonary or allergy specialty clinic, only twenty-five had undergone peak flow measurements at any point during their treatment, and most of the participants had poor knowledge of their asthma and limited understanding of disease management (Price, 1996). A study of college students with asthma indicated that 40% of the sample did not seek medical attention for asthma symptoms despite believing the symptoms were severe enough to warrant medical care. Another 65% of the sample claimed that seeking medical care was inconvenient, and 31% claimed they could not afford medical treatment (Jolicoeur et al., 1994). Collectively, these studies demonstrate that adolescents and young adults with asthma may not be receiving adequate medical treatment necessary to control their disease.

The lack of medical care for asthma is particularly striking given evidence that adolescents and young adults with asthma may be more prone to engage in certain risky behaviors. In a sample of 4,550 Australian adolescents with and without asthma, Forero, Bauman, Young, Booth, and Nutbeam (1996) found that adolescents with asthma were significantly more likely to smoke tobacco and use alcohol than adolescents without asthma. Clark (1998) also notes that some research suggests that adolescents with asthma are more attitudinally inclined to smoke than adolescents who do not have asthma, while other research has found that adolescents with asthma are just as likely to begin smoking as adolescents without asthma despite the increased risk to their already compromised lung function. Tobacco smoking is harmful for all individuals, but can be particularly

difficult for those with asthma, suggesting that these youth may need more attention and encouragement from the medical community to prevent the onset of smoking.

Given that asthma symptoms persist well beyond childhood, coupled with the data suggesting that adolescents and young adults with asthma do not receive adequate medical care and may be engaging in unhealthy, risky behaviors, one might expect adolescents and young adults with asthma to be the target of considerable research and intervention efforts. Unfortunately, these age groups have been largely ignored by the scientific community. Specifically, the majority of research has been conducted on therapeutic strategies and management approaches for infants, children, and adults (Perez-Yarza, 1996). Asthma education tends to target families with asthmatic children or working adults with asthma; however, asthmatics between the ages of 18 and 25, many of whom are attending college, are rarely included in either of these targeted groups. Each year, a number of college students with asthma are hospitalized as a result of poor asthma management, but little has been done to examine asthma-related issues among this age group (Jolicoeur et al., 1994).

In sum, asthma is a chronic illness characterized by its intermittent, variable, and reversible nature. Despite significant medical advances in the treatment of the disease, the prevalence of asthma appears to be rising among all age groups, which is associated with an increase in the morbidity and mortality of the disease (Creer & Bender, 1993, 1995). Psychological factors have been included amongst the possible explanations for the increasing prevalence, morbidity, and mortality of asthma (Bussing, Halfon, Benjamin, & Wells, 1995). Indeed, research has documented the role psychological

factors appear to play in the onset of asthma, the expression and/or escalation of symptoms, and the individual's response to treatment (Creer & Bender, 1995).

## Psychological Adjustment to Asthma

### *Psychological Factors in Adolescents and Young Adults*

The importance of psychological factors in the expression and treatment of pediatric asthma has been well documented (Creer & Bender, 1995; Silverglade et al., 1994). Although a complete review of this literature is beyond the scope of the present paper, several consistent findings related to psychological factors in pediatric asthma are noteworthy. McQuaid, Kopel, and Nassau (2001) recently presented a meta-analysis of twenty-eight samples of children with asthma from twenty-six studies, representing almost 5,000 children with asthma. The results indicated that children with asthma evidenced more adjustment difficulties relative to both comparison groups of healthy children and normative data from standardized psychological distress inventories for children. Further, children with asthma demonstrated more internalizing and externalizing disorders than children without asthma, with the differences between the two groups being greater for internalizing as compared to externalizing disorders. The meta-analysis also demonstrated that global adjustment difficulties, as well as problems with internalizing and externalizing symptoms, increased as asthma severity increased. More specifically, adjustment problems as well as internalizing and externalizing problems tended to be negligible for children with mild asthma and became more severe as children moved from moderate to severe asthma. It is important to note that the majority of the findings indicating that children with asthma evidence more

psychological distress than children without asthma have been largely based on parental report of child behavior (Klennert, McQuaid, McCormick, Adinoff, & Bryant, 2000). Children's self-report of their anxiety and depression symptoms, as well as teacher report of behavior problems, has failed to yield consistent differences between children with and without asthma (Klennert et al., 2000; McQuaid et al., 2001). Overall, however, it appears that children with asthma consistently demonstrate greater levels of psychological distress than children without asthma based on parental report.

Consistent with the neglect of adolescents and young adults with asthma in the medical and research communities, much less is known about the psychological functioning of these two age groups (Chaney et al., 1999; Mullins et al., 1997). The lack of information regarding the role of psychological factors in adolescents with asthma is especially troubling given that emotional factors may facilitate the exacerbation of asthma attacks in some patients (e.g., Bussing et al., 1995). The emotional turbulence usually associated with adolescence and the adolescent to adult transition, coupled with the potential emotional adjustment problems associated with asthma and the limited medical treatment adolescents and young adults with asthma receive, may ultimately yield adverse health outcomes for these age groups.

#### *Emotional Adjustment of Adolescents and Young Adults with Asthma*

A limited amount of empirical work has begun to illuminate the role of psychological factors in adolescents and young adults with asthma. Perez-Yarza (1996) posits that adolescents with chronic illnesses such as asthma may begin to realize that their illness may limit future professional goals and social development. As a result, the adolescent may experience feelings of failure and helplessness, impaired self-esteem, and

anger. These feelings, in turn, may be associated with a failure to avoid stimuli likely to trigger asthma, poor compliance with treatment, and a decline in the monitoring of asthma symptoms (Perez-Yarza, 1996).

Siegel, Golden, Gough, Lashley, and Sacker (1990) compared 80 adolescents with chronic conditions including asthma, type 1 diabetes, or sickle cell to a control group of healthy adolescents matched on age and socioeconomic status. The study found that the chronically ill population was more depressed than the healthy control sample. In a similar study conducted in Spain, Suis, Parera and Puig (1996) compared 162 adolescents with asthma, type 1 diabetes, seizures, or cancer to a control group of healthy adolescents. The results of the study indicated that female participants with a chronic illness had higher rates of depression, emotional distress, and suicidal ideation than their female healthy counterparts. There were no differences between males with a chronic illness and healthy males. Although these studies did not compare adolescents exclusively with asthma to healthy controls, the results lend support to the notion that some adolescents with chronic conditions, including asthma, are more distressed than their healthy peers.

Vila et al. (1999) compared children and adolescents (ages 8-17 years) with asthma to children and adolescents in the same age range with type 1 diabetes. The study found that children and adolescents with asthma were more likely to meet criteria for anxiety disorders as specified in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; APA, 1994) than children and adolescents with type 1 diabetes. There were no differences between the groups on DSM-IV diagnoses of depression or measures of self-esteem. These results suggest that children and

adolescents with asthma may be particularly prone to problems with anxiety compared to children with other chronic conditions.

Vila et al. (2003) recently investigated the relationship between quality of life and psychopathology in adolescents with asthma and their parents. Results of path analyses suggest that diminished health-related quality of life appears to lead to increased psychopathology in adolescents with asthma. These results provide preliminary evidence that adolescents with asthma may experience impaired quality of life due to asthma, which may make them vulnerable to subsequent psychopathology.

Research has also demonstrated that the relationship between emotional adjustment problems and asthma in adolescence may depend on disease severity (Price, 1996). For example, Silverglade et al. (1994) found that 128 adolescents with asthma scored higher on measures of anxiety, depression, and hostility, and measures of irrational beliefs (e.g., the need for approval from others and the inability to control emotions) than a control group of healthy adolescents. However, these results largely depended on the severity of the asthma. Adolescents with mild asthma were more likely to resemble healthy peers on outcome measures, whereas adolescents with severe asthma were more likely to have adjustment difficulties. The researchers also concluded that a subset of adolescents with asthma appear to display a strong dependency on significant others as well as a sense of helplessness, anxiety, depression, and hostility (Silverglade et al., 1994). Thus, adolescents with asthma are at risk of experiencing emotional adjustment problems, and this is particularly true among adolescents with severe asthma.

Similarly, Vila, Nollet-Clemencon, deBlic, Mouren-Simeoni, and Scheinmann (1998) found that children and adolescents with moderate to severe asthma were more

likely to display symptoms consistent with DSM-IV diagnoses of anxiety disorders and anxious/depressed symptoms than children and adolescents with mild asthma. These results suggest that asthma severity may increase the child's or adolescent's risk for psychopathology. The results also further highlight the potential unique relationship between asthma and anxiety, which was also found by Vila et al. (1999).

Clearly, adolescents with asthma, particularly those with severe asthma, are at a higher risk for experiencing psychological difficulties compared to healthy peers. Investigations of the role of psychological distress in the experience of asthma is particularly important given that research into asthma deaths consistently implicates psychosocial factors as contributors to asthma mortality. These psychological factors include family dysfunction, poor patient adherence to medications, poor self-care, disregard of asthma symptoms, family-staff conflict, and reactions to separation and loss (Lehrer, Sargunraj, & Hochron, 1992). Strunk (1987) compared two groups of children with equal levels of asthma severity, with one group having survived their illness while members of the second group died from asthma-related causes. Strunk (1987) found that ten of the fourteen variables that distinguished the two groups were related to the psychological adaptation of the child or the child's family. He further noted that both his results and those of other investigators found that asthma-related deaths occurred more often in adolescents as compared to younger children. Although reasons for the increased mortality among adolescents were unclear, Strunk (1987) suggests that the psychological factors associated with asthma, combined with the developmental issues of adolescence, may lead to fatal outcomes. It is also possible that the endocrine changes of adolescence may produce a physiological explanation for the increase in asthma severity associated

with death in some adolescents (Strunk, 1987). These findings suggest that, for at least some adolescents, the interaction between asthma severity and certain psychological factors may be potent enough to lead to death.

In sum, multiple investigations suggest that adolescents with asthma are more likely to experience psychological distress, particularly anxiety, compared to healthy peers. Further, asthma severity and diminished health related quality of life have been implicated as possible causes of psychopathology in adolescents with asthma. Clearly, some adolescents with asthma, particularly those with severe asthma, experience more psychological distress than their healthy peers. Research suggests that these psychological factors may be associated with asthma mortality. Researchers have begun to identify variables in addition to disease severity that may predict psychological distress among individuals with a chronic illness. Illness uncertainty is one such variable.

#### *Role of Illness Uncertainty in the Psychological Adjustment to Asthma*

In a study conducted by Mullins and his colleagues (Mullins et al., 1997), forty-nine college students with asthma aged 17 to 26 completed measures of psychological distress, illness uncertainty, and attributional style. The results indicated that the participants' level of psychological distress fell just beyond one standard deviation of the instrument's normative sample, indirectly suggesting elevated levels of psychological distress. Interestingly, the study also found that high levels of illness uncertainty and increased stable attributions for negative events were independently related to psychological distress.

Illness uncertainty refers to the inability of an individual with a chronic illness to determine the meaning of an event related to the illness or to predict outcomes related to

the illness accurately due to a lack of appropriate cues (Mishel, 1990). Illness uncertainty may result from ambiguity about the state of the illness, the complexity of treatment, lack of information about the seriousness of the illness or prognosis, and the unpredictability of the illness (Mishel, 1984). Stable attributions for negative events refer to the individual's tendency to view the cause of an adverse outcome as likely to persist across time (Alloy, 1982). Thus, Mullins et al. (1997) found that these two cognitive appraisal processes independently predicted the level of psychological distress in adolescents and young adults with asthma.

Mullins et al. (1997) posited that the intermittent nature of asthma (e.g., the number of attacks varying across time) may increase the individual's level of illness uncertainty, especially in the context of asthma management. In other words, because the individual may not be able to predict the number of attacks he or she is likely to experience in a given time frame, they may feel uncertain about their illness and doubt their ability to manage the illness effectively. Mullins et al. (1997) argue that, over time, the individual's feelings of uncertainty may become associated with negative outcomes (i.e., poor disease control). Further, the researchers posited that, as a result of repeated exposure to the unpredictable nature of asthma, individuals with asthma may tend to have a cognitive style that includes an expectation of negative outcomes for both asthma-related and non-asthma related events, and the expectation that these negative outcomes cannot be avoided. Thus, the researchers argued that uncertainty about asthma management and the expectation of negative outcomes for events may contribute to the psychological distress experienced by individuals with asthma.

Consistent with these arguments, asthma experts have noted that the variable nature of asthma may lead to high levels of uncertainty in patients. For example, Gatchel and Oordt (2003) pointed out that patients with asthma are likely to feel uncertain about their disease because of the sudden, unexpected nature of attacks and the prospect of an attack occurring at any moment. Caplin and Creer (2001) highlight the uncertainty associated with asthma treatment. More specifically, there is no known cure for asthma. Thus, health care providers make their best guess about the best treatment. If this treatment is not successful, a trial and error period often ensues in which the treatment is changed until the disease is well controlled. Both sets of authors noted that this high degree of uncertainty and unpredictability about the illness may lead to anxiety and fear in patients with asthma (Caplin & Creer, 2001; Gatchel & Oordt, 2003). In a similar vein, Taitel et al. (1998) note that patients with asthma often report feeling heightened anxiety and a fear of death when they have significant shortness of breath. In support of these theoretical assertions, Mullins, Chaney, Balderson, and Hommel (2000) found that illness uncertainty predicted symptoms of depression in older adolescents and young adults with long-standing asthma. Further, Hommel, Chaney, Wagner, White, Hoff, and Mullins (2003) recently found that illness uncertainty was a significant predictor of anxiety beyond the effect of demographic, disease, and psychological parameters in adolescents and young adults with a history of childhood onset asthma.

Taken together, the studies by Mullins et al. (1997), Mullins et al. (2000), and Hommel et al. (2003) indicate that older adolescents and young adults with asthma experience elevated levels of illness uncertainty, which has been reliably associated with the experience of both depression and anxiety. Numerous asthma experts argue that the

unique features of asthma (e.g., its variable and unpredictable nature) likely set the stage for the experience of uncertainty, which, in turn, may lead to psychological distress. Indeed, illness uncertainty has been reliably associated with the experience of psychological distress in other chronic illness groups including adults with multiple sclerosis (Mullins, Cote, Fuemmeler, Jean, Beatty, & Paul, 2001) and the caregivers of patients with Parkinson's disease (Sanders-Dewey, Mullins, & Chaney, 2001). Interestingly, previous attempts to determine what variables might cause illness uncertainty to result in psychological distress (i.e., illness intrusiveness, disease severity) have been largely unsuccessful (e.g., Mullins et al., 2000). This suggests that additional research is needed to determine what variables might mediate the relationship between illness uncertainty and psychological distress. A pair of studies conducted by Chaney and his colleagues (Chaney et al., 1999; Chaney, Hommel, Uretsky, & Mullins, 2000) suggest that self-focused attention may be a potential mediator of this relationship.

#### *Investigating Psychological Distress and Asthma in an Experimental Paradigm*

In a unique examination of the long-term outcomes of childhood asthma, Chaney and colleagues (Chaney et al., 1999) applied the reformulated learned helplessness theory to the development of distress in adolescents and young adults with asthma. The reformulated learned helplessness hypothesis presented by Abramson, Seligman, and Teasdale (1978) argues that individuals who explain why negative things happen as: (1) being due to themselves (e.g., an internal attribution), (2) due to factors that are unlikely to change (e.g., stable attributions), and (3) factors that are likely to exist across situations (e.g., global attributions) are likely to experience psychological distress. Such psychological distress occurs because these attributions reflect the belief that the

individual lacks the ability to affect the environment and, thereby, alter the negative outcome. Building on the work of Mullins et al. (1997), Chaney et al. (1999) argued that adolescents and young adults with childhood onset asthma have a long learning history of experiences with the unpredictable nature of asthma. They further argued that these repeated experiences with the capricious nature of asthma may facilitate the belief that their behavior does not exert an influence on the outcome of their disease, thus resulting in helplessness. The perceived lack of contingency between disease-related behaviors and disease outcomes may then lead to negative expectations for future disease outcomes, resulting in emotional adjustment difficulties and problems with disease management. Given the state of helplessness resulting from the illness, Chaney et al. (1999) hypothesized that adolescents and young adults with childhood onset asthma may be more likely to develop an internal, stable, global attributional style than their same-aged peers without asthma.

Assuming that previous experiences with non-contingency would lead to increased susceptibility to future experiences with non-contingency, Chaney et al. (1999) sought to determine if college students with a history of childhood onset asthma would be more susceptible to cognitive difficulties following exposure to non-contingency in an experimental setting than same aged peers who did not have a chronic illness history. Thirty-nine young adults with asthma and ninety-four same-aged healthy controls participated in the Chaney et al. (1999) study. The experimental manipulation was accomplished by exposing participants to one of two task conditions, one involving a solvable task and one involving an unsolvable task. Participants in the solvable task condition were given feedback contingent upon their performance on a puzzle task.

Participants in the unsolvable condition (or non-contingency condition) received random feedback about their puzzle performance that was unrelated to their actual performance. Following the manipulation of contingency, all participants solved a series of anagrams. The results of the study indicated that participants in the unsolvable condition performed more poorly on the anagram task than did participants in the solvable condition; however, participants with asthma in the unsolvable condition performed significantly worse than their healthy peers in the same condition. These results suggest that individuals with asthma are more susceptible to learned helplessness deficits following an experience with non-contingency than individuals who do not have asthma. Such results further suggest that individuals with asthma may be more susceptible to the experience of non-contingency in the real world environment, and the subsequent cognitive, emotional, and motivational deficits that are likely to follow (Chaney et al., 1999).

Interestingly, Chaney et al. (1999) also found that healthy controls in the unsolvable condition made external attributions for the cause of their poor performance on the anagram task, whereas the asthma participants made internal attributions for their poor performance. Based on this finding, Chaney et al. (1999) offered an alternative interpretation of their findings. Specifically, they noted that previous research on the “depressive self-focusing style” (Pyszczynski & Greenberg, 1987; p. 106) has demonstrated that depressed individuals often make internal attributions for failure and external attributions for success, whereas non-depressed individuals demonstrate an opposite pattern. The depressive self-focusing style has been associated with decrements in problem-solving performance similar to those observed in the Chaney et al. (1999) study (Greenberg & Pyszczynski, 1986). Chaney et al. (1999) noted that asthma

management requires a high degree of self-monitoring to observe potential internal signs of an impending asthma attack or triggers within the environment that might lead to an asthma attack. This high degree of self-focus may be adaptive in situations in which the individual's behavior can have an effect on the outcome of an event; however, high degrees of self-focus may not be adaptive in situations in which the individual's behavior is unlikely to have an effect on the outcome (Chaney et al., 1999). In these latter situations, if the individual's attention is directed on himself, he is more likely to make an internal attribution for a negative outcome despite lacking personal control over the situation (e.g., Fenigstein & Levine, 1984). Thus, the Chaney et al. (1999) study implicated the role of self-focusing as a possible cognitive process associated with the emotional adjustment problems of adolescents and young adults with asthma.

#### *Self-Focus and Psychological Adjustment to Asthma*

Chaney and colleagues (Chaney et al., 2000) explored the relationship between experiences of non-contingency and preferences for self-focusing among college aged students with a history of childhood onset asthma. The researchers argued that the nature of asthma management necessitates a high degree of self-monitoring, which may result in a tendency for individuals with a history of asthma to be more likely to be self-focused than individuals without a history of asthma. To investigate this hypothesis, an experiment was conducted with forty college aged students with a history of asthma and forty same-aged peers without a history of asthma. The study employed the same non-contingency experimental manipulation as was used in the Chaney et al. (1999) study. Following the experimental induction of non-contingency, participants were given the option of working on a set of word puzzles in the presence or absence of a mirror.

Working the puzzles in the presence of the mirror was the operational definition of preference for self-focus, while avoiding the mirror was operationalized as avoiding self-focus.

The results of the study indicated that participants with asthma in the unsolvable condition spent more time in front of the mirror than the non-asthma participants in the same condition, and all the participants in the solvable condition. These results indeed suggest that individuals with asthma engage in self-focus after failure. As mentioned previously, Chaney et al. (2000) argue that the development of a self-focusing style may be the natural result of asthma management. However, such a high level of self-focusing may not be adaptive in situations where the individual does not have control over the outcome. Thus, the emotional adjustment problems observed in some individuals with asthma may be the result of perseverative self-focus (Chaney et al., 2000).

Taken together, the studies conducted by Chaney and his colleagues (Chaney et al., 1999, Chaney et al., 2000) suggest that individuals with asthma are more likely to be self-focused in certain situations (e.g., following failure). This preliminary work suggested that more research regarding the role of self-focus in asthma was warranted. Indeed, close examination of the links between self-focused attention and asthma suggest many promising relationships that have received a limited amount of additional research, and certainly warrant further investigation. Before discussing future directions for research in this area, it is important to more clearly define the nature of self-focused attention, how it relates to the unique features of asthma as an illness, and what limited additional research has been conducted on this topic.

## On the Nature of Self-Focused Attention and Asthma

### *Defining self-focus*

In a seminal review of the literature, Ingram (1990) defined self-focused attention as “an awareness of self-referent, internally generated information that stands in contrast to an awareness of externally generated information derived through sensory receptors” (p. 156). A state of self-focused attention may be triggered by internal events, such as physical sensations or emotions, or by external events such as failure or loss (Wells & Matthews, 1994). Because the capacity of human attention is limited by the number of objects that can be attended to at any given time, theorists have postulated that attention can be directed either at the self or at an object external to the self (Wicklund & Gollwitzer, 1987). Although attention has generally been conceived as being directed either inwardly or outwardly, Mor and Winquist (2002) note that self-focused attention is not a unitary construct. Rather, at any given point in time, the individual may focus on different aspects of himself such as his internal, physical sensations, his personal competencies, or his emotions. Further, the individual may focus on himself in relation to aspects of the external environment such as how others might perceive him. Further, the content of whatever the individual is focusing on may lead to positive, negative, or neutral mood (Mor & Winquist, 2002; Wicklund & Gollwitzer, 1987).

