THE RELATION BETWEEN FAMILY FUNCTIONING AND PSYCHOLOGICAL ADJUSTMENT IN CHILDREN WITH ASTHMA AND CHILDREN WITH DIABETES

A Dissertation

by

EVE NICOLE FONTAINE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2005

Major Subject: School Psychology

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Approved by:

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ABSTRACT

The Relation between Family Functioning and Psychological Adjustment in Children with Asthma and Children with Diabetes. (December 2005)

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Dr. Michael Ash

The goals of this study were to evaluate the relationships among family functioning, psychological adjustment, and health-related quality of life in children with asthma and children with diabetes. A secondary goal of this study was to examine the relations between illness severity, psychological adjustment, and health-related quality of life in the children with asthma. Participants included 41 children with asthma and 109 children with diabetes, and one primary caregiver of each child. Questionnaires were given to children to assess their levels of anxiety, depression, and health-related quality of life. Questionnaires pertaining to parenting stress, family functioning, and psychological adjustment also were completed by the participating primary caregiver. Results suggested these two groups of children do not differ in their psychological adjustment, family functioning, or health-related quality of life. Normal levels of anxiety and depression were reported, which both supports and contradicts current research in this area. Additionally, parenting stress mediated the relationship between family cohesion and parent-reported depression in children with diabetes; however, this result was not obtained in the children with asthma. In children with diabetes, significant relationships were found between self-reported anxiety and parenting stress and between

parent-reported anxiety and health-related quality of life. Additionally, parent-reported depression was significantly related to parenting stress, health-related quality of life, and family cohesion. Self-reported depression was significantly predicted by health-related quality of life. In children with asthma, health-related quality of life significantly predicted self-reported anxiety and parenting stress was significantly related to parent-reported depression. Illness severity did not predict psychological adjustment or health-related quality of life in children with asthma.

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CHAPTER I

INTRODUCTION

Significant research has been devoted to investigating the correlates of psychological adjustment in children diagnosed with asthma and children diagnosed with diabetes. A relation between asthma and anxiety has been well established, such that children with asthma have been found to exhibit higher rates of anxiety than healthy children (Ortega et al., 2002; Vila et al., 2000; Gillaspy et al., 2002). Similarly, research suggests that youth with diabetes have more elevated depression scores than do healthy children (Northam, 1997; Grey, Whittemore, & Tamborlane, 2002). However, findings regarding the association between asthma and depression and the relation between diabetes and anxiety are inconsistent. Furthermore, though considerable research has compared asthmatic or diabetic youth to healthy children on measures of psychological adjustment, fewer studies have compared children and adolescents with asthma to diabetic youth on such measures. It is important that these groups be compared in order to identify the similarities and differences in their psychological functioning.

Evidence about the relationship between illness severity in asthmatic youth and psychological adjustment also is conflicting. Despite the breadth of research in this area, consensus is still lacking regarding the most appropriate way to classify children and adolescents with asthma into the categories of mild, moderate, or severe asthma.

This dissertation follows the style of the *Journal of Pediatric Psychology.*

Generally, illness severity is categorized based on the child's use of medication (i.e., frequency and types taken), the frequency of asthma attacks in the past year, and the number of days absent from school due to asthmatic episodes within a school year (MacLean, Perrin, Gortmaker, & Pierre, 1992). The lack of consistent findings in this area signals the need for additional research to clarify the relations between the severity of asthma and psychological adjustment.

Research on the parenting-related stress of parents of children with asthma or diabetes also is limited. Current research has suggested that mothers of children with these illnesses report greater parenting stress than mothers of healthy children (Hauenstein, Marvin, Snyder, & Clarke, 1989; Carson & Schauer, 1992). Family functioning in the families of diabetic children has been linked to psychological adjustment and glycemic control. Family functioning also has been related to the mental health of children with asthma (Sawyer et al., 2000) and to children's perceptions about their health-related quality of life (Sawyer, Spurrier, Kennedy, & Martin, 2001). However, research has failed to elucidate the potential role of parenting stress in the relation between family functioning and child psychological adjustment. Additionally, no empirical investigations have been conducted comparing the levels of parenting stress in the parents of children with asthma to those of diabetic youth.

Though an abundance of research has been conducted on evaluating the psychometric properties of various measures of quality of life, there is a paucity of research on the health-related quality of life of children with asthma and children with diabetes. Current research in this area has suggested that children with asthma have

significantly poorer health-related quality of life than healthy children (Sawyer et al., 2000). A relation between diabetes and perceptions of health-related quality of life also has been established, such that health-related quality of life decreases with an increase in symptoms indicative of the possible prevalence of long-term complications (e.g., renal complications; Hahl et al., 2002). Further, Sawyer et al. (2001) found a significant relationship between children's reports of their quality of life and several important dimensions of family functioning. However, research on the potential relationship between quality of life and family cohesion and adaptability is lacking. Due to the lack of research in this area, it is important that studies focus on how asthma and diabetes impact the health-related quality of life of children. Gaining knowledge about the specific areas of life that are perceived to be the most problematic for these youth can assist in the identification of specific goals to target for individual and family intervention. Moreover, such knowledge can be used to educate parents and teachers about the potential areas of concern and aid in the provision of appropriate services.

Continued research is needed in order to clarify the relationships among the myriad of variables associated with psychological adjustment, family functioning, and quality of life in children and adolescents with asthma and diabetes. Such research will better enable professionals to determine the most important areas to target for intervention in children with these illnesses. Therefore, this study proposed to examine the relations among family functioning, psychological adjustment, quality of life, and illness parameters in children and adolescents with asthma or diabetes. This study was conducted as part of a larger project investigating various individual, family, and illness-

related variables associated with children who have been diagnosed with asthma or diabetes. This study had the following goals: 1) to evaluate family functioning (i.e. family adaptability and cohesion) in the families of children diagnosed with either asthma or diabetes; 2) to investigate the potential mediating effect of parenting stress in the relation between family functioning and psychological adjustment of children with these illnesses; 3) to compare the psychological adjustment of youth with asthma to that of youth with diabetes (i.e., depression, anxiety); 4) to explore the psychological adjustment of children with asthma in relation to illness severity; and 5) to investigate the perceived health-related quality of life of these children.

Specific research questions to be addressed are:

1) *Do families of children with diabetes differ from families of youth with asthma on measures of family cohesion, adaptability, and parenting stress?*
2) *Do children with asthma differ from youth with diabetes on measures of depression, anxiety, and quality of life?*
3) *How well the psychological adjustment of children (i.e. depression, anxiety) is predicted by family cohesion, family adaptability, parenting stress, and health-related quality of life?*
4) *Does parenting stress mediate the relationship between family functioning and child psychological adjustment (i.e. depression, anxiety)?*
5) *Can the psychological adjustment (i.e. depression, anxiety) of children with asthma be predicted by illness severity (i.e. mild, moderate, and severe)?*

6) *What is the relation between illness severity in asthma (i.e. mild, moderate, and severe) and health-related quality of life?*

Based on the current literature, it is predicted children with asthma will have more elevated levels of anxiety when compared to diabetic youth. In contrast, it is anticipated that children with diabetes will exhibit more elevated levels of depression than youth with asthma. Further, children with asthma are not expected to differ from diabetic youth on measures of health-related quality of life, and their parents are not expected to differ in their level of parenting-related stress. However, it is anticipated that parents of children with both illnesses will report experiencing high parenting stress when compared to the parents in the Parenting Stress Index normative sample. It also is anticipated that parenting stress will account for a significant amount of the variance in the relationship between family functioning (i.e., cohesion and adaptability) and psychological adjustment (i.e., depression and anxiety).