Research suggests that self-focused attention has unique relationships with certain individual difference variables. For example, most studies regarding self-focused attention have used adult or adolescent participants rather than children. Collectively, the results of these studies suggest that the effect of self-focused attention on behavior increases with age. Further, meta-analysis suggests that there is a stronger relationship

between self-focused attention and negative affect for women than there is for men (Mor & Winquist, 2002). These findings may be due to the fact that women are more likely to be depressed than men and, therefore, are more likely to engage in certain types of self-focus such as rumination. Finally, meta-analysis reveals that the relationship between self-focused attention and mood is stronger in clinical than non-clinical populations (Mor & Winquist, 2002).

Researchers interested in self-focused attention distinguish between self-focused attention as a temporary state (e.g., self-awareness) and chronic self-focused attention (e.g., self-consciousness). Self-awareness refers to self-focused attention that is induced by cues in the environment, such as seeing one's reflection in a mirror or hearing one's own voice, and is generally believed to be temporary. Self-focused attention that is experimentally induced by exposing participants to objects such as mirrors generally falls under the rubric of self-awareness. Self-consciousness refers to a more chronic state of self-focused attention and is believed to function as a personality trait. Self-consciousness often is measured by scale scores on questionnaires designed to assess dispositional levels of self-focused attention (Mor & Winquist, 2002; Wicklund & Gollwitzer, 1987).

Self-consciousness has been further sub-divided into private versus public self-consciousness. Private self-consciousness refers to the individual's tendency to scrutinize all aspects of himself, including his thoughts, physical sensations, emotions, and behavior. Public self-consciousness refers to thinking about oneself as a social object that both is evaluated by others and has an effect on others. Those high in public self-

consciousness are concerned with the impression they make on others (Ingram & Wisnicki, 1999; Martin & Debus, 1999).

Several researchers have provided evidence supporting the validity of the private-public self-consciousness distinction. For example, Froming and Carver (1981) found that individuals who were high in private self-consciousness were less likely to conform to ratings made by a group of confederates than were individuals low in private self-consciousness. The authors did not find a relationship between public self-consciousness and conformity. The authors suggested that those high in private self-consciousness were more likely to be attending to internally generated information than those low in private self-consciousness and were thus less influenced by externally generated information. Therefore, the participants did not conform (Froming & Carver, 1981). Fenigstein (1979) found that women who were high in public self-consciousness rated a group more negatively when rejected by the group than women who were lower in public self-consciousness. There was no relationship between level of private self-consciousness and ratings of the group following rejection. These results suggest that, as expected, women who are higher in public self-consciousness are more concerned about how they are viewed by others than women lower in public self-consciousness, whereas private self-consciousness was unrelated to how one was viewed by others. Taken together, these two studies suggest that private and public self-consciousness are two distinct, but related, constructs that make unique predictions about the manner in which individuals behave.

*Private and public self-consciousness related to asthma management*

Particular aspects of asthma management may increase the likelihood that individuals with asthma develop heightened levels of private and public self-consciousness when compared to individuals without asthma. Within the last fifteen to twenty years, treatment of asthma has largely focused on the development of self-management programs that place the individual at the center of the management of their disease (Clark, 1998; Creer & Bender, 1995; Creer, 1988). Creer and Caplin (2001) note that the success of asthma self-management programs warrants the inclusion of such programs in treatment guidelines for asthma, including those of the National Heart, Lung, and Blood Institute as outlined in its *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma* (1997).

The emphasis in asthma self-management programs on the role of the individual, in concert with medical providers, in managing asthma cannot be understated. Some have argued that self-management programs developed precisely because of the recognition that control over asthma is impossible without the patient playing the primary role in the management of asthma (Creer, 1991; Creer, Levstek, & Reynolds, 1998). Indeed, Creer (1988) notes in a review of two prominent self-management programs that:

“... self-management provides the person with skills to assume responsibility for controlling his affliction. He can, in short, become the central component of a health care system geared towards providing him with improved health and well being. Health no longer becomes the sole province of someone else; it is determined, to some degree, by the patient.” (p. 237)

Asthma self-management programs have proven to be successful in reducing many of the negative outcomes associated with asthma (Bailey, Davis, & Kohler, 1998; Clark, 1998; Kostas, 1988; Lehrer, Sargunraj, & Hochron, 1992; Lemanek, 1999; Lucas

et al., 2001; Taitel et al., 1998); however, it can be argued that the nature of the information provided in these programs potentially increases the likelihood that individuals with asthma develop a dispositional tendency to be self-focused.

The purpose or objective of most asthma self-management programs is to help patients avoid asthma attacks and to reduce the severity of attacks when they occur (Kostes, 1999). Common elements of asthma self-management programs include (1) educating patients about the importance of medication adherence and taking medications properly (e.g., proper use of an inhaler), (2) teaching patients how to identify the early warning signs of an attack and learning the sequential steps that should be taken should an attack occur, (3) helping patients identify asthma triggers and learn how to avoid them when possible, (4) increasing understanding of the physiology of asthma, and (5) helping patients learn how to manage the consequences of asthma such as restricted activities and financial strain (Creer, 1988; Kostes, 1999; Lehrer et al., 1992; Lemanek et al., 1999). Proponents of asthma self management programs argue that asthma can be avoided, or its impact greatly reduced, through effective use of self-management techniques (Creer, 1991; Kostes, 1999).

One aspect of asthma self-management is self-monitoring or the observation and recording of factors related to asthma such as physiological processes, environmental factors, cognitive processes, and personal behavior (Bailey et al. 1998; Creer, 1988). Self-monitoring may allow the individual to observe cause and effect relationships between certain external and internal stimuli and their effect on asthma symptoms (Bailey et al., 1988). Symptom detection is crucial because there is not a definite treatment or combinations of treatments that are likely to lead to amelioration of symptoms. Rather,

individuals with asthma must monitor their symptoms, make decisions about what treatments might affect these symptoms, implement a plan, and then make judgments regarding the efficacy of the plan in controlling asthma symptoms (Clark, 1998). Self-management, therefore, involves monitoring of both internal states and factors in the environment that might affect asthma symptoms, such as the presence of certain allergens. Monitoring of both internal and external environments for signs of an attack is likely to occur whether or not the individual has received formal asthma training as this is the only method that allows for collection of information about the disease. Asthma management programs, however, are likely to introduce self-monitoring in a more formal, standardized fashion.

Internal states, such as increasing chest tightness, wheezing, and coughing, are signs of an impending attack that the individual with asthma must heed in order to prevent or lessen the severity of an attack (Creer, 1991; Creer et al., 1998; Fritz & Wamboldt, 1998). Creer (1988) notes that individuals with asthma are usually asymptomatic and become adapted to a certain standard of breathing; however, they continue to scan the internal environment for changes in physical sensations that may signal a change in lung functioning. This process is so natural for an individual with asthma that it may occur without their awareness (Creer, 1988). Effective asthma management involves the ability to accurately detect internal symptoms without being either overly sensitive or not sensitive enough to these physical sensations. Some research suggests that children who are accurate at symptom detection have lower functional morbidity, fewer school absences, and fewer trips to the emergency room after controlling for asthma severity than children who are not as adept at accurately

perceiving asthma symptoms (Fritz & Wamboldt, 1998). Creer (1991) notes, however, that there is often a lack of a correlation between changes in objective measures of pulmonary function and the individual's ability to detect these changes, as well as the individual's perception that pulmonary functions have changed and actual changes in lung function. Thus, it appears that accurate detection of asthma symptoms is a constant process that is essential to effective asthma management, but accurate detection may be difficult to achieve. The constant need for internal monitoring of physical states may ultimately lead to increases in private self-consciousness. In other words, the constant increased need to be focused on one's internal physical sensations to control asthma may increase the likelihood that the individual will focus on his internal thoughts and feelings *in general*, more than would be expected from an individual who does not have to spend as much time focusing on internal states. It seems logical to conclude, therefore, that the high need for internal monitoring of symptoms may lead to higher levels of dispositional private self-consciousness in individuals with asthma.

In addition to monitoring the internal environment for signs of potential asthma problems, individuals with asthma must scan the external environment for potential asthma triggers such as allergens and demands for physical exertion. Thus, asthma management requires that the individual think about how he is affected by the external environment. Further, asthma management steps such as peak expiratory flow rate values and use of inhalers are public events in that they can be observed and evaluated by individuals in the environment (Creer et al. 1998). Significant others in the lives of individuals with asthma may play a key role in helping the individual with asthma effectively manage their disease. For example, parents, physicians, and other adults may

notice signs of respiratory distress in children before the child experiences an attack. These same individuals often provide the child with social reinforcement for effectively performing asthma management steps (Creer, 1991). Supportive, positive family relationships are also important for adults with asthma to ensure effective disease management (Bailey et al., 1998). Thus, effective asthma management requires that significant others be involved in the monitoring of symptoms and management steps. This type of public scrutiny may heighten the individual's awareness of his relationship with the environment more than would be expected in an individual without asthma. Thus, asthma management may increase the individual's public self-consciousness in two ways. First, the individual examines the environment for asthma triggers that might have an effect on him. Second the individual monitors the reactions of others in the environment to the individual's symptoms of asthma and attempts to manage the disease. It is plausible that this tendency to think about one's asthma in relation to the external world would carry over into thinking about one's relationship with the external world *in general*, which might lead to individuals with asthma having a greater tendency to be have heightened levels of public self-consciousness in comparison to individuals who do not have a history of asthma. Overall, there appear to be links between the nature of asthma management and both private and public self-consciousness.

This rationale is consistent with the arguments of Chaney et al. (1999) who posited that the increased need for internal monitoring associated with asthma may lead to a greater self-awareness in general. The experimental paradigm used by Chaney and his colleagues (Chaney et al., 1999; Chaney et al., 2000) demonstrated that individuals with asthma tended to be more self-focused in certain *situations* (e.g., following failure),

but the nature of the experimental paradigm did not answer the question about increased *dispositional* self-focus in individuals with asthma. To address this question, Van Pelt (2002) compared college students with a history of childhood onset asthma to age- and gender-matched peers on a measure of dispositional self-focus. This measure, the Self-Consciousness Scale (Fenigstein et al., 1975), includes an assessment of both private and public self-consciousness. The study found that college students with asthma evidenced higher levels of private self-consciousness, but not public self-consciousness, when compared with age- and gender-matched healthy peers. These results provided preliminary evidence that adolescents and young adults with long-standing asthma display a tendency to be self-focused as a personality trait compared to individuals without a chronic illness history. The results of this study, however, were only marginally significant for the private self-consciousness measure and did not support the role of public self-consciousness. Additional research with a larger sample is needed, therefore, to replicate the finding regarding private self-consciousness and to continue to search for differences between individuals with and without asthma on the public self-consciousness measure.

In sum, there appear to be clear links suggesting that individuals with asthma may possess elevated levels of private and public self-consciousness. Indeed, preliminary research supports this conclusion. Research on private and public self-consciousness has suggested that these constructs are associated with the experience of psychological distress. Thus, if individuals with asthma are prone to being privately and publicly self-conscious, these variables may potentially account for the experience of psychological distress amongst individuals with asthma.

### *Self-Focus and Psychological Distress*

Authors have suggested that self-focused attention, in and of itself, is not maladaptive. Self-focused attention that is excessive, inflexible, and chronic, however, may lead to psychological difficulties (Ingram, 1990; Mor & Winquist, 2002). Ingram and Wisnicki (1999) note that research has consistently shown that excessive self-focus, in particular excessive private self-consciousness, is associated with numerous negative conditions including alcohol abuse, chronic pain, schizophrenia, marital dysfunction, paranoia, and many anxiety states including social anxiety and panic disorder. Research has also suggested that individuals with a tendency towards chronic self-focused attention may be more vulnerable to depression (Ingram, 1990; Ingram, Johnson, Bernet, & Dombek, 1992; Ingram & Wisnicki, 1999; Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990). More specifically, in a meta-analysis examining the relationship between self-focused attention and negative affect, Mor and Winquist (2002) concluded that private self-consciousness, more so than public self-consciousness, is strongly related to depression. Public self-consciousness, on the other hand, has been strongly linked to the experience of anxiety (Ingram, 1990; Mor & Winquist, 2002; Wells & Matthews, 1994).

In regards to the relationship between private self-consciousness and depression, researchers have found that private self-consciousness correlated significantly with a self-report measure of depression derived from the Minnesota Multiphasic Personality Inventory (Fenigstein et al., 1975) and the Beck Depression Inventory (Ingram & Smith, 1984). Ingram and Smith (1984) also demonstrated that depressed participants made more references to themselves on a sentence completion task than non-depressed participants. Smith, Ingram, and Roth (1985) demonstrated that private self-

consciousness was correlated with specific depression symptoms including negative self-evaluation and negative affect. Overall, these studies suggest a strong relationship between private self-consciousness and depression.

In regards to the relationship between self-focused attention and anxiety, Ingram (1990) notes that relatively few studies have directly examined the relationship between self-focused attention and anxiety. The studies that have been conducted suggest that individuals who experience test anxiety often report heightened levels of self-focused attention and that individuals with elevated levels of social and generalized anxiety report heightened levels of self-focused attention (Ingram, 1990).

Two studies investigated the relationship between self-focused attention and distress in individuals with a chronic illness. Griffin, Friend, Kaell, Bennett, and Wadhwa (1999) examined the effect of private self-consciousness on symptom reports and psychological distress in adults with either end stage renal disease or rheumatoid arthritis. The results of the study indicated that adults high in private self-focus with end stage renal disease reported more physical symptoms and had higher levels of psychological distress than those with the same disease and lower levels of self-focused attention. Adults with rheumatoid arthritis who were high in private self-consciousness also reported more symptoms of psychological distress but did not report more physical symptoms than those with the same disease who were lower in private self-consciousness. These results suggest that the relationship between self-focus and psychological distress indeed occurs in individuals with a chronic illness, and that excessive self-focus may amplify the experience of physical sensations among individuals with a chronic illness.

As previously discussed, individuals with asthma often experience heightened levels of psychological distress, including symptoms of anxiety (i.e., Hommel et al., 2003). Research has demonstrated that heightened illness uncertainty predicts psychological distress in individuals with asthma and other chronic illnesses; however, attempts to delineate how illness uncertainty leads to psychological distress have been largely unsuccessful (e.g., Mullins et al., 2000). Van Pelt et al. (2003) argued that self-focused attention mediates the relationship between illness uncertainty and psychological distress. More specifically, the authors argued that the variable and unpredictable nature of asthma may lead the individual to experience uncertainty. The individual then scans the internal and external environments for signs of an impending attack. The constant monitoring of the internal environment and the relationship between the external environment in relation to internal, physical states leads to a tendency to be self-focused. As noted earlier, self-focus may be adaptive in situations in which the individual is able to detect a change in respiratory status and avoid an attack or in situations where the individual succeeds and attributes success to himself. Self-focus may not be adaptive when the individual fails and attributes failure to himself because his attention was directed at internal rather than external factors. Thus, the high level of self-focus may lead to psychological distress due to repeated internal attributions for failure (e.g., Mullins et al., 1997; Chaney et al., 1999). The study found that illness uncertainty was a significant predictor of general psychological distress. Moreover, the study found that self-focus mediated the relationship between illness uncertainty and psychological distress. However, this preliminary study was the first to posit that self-focused attention

may mediate the relationship between illness uncertainty and psychological distress; therefore, additional research is needed to support this claim.

In sum, research suggests that private and public self-consciousness are associated with psychological distress. To the extent that individuals with asthma are more likely to have these personality traits, such propensities may explain the heightened levels of psychological distress observed in individuals with asthma. Preliminary evidence suggests that private self-consciousness has been associated with increased symptom reports and depression in one chronic illness group. These findings suggest that additional research is needed to investigate the relationship between private self-consciousness and depression as well as public self-consciousness and anxiety in individuals with asthma. Further, general self-focused attention has been shown to mediate the relationship between illness uncertainty and psychological distress in individuals with asthma (Van Pelt et al., 2003), but further research is needed to confirm this finding. In addition to demonstrating a link between private self-consciousness and depression, research has highlighted behavioral deficits (i.e., limited attempts to cope with stressful situations) in individuals with excessive private self-consciousness.

#### *Self-Focus and Coping with Everyday Life Stressors*

In addition to experiencing negative affect, individuals high in private self-consciousness appear to be less able to persist when trying to solve daily life problems. For example, Wood et al. (1990) examined the relationship between chronic self-focus and efforts to solve problems faced in daily living amongst forty males drawn from a community sample. The results of the study suggested that the higher the men were in self-focus, the less likely they were to take direct action to solve a problem they were

experiencing in daily life. Rather, the men were more likely to use more passive, emotion-focused coping such as ruminating. In a similar study, Wells and Matthews (1994) measured levels of private self-consciousness and coping style when faced with problems of daily living amongst 139 female nurses. The results of the study suggested that the higher the nurses were in private self-consciousness, the less likely they were to make attempts to cope with daily life problems. In other words, rather than using more emotion-focused or problem-focused coping, the nurses higher in private self-consciousness simply reported fewer attempts to cope at all (Wells & Matthews, 1994). Neither study was able to determine if high levels of chronic self-focus result in a lack of effort to cope with daily life problems, or, if many daily life problems leads to high self-focus and lack of coping. However, both studies suggest that heightened self-focus, in particular private self-consciousness, places the individual at risk for failing to cope adequately with daily life stressors and perhaps, subsequent psychological distress.

Ingram et al. (1992) studied the responses of individuals high and low in chronic self-focus to either experimentally manipulated success or failure. Their results indicated that the chronically self-focused participants reacted more strongly to both success and failure compared to their less self-focused counterparts. These results suggested that those high in self-focus are more likely to have stronger emotional reactions to failure than their less self-focused counterparts. In a second study, the authors recruited college student participants who had equivalent levels of dysphoria but differed in their level of chronic self-focus. Participants were followed for several weeks during the semester and their reactions to different naturally occurring life events was monitored. Results indicated that those who were higher in self-focus became more distressed in the face of

life events than those who were lower in self-focus despite equivalent starting points in terms of their level of dysphoria. The authors concluded that chronic self-focus may be a vulnerability factor for both cognitive and affective distress.

Taken together, the studies by Woods et al. (1990), Wells and Matthews (1994), and Ingram et al. (1992) suggest that individuals who are high in chronic private self-consciousness make fewer attempts to cope and do not cope as well with daily life stressors than individuals who are lower in chronic private self-consciousness. Recall that Chaney et al. (1999) found that individuals with asthma demonstrated less problem-solving ability following failure than individuals without a chronic illness who also experienced failure. One explanation for these results is that if the participants with asthma had higher levels of private self-consciousness they may have been less able to cope with the negative affect caused by the failure, which, subsequently, may have interfered with their performance on a problem-solving task. Thus, Chaney et al.'s (1999) study provides an experimental analogue that may demonstrate a lack of persistence in the face of stress amongst individuals with asthma in a manner similar to those high in chronic private self-consciousness.

Van Pelt (2002) provided evidence suggesting that individuals with asthma demonstrate less competence in the face of academic challenges. More specifically, she found that college students with asthma had lower semester and cumulative grade point averages than age- and gender-matched peers without a history of a chronic illness. Although speculative, these results suggest that college students with asthma make fewer efforts to persist in the face of academic stress such as exams and papers as a result of their high levels of private self-consciousness. The veracity of these interpretations rests

on demonstrating that individuals with asthma evidence more private self-consciousness than individuals without asthma and that high levels of private self-consciousness among individuals with asthma are associated with poorer performance in both experimental failure paradigms and real world stressful situations.

In sum, the studies by Woods et al. (1990), Wells and Matthews (1994), and Ingram et al. (1992) suggest that individuals with high private self-consciousness demonstrate less persistence in their attempts to cope with daily life stressors and more reactivity to negative events in both experimental and real world events. Similarly, Chaney et al. (1999) and Van Pelt (2002) have provided results suggesting that individuals with asthma may not cope as well as healthy controls following experimentally induced failure and academic stress, which may account for their poorer performance compared to healthy controls in these areas. These parallels suggest additional research is needed to determine if the deficits demonstrated by those with asthma are due to excessive private self-consciousness. Further, as will be discussed next, the relationship between attributional style and self-focus may partially account for the distress observed in individuals with asthma.

#### *Self-Focused Attention and Attributional Style*

Research has demonstrated that individuals make attributions based on where their attention is directed. Thus, if one's attention is focused on the external environment, one would anticipate an external attribution in that situation. If one's attention is focused internally, one would expect an internal attribution (Fenigstein & Levine, 1984; Smith & Greenberg, 1981). This effect occurs regardless of the positive or negative nature of the event or its outcomes (Duval & Wicklund, 1973). In a

representative study, Greenberg, Pyszczynski, Burling, and Tibbs (1992) exposed depressed and non-depressed participants to experimentally induced success or failure. Following the exposure, participants were manipulated to focus either on themselves or an external object. The authors then measured attributions for success or failure on the experimental task and found that those who were manipulated to focus internally after failure made more internal attributions for failure than those manipulated to focus externally after failure. Further, those manipulated to focus externally after success made more external attributions for success than those manipulated to focus internally after success. These patterns occurred regardless of participants' pre-morbid level of depression. The authors argued that these results demonstrate that attributions follow in the direction of attention. In this vein, individuals who are depressed tend to have their attention focused inward such that they make more internal attributions for failure.

Individuals with asthma experience many situations in which they must make an attribution to explain the success or failure of their behavior in managing their disease. Some proponents of asthma self-management acknowledge that patients must be realistic about the limits of asthma self-management. In particular, they note that self-management skills are unlikely to prevent all asthma symptoms and attacks (Creer, 2000; Creer et al., 1998). In a seven-year follow-up of an asthma self-management program for adults, Caplin and Creer (2001) found that the patients most likely to continue using the self-management skills taught in the program were those who accepted that despite their best efforts, self-management skills could not prevent all attacks, and that these attacks were independent of their behavior. These data suggest that a healthy understanding of the limits of self-management may prevent individuals from blaming themselves for not

being effective at self-management if an attack occurs. These results also suggest, however, that if an individual does not have a good understanding of the limits of self-management, he or she may blame themselves if they experience an attack, which, subsequently, may lead to failure to use self-management skills in the future and psychological distress. Further, if individuals with asthma are likely to be high in dispositional self-focus, their tendency to be focused on themselves may lead to internal attributions for failing to prevent an attack despite knowledge that such an attack may not have been preventable.

Recall that Chaney et al. (1999) demonstrated that individuals with asthma made more internal attributions for failure than healthy controls who also experienced failure. Van Pelt (2002) failed to replicate this finding using a similar methodology. Thus, additional research appears to be needed to more clearly determine if individuals with asthma make more internal attributions for failure than healthy peers. Such a finding would further support the theory that individuals with asthma engage in more self-focus than individuals without asthma.

In sum, there are four aspects of the self-focus literature that appear to be related to the experience of asthma, including the nature of private and public self-consciousness, the relationship between private and public self-consciousness and psychological distress, the reactions of individuals who are high in private self-consciousness to daily life stressors and experimentally induced failure, and the relationship between self-focus and attributions. The purpose of the present study is to replicate and extend findings within each of these four areas regarding the link between self-focused attention and asthma.

## CHAPTER III

### THE PRESENT STUDY

The present study sought to address questions related to the psychological functioning of adolescents and young adults with long-standing asthma. The present study focused on this age group due to the frequent neglect of these individuals in medical and psychological research on adjustment to asthma (Perez-Yarza, 1996) and the burgeoning evidence that the physical symptoms of asthma and the psychological adjustment difficulties associated with the illness persist beyond childhood (Kelly et al., 1987; Chaney et al., 1999; Chaney et al., 2000; Mullins et al., 1997; Mullins et al., 2000). Seven research questions were addressed. First, do individuals with long-standing asthma evidence higher levels of psychological distress than age- and gender-matched peers? Previous research documents that individuals with long-standing asthma evidence higher rates of psychological adjustment difficulties, in particular anxiety, compared to healthy controls (e.g., Siegel et al., 1990), other chronic illness groups (e.g., Vila et al., 1999), and normative data (e.g., Mullins et al., 1997). Thus, it was hypothesized that:

Hypothesis 1: Adolescents and young adults with asthma will evidence higher scores on measures of general psychological distress, as well as specific measures of depression and anxiety, compared to age- and gender-matched peers without a chronic illness history.

Second, do individuals with long-standing asthma evidence higher levels of dispositional self-focus than individuals without a chronic illness? Van Pelt (2002) provided preliminary evidence that college students with asthma scored higher on a measure of dispositional self-focus compared to age- and gender-matched peers without a chronic illness history. These results, however, were marginally significant and the results did not emerge on the public self-consciousness measure. A larger sample size was utilized in the current study to determine if increased power would facilitate observing these differences. Thus, it was hypothesized that:

Hypothesis 2: Adolescents and young adults with a history of long-standing asthma will evidence higher scores on a general measure of dispositional self-focus, as well as more specific measures of private and public self-consciousness, when compared to age- and gender-matched peers without a history of a chronic illness.

Third, does self-focus mediate the often observed relationship between perceived illness uncertainty and psychological distress? Previous research has consistently documented a relationship between illness uncertainty and psychological distress (i.e., Hommel et al., 2003; Mullins et al., 1997; Mullins et al., 2000). The relationship between private self-consciousness and depression has been found in one chronic illness group (e.g., Griffin et al., 1999). Further, Van Pelt et al. (2003) demonstrated that self-focused attention (as measured by the total score on the Self-Consciousness Scale) mediated the relationship between illness uncertainty and general psychological distress. This finding needs to be replicated and additional research is needed to explore whether private and public self-consciousness mediate the relationship between illness uncertainty

and psychological distress. Further, research is needed that includes specific measures of anxiety and depression, in addition to measures of general psychological distress, as criterion variables. Thus, it was hypothesized that:

Hypothesis 3: Illness uncertainty will be a significant predictor of psychological distress among adolescents and young adults with asthma. Further, this relationship will be mediated by self-focused attention. General self-focused attention, private self-consciousness, and public self-consciousness will all be examined as potential mediators. General psychological distress, depression, and anxiety will all be examined as potential criterion variables.

Fourth, do individuals with asthma evidence poorer academic performance and more days missed from class and work for health reasons than individuals without asthma? Previous research has documented that college students with a history of childhood-onset asthma evidence lower semester and cumulative grade point averages than college students without a history of a chronic illness (Van Pelt, 2002). These results were preliminary, however, and need to be replicated. Research has also demonstrated that college students with asthma miss, on average, almost three days of class per semester for health reasons (Jolicoeur et al., 1994). Other research has demonstrated that college students with asthma miss more days of class for health reasons than peers without a chronic illness history (Van Pelt, 2002). This latter finding was preliminary and needs to be replicated. Further, research has demonstrated that individuals with a history of childhood-onset asthma have more difficulty with disrupted employment than individuals without a chronic illness history (Taitel et al., 1998). Taken together, this research suggests that adolescents and young adults may be at risk for academic and

vocational difficulties compared to peers without a chronic illness. Thus, it was hypothesized that:

Hypothesis 4: Adolescents and young adults with long-standing asthma will have lower semester and cumulative grade point averages, more days missed from class, and more days missed from work than age- and gender-matched peers without a chronic illness history.

Fifth, do college students with a history of childhood-onset asthma respond differently to experimentally-induced failure than college students without a chronic illness history? Previous research has demonstrated that those high in private self-consciousness react more strongly to experimentally-induced failure than those lower in private self-consciousness (Ingram et al., 1992). Assuming that college students with asthma have higher levels of private self-consciousness as a result of their disease experiences, they may be expected to respond to experimentally-induced failure differently than college students without a history of asthma. Chaney and his colleagues (Chaney et al., 1999) have demonstrated that college students with a history of asthma evidence problem-solving deficits following experimentally-induced failure compared to healthy peers; however, Van Pelt (2002) failed to replicate this finding. Thus, additional research is needed to further examine the reaction of adolescents and young adults with asthma to experimentally-induced failure. Thus, it was hypothesized that:

Hypothesis 5: Adolescents and young adults with asthma will evidence greater problem solving deficits on an anagram task following experimentally-induced failure when compared to age- and gender-matched healthy peers who also experience experimentally- induced failure.

Sixth, do college students with asthma evidence higher levels of situational self-focus following experimentally-induced failure? Chaney and his colleagues (Chaney et al., 2000) demonstrated that college students with asthma showed a preference for self-focus (as measured by time spent in front of a mirror) following failure compared to age- and gender-matched peers without a chronic illness history who also experienced failure. Van Pelt (2002) attempted to replicate these findings using an alternative measure of self-focus, but failed to do so. She hypothesized that her failure to replicate Chaney et al.'s (2000) results was due the nature of the measure she used to assess situational self-focus. Thus, the present study seeks to replicate Chaney et al.'s (2000) finding using a short questionnaire that has demonstrated reliability and validity in the assessment of situational self-focus (Govern & Marsch, 2000). Thus, it was hypothesized that:

Hypothesis 6: Adolescents and young adults with long-standing asthma will evidence greater situational self-focus following experimentally-induced failure compared to age- and gender-matched peers who also experience experimentally-induced failure.

Finally, do individuals with asthma make more internal attributions for experimentally-induced failure than individuals without a chronic illness history? Given that attributions follow in the direction of one's attention (e.g., Fenigstein & Levine, 1984; Smith & Greenberg, 1981), individuals with asthma would be expected to make more internal attributions for failure than individuals without asthma assuming that individuals with asthma are more self-focused than individuals without asthma. Thus, it was hypothesized that:

Hypothesis 7: Adolescents and young adults with long-standing asthma will evidence more internal attributions for failure than age- and gender-matched peers following experimentally-induced failure.

In order to test these hypotheses, a cohort of college students with a history of long-standing asthma and a cohort of age- and gender-matched peers were recruited. All participants completed a background questionnaire designed to assess general demographic information, as well as information about how frequently the participants miss class and work due to illness and other reasons. The background questionnaire for the asthma participants contained additional information about the nature of the individual's asthma. All participants also completed measures of general psychological distress, as well as specific measures of anxiety and depression. All participants completed a self-report measure of dispositional self-consciousness that yields a total score, as well as measures of private and public self-consciousness. Participants with asthma also completed a self-report measure of illness uncertainty. After completing the self-report measures, participants were randomly assigned to receive either success or failure feedback from a computerized concept formation task that served as the experimental induction of success or failure. Following this task, the participants completed a brief self-report measure of situational self-awareness, an affect checklist that served as a manipulation check for the failure induction procedure, and made attributions for their performance on the concept formation task. Participants then completed a computerized anagram task that served as the measure of cognitive problem-solving ability following failure. Each of these measures and the experimental procedure are described in greater detail in the next chapter.

## CHAPTER IV

### METHOD

#### *Design*

Addressing the seven proposed hypotheses in the current study involved the use of both a quasi-experimental design and an experimental design. The quasi-experimental design was used to address questions regarding mean differences on individual difference variables such as psychological distress and GPA between the two naturally formed groups in the study, individuals with and without a history of childhood-onset asthma. Questions regarding the reaction of these two groups to the experimental paradigm were assessed utilizing a 2 (asthma vs. healthy control) X 2 (contingent vs. non-contingent feedback condition) factorial design. The experimental manipulation involved half of the participants receiving feedback that allowed them to successfully complete the task (contingent condition) and half of the participants receiving random feedback that prevented successful completion of the task (non-contingent condition). Thus, there were four groups of participants in the experimental portion of the current study: (1) asthma participants in the contingent condition, (2) asthma participants in the non-contingent condition, (3) healthy controls in the contingent condition, and (4) healthy controls in the non-contingent condition.

### *Participants*

Two groups of participants, one with a history of childhood-onset asthma and one group of healthy controls, were recruited from undergraduate psychology courses at Oklahoma State University (see Appendix A for sample recruitment form). Asthma participants were also recruited through advertisements in the campus newspaper and flyers advertising the study posted in the university health center and other campus buildings. Participants were informed that the purpose of the study was to examine the relationship between health status and other variables, such as problem-solving ability. Standardized recruitment procedures were used in accordance with the institutional review board of the university. All participants received either extra course credit or ten dollars cash for their participation.

Eighty-four participants with asthma were recruited into the study. Three were unable to be matched with a healthy control participant. Thus, the final asthma sample included 81 (32 males, 49 females) participants with asthma. See Table 1 in Appendix B for descriptive information about the asthma group. Participants in the asthma group (AS) ranged in age from 18- to 22-years ( $M = 19.8$ ,  $SD = 1.25$ ). The group was predominantly Caucasian (87.7%), with the remainder of the participants endorsing Native American (7.4%), African-American (3.7%), or Biracial (1.2%) ethnicity.

All AS participants experienced their first asthma attack prior to the age of 12 ( $M = 6.19$ ,  $SD = 3.56$ ) and were formally diagnosed with asthma prior to the age of 12 ( $M = 6.39$ ,  $SD = 3.97$ ). Forty-five (55.6%) AS participants reported having perennial asthma, 34 (42%) reported having seasonal asthma, and 2 (2.5%) did not indicate the type of asthma with which they had been diagnosed. Measures of illness severity suggested that

the majority of AS participants experienced mild to moderate asthma. The mean self-report of asthma severity within the last year on a scale from 1 (mild) to 7 (respiratory failure) was 1.93 ( $SD = .98$ ). The mean self-report of asthma controllability within the last year on a scale from 1 (entirely uncontrollable) to 7 (entirely controllable) was 4 ( $SD = 2.18$ ). Sixty-two (76.5%) of the AS participants reported having a current prescription for an asthma-related medication. Of those who had a current prescription, 41 (66%) reported taking at least one medication daily for asthma symptoms. Thus, of the total sample of 81 asthma participants, 51% were taking daily medication for asthma symptoms. Thirty-one (38.2%) AS participants reported having seen a physician within six months of their participation in the study for an asthma-related issue, with the mean number of asthma-related physicians visits being 2.29 ( $SD = 2.41$ ). Taken together, these results suggest that approximately half of the asthma participants required daily medication for asthma management, but most of the asthma participants described their asthma as mild and found their asthma to be somewhat to mostly controllable.

Eighty-one (32 males, 49 females) healthy control (HC) participants were recruited into the study. See Table 2 in Appendix B for descriptive information about the healthy control group. The HC participants ranged in age from 18- to 22- years ( $M = 19.84$ ,  $SD = 1.24$ ). Similar to the AS participants, the HC participants were predominantly Caucasian (82.7%) with the remainder endorsing Native American (6.2%), African American (4.9%), Asian (3.7%), and Biracial (2.5%) ethnicities. Participants were included in the HC group if they (1) reported no history of a chronic illness diagnosis, (2) had never been treated by a physician for a medical condition for

more than three consecutive months in any given year, and (3) had never been hospitalized continuously for a medical condition for more than one month.

### *Instruments*

*Background Information Questionnaire.* A questionnaire was designed for the purpose of this study to collect information regarding the participant's gender, age, year in school, ethnic origin, parents' level of education, and parents' occupational status (Appendix C). In addition, asthma participants were asked to report their age of asthma diagnosis, type of asthma (seasonal versus perennial), current treatment status, and ratings of asthma severity and controllability.

*The Beck Depression Inventory (BDI).* The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report measure that assesses depressive symptoms. For each item, the respondent selects one of four descriptive statements that best describes them. Items assess the respondent's thoughts, feelings, and functional status during the previous two-week period. The BDI-II has high internal consistency ( $r = .92$ ) and high test-retest reliability ( $r = .93$ ) (Beck et al., 1996). For the current study, the total score from the BDI-II was used to assess participants' level of depression, with higher scores being indicative of greater levels of depression. Cronbach's alpha for this sample was adequate ( $\alpha = .82$ ). McIntire and Miller (2000) note that alphas of .70 or higher are commonly considered adequate for psychological tests. Thus, this was the standard used to evaluate the reliability of measures in this study.

*The Beck Anxiety Inventory (BAI).* The BAI (Beck & Steer, 1993) is a 21-item self-report measure that assesses anxiety. For each item, participants rate how much each anxiety symptom has applied to them during the past week on a 4-point scale ranging

from 0 (“not at all”) to 3 (“severely, I could barely stand it”). The BAI has high internal consistency ( $r = .92$ ) and adequate test-retest reliability ( $r = .75$ ) (Beck & Steer, 1993). For the current study, the overall score from the BAI was used to assess participants’ level of anxiety with higher scores reflecting greater anxiety. Cronbach’s alpha for this sample was adequate ( $\alpha = .87$ ).

*The Brief Symptom Inventory (BSI).* The BSI (Derogatis, 1993) is a short version of the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983). Whereas the SCL-90-R contains 90 items, the BSI consists of 53 items. The BSI yields measures of nine clinical dimensions of psychological distress with T-scores ranging from 30 to 80. Research demonstrates that the BSI is highly correlated with the SCL-90-R, has internal consistency ranging from .71 to .85, and possesses high test-retest reliability ranging from .68 to .91 (Derogatis, 1993). Participants indicate on a 4-point scale the frequency with which they have experienced various psychological or physiological symptoms within the previous seven days. For the current study, the Global Severity Index (GSI) score from the BSI was used to assess overall psychological distress, with higher scores indicative of greater psychological distress. Cronbach’s alpha for this sample was adequate ( $\alpha = .94$ ).

The BSI also allows researchers to examine T-scores in terms of caseness (i.e., GSI T- score  $\geq 63$ , or two or more subscale scores  $\geq 63$ ). The BSI caseness criteria is considered to provide a good indicator of a positive case, although research regarding caseness on sensitivity and specificity is better developed for the SCL-90-R (Derogatis, 1993). Caseness criterion for maladaptation with the SCL-90-R has been used in a

number of studies examining adaptation to chronic illness (e.g., Mullins et al., 1997; Thompson, Gustafson, Hamlett, & Spock, 1992).

*The Mishel Uncertainty in Illness Questionnaire– Community Form (MUIS -C).*

The MUIS-C (Mishel & Braden, 1988) purports to measure the four components of illness uncertainty: ambiguity, uncertainty, lack of information, and unpredictability. The scale contains 23 items (e.g., “I don’t know what is wrong with me,” “I am unsure if my illness is getting better or worse”) that respondents are asked to rate on a 5-point scale ranging from very true to very false. A single composite score, in which a higher score reflects greater illness uncertainty, is obtained by summing responses to all items. The MUIS-C has demonstrated adequate validity across a number of chronic illnesses and disease states (Mishel & Braden, 1988; Mullins et al., 1995). Reliability coefficients for the MUIS-C collected from 20 studies of individuals with a chronic illness ranged from .74 to .92 (Mishel, 1997). Cronbach’s alpha for the current sample was adequate ( $\alpha = .80$ ).

*The Multiple Affect Adjective Checklist (MAACL).* The MAACL (Zuckerman & Lubin, 1965) is a 132-item adjective checklist that assesses transient mood states (Appendix D). The adjectives used on the MAACL represent three different mood states including anxiety (e.g., afraid), depression (e.g., wilted), and hostility (e.g., angry). Participants are given the instructions: “Please check the words that you feel apply to you right now, at this moment.” Mood adjective items are scored as either present (1) or absent (0). Some items contain positive mood adjectives, which were scored if not endorsed. The items representing each mood state are summed and divided by the total number of words available for each mood state (i.e., 21 for anxiety, 40 for depression,

and 28 for hostility). The resulting scores represent the participant's transient level of anxiety, depression, and hostility.

The MAACL was utilized in this study to evaluate participants' affective responses to the experimental manipulation (i.e., contingent versus non-contingent feedback). The experimental manipulation was expected to increase anxiety, depression, and hostility in the non-contingent condition. Previous research has demonstrated that the MAACL is sensitive to changes in transient moods in studies utilizing experimental induction procedures (e.g., Cairns & Norton, 1988; Nagata & Trierweiler, 1988). Silverglade et al. (1994) demonstrated that the MAACL was able to discriminate among moods across varying levels of asthma severity.

*The Self-Consciousness Scale (SCS)*. The SCS (Fenigstein et al., 1975) is a 23-item scale designed to assess individual differences in the tendency to focus one's attention on oneself (i.e., dispositional self-focusing) (Appendix E). Participants read each statement and rate how much each statement applies to them on a Likert-type scale ranging from 0 ("extremely uncharacteristic of me") to 4 ("extremely characteristic of me"). The SCS yields three factor-analytically derived scale scores including private self-consciousness (i.e., attention to one's inner thoughts and feelings), public self-consciousness (i.e., awareness of the self as a social object), and social anxiety (i.e., measures the individual's level of discomfort in the presence of others) (Fenigstein et al., 1975). Higher scores on each scale reflect higher degrees of self-consciousness. Research has demonstrated the discriminant and construct validity of the SCS (e.g., Carver & Glass, 1976; Smith & Greenberg, 1981; Turner, Carver, Scheier, & Ickes, 1978). Fenigstein et al. (1975) found the test-retest reliability of the SCS to be .84 for the

Private Self-Consciousness subscale, .79 for the Public Self-Consciousness subscale, and .73 for the Social Anxiety subscale with two weeks between each testing. Scheier and Carver (1985) reported test-retest reliability for the SCS to be .76 for the Private Self-Consciousness subscale, .74 for the Public Self-Consciousness subscale, and .77 for the Social Anxiety subscale with four weeks in between each testing. Abrams (1988) conducted a study of the internal consistency of the SCS and reported alpha coefficients of .67, .76, and .73 for the Private, Public, and Social Anxiety subscales, respectively. The SCS was included in the present study as a measure of dispositional self-focusing. Cronbach's alphas for this sample for the SCS total score ( $\alpha = .80$ ) and the Public Self-Consciousness subscale ( $\alpha = .75$ ) were adequate. Cronbach's alpha for this sample for the Private Self-Consciousness subscale fell just below the cut-off for adequate internal consistency ( $\alpha = .68$ ).

*Visual Analog Scale (VAS).* The VAS is a single, 10-centimeter line in which participants are asked to indicate the extent to which they expected to succeed on a future task. The scale on the VAS ranges from 0 (much worse than most people) to 10 (much better than most people). Participants in the current study were asked to place an X on the line indicating how well they expected to perform on the upcoming computer task (i.e., the experimental paradigm). The same procedure was repeated prior to the anagram task. The VAS ratings were used to assess the effects of the experimental manipulation on outcome expectancies as a result of experiencing contingent or non-contingent feedback. Specifically, participants who experienced non-contingency were expected to show a decline in their expectation for success on the computerized anagram task as a result of their previous experience with non-contingency. In a review of the literature on

the use visual analog scales, Ahearn (1997) concluded that such scales, in general, have acceptable reliability and validity, are easy for participants to comprehend, and yield high rates of participant compliance (Appendices F and G).

*Internal-External Attributions.* For the current study, a single item was used to assess participants' internal versus external attributions for their performance on the experimental computerized task both prior to and after completing the task. Specifically, participants were asked, "Do you think that your performance on the computer task (will be/was) due to something about you or due to other circumstances?". The design of this item was similar to items on the Attributional Style Questionnaire (Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982). Participants' responses could range from one (totally due to other circumstances) to seven (totally due to me). Higher scores reflect more internal attributions for performance on the experimental computerized task. The use of the internal-external attribution measure allowed for observation of any changes in locus of control that might occur due to the experimental manipulation (Appendices H and I).

*Experimental Task.* The experimental task that was utilized in the present study was a computerized version of a standard concept-formation task (e.g., Levine, 1971), similar to the task originally used by Hiroto and Seligman (1975) and others (e.g., Benson & Kennelly, 1976). During the experimental task, participants were seated at a computer terminal in a private room and given the following standardized instructions.

"In this task, you will be presented with several problems. Each problem consists of a series of displays like the one in the bottom right hand corner of the screen. Each display will contain a letter 'Y' and a letter 'Z'. You will also see that one

letter will be surrounded by a square and the other by a circle. Also, one background will be red and the other will be blue. Every display will be like this one except that the letters, the surrounding shapes, and the background colors will be combined in different ways.

One of the two patterns, either the top or the bottom, has been chosen to be the right pattern. For each display, you are to indicate which of these two you think is the right pattern and the computer will tell you whether you are 'right' or 'wrong'. Then you will go on to the next display, again you will make a choice, and again the computer will tell you if you are 'right' or 'wrong'.