Based on research suggesting that families of children with asthma are more adaptable compared to the more rigid nature of families of children with diabetes (Holden et al., 1997), it is hypothesized that families of children with asthma will be characterized by greater adaptability than families of children with diabetes. However, family cohesion is not expected to vary according to illness type (i.e., asthma or diabetes). Further, illness severity is expected to be a significant predictor of psychological adjustment in children with asthma. A significant negative correlation between illness severity and quality of life is expected to be found, such that quality of life will decrease as illness severity increases.

CHAPTER II

LITERATURE REVIEW

An estimated 10-20% of children are afflicted with a chronic disease (Boekaerts & Roder, 1999). These children are believed to be at greater risk for the development of psychological difficulties than children without chronic illness. Considerable research has focused on the impact of such illnesses on the psychological functioning of youth, their quality of life, and the impact of their illness on the family. Epidemiological studies have found that children with a chronic illness experience more psychological adjustment difficulties than healthy children (Thompson & Gustafson, 1996). However, research on the social functioning of chronically ill children has failed to find evidence that these children experience greater social isolation (Boekaerts & Roder). Conflicting evidence in this area of research can be partially explained by the considerable variability among the different types of chronic illnesses and the demands they place on children. Thus, current research predominantly focuses on specific diseases and comparisons between children with different illnesses and healthy children. Two childhood diseases that are commonly investigated separately with healthy comparisons include asthma and Type I diabetes.

The impact of asthma and diabetes on the psychological adjustment of youth is important due to the established relation between psychological adjustment and health status (e.g., English & Sills, 1998). For instance, emotional distress may serve as a trigger for asthma attacks (Clark & Rees, 1998). In the case of diabetes, children who demonstrate poor long-term control of their blood glucose levels are more likely to

exhibit emotional and behavior problems (English & Sills). Further, diabetic youth experiencing psychological difficulties are at increased risk for having problems adhering to their treatment regimens (English & Sills). Poor adherence to the treatment regimen may place children and adolescents with diabetes at risk for future long-term diabetic complications (Wysocki, 1997). Thus, children's adjustment to diabetes and asthma has significant ramifications for their physical health. It is therefore critical that variables significantly related to adjustment be determined and that predictors of poor psychological adjustment to asthma and diabetes be identified. Potential correlates of adjustment difficulties include family functioning and the health-related quality of life of youth with asthma and diabetes. A description of these illnesses and a discussion of current research findings in the areas of psychological adjustment, family functioning, and quality of life are presented in the following sections.

Asthma

Asthma is the most common chronic illness in children (Creer & Bender, 1995), affecting an estimated 7% of children between ages 5 and 14 years in the United States (Centers for Disease Control and Prevention [CDC], 1998). The cases of asthma in children 5 to 14 years of age increased 74% between 1980 and 1994 (Lara et al., 2001). The exact cause of this surge in asthma diagnoses is unkown; however, growth of urban areas and increasing air pollution have been pinpointed as potential contributors to this problem (Silverstein, Silverstein, & Nunn, 1997). Prior to puberty, boys are more likely than girls to develop asthma; however, males and females begin to exhibit the same incidence of asthma following the onset of puberty (Silverstein et al.). Higher incidence

of asthma is found among children who are African American, Puerto Rican, or poor (Lara et al.). Rates are impacted by the limited access these subpopulations may have to adequate health care services. Children who were poor had 40% more hospitalizations and 40% fewer doctor visits than children who were not poor (Creer & Bender).

Asthma is a chronic lung disorder characterized by inflammation of the airway, airway obstruction that is reversible spontaneously or with treatment, and airway hyper-responsiveness to a variety of stimuli (National Institutes of Health, 1991). Symptoms of asthma include coughing, wheezing, a feeling of tightness in the chest, and shortness of breath (Silverstein et al., 1997). The symptoms of asthma vary from person to person and over time, reflecting its intermittent nature (Creer & Bender, 1995). Asthmatic episodes may be triggered by exercise, house dust mites, pollens, smoke, respiratory infections, animals, and psychological factors (Clark & Rees, 1998). Fear and anxiety may increase the severity of an asthmatic reaction (Olson, Mullins, Gillman, & Chaney, 1994).

The severity of asthma varies considerably across individuals, resulting in the frequent classification of asthma as mild, moderate, or severe. However, consensual agreement on how to classify individuals into these categories is lacking. In general, the severity of asthma is often based on the child's use of medication (i.e., frequency and types taken), the frequency of asthma attacks in the past year, and the number of days absent from school due to asthmatic episodes within a school year (MacLean et al., 1992). Indeed, more absences from school are due to asthma than any other chronic illness (Clark & Rees, 1998).

Psychological Adjustment to Asthma

Children and adolescents with asthma are believed to be at greater risk for psychological problems. Research suggests that children with asthma experience more internalizing and total behavior problems than healthy children (Klinnert et al., 2000). Having a history of asthma has been related to having an anxiety disorder (Ortega et al., 2002). In their study of 82 children ages 8 to 15 years with moderate or severe asthma, Vila et al. (2000) identified 33 (42%) participants with at least one DSM-IV psychiatric diagnosis based on diagnostic interviews with the Revised Schedule for Affective Disorders and Schizophrenia for School-aged Children (K-SADS-R). Of these 33 children, 29 (35%) were diagnosed with at least one DSM-IV anxiety disorder. The most commonly identified diagnosis was generalized anxiety disorder (24 children), followed by separation anxiety disorder (13 children). Further, fourteen children were diagnosed with two anxiety disorders and three children had three anxiety disorders.

Gillaspy and colleagues (2002) identified asthmatic adolescents from a low socioeconomic status (SES) or ethnic minority group who had a history of academic or vocational problems as being at high risk for psychological maladjustment. Indeed, these youth had significantly higher levels of anxiety, depression, and global psychological distress than healthy children. It is clear that a relationship between asthma and internalizing problems has been established through research; however, there are conflicting reports regarding the role of additional variables such as socioeconomic status and illness severity, and the impact they have on this relationship.

Evidence about the relation between illness severity and psychological adjustment is inconsistent. For example, Perrin, MacLean, & Perrin (1989) found that children with mild or severe asthma had less optimal psychological adjustment scores than youth with moderate asthma. These findings are suggestive of a nonlinear relationship. In contrast, Bender et al. (2000), in their study of 1,041 children aged 5 to 12 years with mild to moderate asthma, found these children's emotional and behavioral problems were not elevated when compared to normative data. Other reports suggest that the severity of asthma is related to increased emotional difficulties (Klinnert et al., 2000), and that anxiety and aggressive behavior in children with asthma are usually associated with severe, continuous asthma (Clark & Rees, 1998), pointing to a linear relationship.