In this way, you can learn the reason for the computer saying 'right' or 'wrong'. The reason may be because of the letter, the surrounding shape, or the background color. The object for you is to figure this out as fast as possible so that you can choose correctly as many times as possible.

For each display, you are to indicate which of the two patterns you think is right and the computer will tell you whether you are 'right' or 'wrong'. To choose a pattern, click it once.”

Participants were given examples of how the task works. After the examples, the computer presented the participants with forty stimulus patterns grouped into four sets of ten problems. After the tenth problem in each set, the stimulus dimension (e.g., the letter Y) associated with a correct response changed automatically such that the participant had to determine which stimulus dimension was now correct (e.g., the color blue).

As part of the standardized instructions, all participants were lead to believe that the task was solvable and that determining the correct stimulus dimension was attainable.

However, only participants in the contingent-feedback condition were given solvable problems with response-contingent correct and incorrect feedback about their performance. In other words, only participants in the contingent-feedback condition were given feedback that facilitated the discovery of the correct stimulus dimension. Participants in the non-contingent-feedback condition received unsolvable problems with feedback that was not contingent upon their actual performance. The random performance feedback provided to participants in this condition did not allow them to solve the problems successfully.

After completing the concept-formation task, the researcher displayed the participant's score and commented on the participant's performance. For participants in the contingent-feedback condition, the experimenter said, "Hmm, it looks like you did very well. You got 20 correct. That's one of the highest scores that I have ever seen. The average score is about 15." For participants in the non-contingent-feedback condition, the experimenter said, "Hmm, it looks like you did not do very well. You got 15 correct. I guess you're not very good at this sort of thing. The average score is about 20."

*Anagram Task.* The present study included a computerized anagram-solving task containing twenty anagrams with five letters per anagram. The purpose of this task was to measure changes in performance and motivation following experiencing non-contingency in the concept-formation task. For this task, all anagrams are presented in the same scrambled order (i.e., 3-4-2-5-1) and are solvable in the same sequence (i.e., 5-3-1-2-4) (e.g. Alloy, Peterson, Abramson, & Seligman, 1984; Benson & Kennelly, 1976;

Hiroto & Seligman, 1975). Participants are given the following standardized instructions to complete the anagram task:

“You will be asked to solve some anagrams. Anagrams are words with the letters scrambled. The problem for you is to unscramble the letters so that they form a word. When you have found the word, type it into the computer keyboard. Notice that there may be a pattern or principal by which to solve the anagrams. But, that’s up to you to figure out.

You will have 100 seconds to solve each anagram before the next one is presented. If you guess incorrectly, you may try again and again until the time is up. If you want to make a correction, use the backspace key.”

Participants were then presented with the twenty anagrams and were given 100 seconds to solve each anagram.

*Situational Self-Awareness Scale (SSAS)*. The SSAS (Govern & Marsch, 2001) is a nine-item scale that assesses a participant’s current level of self-awareness or self-focus. Participants respond to each of the items using a 7-point Likert scale that ranges from strongly disagree (1) to strongly agree (7). Participants completed the SSAS immediately after the contingency manipulation to assess their current level of self-awareness following this task. The SSAS has been found to be both a reliable and valid measure of situational self-awareness (Govern & Marsch, 2001) (Appendix J).

Cronbach’s alpha for the current sample was adequate ( $\alpha = .80$ ).

*Peak Expiratory Flow Rate*. In addition to questions about subjective asthma severity ratings presented on the demographic form, objective information about asthma severity was also collected from all participants via a measure of peak expiratory flow

rate (PEFR). In addition to providing information about asthma severity in the asthma participants, comparing asthma and healthy control participants on the PEFR provided an estimate of the extent to which the two groups differed in their current level of lung function. PEFR, measured in L/min, assesses the volume of air that can be forcefully exhaled in a single breath. PEFR varies with age, gender, and height (O'Hara, 1995; Nunn & Gregg, 1989). Lower levels of PEFR imply more significant levels of disease process (O'Hara, 1995).

In the present study, PEFR was assessed with a MiniWright Peak Flow Meter (Model # 3103001). Participants were given one practice trial to ensure proper use of the meter followed by three test trials. The highest value of the three test measurements was used as an objective measure of illness severity (Appendix K).

*Consent for GPA.* At the end of the session, the experimenter explained that she would like to gather some additional information about each participant. Specifically, the experimenter requested consent to obtain the participant's cumulative grade point average (GPA) and GPA for the semester in which the student participated in the study from the university's registrar. The experimenter emphasized that consenting to provide this additional information was optional, and that the participant's course credit or monetary compensation would not be affected by refusal to consent to provide this information (Appendix L).

### *Procedure*

Participants completed the present study during one-and-one-half-hour individual sessions. Upon arrival at the laboratory, each participant was seated at a table and asked to read and sign an informed-consent form (Appendix M). After signing the informed

consent, participants were instructed on how to use the peak flow meter followed by one practice trial. Following a two-minute rest period, the first PEFr measurement was taken. Participants then completed the questionnaire battery. The questionnaire battery for the healthy control (HC) participants included the Background Information Questionnaire, the BDI, the BAI, the BSI, and the SCS. The questionnaire battery for the asthma participants (AS) included the Background Information Questionnaire, the BDI, the BAI, the BSI, the SCS, and the MUIS-C. After completing the questionnaire packet, the second PEFr rating was taken. After a two-minute rest period, the third and final PEFr rating was taken.

The experimental portion of the session began after completion of the questionnaire packets and the PEFr ratings. Prior to the participant's arrival, the experimenter randomly assigned the participant to one of the two experimental conditions (e.g., contingent versus non-contingent feedback on the concept-formation task). The procedure for the experimental portion occurred in five phases: (1) Pre-treatment Phase – participants completed the MAACL (time one), the VAS (time one), and the internal-external attribution question (time one); (2) Treatment Phase – participants were administered the computerized concept-formation task in which they received either contingent or non-contingent feedback about their performance; (3) Post-treatment phase – participants completed the MAACL (time two), the VAS (time two), the internal-external attribution question (time two) and the SSAS; (4) Performance Phase – participants completed the anagram task; and (5) debriefing – following completion of the experiment, participants were given an explanation regarding the deceptive aspects of the study and the expected results to be gained from the research (Appendix N). During

the debriefing, all participants in the solvable condition were asked to write down an explanation of how they went about solving the problems during the concept formation task. The explanation was reviewed at a later time to ensure that the participant understood he or she was to choose one dimension of the problem as the correct answer and was then to change his or her answer based on the feedback provided by the computer. All participants in the solvable condition demonstrated understanding of the concept formation task (Appendix O). For all participants, the debriefing included a review of possible reactions and feelings that participants might have experienced as a result of the study. Referral sources were provided in case follow-up for exacerbated emotional reactions was necessary (Appendix P). After providing the participant with referral information, the experimenter presented information regarding consent for GPA.

## CHAPTER V

### RESULTS

#### *Preliminary Analyses*

In order to determine if the AS and HC participants differed in their mean level of lung functioning prior to the experiment, an independent samples t-test was conducted using the mean highest PEFr rating as the dependent variable. Due to problems with the peak flow equipment, PEFr ratings were not available for all participants. In order to maintain the matched nature of the study design, only those participants whose age- and gender-match also contributed a PEFr score were used in the analysis. Relevant means and standard deviations for this analysis can be found in Table 1 of Appendix Q. Thus, 47 AS-HC pairs were used in the PEFr analysis. The results of the analysis indicated that the AS and HC groups did not differ prior to the experiment in regards to their mean level of lung functioning ( $t(1,92) = -.74, p = .46$ ). From a pulmonary perspective, these results suggest that the majority of participants in the AS group may have more closely resembled peers without a history of asthma than individuals with a more severe disease course. These results provide additional confirmation that the AS sample utilized in this study is best characterized as experiencing mild asthma.

Before conducting the primary analyses, participants with asthma who were recruited through courses in the Psychology Department (received extra credit for participation) were compared to asthma participants who were recruited from the wider

university community via ads in the university newspaper, health center, and campus buildings (paid \$10 for their participation) to determine if the groups differed on any of the dependent measures prior to the analyses. Independent samples t-tests were conducted for each variable of interest. Twenty-two participants with asthma were recruited through the university community, while 59 were recruited through psychology courses. The results of the analysis indicated that the asthma participants recruited through the university community were approximately one year older than the asthma participants recruited through psychology courses ( $t(1,79) = 2.77, p = .03$ ). The results also indicated that participants recruited through the university community reported higher levels of asthma severity than participants recruited through psychology courses ( $t(1,79) = 2.21, p = .007$ ). Further, the results indicated that participants recruited through the larger university community had higher semester GPAs than participants recruited through psychology courses ( $t(1,63) = 1.97, p = .05$ ).

It is reasonable that participants recruited from the university community were older than participants recruited through psychology courses. The majority of the psychology courses from which participants were recruited were introductory psychology courses, which generally are made up of freshman and sophomore students. Recruiting from the wider university community increased the possibility of participation for upperclassmen. Further, it was expected that participants recruited through the university community would have higher levels of self-reported asthma severity. Indeed, the purpose of recruiting from the university community was to increase the probability of finding participants with a severe disease course. Finally, given that participants from the wider university community were older than participants recruited through psychology

classes, it seems logical that the former group would have had more time to attain a stronger GPA than the latter group. Overall, these differences between the two groups in terms of their recruitment methods are unlikely to have affected the study's results. Thus, recruitment type was not considered in any of the primary analyses.

The results indicated that the participants with asthma recruited through psychology courses and participants with asthma recruited from the wider university community did not differ on cumulative grade point average, total scores on the Self-Consciousness Scale, scores on the Private Self-Consciousness subscale, scores on the Public Self-Consciousness subscale, number of anagrams solved incorrectly, total score from the Situational Self-Awareness Scale, total number of days missed from school for health reasons, total number of days missed from work for health reasons, highest PEFr score, asthma controllability, BSI-GST T-score, BDI total score, BAI total score, MUIS-C total score, and internal attributions for failure. See Table 2 of Appendix Q for relevant means, standard deviations, and test statistics.

### *Primary Analyses*

*Hypothesis 1.* The first hypothesis predicted that participants with asthma would evidence higher scores on measures of general psychological distress, as well as specific measures of depression and anxiety, compared to age- and gender-matched peers without a chronic illness history. In order to test this hypothesis, a series of independent samples t-tests was conducted with health status (asthma versus healthy control) as the independent variable and BSI-GSI T-scores, total scores from the BDI, and total scores from the BAI serving as dependent variables. Relevant means and standard deviations for this analysis can be found in Table 3 of Appendix Q. The first analysis indicated that

AS participants had significantly higher levels of general psychological distress than HC participants ( $t(1,160) = 2.66, p = .009$ ). Examining the means for each group indicated that the mean for the AS group ( $M = 60.77, SD = 10.34$ ) fell just beyond one standard deviation of the measure's mean ( $M = 50, SD = 10$ ), suggesting that, as a group, the AS participants may have been experiencing clinically significant levels of psychological distress. The mean for the HC group ( $M = 56.44, SD = 10.31$ ), however, fell well within one standard deviation of the measure's mean, suggesting that the HC participants, as a group, were not experiencing the same level of distress.

In addition to examining mean differences on the BSI-GSI, a chi-square analysis was conducted to determine if the frequency with which participants met caseness criteria for the BSI differed between the AS and HC groups. Participants met caseness criteria for the BSI if their GSI T-score was equal to or greater than 63 or if two individual subscales had T-scores equal to or greater than 63 (Derogatis, 1993). The BSI caseness criteria serves as a means of defining clinically significant levels of distress, thereby indicating a potential need for intervention. Relevant frequencies are in Table 4 of Appendix Q. The results indicated that the rate at which participants met BSI caseness criteria did not differ significantly across the AS and HC groups ( $\chi^2(1, N = 162) = 3.58, p > .05$ ). At the same time, it should be noted that 60.4% of the AS group and 45% of the HC group met caseness criteria. Normative data suggests that only 10% of the population should meet caseness criteria at any given point in time (Derogatis & Spencer, 1982).

The second analysis used total scores from the BDI as the dependent variable. Five participants did not complete the BDI measure properly. These five participants and

their age- and gender-match were removed from the analysis in order to maintain the matched nature of the study design. Thus, 76 participants from each group were used in the analysis. The analysis indicated that participants in the AS group evidenced higher scores on the BDI than participants in the HC group ( $t(1,150) = 2.6, p = .01$ ). It is important to note that although the AS group had a higher mean score on the BDI than the HC group, the means for each group were within the minimal severity level (i.e., sub-clinical level) using the descriptive categories identified by the measure's authors (e.g., Beck, Steer, & Brown, 1996). Thus, although this analysis represents a statistically significant difference between the two groups, the difference may not be clinically significant.

The third analysis used total scores from the BAI as the dependent variable. The analysis yielded a significant difference between the AS and HC groups such that the participants with asthma evidenced higher levels of anxiety than the participants without asthma ( $t(1,160) = 4.14, p < .001$ ). It is important to note that although the AS group had a higher mean BAI score than the HC group, the means for both groups fell within the minimal range of severity (i.e., sub-clinical range) as described by the measure's authors (e.g., Beck & Steer, 1993). Thus, while the analysis yielded a statistically significant difference between the two groups, the results may not indicate clinical significance.

*Hypothesis 1 follow-up analyses.* Given that previous research indicates that individuals with severe asthma are more likely to have difficulty with psychological distress than individuals without a chronic illness history (i.e., Silverglade et al., 1994), the psychological distress variables were also explored taking into consideration self-reported asthma severity. This was accomplished by performing a median split on the

self-reported asthma severity variable. Recall that participants with asthma were asked to self-report their level of asthma severity on a seven point Likert scale with one reflecting mild asthma, three reflecting moderate asthma, five reflecting severe asthma, and seven reflecting respiratory failure. The median for the asthma severity variable was two. Thus, the mild asthma group was comprised of participants who indicated that their asthma severity was a one or a two ( $N = 57$ ), and the moderate-severe group was comprised of participants who endorsed an asthma severity rating of three or higher ( $N = 24$ ).

Three one-way ANOVAs were conducted with three groups (mild asthma vs. moderate-severe asthma vs. healthy controls) using BSI-GSI T-scores, total scores from the BDI, and total scores from the BAI as dependent variables. See Table 5 of Appendix Q for relevant means and standard deviations. The analysis using BSI-GSI T-scores as the dependent variable yielded a significant effect of group ( $F(2,159) = 5.34, p = .006$ ). Follow-up comparisons revealed that the participants with mild asthma did not differ from the healthy control participants ( $F(1,159) = 2.76, p = .09$ ), but the difference between the participants with mild asthma and the participants with moderate-severe asthma was marginally significant ( $F(1,159) = 3.49, p = .06$ ), with the moderate-severe asthma group having a higher mean level of general psychological distress.

The analysis using total scores from the BDI also yielded a significant effect of group ( $F(2,149) = 6.18, p = .003$ ). Follow-up comparisons revealed that participants with mild asthma did not differ from the healthy control participants ( $F(1,149) = 2.22, p = .13$ ), but participants with moderate-severe asthma had a higher mean level of depression than participants with mild asthma ( $F(1,149) = 5.39, p = .02$ ). Although the participants

with moderate-severe asthma had a higher mean level of depression ( $M = 13.09$ ,  $SD = 7.86$ ) than the healthy controls ( $M = 7.31$ ,  $SD = 5.74$ ) and the participants with mild asthma ( $M = 9.09$ ,  $SD = 7.49$ ), it is important to note that the means for all three groups fell in the minimal severity (i.e., sub-clinical) range.

The analysis using total scores from the BAI also yielded a significant effect of group ( $F(2,159) = 20.56$ ,  $p < .001$ ). Follow-up comparisons revealed that participants with mild asthma had significantly higher anxiety scores than the healthy control participants ( $F(1,159) = 4.23$ ,  $p = .04$ ) and participants with moderate-severe asthma had higher mean levels of anxiety than participants with mild asthma ( $F(1,159) = 21.75$ ,  $p < .001$ ). Further the mean level of anxiety for the participants with moderate-severe asthma ( $M = 14.83$ ,  $SD = 9.57$ ) fell in the mild severity range, while the mean for the healthy controls ( $M = 5.28$ ,  $SD = 5.53$ ) and the participants with mild asthma ( $M = 7.56$ ,  $SD = 5.93$ ) fell in the minimal severity range.

Taken together, the results of the analyses related to psychological distress relative to asthma severity suggest that participants with mild asthma do not differ from participants without a chronic illness history on measures of general psychological distress and depressive symptoms. Participants with moderate-severe asthma, however, evidenced higher levels of general psychological distress and depression than the participants with mild asthma, suggesting that asthma severity increases the risk for psychological distress among those with asthma. Further, both participants with mild asthma and those with moderate-severe asthma had higher levels of anxiety than the healthy control participants; however, those with moderate-severe asthma had significantly higher levels of anxiety than those with mild asthma. These results suggest

that having asthma increases one's risk for experiencing anxiety and that having a more severe disease course increases one's risk for experiencing higher levels of anxiety.

*Hypothesis 2.* The second hypothesis predicted that participants with asthma would evidence higher scores on a general measure of dispositional self-focus, as well as more specific measures of private and public self-consciousness, when compared to age- and gender-matched peers without a chronic illness history. In order to test this hypothesis, a series of independent samples t-tests was conducted with health status (asthma versus healthy control) as the independent variable and scores on the SCS as the dependent variable. Relevant means and standard deviations can be found in Table 6 of Appendix Q. The first t-test utilized the total score from the SCS as the dependent variable. This analysis indicated that AS participants and HC participants did not evidence statistically significant differences on the SCS total score ( $t(1,160) = .54, p = .59$ ). The second t-test utilized the private self-consciousness subscale from the SCS as the dependent variable. The analysis yielded a non-significant difference between the AS and HC groups on this dependent variable ( $t(1,160) = .58, p = .56$ ). The public self-consciousness subscale was the dependent variable for the third analysis. No significant differences between the AS and HC groups were found on the public self-consciousness subscale ( $t(1,160) = .99, p = .33$ ).

*Hypothesis 2 follow-up analyses.* Additional analyses were conducted to determine if self-reported asthma severity played a role in self-consciousness scores. Three one-way ANOVAs were conducted with three groups (mild asthma vs. moderate-severe asthma vs. healthy controls) using scores from the SCS as the dependent variables. See Table 7 of Appendix Q for relevant means and standard deviations. The analyses

revealed that the three groups did not differ on the total SCS score ( $F(2,159) = 1.06, p = .34$ ), private self-consciousness score from the SCS ( $F(2,159) = .45, p = .63$ ), or the public self-consciousness score from the SCS ( $F(2,159) = 1.4, p = .25$ ).

*Hypothesis 3.* The third hypothesis predicted that illness uncertainty would be a significant predictor of psychological distress among participants with asthma. Further, this relationship was expected to be mediated by self-focused attention. General self-focused attention, private self-consciousness, and public self-consciousness were examined as potential mediators. General psychological distress, depression, and anxiety were examined as potential criterion variables in separate regression models. Due to experimenter error, 15 participants with asthma were given the wrong version of the illness uncertainty measure and, subsequently, had to be removed from the analyses. Sixty-six participants with asthma were available for these analyses.

This hypothesis was analyzed for mediation effects in the manner of Baron and Kenney (1986) as described by Holmbeck (1997). Specifically, four criteria were needed in order to demonstrate mediation. First, there must be a significant relationship between the predictor variable (illness uncertainty) and the mediator variable (self-consciousness). Second, there must be a significant relationship between the predictor (illness uncertainty) and the criterion or outcome variable (psychological distress). Third, there must be a significant relationship between the mediator (self-consciousness) and the criterion or outcome variable (psychological distress). If mediation occurs, there will be a decrease in the relationship between the predictor (illness uncertainty) and the outcome variable (psychological distress) when the variance due to the mediator (self-consciousness) is controlled.

For each potential mediator and outcome variable, these criteria were tested via three regression analyses. The first regression assessed the relationship between the predictor (illness uncertainty) and the mediator (one of the measures of self-consciousness). The second regression tested the relationship between the predictor (illness uncertainty) and the outcome (one of the measures of psychological distress). The third regression involved entering the predictor and the mediator simultaneously to determine which was the best predictor of the outcome with the variance due to the second variable removed.

For each regression equation, age and gender were entered on the first step and asthma severity was entered on the second step. Research suggests that these demographic and disease variables play an important role in cognitive appraisal mechanisms and their subsequent relationship to psychological distress among individuals with a chronic illness (Thompson & Gustafson, 1996). Thus, when examining the relationships among illness uncertainty, self-consciousness, and psychological distress, it is important to control for these demographic and disease parameters.

The first set of analyses used illness uncertainty as measured by the total score on the MUIS-C as the predictor variable, general psychological distress as measured by the BSI-GSI T-score as the outcome variable, and general self-consciousness as measured by the total score on the SCS as the potential mediator variable. See Table 8 of Appendix Q for relevant correlations between the variables of interest and Table 9 of Appendix Q for relevant test statistics. The first hierarchical regression assessed the relationship between illness uncertainty (the predictor) and general self-consciousness (the mediator) after

controlling for age, gender, and disease severity. This analysis yielded a significant regression equation ( $F(4,61) = 2.6, p = .04$ ). The second hierarchical regression assessed the relationship between illness uncertainty (the predictor) and general psychological distress (the outcome) after controlling for age, gender, and asthma severity. This analysis yielded a significant regression equation ( $F(4,61) = 7.47, p < .001$ ). The third regression was a hierarchical regression with illness uncertainty and general self-consciousness entered simultaneously as predictors after controlling for age, gender, and asthma severity and general psychological distress as the outcome. This analysis yielded a significant regression equation ( $F(5,60) = 6.71, p < .001$ ); however, general self-consciousness was not a significant predictor of psychological distress. Because general self-consciousness was not a significant predictor of general psychological distress, the criteria for mediation were not met. The second set of analyses used illness uncertainty as measured by the total score on the MUIS-C as the predictor variable, general psychological distress as measured by the BSI-GSI T-score as the outcome variable, and private self-consciousness as measured by the private self-consciousness subscale of the SCS as the potential mediator variable. The first hierarchical regression assessed the relationship between illness uncertainty (the predictor) and private self-consciousness (the mediator) after controlling for age, gender, and asthma severity. This analysis did not yield a significant regression equation ( $F(4,61) = 2.32, p = .07$ ). Because illness uncertainty was not a significant predictor of private self-consciousness, the criteria for mediation were not met. Due to the lack of a relationship between illness uncertainty and private self-consciousness, private self-consciousness was not considered as a potential

mediator of the relationship between illness uncertainty and depressive symptoms or the relationship between illness uncertainty and anxiety symptoms.

The third set of analyses used illness uncertainty as measured by the total score on the MUIS-C as the predictor variable, general psychological distress as measured by the BSI-GSI T-score as the outcome variable, and public self-consciousness as measured by the public self-consciousness subscale of the SCS as the potential mediator variable. The first hierarchical regression assessed the relationship between illness uncertainty (the predictor) and public self-consciousness (the mediator) after controlling for age, gender, and asthma severity. This analysis did not yield a significant regression equation ( $F(4,61) = 1.51, p = .21$ ). Because there was not a significant relationship between the predictor variable and the potential mediator, the criteria for mediation were not met. Given the lack of a relationship between illness uncertainty and public self-consciousness, public self-consciousness was not considered as a potential mediator between illness uncertainty and depression or illness uncertainty and anxiety.

The fourth set of analyses used illness uncertainty as measured by the total score on the MUIS-C as the predictor variable, depressive symptoms as measured by the total score on the BDI as the outcome variable, and general self-consciousness as measured by the total score on the SCS as the potential mediator variable. See Table 10 in Appendix Q for relevant test statistics. The first hierarchical regression assessed the relationship between illness uncertainty (the predictor) and general self-consciousness (the mediator) after controlling for age, gender, and asthma severity. This analysis yielded a significant regression equation ( $F(4,61) = 2.6, p = .04$ ). The second hierarchical regression assessed the relationship between illness uncertainty (the predictor) and depressive symptoms (the

outcome) after controlling for age, gender, and asthma severity. This analysis yielded a significant regression equation ( $F(4,59) = 5.72, p = .001$ ). The third regression was a hierarchical regression with illness uncertainty and general self-consciousness entered simultaneously as predictors after controlling for age, gender, and asthma severity and depressive symptoms as the outcome. This analysis yielded a significant regression equation ( $F(5,58) = 4.57, p = .001$ ); however, general self-consciousness was not a significant predictor of depressive symptoms. Because general self-consciousness was not a significant predictor of depressive symptoms with illness uncertainty in the equation, the criteria for mediation were not met.

The sixth set of analyses used illness uncertainty as measured by the total score on the MUIS-C as the predictor variable, anxiety symptoms as measured by the total score on the BAI as the outcome variable, and general self-consciousness as measured by the total score of the SCS as the potential mediator variable. See Table 11 of Appendix Q for relevant test statistics. The first hierarchical regression assessed the relationship between illness uncertainty (the predictor) and general self-consciousness (the mediator) after controlling for age, gender, and asthma severity. This analysis yielded a significant regression equation ( $F(4,61) = 2.6, p = .04$ ). A hierarchical regression was used to assess the relationship between illness uncertainty (the predictor) and anxiety symptoms (the outcome) after controlling for age, gender, and asthma severity. This yielded a significant regression equation ( $F(4,61) = 6.65, p < .001$ ). The third regression was a hierarchical regression with illness uncertainty and general self-consciousness entered simultaneously as predictors after controlling for age, gender, and asthma severity and anxiety symptoms as the outcome. This analysis yielded a significant regression equation

( $F(5,60) = 5.67, p < .000$ ); however, general self-consciousness was not a significant predictor of anxiety symptoms. Because general self-consciousness was not a significant predictor of anxiety symptoms with illness uncertainty in the equation, the criteria for mediation were not met.

Taken together, this series of analyses suggests that, as predicted, illness uncertainty is a significant and robust predictor of general psychological distress, depressive symptoms, and anxiety symptoms among those participants with asthma. Results of the mediation analyses suggest, however, that general self-consciousness, private self-consciousness, and public self-consciousness fail to mediate the relationship between illness uncertainty and any of the three measures of psychological distress.

*Hypothesis 4:* Hypothesis four predicted that adolescents and young adults with long-standing asthma would have lower semester and cumulative grade point averages, more days missed from class, and more days missed from work than age- and gender-matched peers without a chronic illness history. In order to test this hypothesis, a series of independent samples t-tests were conducted in which health status (asthma versus healthy control) served as the independent variable. Semester grade point average, cumulative grade point average, days missed from class, and days missed from work each served as a dependent variable.

Participants were asked to give consent for their semester and cumulative grade point averages to be released from the university registrar. The semester grade point average was for the semester during which the participant completed the study. Not all participants consented to have their grade point averages released. In order to maintain the matched nature of the study design, only those participants whose age- and gender-

match also provided a grade point average were included in the analysis. Thus, there were 58 AS-HC pairs available for the analysis. See Table 12 in Appendix Q for relevant means and standard deviations for this analysis. An independent samples t-test using semester grade point averages as the dependent variable indicated no significant difference between participants with asthma and healthy controls ( $t(1,114) = .04, p = .96$ ). An independent samples t-test using cumulative grade point averages as the dependent variable also did not reveal any significant differences between participants with asthma and healthy controls ( $t(1,114) = .11, p = .91$ ).

Information about the number of days missed from class for health reasons was assessed via the Background Information Questionnaire. Unfortunately, many participants did not provide an estimate of the number of days they missed from class during the current school year due to health problems. In order to maintain the matched nature of the study design, only those pairs in which both the AS and HC participant provided an estimate of the number of days missed from class for health reasons were retained for the analyses. Fifty-three pairs were available for analysis. Relevant means and standard deviations for this analysis may be found in Table 13 of Appendix Q. The results of the analysis indicated that participants with asthma missed more days of class for health reasons than participants without asthma ( $t(1,104) = 2.61, p = .01$ ).

Information about the number of days missed from work for health reasons was also assessed via the Background Information Questionnaire. Similar to the days missed from class for health reasons variable, many participants did not provide an estimate of the number of days they missed from work during the past year due to health problems. In order to maintain the matched nature of the design, only those pairs in which both the

AS and HC participant provided an estimate of the number of days missed from work for health reasons were used in the analysis. Forty-three pairs were available for analysis. Relevant means and standard deviations for this analysis may be found in Table 14 of Appendix Q. The results of the analysis indicated that participants with asthma missed more days from work for health reasons than participants without asthma ( $t(1,84) = 2.27, p = .02$ ).

*Hypothesis 4 follow-up analyses.* The GPA, days missed from class, and days missed from work variables were also examined taking into account asthma severity. See Table 15 of Appendix Q for relevant means and standard deviations. Two one-way ANOVAs were conducted using three groups (mild asthma vs. moderate-severe asthma vs. healthy controls) with semester and cumulative GPAs serving as dependent variables. Results from the analyses indicated that the three groups did not differ in regards to their semester GPA ( $F(2,113) = .91, p = .40$ ) or their cumulative GPA ( $F(2,113) = .675, p = .51$ ).

A one-way ANOVA was conducted using the three health status groups with days missed from class for health reasons as the dependent variable. The analysis yielded a significant effect of group ( $F(2,103) = 3.45, p = .03$ ). Follow-up comparisons indicated that participants with mild asthma missed more days from class for health reasons than participants without asthma ( $F(1,103) = 6.27, p = .01$ ), but the participants with mild asthma did not differ significantly from the participants with moderate-severe asthma ( $F(1,103) = .15, p = .70$ ).

A one-way ANOVA was conducted using the three health status groups with days missed from work for health reasons as the dependent variable. The analysis yielded a

significant effect of group ( $F(2,83) = 3.56, p = .03$ ). Follow-up comparisons indicated that participants with moderate-severe asthma missed more days from work for health reasons than healthy control participants ( $F(1,103) = 6.7, p = .01$ ), but the participants with mild asthma did not differ significantly from the healthy control participants ( $F(1,83) = 1.91, p = .17$ ).

Taken together, these results suggest that asthma severity may not play a role in the grade point averages obtained by those with asthma. Although asthma in general increases the risk for missing school compared to not having a chronic illness, asthma severity appears to further increase the risk for missing work compared to both having milder asthma or no chronic illness.

*Hypothesis 5.* The fifth hypothesis predicted that participants with asthma would evidence greater problem-solving deficits on an anagram task following experimentally-induced failure when compared to age- and gender-matched healthy peers who also experienced experimentally-induced failure. Before testing this hypothesis, a series of 2 (pre-test versus post-test) X 2 (asthma participants versus healthy control) X 2 (unsolvable condition versus solvable condition) repeated measures ANOVAs using the subscales of the MAACL as the dependent variables were conducted. Time (pre-test versus post-test) served as the within subjects factor while health status and feedback condition served as the between subjects factors. Relevant means and standard deviations for these analyses may be found in Table 16 of Appendix Q. The purpose of this analysis was to determine the effectiveness of the experimental manipulation. If the experimental manipulation was effective, participants in the non-contingent condition should evidence higher levels of depression, anxiety, and hostility following the

experimental manipulation than participants in the contingent condition. These results would suggest that the participants in the non-contingent condition found the experimental manipulation to be negative, as intended.

The analysis of the depression subscale revealed a significant main effect of time ( $F(1,156) = 51.18, p < .001$ ) and a significant main effect of feedback condition ( $F(1,156) = 10.6, p = .001$ ). The main effects were qualified by a significant time by feedback condition interaction ( $F(1,156) = 56.14, p < .001$ ). The results of the interaction suggest that the individuals in the non-contingent feedback condition experienced higher levels of transient depression than the participants in the contingent condition after the experimental manipulation. The analysis of the depression subscale revealed no significant main effect of health status ( $F(1,156) = 3.72, p = .06$ ), no significant health status by feedback condition interaction ( $F(1, 156) = .41, p = .52$ ), no significant health status by time interaction ( $F(1, 156) = .12, p = .73$ ), and no significant health status by feedback condition by time interaction ( $F(1, 156) = .59, p = .44$ ).

The analysis of the anxiety subscale revealed a significant main effect of time ( $F(1,156) = 34.9, p < .001$ ) and a significant main effect of feedback condition ( $F(1,156) = 4.74, p = .03$ ). These main effects were qualified by a significant time by condition interaction ( $F(1,156) = 28.66, p < .001$ ). The results of the interaction suggest that the individuals in the non-contingent feedback condition experienced higher levels of transient anxiety than the participants in the contingent condition after the experimental manipulation. The analysis of the anxiety subscale revealed no significant main effect of health status ( $F(1, 156) = 3.17, p = .07$ ), no significant health status by feedback condition interaction ( $F(1, 156) = .04, p = .83$ ), no significant health status by time

interaction ( $F(1, 156) = .06, p = .79$ ), and no significant health status by feedback condition by time interaction ( $F(1, 156) = .02, p = .89$ ).

The analysis of the hostility subscale revealed a significant main effect of time ( $F(1,156) = 68.18, p < .001$ ), a significant main effect of feedback condition ( $F(1,156) = 9.31, p = .003$ ), and a significant main effect of health status ( $F(1,156) = 3.9, p = .05$ ). However, these effects was qualified by a significant time by feedback condition interaction ( $F(1,156) = 25.44, p < .001$ ). The interaction results suggest that the individuals in the non-contingent feedback condition experienced higher levels of transient hostility than the participants in the contingent condition after the experimental manipulation. The analysis of the hostility subscale revealed no significant health status by feedback condition interaction ( $F(1, 156) = .21, p = .64$ ), no significant health status by time interaction ( $F(1, 156) = .93, p = .33$ ), and no significant health status by feedback condition by time interaction ( $F(1, 156) = .12, p = .74$ ).

To further assess for the effectiveness of the experimental manipulation, a 2 (pre-test versus post-test) by 2 (asthma versus healthy control) X 2 (contingent versus non-contingent feedback condition) repeated measures ANOVA using participants' scores on the VAS as the dependent variable was conducted. Time served as the within subjects variable while health status and feedback condition served as between subjects variables. Recall that the VAS was administered immediately prior to the contingency manipulation and immediately prior to the anagram task and asked participants to indicate how well they expected to perform on the upcoming task by making a mark on a 10-cm line that was anchored on one end by "much worse than most people" and on the other end by "much better than most people." Higher scores indicated higher expectations for success.

Relevant means and standard deviations for this analysis may be found in Table 17 of Appendix Q. The analysis revealed a significant main effect of feedback condition ( $F(1,156) = 15.22, p < .01$ ) and a significant main effect of time ( $F(1,156) = 36.392, p < .001$ ). These effects were clarified by a significant time by feedback condition interaction ( $F(1,156) = 55.35, p < .001$ ). These results suggest that the participants did not expect to do as well on the anagram task, but this effect only occurred for the participants in the non-contingent feedback condition. The analysis revealed no significant main effects of health status ( $F(1,156) = 1.74, p = .19$ ), no significant time by health status interaction ( $F(1,156) = .01, p = .91$ ), no significant feedback condition by health status interaction ( $F(1,156) = .03, p = .85$ ), and no significant time by feedback condition by health status interaction ( $F(1,156) = .22, p = .63$ ).

Taken together, the results of the manipulation check suggest that participants in the non-contingent condition indeed experienced higher rates of negative affect and lower expectations for performance on the task following the experimental manipulation. These were the intended results from the experimental manipulation and suggest that the participants responded to the manipulation as expected.

The primary analysis for this hypothesis was a 2 (asthma versus healthy control) X 2 (contingent versus non-contingent) ANOVA using the number of anagram solved incorrectly as the dependent variable. Due to computer error, anagram scores were not recorded for seven participants. In order to maintain the matched nature of the design, these seven participants and their age- and gender-match were removed from the analyses. Further, the data was examined to determine if any participants might be considered outliers on the number of anagrams solved incorrectly. Being an outlier was

defined as having a score that was greater than two standard deviations above the mean number of anagrams missed for the total sample of participants who contributed a score. The mean was 4.37 and the standard deviation was 3.7. Thus, any participant who incorrectly solved 12 or more anagrams was removed. Five participants met this criteria (three with asthma and three healthy controls). In order to maintain the matched nature of the design, their age- and gender matches were also removed from the analysis. Thus, there were 69 AS-HC pairs available for the analysis. Relevant means and standard deviations for this analysis may be found in Table 18 of Appendix Q. The results of the analysis revealed a significant main effect of health status ( $F(1,134) = 5.79, p = .01$ ), suggesting that AS participants solved more anagrams incorrectly than HC participants regardless of feedback condition. There was no significant main effect of feedback condition ( $F(1,134) = .06, p = .80$ ), nor was there a significant health status by feedback condition interaction ( $F(1,134) = .59, p = .44$ ). See Figure 1 of Appendix R for a graphical representation of these results. These results suggest that participants with asthma did not respond differentially to the non-contingent feedback condition compared to age- and gender-matched peers in the healthy control condition. Rather, participants with asthma appear to perform worse than healthy control participants, regardless of feedback condition.

*Hypothesis 5 follow-up analyses.* Additional analyses explored the role of asthma severity in participant's reaction to the experimental paradigm. A 3 (mild asthma vs. moderate-severe asthma vs. healthy control) X 2 (contingent vs. non-contingent feedback condition) was conducted using the number of anagrams solved incorrectly as the dependent variable. See Table 19 of Appendix Q for relevant means and standard

deviations. The results indicated a significant main effect of health status ( $F(1,132) = 4.51, p = .01$ ). Follow-up comparisons indicated that participants with moderate-severe asthma solved more anagrams incorrectly than healthy control participants regardless of feedback condition ( $F(1,150) = 4.76, p = .03$ ), but participants with moderate severe asthma did not differ from participants with mild asthma on the number of anagrams solved incorrectly ( $F(1,150) = 2.14, p = .146$ ). These results suggest that participants with moderate-severe asthma may evidence more difficulty with completing the anagram task than healthy control participants, regardless of feedback condition.

*Hypothesis 6.* The sixth hypothesis predicted that AS participants with long-standing asthma would evidence greater situational self-focus following experimentally induced failure compared to age- and gender-matched peers who also experienced experimentally induced failure. Relevant means and standard deviations for this analysis may be found in Table 20 of Appendix Q. A 2 (asthma participants versus healthy control) X 2 (contingent versus non-contingent feedback) ANOVA was conducted using total scores from the SSAS as the dependent variable. The analysis revealed no significant main effects of health status ( $F(1,156) = .02, p = .86$ ), no significant main effect of feedback condition ( $F(1,156) = 3.35, p = .06$ ), and no significant health status by feedback condition interaction ( $F(1,156) = .36, p = .54$ ).

*Hypothesis 6 follow-up analyses.* Additional analyses explored the role of asthma severity in participant's level of situational self-awareness. A 3 (mild asthma vs. moderate-severe asthma vs. healthy control) X 2 (contingent vs. non-contingent feedback condition) was conducted using the total score from the SSAS as the dependent variable. See Table 21 of Appendix Q for relevant means and standard deviations. The results did

not indicate a significant main effect of health status ( $F(1,154) = .004, p = .99$ ) or feedback condition ( $F(1,154) = 1.01, p = .31$ ) nor a significant health status by feedback condition interaction ( $F(1,154) = .55, p = .57$ ).

*Hypothesis 7.* Hypothesis seven argued that AS participants would show more internal attributions for failure than age- and gender-matched peers following experimentally-induced failure. Relevant means and standard deviations for this analysis may be found in Table 22 of Appendix Q. A 2 (asthma participants versus healthy control) X 2 (unsolvable condition versus solvable condition) ANOVA was conducted using the attributions for performance on the anagram task (this measure is taken immediately after the experimental manipulation prior to completing the anagrams) as the dependent variable. Higher scores were indicative of more internal attributions. The analysis revealed a significant main effect of condition ( $F(1,156) = 4.97, p = .02$ ) such that participants in the non-contingent feedback condition made more external attributions for their performance than participants in the contingent condition, regardless of health status. No significant main effect of health status ( $F(1,156) = .003, p = .95$ ) emerged. No significant health status by feedback condition interaction emerged ( $F(1,156) = .07, p = .78$ ).

*Hypothesis 7 follow-up analyses.* Additional analyses explored the role of asthma severity in participant's attributions for their performance. A 3 (mild asthma vs. moderate-severe asthma vs. healthy control) X 2 (contingent vs. non-contingent feedback condition) was conducted the attributions for performance on the anagram task as the dependent variable. See Table 23 of Appendix U for relevant means and standard deviations. The results did not indicate a significant main effect of health status

( $F(1,150) = .15, p = .85$ ) or feedback condition ( $F(1,150) = 1.74, p = .18$ ) nor a significant health status by feedback condition interaction ( $F(1,150) = 1.73, p = .18$ ).

## CHAPTER V

### DISCUSSION

The purpose of the present study was to examine differences in psychological distress, dispositional self-focus, reactions to failure in an experimental paradigm, situational self-focus, attributional style, and functioning in daily activities between college students with a history of asthma and college students with no chronic illness history. Further, the study sought to explore the relationship between illness uncertainty and psychological distress, specifically focusing on potential mediators of this relationship, among college students with asthma. Towards these ends, 81 pairs of college students completed the present study. Each pair consisted of a college student with a history of childhood-onset asthma (e.g., asthma diagnosed prior to the age of 12-years) and an age- and gender-matched peer without a chronic illness history. All participants completed a basic demographics form, measures of dispositional self-focus and psychological distress, an experimental paradigm that induced either success or failure, a measure of situational self-focus, and a measure of attributional style related to the experimental paradigm. Further, participants with asthma completed a measure of illness uncertainty. Specific predictions regarding each of the study variables as well as results from the present study will be discussed in the following sections.

#### Psychological Distress

Research on children with asthma has consistently demonstrated that children with asthma, in particular those with severe asthma, evidence more adjustment

difficulties, internalizing problems, and externalizing problems compared to children without a chronic illness history using parental report of child behavior (Klennert et al., 2000; McQuaid et al., 2001). Although much less is known about the psychological adjustment of adolescents and young adults with childhood-onset asthma (Chaney et al., 1999; Mullins et al., 1997), previous research has demonstrated that adolescents and young adults with asthma evidence higher rates of psychological distress than same-age healthy peers (e.g., Silverglade et al., 1994) and normative samples (Mullins et al., 1997). The present study sought to replicate and extend these findings by using more specific measures of depression and anxiety in addition to measures of general psychological distress. The results of the study indicate that college students with asthma indeed evidence higher rates of general psychological distress than age- and gender-matched peers. Additional analyses suggested, however, that college students who self-report having mild asthma do not differ from college students without a chronic illness history in regards to their level of general psychological distress. College students who self-report having moderate to severe asthma, however, report significantly higher levels of general psychological distress compared to those with mild asthma. Although the difference between those with mild asthma and those with moderate-severe asthma achieved only marginal statistical significance, this pattern of results is consistent with previous research demonstrating that asthma severity increases the risk for psychological distress in both the pediatric and adolescent asthma populations (McQuaid et al., 2001; Silverglade et al., 1994; Vila et al., 1998). Only 24 participants in the current study reported having moderate or severe asthma. Thus, a larger sample of those with moderate to severe asthma may reveal differences with a higher degree of statistical

significance. Further, the mean level of general psychological distress among those with moderate to severe asthma fell well in the clinically significant range, while the mean level of general psychological distress experienced by the college students with mild asthma and those without a chronic illness history fell within the normal range. These results add further support to the argument that asthma severity increases the risk for psychological distress.