Insulin-Dependent Diabetes Mellitus

Insulin-dependent diabetes mellitus, also known as Type I diabetes, is a chronic metabolic disease characterized by pancreatic failure (Johnson, 2001), which results from the destruction of the insulin-producing islet cells within the pancreas. An estimated 1 in every 600 children in the United States has diabetes (LaPorte & Tajima, 1985). Male and female children are equally likely to develop diabetes and Caucasian children are 1.5 times more likely than black children to be diagnosed with diabetes (Johnson).

The goal of treatment is to maintain optimal metabolic control. Metabolic control, also called glycemic control, refers to the achievement of good long-term blood glucose control. Consistent definitions of "good" control are lacking; however, it is

based on the level of glycosylated hemoglobin (HbA1c), which is considered a reliable indicator of long-term blood glucose control. Treatment of diabetes often involves injections of insulin in order to maintain appropriate blood glucose levels (80-120 mg/100 ml). Two types of insulin are commonly prescribed, short-acting and intermediate-acting, which differ with respect to their absorption rates, and time and duration of maximal action. Due to recent medical advances, a number of children and adolescents are now using insulin pumps to regulate their blood glucose levels. An insulin pump is a device that is filled with insulin and usually attached to the abdomen. The pump is programmed to deliver insulin continuously, with the dosage based on the unique needs of the individual. Further, the pump allows for flexibility in an individual's lifestyle due to its ability to account for variations in timing and amounts of nutritional intake as well as physical activity (Plotnick, Clark, Brancati, & Erlinger, 2003).

Due to the considerable variability of blood glucose levels over time, they must be routinely monitored. Youth diagnosed with diabetes are faced with the challenge of adhering to a complex treatment regimen. Illness management involves daily insulin injections, blood glucose monitoring, a rigid diet, and regular exercise. These demands of daily management, the constraints placed on everyday life, medical complications, and hospitalizations are believed to place children with diabetes at risk for the development of psychosocial difficulties (Kovacs et al., 1990b).

Psychological Adjustment to Diabetes

Adaptation to diabetes begins immediately following the diagnosis. A three-phase model of the phases of psychological adaptation to the diagnosis of diabetes

mellitus in children and adolescents has been proposed (Jacobson & Hauser, 1982). The onset period is believed to immediately follow the child's diagnosis and to last throughout the first year post-diagnosis. This phase is considered to be characterized by initial feelings of shock and a lack of emotional acceptance followed by grief, anxiety, guilt, and self-blame. At approximately the second year post-diagnosis, the child is believed to enter the general illness course. During this time, children focus on learning the skills to manage their illness on a daily basis (e.g., injecting insulin, testing their blood glucose levels, maintaining a healthy diet and exercise regimen). Adolescents in this phase are thought to desire more autonomy and often struggle with their parents to achieve this end. Teenagers in this phase also may feel heightened anxiety about their future and potential health complications of the disease. Children and adolescents are believed to remain in this phase until they enter the complications period. During this time, they will experience medical complications related to their illness, requiring them to adapt physically and psychologically to these changes.

Research on the psychological adjustment to diabetes in youth has generally found that children with diabetes appear similar to healthy children on most measures of psychological adjustment (Johnson, 2001; Kovacs et al., 1990b). However, it has been demonstrated that children with diabetes experience mildly elevated levels of anxiety and depression following their diagnosis of diabetes (Northam, 1997). Furthermore, children's initial responses to their diagnosis, as reflected by levels of depression, anxiety, and self-esteem, are predictive of their adjustment six years later (Kovacs et al., 1990b). Relationships have been established between the onset and chronic course of

diabetes and increased anxiety, depressive mood, social withdrawal, rebelliousness, insecurity, and denial among children (Gath, Smith, & Baum, 1980).

Internalizing problems are the most common type of psychological difficulties experienced by children with diabetes. Approximately 20% of youth with diabetes are affected by depression, compared to less than 7% of youth without diabetes (Grey et al., 2002). In children with diabetes and depression, depressive symptoms are more severe, the initial episode takes longer to resolve, and additional episodes are more likely to recur (Grey et al.). Research has suggested that psychological difficulties in children with diabetes are related to disease-specific problems, such as problems adhering to the medical regimen and relationship difficulties with family and peers (Chisholm, 2003). Indeed, depressive symptomatology in youth with diabetes also is associated with poorer metabolic control (Grey et al.).

Conflicting evidence exists regarding gender differences in depression among youth with diabetes. LaGreca and colleagues (1995) reported that the girls in her sample of 42 adolescents with Type I diabetes were significantly more depressed than the boys. However, boys with diabetes have been found to be significantly more likely to be depressed than girls 10 years following onset of their illness (Jacobson et al., 1997). It is unclear what role, if any, duration of illness plays in the differential development of depressive symptoms based on gender.

A breadth of research has investigated the adjustment of children with diabetes in terms of health status because poor adherence to the treatment regimen may place children with diabetes at risk for future long-term diabetic complications (Wysocki,

1997). Moreover, studies have linked children's health status to their psychological functioning. For instance, children and adolescents with poor metabolic control are more likely to exhibit emotional and behavior problems and to have difficulties adhering to their treatment regimens (English & Sills, 1998). Furthermore, research suggests an association between metabolic control and family functioning, such that family variables influence children's health status.

Family Functioning

Family functioning is comprised of a set of family and parent variables. These factors include parental adjustment, marital adjustment or conflict, family conflict, family resources, family cohesion, family adaptability, and the degree of parenting stress. The influence of these variables on children's adjustment to diabetes and asthma is discussed below. Families play a pivotal role in children's adjustment to chronic illness. Families determine the environment with which children interact and may therefore have a considerable impact on children's development of adequate or inadequate coping strategies (Boekarts & Roder, 1999). Diabetes and asthma are two chronic illnesses that have implicated family functioning in significantly influencing children's adjustment (Sawyer et al., 2000). In the following paragraphs, these family and parent variables will be discussed: parental adjustment, marital conflict, family conflict, family resources, family cohesion, family adaptability, and parenting stress.

Parental Adjustment

The diagnosis of a child with diabetes may result in mild depression and overall distress in their mothers (Kovacs et al., 1985); however, these initial reactions tend to

resolve for most mothers over the course of the first year of the illness (Kovacs et al., 1990a). Mothers appear to display greater distress than do fathers, and mothers experiencing poorer psychological functioning have reported greater difficulty adapting to the daily demands of diabetes (Kovacs et al., 1990a). Northam and colleagues (1996) found anxiety to be the most consistently reported symptom by mothers and fathers of children recently diagnosed with diabetes. Over time, parents may begin to display symptoms of depression (Northam et al.). Parents may experience feelings of helplessness over their child's medical condition or may have limited time to pursue interests previously enjoyed due to the increase in time spent managing illness-related tasks.

Research also suggests that maternal psychological adjustment impacts the psychological functioning of children with diabetes (Chaney et al., 1997). Cross-sectional studies have demonstrated that significant amounts of variance in child adjustment to diabetes can be explained by the influence of maternal adjustment, beyond the variance due to demographics and illness parameters (Chaney et al.).