Analysis of the results from the *Brief Symptom Inventory* (BSI; Derogatis, 1993) using caseness criteria suggests that college students with and without asthma were equally likely to be identified as having a clinically significant level of distress, thereby indicating a potential need for clinical intervention. It is important to note that the rate of meeting caseness criteria across the asthma and healthy control groups was notably higher than what has been previously found in normative samples. Specifically, normative data suggests that 10% of the population should meet caseness criteria at any given point in time (Derogatis & Spencer, 1982). In the current sample, 37 of the 81 (45%) healthy controls and 49 of the 81 (60%) participants with asthma met caseness criteria. However, the use of caseness criteria as defined by Derogatis (1993) with college student populations may not be appropriate. Specifically, Johnson, Ellison, and Heikkinen (1989) examined the rate at which 1,589 college students seeking counseling services at a university counseling center met caseness criteria on the SCL-90-R, the parent measure of the BSI. The authors found that 65.1% of males and 62% of females met caseness criteria. The authors concluded that these high rates of meeting caseness criteria among college students suggest that scores on the SCL-90-R for the college student population may need to be interpreted differently than other populations. Further,

Hayes (1997) examined BSI scores in a sample of 2,078 college students seeking services at university counseling centers and found that mean subscales scores for the sample tended to be higher than published means for adult non-clinical samples, but lower than published means for adult psychiatric samples. Although Hayes (1997) did not directly study the appropriateness of caseness criteria for college students, his findings indirectly suggest that the current rules of caseness criteria may not be wholly appropriate for college students. Specifically, using the adult non-clinical sample norms to determine T-scores, as was done in the current study, may lead to artificially high T-scores in college students, which is likely to artificially inflate the number of college students who meet caseness criteria. Although adolescent norms are available for the BSI, Hayes (1997) notes that the mean age of the adolescent normative sample is 16-years and, thus, is not an ideal comparison group for college students. Therefore, the results from the current study using BSI caseness criteria should be interpreted cautiously.

Analyses using a specific measure of depression symptoms indicated that college students with asthma evidenced higher levels of depression than college students without asthma. Additional analyses revealed that participants with mild asthma did not differ from healthy controls with regard to their mean level of depressive symptoms; however, college students with moderate to severe asthma reported significantly higher rates of depressive symptoms than college students with mild asthma. These results are similar to the pattern of results obtained for general psychological distress, lending further support to the argument that asthma severity increases the risk for psychological distress. Examining the means for the three groups suggested that the mean level of depressive symptoms for all three groups was in the minimal severity, or subclinical, range. Thus,

college students with moderate to severe asthma may not be more likely to have clinically significant levels of depression than those with mild asthma or those without a chronic illness history. College students with moderate to severe asthma do appear, however, to have higher baseline rates of depressive symptoms compared to those with mild asthma, or, those without a chronic illness. Although speculative, this higher baseline level may make college students with asthma more vulnerable to reaching clinically significant levels of depression if other risk factors for depression emerge in their lives, such as the loss of a significant relationship or academic difficulties. In other words, considering the results from the current study from a diathesis-stress model perspective suggests that asthma severity may serve as a diathesis that increases the risk for depression in college students with moderate to severe asthma if additional stressors arise in their lives.

Analyses using a specific measure of anxiety symptoms revealed that college students with asthma evidence higher rates of anxiety symptoms than college students without asthma. Additional analyses revealed that participants with mild asthma had significantly higher rates of anxiety symptoms than participants without a chronic illness history, and the participants with moderate to severe asthma had significantly higher rates of anxiety symptoms than those with mild asthma. Further, the mean level of anxiety symptoms for the moderate-severe asthma group fell in the mild severity range, while the mean level of anxiety symptoms for the mild asthma group and healthy controls fell in the minimal severity, or subclinical, range. Overall, this pattern of results suggests that having asthma increases one's risk for anxiety symptoms and that as asthma severity increases, the risk for significant problems with anxiety also increases. These results are consistent with previous research indicating that children and adolescents with asthma are

more likely to meet criteria for anxiety-related diagnoses as defined by DSM-IV than children and adolescents with other chronic illnesses (Vila et al., 1999) and that children and adolescents with moderate to severe asthma are more likely to display symptoms consistent with DSM-IV diagnoses of anxiety disorders than children and adolescents with mild asthma. Taitel et al. (1998) note that patients with asthma often report heightened anxiety and a fear of death when they have significant shortness of breath. Thus, although speculative, it is possible that repeated experiences with shortness of breath associated with asthma may lead to a generalized sense of anxiety among individuals with asthma. Additional research is needed to document the development of anxiety symptoms over time in children and adolescents with asthma, as well as to document that an increased number of episodes of shortness of breath predicts increased general anxiety.

The results related to anxiety symptoms may also be interpreted within a diathesis-stress framework in a manner similar to the results related to depressive symptoms. More specifically, individuals with asthma may not be more likely to have clinically significant problems with anxiety in general, but their higher baseline rates of anxiety may make them more vulnerable to experiencing clinically significant problems with anxiety if other risk factors for anxiety emerge in their lives. Considering the results related to depression and anxiety from a diathesis-stress perspective suggests that individuals with asthma, in particular those with severe asthma, may need interventions designed to help them cope with life stressors to prevent them from experiencing clinically significant problems with depression and/or anxiety.

In sum, results from the current study suggest that college students with asthma, in particular those with moderate to severe asthma, evidence higher rates of general psychological distress, depression, and anxiety compared to same-age and gender peers without a chronic illness history. Although individuals with mild asthma may not necessarily evidence clinically significant problems with psychological distress, those with moderate to severe asthma appear to be more likely to evidence problems with general psychological distress and anxiety in the clinically significant range. These results are consistent with previous research suggesting that asthma severity increases the risk for psychological distress (McQuaid et al., 2001; Silverglade et al., 1994; Vila et al., 1998). Considering the results from a diathesis-stress perspective suggests that asthma severity may be a diathesis that enhances an individual's vulnerability to life stressors, which may then result in clinically significant problems with depression and anxiety. Further, results from the current study also highlight the potential unique relationship between asthma and anxiety. More specifically, even those with mild asthma evidenced higher rates of anxiety than healthy controls. Previous research has demonstrated that children and adolescents with asthma are more likely to meet diagnostic criteria for an anxiety related diagnosis (e.g., Vila et al., 1999). It may be that the feelings of anxiety associated with shortness of breath may lead to generalized anxiety among those with asthma. Additional research is needed to further determine if anxiety is more common among those with asthma compared to other chronic illnesses and those without chronic illnesses due to the nature of the disease.

Finding significant differences in various measures of psychological distress among college students with asthma compared to college students without a chronic

illness is remarkable, given that, by definition, college students with asthma who are able to matriculate in a university are arguably resilient individuals. Thus, older adolescents and young adults with asthma who chose not to, or are unable to, attend college for medical reasons may represent a population of individuals with a chronic illness who are at an even greater risk for psychological distress than college students with asthma. Thus, future research with individuals with asthma in this age range might include recruitment of participants with more severe asthma including accessing hospitals, asthma/allergy clinics, and employment centers. Including participants with a more severe disease course than those in the current study may reveal additional information about the relationship between asthma severity and psychological distress, as well as documenting the unique needs of older adolescents and young adults with asthma.

#### Dispositional Self-Focus

Previous research has demonstrated that college students with asthma have a greater tendency to be habitually self-focused in terms of taking their inner thoughts and feelings as the subject of their attention (e.g., private self-consciousness), more often than college students without a chronic illness history (Van Pelt, 2002). College students with asthma are hypothesized to have higher levels of private self-consciousness due to the need to constantly scan their internal environment for signs of an impending attack. The previous research related to dispositional self-focus in college students with asthma was preliminary, utilized a small sample size, and generated only a marginal difference between the two groups on the measure of private self-consciousness. Thus, one of the purposes of the present study was to replicate this finding using a larger sample and to

explore differences in general self-consciousness and public self-consciousness between college students with asthma and those without a chronic illness history.

The results of the present study suggest that college students with asthma do not differ in their mean level of general self-consciousness, private self-consciousness, or public self-consciousness compared to age- and gender-matched peers. Further, analyses comparing those with mild asthma, moderate-severe asthma, and healthy controls also did not reveal any differences between the groups on measures of general self-consciousness, private self-consciousness, or public self-consciousness. The lack of significant differences between the participants with and without asthma on the self-consciousness measures could be due to the limited number of participants with moderate to severe asthma in the current sample. Although 24 participants reported having moderate to severe asthma, this sample size may not have been sufficient to detect differences between those with moderate-severe asthma, those with mild asthma, and those without a chronic illness history. Further, among those who reported having moderate to severe asthma, only five participants reported having asthma above a severity level of three on the seven point Likert scale. Thus, there may not have been sufficient variability among those with moderate to severe asthma to detect differences on the Self-Consciousness Scale. Participants with asthma are hypothesized to have differences in their level of self-consciousness due to their constant need to scan both their internal and external environments for signs of an impending attack. If the majority of participants in the current study do not have frequent attacks, including those with moderate to severe asthma, it may not be necessary for them to engage in this scanning process at all or to not do so very often. Without the high need for scanning the internal

environment for signs of an impending attack, participants with asthma may not be any more likely to develop high levels of self-consciousness than participants without asthma. Thus, uncovering differences between individuals with asthma and those without on measures of self-consciousness may require recruiting more participants with moderate to severe asthma.

### Illness Uncertainty and Psychological Distress

Previous research demonstrates that illness uncertainty consistently predicts general psychological distress (Mullins et al., 1997), depression (Mullins et al., 2000), and anxiety (Hommel et al., 2003) in adolescents and young adults with a history of childhood-onset asthma. Illness uncertainty has been reliably associated with the experience of psychological distress in other chronic illness groups including adults with multiple sclerosis (Mullins et al., 2001) and the caregivers of patients with Parkinson's disease (Sanders-Dewey et al., 2001). Thus, the extant literature appears to support a robust relationship between the experience of illness uncertainty and psychological distress. Previous research has been less successful, however, in identifying cognitive appraisal variables that mediate the relationship between illness uncertainty and psychological distress (e.g., Mullins et al., 2000).

Van Pelt et al. (2003) found that general self-consciousness mediated the relationship between illness uncertainty and psychological distress. The authors hypothesized that high levels of uncertainty about symptoms and an impending attack results in the need to scan the internal and external environments for information, resulting in a tendency to be self-focused. Excessive, chronic self-focus has been associated with psychological distress (Ingram, 1990; Mor & Winquist, 2002). Thus,

illness uncertainty was hypothesized to exert its influence on psychological distress by increasing self-focus, which, in turn, leads to psychological distress. The present study sought to replicate and extend these findings. More specifically, because illness uncertainty has been found to predict general psychological distress, depression, and anxiety, each of these was tried as a potential outcome variable. Further, general self-consciousness, private self-consciousness, and public self-consciousness were also tried as potential mediators.

The results of the study suggest that illness uncertainty was indeed a significant predictor of general psychological distress, depressive symptoms, and anxiety symptoms. The results did not indicate, however, that any of the self-consciousness scales mediated the relationship between illness uncertainty and psychological distress. Overall, the results of the current study clearly add to the extant literature on the robustness of the relationship between illness uncertainty and psychological distress. The results of the study suggest little support for the role of self-consciousness as a mediator of this relationship.

Given that the current study utilized a larger sample size than Van Pelt et al. (2003), the current study likely had more power to detect the ability of self-consciousness to mediate the illness uncertainty-psychological distress relationship if it is indeed a true mediator. Thus, Van Pelt et al.'s (2003) results may have been obtained by chance. Alternatively, given that the majority of participants with asthma reported a mild to moderate disease course, they may not have had sufficient experience with scanning the internal and external environments to develop excessive, chronic self-focus. Therefore, in the current sample, illness uncertainty may exert its influence on psychological distress

through some other means. In a sample of individuals with more severe asthma, however, individuals with asthma might have more of an opportunity and need to scan their internal environment for signs of an impending attack and, consequently, develop higher rates of excessive, chronic self-focus. In such a sample of individuals with asthma, illness uncertainty may indeed exert its influence on psychological distress via self-consciousness. Future research with a sample of individuals with asthma with a more severe disease course is needed to test the viability of this hypothesis.

#### Academic and Vocational Functioning

Previous research suggests that college students with asthma miss on average 2.8 days of class per semester due to asthma related health problems (Jolicoeur et al., 1994), and that college students with asthma have lower semester and cumulative grade point averages than college students without a chronic illness (Van Pelt, 2002). Other research suggests that young adults with a history of childhood-onset asthma are more likely to experience disrupted employment compared to same age peers without a chronic illness history (Taitel et al., 1998). Thus, when discussing the functioning of college students with asthma, it is important to consider differences in their academic and vocational functioning compared to college students without a history of asthma.

Although Van Pelt (2002) found significant differences in semester and cumulative grade point averages between college students with asthma and healthy controls, the current study failed to replicate this finding. Participants with asthma and healthy controls did not differ on either grade point average measure in the current study. Follow-up analyses comparing participants with mild asthma, moderate-severe asthma, and healthy controls also indicated that the three groups did not differ on either grade

point average measure. These results suggest that asthma may not have an impact on the academic functioning of college students with asthma when compared to age- and gender-controls. These results are consistent with findings in the literature on children with asthma that do not demonstrate differences in overall intelligence or academic achievement when comparing children with asthma to children without a chronic illness history (Lemanek & Hood, 1999; Lemanek et al., 1999). Thus, while asthma may have an impact on class attendance, as discussed below, it does not appear to have a direct impact on academic performance.

At the same time, results from the current study suggest that college students with asthma evidence more days missed from class and more days missed from work for health reasons compared to college students without a chronic illness history. These results also suggest that college students with asthma experience more disruption in their daily lives from health-related problems than college students without asthma. Interestingly, follow-up analyses indicated that the asthma participants, regardless of self-reported disease severity, were more likely to miss more days of class for health reasons than healthy controls. Given that those with mild asthma report a limited number of asthma-related symptoms, one might expect them to not differ from healthy controls in regards to how much class they miss for health reasons. The fact that those with mild asthma miss more days from class for health reasons than healthy controls might suggest that the individuals with asthma have a lower threshold for determining when an illness necessitates limiting daily activities. Alternatively, those with mild asthma may indeed have more health-related problems, but they inaccurately report the severity of their illness (i.e., their asthma does interfere with daily functioning but they are reporting that

their asthma is mild). In either case, future research needs to determine if there are specific ramifications for college students with asthma due to their higher rate of absenteeism from school that college students without asthma do not experience. Are they more likely to drop a class due to absenteeism for health reasons than college students without asthma? Further, for those with moderate to severe asthma, are there specific ramifications for work absenteeism that college students with mild asthma and those without a chronic illness history do not experience? For example, are those with moderate-severe asthma more likely to be fired than those with mild asthma or those without a chronic illness? If these higher rates of absenteeism from school and/or work lead to specific negative outcomes for college students with asthma, interventions may need to be developed to decrease the rate of absenteeism among these individuals or to help them intervene in their own school places to prevent such negative outcomes.

#### Responses to Experimentally-Induced Failure

Chaney et al. (1999) argued that college students with asthma have a history of non-contingent experiences with asthma due to the variable and unpredictable nature of the disease. More specifically, asthma attacks may occur without warning, the frequency of attacks may change over time, and the severity of attacks may change over time. Thus, individuals with asthma may come to believe that they cannot exert an influence on their disease. In other words, individuals with asthma may develop a sense of learned helplessness about their disease (Chaney et al., 1999). Chaney et al. (1999) suggested that feelings of learned helplessness about the disease may transfer to real world situations in which the individual experiences non-contingent events. In support of this reasoning, the authors found that college students with asthma evidenced greater

problem-solving deficits following experimentally-induced failure compared to healthy controls who also experienced experimentally-induced failure. Van Pelt (2002) attempted to replicate these findings, but failed to do so. However, Van Pelt (2002) made substantial changes to the methodology used by Chaney et al (1999), which may have accounted for her failure to replicate the results. Thus, the present study attempted to more closely replicate the study conducted by Chaney and his colleagues to determine if college students with asthma evidence greater difficulty with problem-solving than participants without asthma following experimentally-induced failure.

Results from the present study suggest that participants found the experimentally-induced failure aversive, as intended. The results also suggested that, as expected, participants in the non-contingent condition lowered their expectations for success on a subsequent problem-solving task. The results from the study did not indicate, however, that participants with asthma in the non-contingent condition responded differentially to the experimentally-induced failure as was found in the Chaney et al. (1999) study. The results from this analysis indicated, unexpectedly, that participants with asthma had more difficulty with a problem-solving task regardless of the type of experimental manipulation they experienced. Follow-up analyses indicated that the asthma participants with moderate-severe asthma solved more anagrams incorrectly compared to the healthy control participants, but did not differ from the participants with mild asthma. Thus, it may be that those with more severe asthma evidence greater difficulty with the problem-solving task than participants without a chronic illness history. One potential explanation for this difference is the higher degree of anxiety evidenced by the participants with moderate-severe asthma. This heightened level of anxiety in the

participants with moderate to severe asthma may have interfered with their ability to solve the anagrams regardless of their feedback condition.

The lack of a differential response to the non-contingent feedback between those with asthma and those without asthma may again relate back to the limited asthma severity among the majority of the asthma participants. Participants with asthma were expected to perform worse than their healthy control counterparts in the non-contingent condition due to participants with asthma having previous experiences with non-contingency as a result of their disease. Individuals in the asthma group, on average, reported that they found their disease to be somewhat to mostly controllable. Thus, these individuals may have been unlikely to have had many non-contingent experiences related to the variable and unpredictable nature of their disease. If the participants with asthma have not had these non-contingent experiences with their asthma, one would not expect their reaction to non-contingencies in other areas of life to differ from healthy controls. Interestingly, examining the means for the mild asthma, moderate-severe asthma, and healthy control groups in the non-contingent condition reveals that those with moderate-severe asthma had the most difficulty solving the anagrams following non-contingent feedback. This suggests that those who likely have had the most experiences with non-contingency due to their asthma do have difficulty when they encounter non-contingency in other areas. Such a pattern of results lends support to the argument that those with mild asthma may not have had sufficient experiences with non-contingency as a result of their disease to respond differentially to the non-contingent feedback in the experimental paradigm compared to individuals without a chronic illness history. It is less clear, however, why the individuals with moderate-severe asthma also had more difficulty with

the anagrams following contingent feedback in the experimental paradigm. This latter result suggests that some other factor, perhaps anxiety, rather than previous experiences with non-contingency, interferes with problem-solving ability among those with moderate-severe asthma. In either case, additional research appears to be warranted to determine why individuals with moderate-severe asthma have more difficulty with problem-solving compared to those without a chronic illness history.

#### Situational Self-Awareness

In a follow-up study to the original Chaney et al. (1999) study, Chaney and his colleagues (Chaney et al., 2000) explored the relationship between self-focused attention following experimentally-induced failure and health status. The researchers found that participants with asthma preferred to self-focus following experimentally-induced failure while participants without asthma avoided self-focus following failure. Self-focus was measured by the amount of time participants spent solving puzzles in front of a mirror following experimentally-induced failure. The present study sought to replicate these findings using a questionnaire that assessed situational self-awareness rather than the time spent in front of the mirror variable. The results of the study suggested that participants with asthma who experienced experimentally-induced failure did not differ from healthy control participants who also experienced experimentally-induced failure in regards to their level of situational self-awareness. Follow-up analyses also suggested that levels of situational self-awareness following experimentally induced failure did not differ across those with mild asthma, moderate-severe asthma, and healthy controls. The failure to find differences in situational self-awareness following the experimental manipulation may possibly be due to lack of validity of the Situational Self-Awareness

Scale (SSAS; Govern & Marsch, 2001). Indeed, it is possible that the SSAS was not as sensitive a measure for detecting differences in self-focus following failure as time spent in front of the mirror was in the Chaney et al. (2000) study. Govern and Marsch (2001) report, however, that the SSAS was able to detect differences in experimentally-induced self-awareness including self-awareness induced by a small mirror, a large mirror, a video camera, and recall of a personal event when each was compared to a control condition in which no self-awareness manipulation was used. These results suggest that the SSAS is a valid measure for assessing levels of situational self-awareness if a laboratory manipulation effectively induces situational self-awareness. Thus, while it is possible that no differences were found on the SSAS because it was not an effective measure of situational self-awareness, this may not be the most plausible explanation for the study's results.

Another possible explanation for the lack of differences in situational self-awareness between participants with asthma and healthy controls following experimentally-induced failure is that participants in the non-contingent condition were suspicious of the experimental manipulation. Following the debriefing phase of the study, a few participants in the non-contingent condition remarked that they suspected that the non-contingency task was "fake." If participants correctly perceived that their failure was due to an experimental manipulation rather than their own lack of ability, participants may have been thinking about the experiment or the experimenter as reasons for their difficulty rather than themselves following failure. Thus, when given the questionnaire assessing how much they were thinking about themselves in the moments following the experiment, all participants in the non-contingent condition, regardless of

health status, may have been thinking about external sources. Thus, in real world situations when the cause of failure is not as obvious as it may have been in the current study, individuals with asthma may be more likely to focus on themselves in the moments following failure more than individuals without asthma. The nature of the current experimental manipulation may have prevented the observation of these differences. Future research using an experimental paradigm that is more subtle in its manipulation of failure may be needed to determine if individuals with asthma respond differently in failure situations in terms of self-focus compared to individuals without a chronic illness history.

#### Attributions for Performance

The present study hypothesized that participants with asthma would make more internal attributions for failure following experimentally-induced failure than participants without asthma. This hypothesis was based on the idea that attributions following in the direction of attention. If participants with asthma were more likely to be self-focused following failure, one would expect them to make more internal attributions for their performance on the task following experimentally-induced failure than participants without asthma. The results of the present study suggest that all participants in the non-contingent condition made more external attributions for their performance on the task following experimentally-induced failure than participants in the contingent condition. These results suggest that participants in the non-contingent condition may indeed have been aware of the deceptive nature of the experiment, and expected that their performance on future tasks in the study would be more dependent on external circumstances than anything about their ability. Thus, any internal attributions for

performance on the experimental task that participants with asthma might have made may have been “washed out” by their realization that the experimenter, rather than them as individuals, was responsible for their performance. In real world situations in which the cause of failure is more ambiguous, individuals with asthma may be more inclined to make internal attributions for failure than individuals without asthma. Additional research may be needed that utilizes a more subtle experimental manipulation to examine differences in attributions for task performance.