Marital Conflict

The diagnosis of a child with diabetes has not been found to adversely affect marital status, but has been demonstrated to increase marital distress (Garrison & McQuiston, 1989). Parents may have difficulty resolving any differences in opinion concerning management of their child's illness (Ahmed & Ahmed, 1985), which may contribute to elevated levels of conflict within the marital relationship. Marital conflict

may in turn negatively impact children's adjustment to their illness (Garrison & McQuiston).

The restructuring of the family that occurs following the diagnosis of asthma or diabetes also may influence marital conflict. For instance, one parent often becomes primarily responsible for illness-related tasks. If this occurs in a family in which the marital relationship already is strained, there is the potential for a rift in the marriage to develop. In this case, parents shouldering the responsibilities for illness management may decrease interactions with spouses in order to attend to the ill child's care (Ahmed & Ahmed, 1985).

Family Conflict

The presence of conflict in families with a child diagnosed with diabetes has been linked to the incidence of psychological difficulties. When acute complications due to diabetes occur in children, the presence of family conflict, coupled with low levels of family organization and expressiveness, are associated with children's reduced social competence and increased behavior problems (English & Sills, 1998). Research also suggests that increased family conflict is related to children's poor metabolic control (English & Sills). Specifically, children who perceive high levels of family conflict demonstrated poorer adherence to their treatment regimen (Hauser et al., 1990). Conversely, the ability of family members to express their feelings freely has been associated with better metabolic control (English & Sills). Additionally, research has found that child and parent reports of diabetes-specific family conflict significantly

predict total quality of life (Laffel et al., 2003). Thus, a link between family conflict and children's adjustment to diabetes and overall quality of life is evident.

Family Resources

The personal social networks of families of children with diabetes may have an important effect on their children's development (Hamlett, Pellegrini, & Katz, 1992). For instance, families that have wide support networks may have greater access to ideas and information about childrearing, emotional and material assistance, and the cognitive and social stimulation of the child (Cochran & Brassard, 1979). Families that do not have such support to draw upon may be at increased risk for difficulties adjusting to the changes induced by diabetes diagnosis.

Additional family resources that can assist children and their families in the adaptation process include money, the emotional support of family members, healthy and positive family relationships, and the competencies of individual family members. The availability of these resources contributes to the family's ability to cope with the crises and changes associated with their child's chronic illness (Hamlett et al., 1992). The amount of emotional support that children perceive they received from other family members is particularly important for their adjustment to diabetes (Wysocki, 1997). Abnormal family functioning involving low social support has been found to be a risk factor for asthma death (Winefield, 1994). It has been suggested that a lack of resources may contribute to the child's psychological maladaptation (Garrison & McQuiston, 1989). Additionally, reduced family resources have been associated with children's poor metabolic control (English & Sills, 1998).

Family Cohesion and Adaptability

Family cohesion refers to a family's emotional togetherness. Strong family cohesiveness has been found to be important to achieving a good health status in youth with diabetes (Wysocki, 1997). Hauser and colleagues (1990) demonstrated that parents of diabetic youth who perceived their families as more cohesive had children rated as having higher overall diet and metabolic monitoring adherence. Additional research has supported the association between high family cohesion and good metabolic control (Hanson et al., 1989). Less cohesion is more likely in non-traditional families (e.g., single-parent or blended) with a child who has diabetes (English & Sills, 1998). Children in these families also displayed greater behavioral difficulties and poorer metabolic control. A significant relationship between family cohesion, family conflict, and externalizing behaviors has been established (Hamlett et al., 1992). Additionally, research has found that high cohesion is related to high self-esteem in diabetic youth (Evans & Hughes, 1987).

Family adaptability is defined as the ability of a family system to modify its role relationships, relationship rules, and power structure in response to stressors (Olson et al., 1992). One study on the associations among asthma or diabetes and children's adjustment, family functioning, and maternal coping found families of children with asthma to be more adaptable, and families of children with diabetes to be more rigid (Holden et al., 1997). Based on Olson's (2000) circumplex model of family functioning, extremes of cohesion or adaptability are considered challenges in a family with a child suffering from a chronic illness. Grey et al. (2002) found that adolescents who reported

lower family adaptability and lower family cohesion were more likely to have depressive symptoms than adolescents with higher family functioning. Thus, poor family functioning may predispose children and adolescents to internalizing difficulties.

Parenting Stress

Research suggests that parental stress and distance are related to children's adjustment to their illness (Thompson & Gustafson, 1996). Research on parenting-related stress in the parents of children and adolescents with diabetes or asthma is limited. Current research in the area of diabetes focuses on the parenting stress of mothers due to the tendency of mothers to shoulder the responsibilities of managing the child's illness demands. The demands placed on the family to manage diabetes may increase parental stress. Indeed, greater parenting stress has been reported by mothers of children with diabetes than by mothers of healthy children (Hauenstein et al., 1989). Children with diabetes are perceived by their mothers as more demanding, unacceptable, non-adaptable, and as having a more negative mood. Hauenstein and colleagues also found that mothers of children with diabetes report receiving less support from their spouses, having poorer health, and having less attachment to their children.

Few studies have been conducted on the parenting-related stress of parents of asthmatic youth. Carson & Schauer (1992), in their study of 41 mothers of youth with asthma, found that these parents reported a greater degree of parenting stress than a comparison group of mothers of healthy children. Further, these mothers perceived the quality of the relationship with their ill child to be more problematic.

The quality of family functioning may either serve as a potential buffer of stressful events or may intensify the disruptive effects of illness-related stressors (Hamlett et al., 1992). Families with effective organization can successfully manage children's diabetes and development (Ahmed & Ahmed, 1985). However, ineffective families characterized by poor organization may experience significant difficulties adapting to their child's illness (Ahmed & Ahmed). Parental maladjustment, marital conflict, the absence of family resources, and the lack of family cohesion may impact children's adjustment to asthma or diabetes. However, family functioning makes up only one set of parameters affecting children's adaptation to chronic illness. The complex interplay among disease-specific, child, and family factors will help determine children's adjustment to their illness and influence their health status. Further, children's perceptions of their health-related quality of life will play a role in their overall adjustment to their illness.

Asthma and the Family

Following the diagnosis of asthma in a child, the child's family experiences a myriad of changes. Asthma may impact the family socially, financially, and emotionally. The adjustment of the ill child depends greatly on how the non-asthmatic family members react (Freedman, Rosenberg, & Divino, 1998), as well as on the resources available to the child and family. A supportive and well-organized family is believed to serve as a protective factor for youth with asthma (Kazak, 1989). Research has demonstrated a relationship between family processes and symptoms of asthma in children and adolescents (Creer & Bender, 1995). Furthermore, family factors have been

found to moderate the relationship between asthma and anxiety (Markson & Fiese, 2000). In their study of 43 families with a child with asthma, Markson and Fiese found that families reporting more meaning in their family routines had children who reported lower levels of anxiety. Additionally, results suggested that when families are experiencing increased parenting stress, family rituals may serve as a protective function for children with asthma.

Diabetes and the Family

When a child is diagnosed with diabetes, a multitude of changes occur in the family system. Alterations in the family's pattern of communication, interaction styles, coalitions, and alliances within the family network may occur as families adapt to the demands of managing the illness (Northam et al., 1996). Families must reorganize their daily routines and renegotiate family roles in response to the diagnosis. For instance, the family must arrange for meal times to be scheduled around the child's treatment regimen (i.e. within specific time period following an insulin injection). Depending on the age and developmental level of the ill child, either one or both parents may need to adopt the role of monitoring the child's blood glucose level and providing insulin injections. A family member also may need to adopt the role of ensuring the child adheres to his or her prescribed diet and exercise regimen. In some instances, a family member must acquire another job in order to afford the cost of medical treatment. The challenge becomes balancing the needs of the family and those of the ill child (English & Sills, 1998).

Children with diabetes and their families will experience a life-long process of adaptation as illness-related stressors occur (Hamlett et al., 1992). The families of children with asthma also will go through a process of adjusting to the child's illness and what illness-related stressors they experience will depend greatly on the severity of the illness. How the family adapts to the changes in the family system will affect both child and family functioning. Moreover, the quality of family functioning will influence the child's psychological adjustment and health status.

Quality of Life

Health-related quality of life refers to the aspect of children's well-being that is impacted by illness severity and conditions related to the illness or medical treatment (Fayers & Machin, 2000). The quality of life of children with chronic illnesses is usually assessed based on child and parent reports. The symptoms of asthma or diabetes and the physical limitations these illnesses may place on children influence the quality of life of these youth. In a study conducted by Sawyer and colleagues (2000), in which the health-related quality of life of 236 children with mild or moderate/severe asthma was compared to a large representative sample of children in the general community, children with asthma were found to have a significantly poorer health-related quality of life.

Studies on the quality of life of children and adolescents with diabetes have found a relationship between diabetes and perceptions of health-related quality of life (Hahl et al., 2002). Limited research has been conducted on the relation between quality of life and family functioning. Sawyer and colleagues (2001) found a significant

relationship between children's reports of their quality of life and several important dimensions of family functioning. However, these dimensions did not include the evaluation of family cohesion or adaptability.

CHAPTER III

METHODS

Participants

A total of 179 caregivers originally consented for participation in this study. Of these, 15.1% did not complete participate in the study (84.9% completed participation). Participants included 41 (27.3%) children diagnosed with Asthma and 109 (72.7%) children diagnosed with Type I Diabetes, resulting in a total sample size of 150. Of these, 76 (50.7%) were male and 73 (48.7%) were female. The mean age was 10.31 (SD = 1.29) and the ethnic composition of the sample was 63.3% Caucasian, 14.7% African American, 6% Hispanic/Latino, 5.3% Bi-racial, 3.3% Alaskan Native/American Indian, and 0.7% Other (6.7% of parents did not report this information). One caregiver of each of these children also was asked to participate in the study. In the majority of cases (86%), the children's mother served as the caregiver participant. Additional caregivers included fathers (5.3%), grandmothers (1.3%), stepmothers (0.7%), and other females (0.7%). Information on the caregiver completing questionnaires was not provided by 6% of caregiver participants. See Table I for additional information on demographic characteristics.

Due to missing data, only 24 (58.5%) of the children with asthma were able to be categorized into illness severity groups (mild, moderate, and severe). The majority of these children (n = 17, 70.8%) were characterized by moderate illness severity. Six children (25%) fell into the mild illness severity category, and only one child (4.2%) was classified as severe. Due to the small number of children in the severe illness severity

Table I. Demographic Characteristics of Participants by Group.

	Asthma *n* = 41	Diabetes *n* = 109	Total *n* = 150
		Frequencies	
Gender			
Males	19	57	76
Females	22	51	73
Ethnicity			
African-American	13	9	22
American Indian/Alaskan Native	0	5	5
Bi-Racial	3	5	8
Hispanic	4	5	9
Caucasian	16	79	95
Other	0	1	1
Age			
Eight	6	9	15
Nine	12	20	32
Ten	9	17	26
Eleven	8	38	46
Twelve	6	25	31
Camp			
Broncho	27	0	27
Endres	0	35	35
Lions 1	0	31	31
Lions 2	0	33	33

Table I. Continued

	Asthma n = 41	Diabetes n = 109	Total n = 150
	Frequencies		
Wenoweez	14	0	14
Parents' Marital Status			
Married	24	75	99
Divorced/Separated	5	22	27
Single	5	6	11
Widowed	0	1	1
Relationship to Child			
Mother	33	96	129
Father	1	7	8
Stepmother	0	1	1
Grandmother	0	2	2
Other Female	0	1	1
Family's Annual Income			
< $10,000	6	4	10
$10,000-14,999	2	6	8
$15,000-24,999	3	10	13
$25,000-49,999	6	38	44
$50,000-74,999	4	17	21
$75,000-99,999	3	12	15
≥ $100,000	7	9	16

Table I. Continued

	Asthma n = 41	Diabetes n = 109	Total n = 150
	Frequencies		
Parents' Level of Education			
Less than High School	1	0	1
Some High School	3	4	7
High School Graduate/G.E.D.	2	13	15
Some College/Vocational/Technical School	10	33	43
Vocational/Technical School Graduate	2	8	10
Associate's Degree	6	8	14
4-year College Graduate	3	20	23
Some Graduate Work	2	5	7
Completed a Graduate Degree	4	12	16
Number of Days Missed School in Last Year Due to Chronic Illness			
Zero	8	46	54
One - Five	12	42	54
Six - Ten	6	7	13
Eleven - Fifteen	2	4	6
Sixteen - Twenty	0	0	0
Greater than Twenty	2	2	4

category, this case was removed for the purposes of statistical analyses related to illness severity.

Children were eligible to participate in this study if they: a) were boys and girls between 8 and 12 years of age; b) had been diagnosed with either Asthma or Diabetes by a medical professional; and c) had not been diagnosed with more than one chronic illness. Participants were children attending summer camps for children diagnosed with Asthma or Diabetes in the states of Texas and Oklahoma. Data was collected during the summer of 2003. In return for their participation, camps received the opportunity to receive feedback from campers regarding their camp experience via the administration of a Camp Satisfaction Survey to child participants at the completion of the camp session; however, all camps declined this opportunity. Additionally, each child and parent who participated in this study received a $10.00 gift card to Wal-Mart.

Measures

Family Adaptability and Cohesion Scales – Second Edition (FACES-II)

Family functioning was assessed using the FACES-II (Olson et al., 1992). One parent of each participating child completed the FACES-II. The FACES-II is a 30-item measure of the degree of family cohesion and adaptability. These variables comprise two of the dimensions included in the Circumplex Model of Marital and Family Systems (Olson, 2000).

Family cohesion refers to the extent to which family members are emotionally connected to or separated from one another (Olson et al., 1992). Families are categorized on a continuum ranging from very connected to disengaged. Family adaptability is

defined as the ability of a family system to modify its role relationships, relationship rules, and power structure in response to stressors (Olson et al.). Families are described as very flexible, flexible, structured, or rigid, based on their scores on this measure. In terms of both family cohesion and family adaptability, families that are not functioning in the extreme ranges that fall on both sides of the continuum are characterized as functioning well. Thus, family cohesion and adaptability are considered curvilinear dimensions (Reichenberg, 2000).