#### Strengths and Limitations of the Current Study

Several strengths of the current study are notable. First, the present study sought to investigate a population of individuals with asthma that have been largely ignored to date. Although it was once believed that children outgrew asthma as they age, increasing evidence suggests that many children with asthma continue to experience asthma into adolescence and adulthood (Price, 1996; Roordan, 1996). Indeed, this population appears to be largely ignored in terms of both medical care and psychological treatment of the disorder (Perez-Yarza, 1996). Thus, the present study represents a unique effort to document the psychological experience of adolescents and young adults with asthma. Further, the present study is one of a limited number of studies that attempted to utilize an experimental paradigm within the field of pediatric psychology. These types of studies are limited, but are an important effort to uncover the causal mechanisms that may explain how specific disease variables lead to psychological distress.

Several important limitations are acknowledged in the current study. First, several dependent variables had missing data due to either technical problems (i.e., the computer program failed to record anagram data for some participants) or participants

failing to respond to all questionnaire items. In order to maintain the matched nature of the study design, participants were removed from the analysis if their age- and gender-match did not contribute a score. Thus, the total number of pairs available for analysis was greatly reduced for some study variables (i.e., the PEFR variable), which may have reduced the study's ability to detect significant differences between groups. Future research with the experimental paradigm may need to correct problems with the anagram program or computer on which the program is run to prevent losing important data. Further, experimenters may need to be more attentive to redirecting participants to questions that they may have inadvertently skipped.

Second, the majority of individuals with asthma in the current study did not evidence a severe disease course. Consequently, they may not have had a need to monitor both their internal and external environments for asthma-related cues. This internal monitoring process was the hypothesized mechanism for the development of excessive, chronic self-focus in individuals with asthma. If the majority of participants with asthma in the current study did not have to engage in this process over a long period of time for effective asthma management, then they would not be expected to develop excessive, chronic self-focus at a differential rate compared to individuals without a history of asthma. Thus, in order to determine if individuals with asthma are at a greater risk for excessive, chronic self-focus, future research must focus on individuals with a more severe disease course. Recruiting individuals with a more severe disease course may require going beyond college campuses to hospitals, asthma/allergy clinics, and places of employment to find individuals who may be more impaired by their disease than college students.

## Conclusions and Future Directions

Overall, the present study found support for a limited number of its hypotheses related to self-consciousness. The study did find that college students with asthma, in particular those with severe asthma, may be experiencing higher levels of psychological distress than college students without a chronic illness history. The results of the study indicate that college students with moderate-severe asthma evidence levels of general psychological distress and anxiety that are in the clinically significant range.

Consequently, these individuals may be in need of interventions to reduce their level of distress. Further, the study's results suggest that college students with asthma, particularly those with moderate to severe asthma, may have a higher baseline level of depression and anxiety than college students without asthma. This higher baseline may make college students with asthma more vulnerable to experiencing clinically significant levels of depression and anxiety if other stressors emerge in their lives. In other words, interpreting the results from a diathesis-stress perspective, asthma, in particular moderate to severe asthma, may serve as a diathesis that makes individuals with asthma more vulnerable to psychological distress if a stressor occurs than individuals without asthma. Thus, individuals with asthma may need interventions designed to help them cope with stressors to prevent the development of depression and anxiety.

The results from the current study also suggest that there is a robust relationship between illness uncertainty and psychological distress among adolescents and young adults with asthma. These results add to the extant literature on the robust nature of the relationship between illness uncertainty and psychological distress. Thus, identifying adolescents and young adults with asthma who have elevated levels of illness uncertainty

may be one means of identifying individuals who are in need of psychological intervention to reduce their risk for, or their current levels of, psychological distress. Educating the individual about his or her disease, increasing the number of treatment options, and empowering the individual to take charge of their disease management may be a means of reducing their level of uncertainty and, therefore, decreasing their level of distress.

The study also found that college students with asthma may be experiencing greater difficulty with some activities of daily living such as attending class and work compared to college students without a chronic illness. These results are important because they suggest that college students with asthma may benefit from interventions designed to ameliorate the potential negative effects of such absenteeism. For example, students with asthma might need education about how to handle frequent absences from a class (i.e., letting the professor know why you are absent, getting lecture notes from a classmate) to prevent their absences from having a negative effect on their grades.

Arguably, the limited number of participants with a severe disease course of asthma may have contributed significantly to the study not finding more support for its hypotheses. Future research may need to focus on recruiting a more severe sample of individuals with asthma in order to more effectively test the hypotheses presented in the current study. Further, future research may need to focus on examining the proposed mechanisms for the development of excessive self-focus in individuals with asthma. More specifically, future research ought to determine if individuals with asthma, in particular those with severe asthma, spend more time scanning their internal and external environments for signs of an impending attack. Such a study might involve a diary study

in which individuals with asthma are prompted to report on their thoughts at several time points during the day for several days. Establishing that individuals with asthma do indeed engage in this internal scanning process may suggest the need to continue to evaluate the relationship between self-focused attention and health status. In addition, given that participants in the current study may have been aware of the deceptive nature of the experimental manipulation, future research may need to focus on differential reactions to failure in real world paradigms such as reactions to receiving a bad grade in a class or relationship difficulties between individuals with asthma and individuals without a chronic illness history. Regardless of the form future research takes, continued research with adolescents and young adults with asthma, as well as adolescents and young adults with other chronic illnesses, is important in order to document formally the long term psychological outcomes of pediatric chronic illness.

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Appendix A

RECRUITMENT FORM

**SUBJECT RECRUITMENT – HEALTH STUDY**

We are currently recruiting participants in the Psychology Department. Please complete the following form if you are interested in being considered for the present study. We will contact you in the future if you meet the requirements for the current study. Thank you for your time.

**PLEASE PRINT AS NEATLY AS POSSIBLE! THANK YOU!**

Name: \_\_\_\_\_ E-mail address: \_\_\_\_\_

Home Phone#: \_\_\_\_\_ Other phone# (cell, etc.): \_\_\_\_\_

Age: \_\_\_\_\_ Gender: \_\_\_\_\_

Do you have any chronic illnesses? Examples might include diabetes, asthma, arthritis or lupus. Please circle a response:      YES              NO

If you answered yes to the previous question, please list the chronic illness that you have and indicate if you were diagnosed with this illness *prior to the age of 12* .

	<u>Diagnosed prior to the age of 12</u>	
	Yes	No
1. _____		
2. _____	Yes	No
3. _____	Yes	No

Appendix B

DESCRIPTION OF ASTHMA AND  
HEALTHY CONTROL PARTICIPANTS

Table 1

*Descriptive Statistics for Variables of Interest for Asthma Participants (n = 81)*

Variable	Frequency	Percentage
Gender		
Female	49	60.5%
Male	32	39.5%
Race		
Caucasian	71	87.7%
African-American	3	3.7%
Biracial	1	1.2%
Native American	6	7.4%
Asthma type		
Seasonal	34	42.0%
Perennial	45	55.6%
Not Reported	2	2.5%
Number of asthma medications		
None	20	24.7%
One	32	39.5%
Two	14	17.3%
Three	15	18.5%
Frequency of medication use		
Daily	42	51.9%
As needed	19	23.5%
No medications	20	24.6%
Variable	Mean	Standard Deviation
Current age	19.80	1.25
Age at first attack	6.19	3.55
Age at diagnosis	6.39	3.97
Self-rated disease severity	1.93	0.99
Self-rated disease controllability	4.00	2.16
No. of physician visits for asthma in last 6 mos.	2.29	2.41

Table 2

*Descriptive Statistics for Variables of Interest for Healthy Control Participants (n = 81)*

Variable	Frequency	Percentage
Gender		
Female	49	60.5%
Male	32	39.5%
Race		
Caucasian	67	82.7%
Native American	5	6.2%
African-American	4	4.9%
Asian	3	3.7%
Biracial	2	2.5%

Appendix C

BACKGROUND INFORMATION



9. Do you live with your parents even part-time (including weekends or summers)?  
\_\_\_\_\_

10. Are you currently taking any psychoactive medication (e.g., antidepressants, anti-anxiety)?

YES	NO
1	2

11. Have you ever been treated by a physician for a medical condition for more than three consecutive months in any given year? (For example: May, June, and July, 1999)

YES	NO
1	2

12. Have you ever been hospitalized continuously for a medical condition for more than one month?

YES	NO
1	2

13. Do you have a chronic illness?

YES	NO
1	2

**IF NO, PLEASE ANSWER 13B AND THEN GO ON TO THE NEXT QUESTIONNAIRE IN YOUR PACKET. THANK YOU. IF YES, PLEASE GO ON TO QUESTION 14.**

13B. Please estimate the number of school and/or work days you missed during the last academic year (2000-2001) *for medical reasons*. (If you are a freshman in college and you were in high school during the 2000-2001 academic year, please refer to your senior year of high school. If you were not in school during the 2000-2001 academic year, please list days missed from work only.)

SCHOOL: \_\_\_\_\_  
WORK: \_\_\_\_\_

14. Do you have asthma?

YES	NO
1	2

If you have another chronic illness in addition to asthma, please specify the type or types of condition(s): \_\_\_\_\_

15. Have you or another family member ever received any type of psychological counseling or therapy?

YES                  NO  
1                      2

If yes, was your counseling related to your asthma?

YES                  NO  
1                      2

16. Are you currently taking any medications for your asthma?

YES                  NO  
1                      2

If yes, please specify the type of medication(s) and how frequently you take the medication(s):

Type	Frequency
a. _____	_____
b. _____	_____
c. _____	_____

17. At what age did you have your first asthma attack?

\_\_\_\_\_

18. At what age were you diagnosed with asthma?

\_\_\_\_\_

19. Are you presently receiving any medical treatment from a physician for your asthma?

YES                  NO  
1                      2

If yes, please indicate the number of visits to your physician in the past 6 months.

\_\_\_\_\_

20. Do you have asthma attacks only during a certain season (SEASONAL) or all-year round (PERENNIAL)?

SEASONAL                  PERENNIAL  
1                                  2

21. How **severe** do you think your asthma has been in the past year?

1	2	3	4	5	6	7
Mild		Moderate		Severe		Respiratory Failure

**Mild** = 1 or 2 attacks per week; as many as two episodes of nighttime cough a month; good exercise tolerance; no symptoms between attacks; bronchospasm responds to bronchodilator.

**Moderate** = More than 2 attacks per week; symptoms between attacks; symptoms affect sleep, activity level, or work performance; bronchospasm responds to bronchodilator; reduced exercise tolerance; coughing; chest tightness, wheezing; seeking emergency room treatment more than three times per year.

**Severe** = Daily wheezing; sudden, severe attacks; limited exercise tolerance and activity level; sleep is disrupted; bronchospasm does not always respond to bronchodilator; poor work attendance; mild tachycardia (excessively rapid heartbeat); tachypnea (excessively rapid breathing); difficulty speaking in complete sentences; seeking emergency care more than 3 times per year.

**Respiratory Failure** = Increased tachycardia (excessively rapid heartbeat); tachypnea (excessively rapid breathing); wheezing; reduced, poor air exchange; uses accessory muscles (e.g., arms) to sit up, with perspiration; confusion; lethargy; altered consciousness.

22. How **controllable** do you think your asthma is?

1	2	3	4	5	6	7
Entirely		Somewhat		Mostly		Entirely
Uncontrollable	Controllable		Controllable		Controllable	

23. Please estimate the number of school and/or work days you missed during the last academic year (e.g., 2000-2001) *as a result of your asthma or asthma-related symptoms*. (If you are a freshman in college and you were in high school during the 2000-2001 academic year, please refer to your senior year of high school. If you were not in school during the 2000-2001 academic year, please list days from work only.)

SCHOOL: \_\_\_\_\_

WORK: \_\_\_\_\_

24. Please estimate the number of school and/or work days you missed during the last academic year (2000-2001) *for medical reasons other than asthma*. (If you are a freshman in college and you were in high school during the 2000-2001 academic year, please refer to your senior year of high school. If you were not in school during the 2000-2001 academic year, please list days from work only.)

SCHOOL: \_\_\_\_\_

WORK: \_\_\_\_\_

25. During the 2000-2001 academic year, did you ever attend class when you had asthma symptoms?

YES	NO
1	2

If yes, please estimate the number of days you did attend class when you had asthma symptoms.

\_\_\_\_\_

If yes, please circle the number that indicates how much the asthma symptoms interfered with your normal daily class routine (i.e., taking notes, taking an exam, participating in a laboratory).

1	2	3	4	5	6	7
No		Mild		Moderate		Interfered a
Interference		Interference		Interference		Great Deal

26. During the 2000-2001 academic year, did you ever attend work when you had asthma symptoms?

YES	NO
1	2

If yes, please estimate the number of days you did attend work when you had asthma symptoms.

\_\_\_\_\_

If yes, please circle the number that indicates how much the asthma symptoms interfered with your normal work routine (i.e., getting to work on time; completing job tasks efficiently).

1	2	3	4	5	6	7
No		Mild		Moderate		Interfered a
Interference		Interference		Interference		Great Deal

27. During the 2000-2001 academic year, do you feel that your asthma interfered with your social life?

YES	NO
1	2

If yes, please circle the number that indicates how much your asthma symptoms interfered with your social life.

1	2	3	4	5	6	7
No		Mild		Moderate		Interfered a
Interference		Interference		Interference		Great Deal

## Appendix D

### MAACL

Subject # \_\_\_\_\_

**INSTRUCTIONS:** Please check the words that you feel apply to you right now, at this moment.

1	active	45	fit	89	peaceful
2	adventurous	46	forlorn	90	pleased
3	affectionate	47	frank	91	pleasant
4	afraid	48	free	92	polite
5	agitated	49	friendly	93	powerful
6	agreeable	50	frightened	94	quiet
7	aggressive	51	furious	95	reckless
8	alive	52	gay	96	rejected
9	alone	53	gentle	97	rough
10	amiable	54	glad	98	sad
11	amused	55	gloomy	99	safe
12	angry	56	good	100	satisfied
13	annoyed	57	good-natured	101	secure
14	awful	58	grim	102	shaky
15	bashful	59	happy	103	shy
16	bitter	60	healthy	104	soothed
17	blue	61	hopeless	105	steady
18	bored	62	hostile	106	stubborn
19	calm	63	impatient	107	stormy
20	cautious	64	incensed	108	strong
21	cheerful	65	indignant	109	suffering
22	clean	66	inspired	110	sullen
23	complaining	67	interested	111	sunk
24	contented	68	irritated	112	sympathetic
25	contrary	69	jealous	113	tame
26	cool	70	joyful	114	tender
27	cooperative	71	kindly	115	tense
28	critical	72	lonely	116	terrible
29	cross	73	lost	117	terrified
30	cruel	74	loving	118	thoughtful
31	daring	75	low	119	timid
32	desperate	76	lucky	120	tormented
33	destroyed	77	mad	121	understanding
34	devoted	78	mean	122	unhappy
35	disagreeable	79	mEEK	123	unsociable
36	discontented	80	merry	124	upset
37	discouraged	81	mild	125	vexed
38	disgusted	82	miserable	126	warm
39	displeased	83	nervous	127	whole
40	energetic	84	obliging	128	wild
41	enraged	85	offended	129	willful
42	enthusiastic	86	outraged	130	wilted
43	fearful	87	panicky	131	worrying
44	fine	88	patient	132	young

Appendix E

SELF-CONSCIOUSNESS SCALE (SCS)

## The Self-Consciousness Scale

### Items on the private self-consciousness scale

- I'm always trying to figure myself out. (1)
- Generally, I'm not very aware of myself. (3)\*
- I reflect about myself a lot. (5)
- I'm often the subject of my own fantasies. (7)
- I never scrutinize myself. (9)\*
- I'm generally attentive to my inner feelings. (13)
- I'm constantly examining my motives. (15)
- I sometimes have the feeling that I'm off somewhere watching myself. (18)
- I'm alert to changes in my mood. (20)
- I'm aware of the way my mind works when I work through a problem. (22)

### Items on the public self-consciousness scale

- I'm concerned about my style of doing things. (2)
- I'm concerned about the way I present myself. (6)
- I'm self-conscious about the way I look. (11)
- I usually worry about making a good impression. (14)
- One of the last things I do before I leave the house is look in the mirror. (17)
- I'm concerned about what other people think of me. (19)
- I'm usually aware of my appearance. (21)

### Items on the social anxiety scale

- It takes me time to overcome my shyness in new situations. (4)
- I have trouble working when someone is watching me. (8)
- I get embarrassed very easily. (10)
- I don't find it hard to talk to strangers. (12)\*
- I feel anxious when I speak in front of a group. (16)
- Large groups make me nervous. (23)

The number in parentheses represents the order of the items on the original scale. Items with asterisks represent items that will be reverse scored.

Appendix F and G

VISUAL ANALOG SCALE  
AND INTERNAL-EXTERNAL ATTRIBUTIONS TIME 1 (VAS-TI)

Subject #: \_\_\_\_\_

VAS T1

1. The scale below asks you to rate the extent to which you expect to succeed on the computer task that will be administered. The scale ranges from “Much worse than most people” to “Much better than most people.” Please place an “X” on the line that indicates how you expect to perform on the task.

Much worse than  
most people

Much better  
than most people

\_\_\_\_\_

**(For question 2, please circle one number for your answer. Please do not circle the words.)**

2. Do you think that your performance on the upcoming task will be due to something about you or something about other circumstances?

Totally due to other  
Circumstances

Totally due to me

1      2      3      4      5      6      7

Appendix H and I

VISUAL ANALOG SCALE  
AND INTERNAL-EXTERNAL ATTRIBUTIONS TIME 2 (VAS-T2)

Subject #: \_\_\_\_\_

**VAS-T2**

1. The scale below asks you to rate the extent to which you expect to succeed on the next task that will be administered. The scale ranges from “Much worse than most people” to “Much better than most people.” Please place an “X” on the line that indicates how you expect to perform on the task.

Much worse than  
most people

Much better  
than most people

\_\_\_\_\_

**(For question 2, please circle one number for your answer. Please do not circle the words.)**

2. Do you think that your performance on the upcoming task will be due to something about you or something about other circumstances?

Totally due to other  
Circumstances

Totally due to me

1            2            3            4            5            6            7

Appendix J

SITUATIONAL SELF-AWARENESS SCALE

Please respond to each statement based on how you feel **RIGHT NOW, AT THIS INSTANT** – not how you feel in general or at this point in your life. Circle the number on the line that best corresponds to your answer. There are no “right” or “wrong” answers – just be honest.

1. Right now, I am keenly aware of everything in my environment.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

2. Right now, I am conscious of my inner feelings.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

3. Right now, I am concerned about the way I present myself.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

4. Right now, I am self-conscious about the way I look.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

5. Right now, I am conscious of what is going on around me.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

6. Right now, I am reflective about my life.

1	2	3	4	5	6	7
strongly			Neutral			strongly
disagree						agree

7. Right now, I am concerned about what other people think of me.

1	2	3	4	5	6	7
strongly disagree			Neutral			strongly agree

8. Right now, I am aware of my innermost thoughts.

1	2	3	4	5	6	7
strongly disagree			Neutral			strongly agree

9. Right now, I am conscious of all objects around me.

1	2	3	4	5	6	7
strongly disagree			Neutral			strongly agree

Appendix K

PEAK EXPIRATORY FLOW RATE RECORD FORM (PEFR)

**Subject #:** \_\_\_\_\_

PEFR Record Form

Subject's height in inches: \_\_\_\_\_

Practice Trial PEFR rating: \_\_\_\_\_

Trial One PEFR rating: \_\_\_\_\_

Trial Two PEFR rating: \_\_\_\_\_

Trial Three PEFR rating: \_\_\_\_\_

Appendix L  
PERMISSION FOR GPA

PERMISSION FOR GPA

We would like to obtain your grade point average (GPA) to use in our analyses. We would like to obtain your GPA for the most recent semester you completed as well as your cumulative GPA. IF this is your first semester in college, we will request your GPA from your last semester of high school as well as your cumulative high school GPA. In order to ensure accuracy, we would like to obtain this information from the registrar at Oklahoma State University. Please note that we will not use your individual GPA when reporting the results of the study. We will only report average GPA's for groups of participants in the study.

\_\_\_\_\_ I consent to allow Jill Van Pelt or her authorized representatives to obtain my GPA for the most recent semester I completed in college and my cumulative college GPA. If this is my first semester in college, I understand they will request my GPA from my last semester of high school and my cumulative high school GPA.

\_\_\_\_\_ I DO NOT give permission for my GPA to be obtained from the Oklahoma State University Registrar.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Social Security Number  
(for consenting participants)

\_\_\_\_\_  
Date and Time

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date and Time

\_\_\_\_\_  
Signature of Experimenter

\_\_\_\_\_  
Date and Time

Appendix M  
INFORMED CONSENT

## Consent Form

I, \_\_\_\_\_, (name of participant), voluntarily consent to participate in the investigation of cognitive abilities, the purposes of which have been explained to me by Jill Van Pelt or associates or assistants of her choosing. I thereby authorize Jill Van Pelt or associates or assistants to perform the following treatments or procedures:

I understand that the research requires the completion of several paper-and-pencil measures that address my perceptions of life events. In addition, I will be asked to complete computer tasks.

I understand that any data collected as part of my participation in this experiment will be treated as confidential and will receive a code number so that they will remain anonymous. In no case, will any use be made of these data other than as research results. If data from my participation are ever displayed, my identity will remain anonymous.

I understand that I will receive either one (1) research credits or the sum of \$5 for one hour of participation. I understand that, although my participation may not be personally beneficial to me, the information derived from this project may have important implications for others. I realize that the information gained may contribute to better understanding of the cognitive abilities in individuals with and without asthma.

I understand that my participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty, after notifying the project director.

I may contact Dr. Larry Mullins, Psychology Department, 215 North Murray Hall, Oklahoma State University, at (405)-744-6951 should I wish further information about the research. I may also contact Sharon Bacher, IRB Executive Secretary, 203 Whitehurst, Oklahoma State University, Stillwater, Oklahoma, 74078, (405)-744-6501. Should any problems arise during the course of the study, I may take them to Dr. Maureen Sullivan, Psychology Department Head, 215 North Murray Hall, Oklahoma State University, at (405)-744-6027.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date and Time

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date and Time

I certify that I have personally explained all elements of this form to the participant before requesting that he or she sign it.