The FACES-II also yields a total score (ranging from 1 to 8) that places families into one of four categories: balanced (score of 7 or 8), moderately balanced (score of 5 or 6), mid-range (score of 3 or 4), or extreme cohesion and adaptability (score of 1 or 2). The FACES-II has been demonstrated to have good internal consistency (alpha = 0.91 for cohesion and 0.80 for adaptability; Olson et al., 1992) and test-retest reliability (0.84 for total scale; 0.83 for cohesion; 0.80 for adaptability; Olson et al.)

Parenting Stress Index – Third Edition (PSI)

The PSI (Abidin, 1990) was used to measure parental stress and problems within the parent-child relationship. One parent of each participating child completed the PSI. The PSI is comprised of 101 items, which are rated on a 5-point Likert scale. Nineteen optional items also are included to aid in the identification of stressful family events that have occurred within the past year. Responses to these optional items yield a Life Stress score. Each parent participant completed the 101 items of the PSI, as well as the optional 19 items.

The PSI is comprised of 6 scales related to child characteristics (Distractibility/Hyperactivity, Adaptability, Reinforces Parent, Demandingness, Mood, and Acceptability) and 7 scales related to parent personality and situational variables (Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse). Scores are obtained for each of these scales. Additionally, a Total Stress raw score is derived from responses to all test items. Based on participants' responses, raw scores are obtained. Percentiles can then be determined based on these scores. Raw scores will either correspond directly to a percentile (e.g., a raw score of 294 on Total Parenting Stress is equivalent to the 95th percentile) or will fall between two percentiles (e.g., a raw score of 162 on Total Parenting Stress is equivalent to between the 5th and 10th percentile). For the purposes of statistical analyses, raw scores were used in order to maintain the continuous nature of this variable. The raw scores derived from analyses were then matched to the percentiles in order to draw meaningful conclusions from the results. Scores within the 16th to 80th percentile range are considered Normal, whereas scores between the 81st and 84th percentile are Borderline, and scores at and above the 85th percentile are indicative of Clinically Significant concerns.

The validity of the PSI has been established in a variety of U.S. samples, as well as in diverse non-English-speaking populations. Internal consistency coefficients for the subscale and domain score range from 0.60 to 0.90 and test-retest reliabilities range from 0.70 to 0.90 for 3 to 4 week intervals (Abidin, 1990). Research also has demonstrated that the PSI has been able to accurately discriminate the degree of parenting stress

between families of children with and without disabilities (Solis, 1990) The manual includes Hispanic norms, and expanded norms by age, which facilitate interpretation.

Behavior Assessment System for Children (BASC)

The BASC (Reynolds & Kamphaus, 1992) is a conceptually derived, multidimensional approach to assess the behaviors and emotions of children and adolescents between 4 and 18 years of age. There are multiple versions of the BASC, including a Parent-Report Scale (PRS), Teacher-Report Scale (TRS), and Self-Report Scale (SRP). Each form yields T-scores on a number of clinical and adaptive skills subscales, as well as behavioral composite scores. For the purposes of this study, only the PRS and SRP were employed. Subscales of the BASC-PRS and BASC-SRP include Hyperactivity, Aggression, Conduct Problems, Anxiety, Depression, Somatization, Atypicality, Withdrawal, Attention Problems, Attitude to School, Attitude to Teachers, Locus of Control, Social Stress, Sense of Inadequacy, Adaptability, Social Skills, Leadership, Relations with Parents, Interpersonal Relations, Self-Esteem, and Self-Reliance. Composite scores are obtained on Externalizing Problems, Internalizing Problems, Adaptive Skills, School Maladjustment, Clinical Maladjustment, Personal Adjustment, and both a Behavior Symptoms Index and an Emotional Symptoms Index. For the purposes of this study, scores on the Depression and Anxiety subscales were of interest. Scores on the BASC are provided in the form of T-scores, and these T-scores were employed in all statistical operations that included variables from the BASC.

There are three different forms of the PRS, which are administered based on the age of the child: preschool (ages 2.5 – 5), child (ages 6 – 11), and adolescent (ages 12-

18). There also are two different versions of the SRP based on age level: child (ages 8-11) and adolescent (ages 12-18). The content and structure of these forms is similar across age levels (Reynolds & Kamphaus, 1992). Due to the age restrictions in this study, only the child and adolescent versions of both the PRS and SRP were administered.

The PRS was administered to the one parent or caregiver of each child who consented to participation in this study. The SRP was completed by each participating child. An F Index is included with each form to serve as a check on the validity of parent and self-report ratings. Due to the initial investigation of the parent and child variables included in this study, as well as the ambiguity of interpreting scores on this index (e.g., the scores could be an indicator of an excessively negative response pattern or actually reflect severe psychopathology), scores on the F Index were not utilized for the purposes of this study. However, scores on the BASC-SRP were not included in the dataset for children whose forms were invalid based on obvious response sets (i.e., children who only answered all "A's" in one column, "B's" in the other, or children who used the same response pattern throughout).

The validity of the BASC has been established based on the results of factor analyses and correlations between scores on the BASC and scores on other measures of behavioral and emotional problems in children (Reynolds & Kamphaus, 1992). Additional empirical support for the validity of the BASC has been obtained through an investigation of the ability to predict membership in diagnostic groups (e.g., no diagnosis, diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) only, and

diagnosis of ADHD and other comorbid behavior disorder) based on scores on the BASC-PRS (Doyle, Ostrander, Skare, Crosby, & August, 1997).

Regarding the reliability of the BASC, internal consistency reliabilities of the composite scores of the PRS are reported to be between the middle 0.80s and the low 0.90s at all age levels, and internal consistency reliabilities of the composite scores of the SRP are reported to range from the middle 0.80s to the high 0.90s at both age levels (Reynolds & Kamphaus, 1992). The internal consistency coefficients of the scales vary considerably for both the PRS and SRP, but are generally reported to be adequate. Support for test-retest reliability also has been obtained based on high test-retest correlations (e.g., median values of 0.85, 0.88, and 0.70 for the three age levels of the PRS, respectively; Reynolds & Kamphaus).

Pediatric Quality of Life Inventory 4.0 Measurement Model (PedsQL™)

The PedsQL™ (Varni, 2000) is a modular approach that was used as a measure of both the general and disease-specific health-related quality of life of child and adolescent participants. Each child completed a PedsQL™ – General Module Form and either a PedsQL™ – Asthma Module Form or PedsQL™ – Diabetes Module Form. The PedsQL™ – General Module Form is comprised of 23 items that measure the core dimensions of health. It yields raw scores that are linearly transformed on the following scales: Physical Functioning, Emotional Functioning, Social Functioning, and School Functioning. Additionally, the PedsQL™ – General Module Form yields a Total Scale Score, a Physical Health Summary Score, and a Psychosocial Health Summary Score. Scores range from 0-100 and higher values indicate better health-related quality of life.

The PedsQL™ asthma-specific and diabetes-specific modules complement the generic core scales. Each module consists of developmentally appropriate forms for children ages 2-4, 5-7, 8-12, and 13-18 years. The number of items varies across forms. The PedsQL™ is a valid and reliable measure of health-related quality of life (Varni, 2000; Varni, Seid, & Rode, 1999). Research has demonstrated the PedsQL™ can effectively discriminate between healthy children and children with acute and chronic health conditions (Varni et al., 1999). Additionally, the PedsQL™ can distinguish disease severity within a chronic illness (Varni et al., 1999). Reliability coefficients for the PedsQL™ are high (e.g., 0.88 for the Total Scale Score from the General Module; Varni et al., 1999). In an evaluation of the psychometric properties of the PedsQL™ with a sample of pediatric cancer patients, internal consistency was adequate across both patient and parent report (e.g., coefficient alpha = 0.83 for patient-report; Varni, et al., 1999).

Illness Severity

Due to concerns about the subjective nature of parents' report of illness severity, an objective method of characterizing illness severity was preferred for this study. Previous studies investigating illness severity in children with asthma have utilized a classification system that categorizes the severity of asthma as mild, moderate, or severe. This study used an objective measure of illness severity classification developed by Perrin et al. (1989; see Appendix A). Thus, a continuous variable of illness severity was not created for the purposes of this study. This method is consistent with research

method typically employed in the study of illness severity in children with asthma (Perrin et al.).

This method of illness severity classification in children with asthma involves the assignment of scores to the following information: 1) Medications used (i.e., epinephrine, steroid, medication used between asthma attacks); 2) Acute illness (i.e., number of asthma attacks within the past year); and 3) Number of school days missed because of asthma during the school year immediately prior to study entry. Based on the final score, children were placed into either the mild, moderate, or severe asthma groups.

Procedure

Camp directors for all summer camps for children diagnosed with Asthma or Diabetes in the states of Texas, Oklahoma, New Mexico, Arizona, and Louisiana were contacted via telephone. Each camp director was given a brief description of the study and asked to consider the possibility of their camp's participation. Camp directors were mailed a cover letter, a copy of the letter of approval from the Institutional Review Board, and a description of the study. Within two to three weeks, camp directors were contacted again to determine whether they were interested in participating in the study. Camps who expressed interest in the study met with their staff prior to providing their consent for participation in order to ensure the study's feasibility at their camp site.

Once consent for camp's participation was obtained, participants were recruited through materials sent with camp application or registration packets, or materials provided to parents at the camp's parent orientation. Materials provided in the initial parent packet in their camp application packet included a cover letter describing the

study (see Appendix B), a consent form for both child and parent participation (see Appendices C and D), a demographic questionnaire (see Appendix E), a medical history questionnaire (see Appendices F and G), and a self-addressed postage-paid envelope. The consent form informed parents that whether or not they chose to participate in the study would not affect the services their children received at the camps. Two different consent forms were developed, one corresponding to each illness type (i.e., asthma or diabetes). The cover letter included instructions for parents regarding the return of materials should they consent to participation. The demographic questionnaire was used to obtain data on the child's age, gender, and ethnicity, as well as the parent's highest level of education obtained, current employment, and family income. The medical history questionnaire included questions regarding the child's duration of illness, medication use, and daily medical management. Two separate medical history questionnaires were created for the purpose of this study, based on disease type (i.e., asthma or diabetes).

After these materials were returned, each parent and child was assigned a unique identification number (e.g., 101A, 101B). A list matching participant names with their identification numbers was maintained in a secure location by faculty supervisors. Questionnaire packets for each parent and child were developed and coded with the appropriate identification numbers. Both child and parent questionnaire packets varied based on the age of the child; therefore, each child received age-appropriate forms of each measure and each parent received the corresponding forms. Parent questionnaire packets were comprised of the following measures: a) the BASC – PRS; b) the PSI; and

c) the FACES-II. Child questionnaire packets were made up of the following measures: a) the BASC-SRP; b) the PedsQL™ – General Module; and c) either the PedsQL™ – Asthma Module or the PedsQL™ - Diabetes Module.

Children were asked to complete their questionnaire packets on the first day of each camp session. The majority of parents completed their questionnaire packets at the parent orientation or on the first day of the camp session. An index card listing the names of the child and parent was attached to each packet; these were removed by researchers when the packets were given to children and parents. Children were gathered in one area and read an assent form (See Appendices J and K), describing their tasks in developmentally appropriate language. Children were informed regarding compensation for their participation and were given an opportunity to ask questions. Instructions were provided to children prior to the administration of each questionnaire. Researchers were on-site to provide assistance to participants as needed (i.e., participants who had difficulty reading the form had items read aloud).

Parents of all participating campers were gathered in one area either at a parent orientation meeting or on the first day of camp. Parents were provided a brief description of the study and those who had not already consented to participation were given another opportunity to do so. The purpose of this method of recruitment was to maximize the number of parents who would consent to participation. Parents whose participation was solicited at camp orientations, but who declined to participate, were asked to complete a brief demographic questionnaire (See Appendix L). The purpose of the completion of this brief survey was to assist in determining whether there was non-respondent bias in

the sample. Due to the fact that the vast majority of parents consented to participating through the mail, and the low number of parents who declined participation at camp orientations, only a small number of non-respondent bias surveys were completed (n = 3). Due to the small non-respondent sample size, analyses to determine whether the responders differed from the non-responders along some variable were unable to be performed.

Parents who consented to participation completed the initial parent packets as well as the parent packets including the measures. Researchers were available to assist parents with any questions prior to and throughout test administration. Instructions were read aloud to parents prior to the administration of the measures. Parents who were unavailable to complete the questionnaire packet at this time (i.e., parents who are not present but had provided consent through the mailed initial parent packets) were mailed a parent packet to their homes; a letter was included that instructed them to complete the packets and return them in a self-addressed, stamped envelope that was provided. Within two weeks following the completion of measures and return of all materials, each parent and child dyad was sent their compensation in the mail.

CHAPTER IV

RESULTS

This study is cross-sectional in nature due to the collection of data at one time point. Analyses designed to detect group differences were conducted by comparing the two groups of children (those with asthma and those with diabetes) along a number of dependent variables. Additionally, illness groups (asthma, diabetes) were separated for further analyses in order to evaluate relations among dependent variables for each illness type. Due to the curvilinear nature of family cohesion and family adaptability (Reichenberg, 2000), both of these constructs were transformed into quadratic variables for the purposes of statistical analyses.

The result of multiple analyses performed on the same set of data is an inflated Type I error rate. A Type I error refers to an error made when an effect, difference, or relationship is declared statistically significant when it in fact may have occurred due to chance. A Bonferroni correction is often performed to make alpha levels more stringent for each individual test performed and to control for the experiment-wise error rate (Tabachnick & Fidell, 1996). Two caveats when using this technique are that it includes the assumption of equal probability and it may result in an increase in the risk of a Type II error rate (i.e., not detecting effects, differences, or relationships when they exist). Therefore, an intermediate technique for limiting the Type I error rate while minimizing the risk of a Type II error rate was adopted for the purposes of this study. The alpha level was reduced to 0.001 for each group comparison analysis and to 0.01 for the

remainder of analyses (i.e. regression analyses). SPSS was employed for all statistical operations.

Descriptive Statistics

The means and standard deviations of all parent-reported and child self-reported variables were computed separately for each illness type (asthma, diabetes). Results for parent-reported dependent variables of each illness group are displayed in Table II. Table III presents the means and standard deviations of all child outcome variables by illness type.

Table II. Means and Standard Deviations for Parent Report Variables by Illness Group.