\_\_\_\_\_  
Signature of Project Director (or authorized representative)

\_\_\_\_\_  
Date and Time

Appendix N  
DEBRIEFING STATEMENT

## DEBRIEFING STATEMENT

The preceding experiment examined the relationship between self-focused attention and health status. During the computer task, some participants did not have control over solving the problems. Participants were manipulated to believe that they were capable of solving what was actually an unsolvable task. Any frustration or negative perceptions you may have experienced in response to the task were purely a function of the deceptive nature of the experiment. Your performance is not a reflection of you ability to perform this, or related, tasks.

Some of the questionnaires, in addition to the computer task, may have touched upon sensitive issues such as depression. The scores that you received on any of the questionnaires are not available to me. Thus, I do not know how you performed on any of these measures. Since these tasks might have elicited some introspection on your part, we are handing out a list of the services available in the area to everyone, in case they are interested in speaking with someone.

Finally, we ask that you do not tell anyone about any portion of this experiment. Do you have any questions?

Appendix O

RECORD OF HOW CONCEPT FORMATION TASK WAS SOLVED  
SOLVABLE CONDITION ONLY

Subject # \_\_\_\_\_

Experimenter: Please record the participant's explanation of how he or she went about solving the problems in the concept-formation task.

Appendix P  
CAMPUS SERVICES

## CAMPUS SERVICES

Psychological Services Center – (118 North Murray Hall, 744-5975)

The center provides assistance to any interested individual from Oklahoma State University or the surrounding area. The center is open Monday, Tuesday, and Thursday from 8 a.m. to 9 p.m. and Wednesday and Friday from 8 a.m. to 5 p.m. There is a graduate fee for those using this service. All appointments are confidential.

Personal Counseling Services – 310 Student Union, 744-5472 or 002 Student Health Center, 744-7007

The Personal Counseling Services supports the personal, social, and intellectual growth of members of the University community. They provide a broad spectrum of services to OSU students.

Counseling services include individual and group counseling relating to areas of career/life planning, study skills, and personal concerns including stress, anxiety, depression, relationships, eating disorders, and substance abuse. Counseling sessions are provided at a minimal fee. All appointments are confidential.

Reach-out Hotline – Oklahoma City, 1-800-522-9054

Crisis hotline in Oklahoma City.

Appendix Q  
RELEVANT RESULTS

Table 1

*Means and Standard Deviations Comparing Participants on Lung Function Measure*

Highest PEFR Measure	N	Mean	SD
Asthma	47	400.21	124.75
Healthy Control	47	419.36	125.42

Table 2

*Means and Standard Deviations Comparing Asthma Participants by Recruitment Type*

Variable	Illness Group	N	Mean	SD	t	p (2-tailed)
Age	Class	59	19.57	1.24	2.77	0.01
	Community	22	20.40	1.05		
Asthma Severity	Class	59	1.77	0.98	2.21	0.03
	Community	22	2.31	0.94		
Semester GPA	Class	44	2.83	0.92	1.97	0.05
	Community	21	3.27	0.65		
Cumulative GPA	Class	44	2.97	0.62	1.68	0.09
	Community	21	3.23	0.55		
SCS Total Score	Class	59	52.18	12.39	0.49	0.62
	Community	22	50.63	13.20		
SCS Private Self-Consciousness	Class	59	23.61	6.06	0.72	0.47
	Community	22	22.54	5.56		
SCS Public Self-Consciousness	Class	59	18.33	4.84	1.32	0.19
	Community	22	16.68	5.54		
Number of Anagrams Solved Incorrectly	Class	55	4.91	3.65	0.24	0.80
	Community	22	5.14	3.84		
SSAS Total Score	Class	58	38.63	7.83	1.90	0.06
	Community	22	35.00	7.10		
Days Missed From School	Class	59	1.27	2.47	0.83	0.41
	Community	21	1.85	3.45		
Days Missed From Work	Class	54	1.81	3.07	1.37	0.17
	Community	17	3.17	4.83		
PEFR Ratings					1.36	0.17

Asthma Controllability	Class	43	407.44	116.94	1.27	0.20
	Community	11	350.90	144.66		
BSI-GSI T score	Class	59	4.18	2.28	0.43	0.66
	Community	22	3.50	1.76		
Table 2 , continued	Class	59	60.45	10.77		
	Community	22	61.59	9.26		

*Means and Standard Deviations Comparing Asthma Participants by Recruitment Type*

Variable	Illness Group	N	Mean	SD	t	p (2-tailed)
BDI Total Score	Class	58	9.98	8.00	0.11	0.91
	Community	21	10.19	6.84		
BAI Total Score	Class	59	8.98	7.74	1.37	0.17
	Community	22	11.68	8.08		
MUIS-C Total Score	Class	59	55.30	10.17	0.91	0.36
	Community	22	57.54	9.04		
Attributions for failure	Class	58	4.75	1.38	0.43	0.66
	Community	22	4.91	1.41		

Table 3

*Means and Standard Deviations Comparing Participants on Psychological Distress Measures*

Variable	Illness Group	N	Mean	SD	t	p (2-tailed)
BSI Global Severity Index	Asthma	81	60.77	10.34	2.66	0.009
	Healthy Control	81	56.44	10.30		
BDI Total Score	Asthma	76	10.19	7.76	2.60	0.01
	Healthy Control	76	7.32	5.74		
BAI Total Score	Asthma	81	9.72	7.88	4.14	<.001
	Healthy Control	81	5.28	5.53		

Table 4

*Frequency of BSI Caseness Classification for AS and HC Participants*

BSI Caseness	N	Asthma	Healthy Control
Met caseness	81	49 (60.4%)	37 (45.1%)
Did not meet caseness	81	32 (39.5%)	44 (54.3%)

Table 5

*Means and Standard Deviations For Follow-up Comparisons of Participants on Psychological Distress Measures*

Variable	Illness Group	N	Mean	SD	<i>F</i>	<i>p</i>
BSI Global Severity Index	Mild Asthma	57	59.38	10.25	5.35	.006
	Moderate-Severe Asthma	24	64.04	10.01		
	Healthy Control	81	56.44	10.31		
BDI Total Score	Mild Asthma	56	9.00	7.45	5.63	.004
	Moderate-Severe Asthma	23	12.57	7.76		
	Healthy Control	78	7.29	5.68		
BAI Total Score	Mild Asthma	57	7.56	5.93	20.55	.000
	Moderate-Severe Asthma	24	14.83	9.57		
	Healthy Control	81	5.28	5.53		

Table 6

*Means and Standard Deviations Comparing Participants on Self Consciousness Scale*

Variable		N	Mean	SD
Private Self-Consciousness Subscale	Asthma	81	23.32	5.92
	Healthy Control	81	22.82	5.18
Public Self-Consciousness Subscale	Asthma	81	17.89	5.07
	Healthy Control	81	17.12	4.81
Total Self-Consciousness Scale	Asthma	81	51.77	12.55
	Healthy Control	81	50.80	9.81

Table 7

*Means and Standard Deviations for Follow-up Comparisons of Participants on Self-Consciousness Scale*

Variable	N	Mean	Standard Deviation
Private Self-Consciousness Subscale			
Mild Asthma	57	23.02	5.99
Moderate-Severe Asthma	24	24.04	5.78
Healthy Control	81	22.81	5.18
Public Self-Consciousness Subscale			
Mild Asthma	57	18.36	4.86
Moderate-Severe Asthma	24	16.75	5.44
Healthy Control	81	17.12	4.8
Total Self-Consciousness Scale			
Mild Asthma	57	52.85	11.89
Moderate-Severe Asthma	24	49.16	13.91
Healthy Control	81	50.80	9.8

Table 8

*Correlations between Illness Uncertainty, Self-Consciousness Measures, and Psychological Distress Measures for Asthma Participants*

	SCS Total Score	SCS Private	SCS Public	BSI-GSI T-Score	BDI Total	BAI Total
MUIS-C						
Total	.28*	.33**	.14	.54***	.41***	.47***
BAI Total	.23*	.28*	.10	.59***	.63***	
BDI Total	.26*	.22*	.15	.58***		
BSI-GSI T- Score	.33**	.39***	.17			
SCS Public	.83***	.47***				
SCS Private	.73***					
SCS Total Score						

*Note.* \* $p < .05$ , \*\* $p < .01$ ,  
\*\*\* $p < .001$

Table 9

*Summary of Hierarchical Regression Analysis for Mediation of MUIS-C and BSI-GSI T-Score by SCS Total Score*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Age	.04	.96	.006
Gender	-.25	2.55	-.01
Step 2			
Age	.32	.97	.04
Gender	-1.42	2.64	-.07
Asthma Severity	1.99	1.31	.20
Step 3			
Age	.98	.82	.13
Gender	-4.13	2.28	-.21
Asthma Severity	.92	1.14	.09
MUIS-C Total	.49	.10	.52**
SCS Total	.143	.08	.18

*Note.* \*  $p < .05$ ; \*\* $p < .001$

Table 10

*Summary of Regression Analysis for Mediation of MUIS-C and BDI Total Score by SCS Total Score*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Age	1.24	.72	.20
Gender	4.71	1.90	.29
Step 2			
Age	1.42	.73	.23
Gender	4.00	1.97	.25
Asthma Severity	1.21	.97	.15
Step 3			
Age	1.76	.71	.29
Gender	2.82	1.95	.17
Asthma Severity	.62	.97	.07
MUIS-C Total	.24	.09	.33*
SCS Private	.03	.07	.06

*Note.* \*  $p < .05$ ; \*\* $p < .001$

Table 11

*Summary of Regression Analysis for Mediation of MUIS-C and BAI Total Score by SCS Total Score*

Variable	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Age	.10	.75	.02
Gender	5.72	1.98	.34
Step 2			
Age	.41	.74	.06
Gender	4.40	2.01	.26
Asthma Severity	2.24	.99	.27
Step 3			
Age	.76	.69	.12

Gender	2.9	1.94	.17
Asthma Severity	1.73	.98	.21
MUIS-C Total	.25	.09	.33*
SCS Private	.08	.07	.14

Note. \*  $p < .05$ ; \*\* $p < .001$

Table 12

*Semester and Cumulative Grade Point Averages*

Variable	N	Mean	SD
Semester GPA			
Asthma	58	2.91	.88
Healthy Control	58	2.90	.89
Cumulative GPA			
Asthma	58	2.99	.61
Healthy Control	58	2.98	.76

Table 13

*Means and Standard Deviations for Days Missed from Class for Health Reasons*

	N	Mean	SD
Asthma	53	3.98	3.97
Healthy Control	53	2.17	3.12

Table 14

*Means and Standard Deviations for Days Missed from Work for Health Reasons*

	N	Mean	SD
Asthma	43	1.81	2.51
Healthy Control	43	1.42	0.22

Table 15

*Follow-up Comparisons for GPA, Days Missed From Class, and Days Missed from Work*

Variable	N	Mean	SD
<b>Semester GPA</b>			
Mild Asthma	40	2.80	0.97
Moderate-Severe Asthma	18	3.14	0.59
Healthy Control	58	2.90	0.88
<b>Cumulative GPA</b>			
Mild Asthma	40	2.92	0.65
Moderate-Severe Asthma	18	3.15	0.49
Healthy Control	58	2.98	0.76
<b>Days missed from class</b>			
Mild Asthma	36	4.11	4.47
Moderate-Severe Asthma	17	3.71	2.71
Healthy Control	53	2.17	3.12
<b>Days missed from work</b>			
Mild Asthma	29	1.52	2.64
Moderate-Severe Asthma	14	2.42	2.17
Healthy Control	43	0.81	1.41

Table 16

*Means and Standard Deviations for MAACL Subscale Scores*

Variable	Feedback Condition		Time 1		Time 2	
			Mean	SD	Mean	SD
Depression	Contingent	Asthma	12.33	4.86	12.36	5.04
		Healthy				
		Control	11.44	5.40	11.23	5.59
	Non-contingent	Asthma	13.53	5.51	17.24	4.63
		Healthy				
		Control	11.22	5.16	15.54	5.43
Anxiety	Contingent	Asthma	6.52	3.12	6.59	2.97
		Healthy				
		Control	5.58	3.41	5.69	3.12
	Non-contingent	Asthma	6.55	3.18	8.39	3.21
		Healthy				
		Control	5.76	3.03	7.73	2.78
Hostility	Contingent	Asthma	7.29	2.99	8.05	3.65
		Healthy				
		Control	6.63	3.24	7.14	3.34
	Non-contingent	Asthma	8.03	3.03	10.92	4.03
		Healthy				
		Control	7.03	3.58	9.40	3.93

Table 17

*Means and Standard Deviations for VAS*

Variable	Feedback Condition	<u>Time 1</u>		<u>Time 2</u>	
		Mean	SD	Mean	SD
VAS					
	Contingent				
	Asthma	5.41	2.49	5.51	2.55
	Healthy				
	Control	5.69	1.97	5.94	2.03
	Non-contingent				
	Asthma	5.24	2.34	3.61	2.11
	Healthy				
	Control	5.76	1.45	4.03	1.69

Table 18

*Means and Standard Deviations for Number of Anagrams Solved Incorrectly*

Feedback Condition		Mean	SD
Contingent			
	Asthma	4.63	3.66
	Healthy		
	Control	2.94	2.92
Non-contingent			
	Asthma	4.35	2.92
	Healthy		
	Control	3.48	2.85

Table 19

*Means and Standard Deviations for Follow-Up Comparisons for Number of Anagrams Solved Incorrectly*

Feedback Condition	N	Mean	Standard Deviation
Contingent			
Mild Asthma	28	4.32	3.45
Moderate-Severe Asthma	7	5.86	4.48
Healthy Control	36	2.94	2.92
Non-contingent			
Mild Asthma	19	3.58	2.16
Moderate-Severe Asthma	15	5.33	3.49
Healthy Control	33	3.48	2.85

Table 20

*Means and Standard Deviations for Situational Self-Awareness Scale*

Feedback Condition	Mean	SD
Contingent		
Asthma	38.33	8.28
Healthy Control	36.87	7.19
Non-contingent		
Asthma	38.86	7.72
Healthy Control	35.95	6.79

Table 21

*Means and Standard Deviations for Follow-Up Comparisons of Situational Self-Awareness Scale*

Feedback Condition	N	Mean	Standard Deviation
Contingent			
Mild Asthma	35	38.65	8.40
Moderate-Severe Asthma	7	36.71	8.07
Healthy Control	43	38.86	7.71
Non-contingent			
Mild Asthma	21	36.14	6.74
Moderate-Severe Asthma	17	37.76	7.82
Healthy Control	37	35.94	6.79

Table 22

*Means and Standard Deviations for Attributions for Performance*

Feedback Condition	Mean	SD
Contingent		
Asthma	5.07	1.19
Healthy Control	4.93	1.3
Non-contingent		
Asthma	4.54	1.56
Healthy Control	4.58	1.32

Table 23

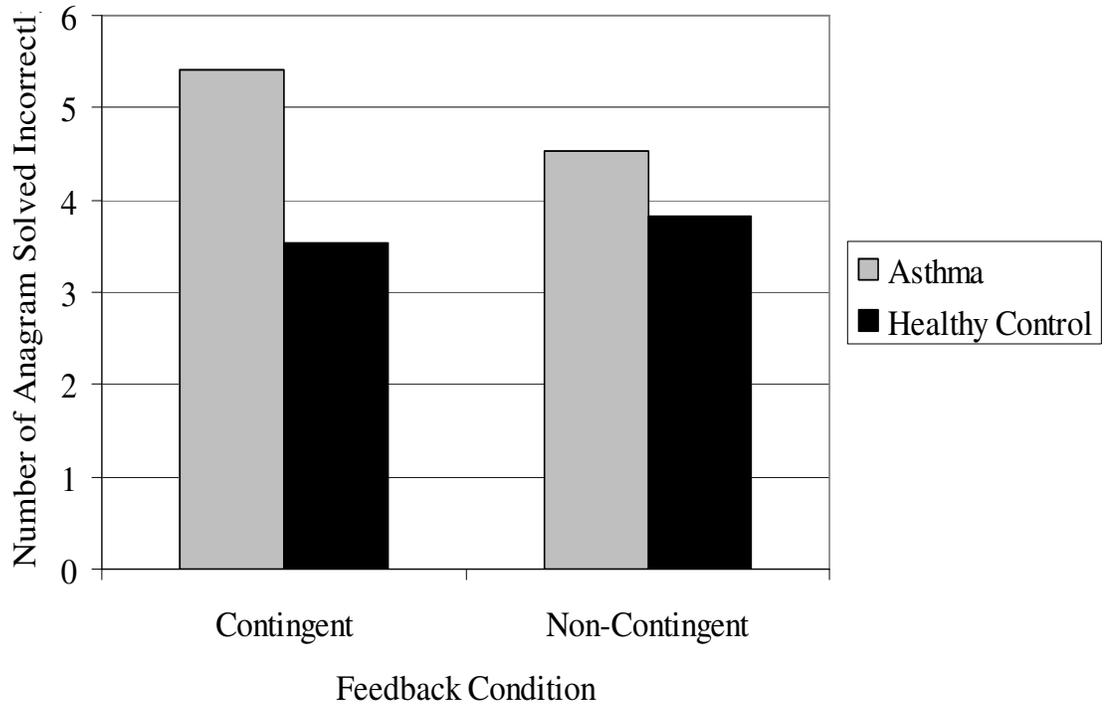
*Means and Standard Deviations for Follow-Up Comparisons for Attributions for Performance*

Feedback Condition	N	Mean	Standard Deviation
Contingent			
Mild Asthma	34	5.14	1.23
Moderate-Severe Asthma	7	4.71	0.95
Healthy Control	42	4.92	1.29
Non-contingent			
Mild Asthma	21	4.19	1.47
Moderate-Severe Asthma	16	5.00	1.59
Healthy Control	36	4.58	1.31

Appendix R

FIGURE 1: MEAN NUMBER OF ANAGRAMS  
SOLVED INCORRECTLY

Figure 1: Number of Anagrams Solved Incorrectly By Experimental Group



Appendix S

INSTITUTIONAL REVIEW BOARD APPROVAL PAGE

**Oklahoma State University  
Institutional Review Board**

Protocol Expires: 2/28/2005

Date: Monday, March 01, 2004

IRB Application No AS0359

Proposal Title: THE INFLUENCE OF SELF-FOCUS ON PSYCHOLOGICAL ADJUSTMENT IN OLDER  
ADOLESCENTS AND YOUNG ADULTS WITH ASTHMA

Principal  
Investigator(s):

Jill Van Pelt  
215 N. Murray  
Stillwater, OK 74078

Larry L. Mullins  
215 N Murray  
Stillwater, OK 74078

Reviewed and  
Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

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Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone: 405-744-5700, colson@okstate.edu).

Sincerely,



Carol Olson, Chair  
Institutional Review Board

## VITA

Jill Christine Van Pelt

Candidate for the Degree of

Doctor of Philosophy

Dissertation: SELF-FOCUS AND PSYCHOLOGICAL DISTRESS IN  
ADOLESCENTS AND YOUNG ADULTS WITH LONG STANDING  
ASTHMA

Major Field: Clinical Psychology

Biographical:

Personal Data: Born in Lakewood, New Jersey, On August 21, 1976, the daughter of Jeremy and Linda Van Pelt.

Education: Graduated from Plano Senior High School, Plano, Texas, in May 1994; received a Bachelor of Arts degree in Psychology in May 1998 and a Master of Arts degree in Experimental Psychology in May 2000 from Wake Forest University, Winston-Salem, North Carolina. Completed the requirements for the Master of Science degree with a major in Clinical Psychology at Oklahoma State University in December 2002.

Experience: Employed by Oklahoma State University as a graduate research assistant and/or graduate teaching assistant from 2000-2004. Worked as a psychological associate from 2000-2003 and as the Assistant Director of Clinical Services from 2003-2004 in the Psychological Services Center at Oklahoma State University. Served as a volunteer practicum student in the Neuropsychology Lab at the University of Oklahoma Health Sciences Center during the 2002-2003 academic year. Completed pre-doctoral internship at the University of Minnesota Medical School, Minneapolis, Minnesota from September 2004-August 2005.

Professional Memberships: American Psychological Association

Name: Jill Van Pelt

Date of Degree: December, 2005

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: SELF-FOCUS AND PSYCHOLOGICAL DISTRESS IN  
ADOLESCENTS AND YOUNG ADULTS WITH LONG STANDING  
ASTHMA

Pages in Study: 182

Candidate for the Degree of Doctor of Philosophy

Major Field: Clinical Psychology

Scope and Method of Study: The purpose of the present study was to examine differences in situational and dispositional self-focused attention between adolescents and young adults with and without a history of childhood asthma. Participants were 81 college students with a history of childhood onset asthma and 81 age- and gender-matched healthy controls. Participants completed measures of depression, anxiety, dispositional self-focus, and situational self-focus. The situational self-focus measure was completed following an experimental task that induced either success or failure.

Findings and Conclusions: Results from the current study indicated that participants with moderate to severe asthma reported higher rates of general psychological distress, depression, and anxiety than participants with mild asthma and age- and gender-matched peers. Participants with and without a history of asthma did not differ in their mean level of dispositional self-focus. Further, in contrast to what was predicted by the current study, participants with and without a history of asthma did not respond differently to experimentally induced failure and they did not demonstrate a differential pattern of self-focused attention following experimentally induced failure. The current study predicted that, among participants with asthma, increased levels of illness uncertainty would predict psychological distress and that this relationship would be mediated by dispositional self-focused attention. While illness uncertainty was a predictor of psychological distress, dispositional self-focused attention failed to mediate this relationship. As predicted, participants with asthma missed more days from class and work due to health related problems compared to participants without asthma; however, the two groups did not differ on semester or cumulative grade point average. Results from the current study suggest that college students with a history of childhood onset asthma may be more vulnerable to psychological distress compared to age- and gender-matched peers without a chronic illness history and may, therefore, warrant interventions to improve their ability to cope with life stressors.

ADVISER'S APPROVAL: Larry L. Mullins, Ph.D.

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