Variable	Asthma			Diabetes		
	n	Mean (SD)	Range	*n*	Mean (SD)	Range
FACES-II Cohesion	26	5.77 (1.61)	3-8	77	5.96 (1.60)	2-8
FACES-II Adaptability	26	4.96 (1.46)	2-7	77	5.04 (1.34)	2-7
PSI Total Parenting Stress	26	212.31 (44.54)	138-305	77	215.12 (44.89)	138-368
BASC-PRS Anxiety	24	48.71 (7.81)	36-63	75	50.84 (9.78)	33-78
BASC-PRS Depression	24	47.25 (10.88)	34-78	75	48.76 (11.31)	34-85

Note. Standard deviations appear in parentheses. FACES-II scores range from 1-8 (higher scores indicate greater cohesion and adaptability). BASC scores are presented as T scores. PSI Total Parenting Stress scores are presented as raw scores and range from 131-320 (higher scores indicate greater parenting stress).

Table III. Means and Standard Deviations for Child Outcome Variables by Illness Group.

Variable	Asthma			Diabetes		
	n	Mean (SD)	Range	*n*	Mean (SD)	Range
PedsQL™ Total Score	36	73.58 (17.81)	30-98	78	75.27 (16.18)	28-99
PedsQL™ Physical Health	36	76.00 (17.73)	38-100	81	80.99 (17.45)	31-100
PedsQL™ Psychosocial Health	37	72.97 (19.34)	25-100	78	72.97 (17.32)	27-98
PedsQL™ Emotional Functioning	36	69.58 (23.43)	20-100	81	70.19 (21.89)	10-100
PedsQL™ Social Functioning	36	76.56 (20.14)	20-100	81	79.22 (20.46)	0-100
PedsQL™ School Functioning	36	71.06 (23.24)	10-100	78	70.97 (21.17)	15-100
PedsQL™-Asthma Symptoms	35	66.06 (16.54)	30-100			
PedsQL™-Treatment Problems	36	80.17 (16.51)	45-100			
PedsQL™-Worry	36	71.75 (26.73)	8-100			
PedsQL™-Communication	36	71.97 (23.44)	8-100			
PedsQL™-Diabetes Symptoms				81	59.95 (16.94)	16-98

Table III. Continued

Variable	Asthma			Diabetes		
	n	Mean (SD)	Range	*n*	Mean (SD)	Range
PedsQL™-Treatment Barriers				80	75.15 (21.89)	6-100
PedsQL™-Treatment Adherence				81	79.75 (17.50)	36-100
PedsQL™-Worry				81	68.25 (26.30)	0-100
PedsQL™-Communication				79	72.25 (23.74)	0-100
BASC-SRP Anxiety	32	46.34 (10.65)	34-69	78	47.92 (9.29)	34-70
BASC-SRP Depression	33	48.67 (10.72)	41-83	78	48.63 (9.11)	41-77

Note. Standard Deviations are in parentheses. HSS = Health Summary Score. PedsQL™ scores presented as linearly transformed scores and range from 0-100 (higher scores indicate greater health-related quality of life). BASC scores are presented as T scores.

Mean scores on the BASC Anxiety and Depression subscales (both parent and child self-report) were mostly within the average range. These results suggest that children with asthma and children with diabetes did not differ in degrees of anxiety and depression from the BASC normative sample. Mean scores on Family Cohesion for both children with asthma and children with diabetes fell within the Connected range. These results indicate that parents of children with asthma and children with diabetes report that their families have a balanced and adaptive degree of cohesion within their families.

The mean scores on Family Adaptability for both of these groups resulted in children with asthma falling into the Structured range and children with diabetes falling within the Flexible range. Though the families of children with asthma and the families of children with diabetes technically fell into separate categories, their mean scores are not significantly different which suggests that families of children with both of these illnesses exhibit a moderate and balanced degree of family flexibility.

Regarding children's scores on the PedsQL™ General Module, independent samples t-tests (alpha = .01) revealed that children with asthma obtained mean scores significantly below the mean scores of children in a healthy normative sample on the Total Score ($t = 3.23$, $df = 5112$), Physical Health ($t = 3.75$, $df = 5104$), Psychosocial Functioning ($t = 2.54$, $df = 5104$), and School Functioning ($t = 2.56$, $df = 5059$) scales. Independent samples t-tests also were performed to compare the PedsQL™ General Module scores of children from the healthy normative sample to those of the children with diabetes in this study (alpha = .01). Results suggested that children with diabetes reported having poorer health-related quality life than healthy children across all scales (Total Score: $t = 2.60$, $df = 5156$; Physical Health: $t = 3.67$, $df = 5150$; Psychosocial Functioning: $t = 4.65$, $df = 5147$; Emotional Functioning: $t = 3.87$, $df = 5148$; Social Functioning: $t = 2.69$, $df = 5106$; School Functioning: $t = 4.35$, $df = 5103$; Varni, Burwinkle, Seid, and Skarr, 2003). The descriptive statistics for this measure with both the children with asthma and a large sample of healthy children are provided in Table IV. Table V depicts the descriptive statistics found in both this healthy normative sample and the children with diabetes in this study.

Table IV. Descriptives for the PedsQL™ General Module Scales: Asthma Sample and Healthy Sample.

Variable	Asthma		Healthy Sample	
	n	Mean (*SD*)	*n*	Mean (*SD*)
Total Score	35	74.49 (17.22)	5079	83.91 (12.47)
Physical Health	36	77.39 (16.59)	5070	87.77 (13.12)
Psychosocial Health	36	73.75 (19.02)	5070	81.83 (13.97)
Emotional Functioning	35	71.00 (22.16)	5068	79.21 (18.02)
Social Functioning	35	77.46 (19.68)	5026	84.97 (16.71)
School Functioning	35	71.09 (23.57)	5026	81.31 (16.09)

Note. Standard Deviations are in parentheses. PedsQL™ scores are presented as linearly transformed scores. Higher values equal better health-related quality of life. Descriptive statistics for the healthy sample were obtained from Varni et al., 2003a.

Table V. Descriptives for the PedsQL™ General Module Scales: Diabetes Sample and Healthy Sample.

Variable	Diabetes		Healthy Sample	
	n	Mean (*SD*)	*n*	Mean (*SD*)
Total Score	79	74.85 (16.51)	5079	83.91 (12.47)
Physical Health	82	80.46 (17.98)	5070	87.77 (13.12)
Psychosocial Health	79	72.62 (17.50)	5070	81.83 (13.97)
Emotional Functioning	82	69.57 (22.45)	5068	79.21 (18.02)
Social Functioning	82	78.80 (20.68)	5026	84.97 (16.71)
School Functioning	79	70.96 (21.04)	5026	81.31 (16.09)

Note. Standard Deviations are in parentheses. Higher values equal better health-related quality of life. Descriptive statistics for the healthy sample were obtained from Varni et al. (2003a).

Although there are no existing norms for either the PedsQL™ Asthma Module or the PedsQL™ Diabetes Module, the descriptive statistics found with these measures may be compared to those found in other research studies that have employed these measures through independent samples t-tests. For instance, the means and standard deviations on the PedsQL™ Diabetes Module can be compared to those found in a study on the reliability and validity of this measure with a sample of children with both Type 1 and Type 2 diabetes (Varni et al., 2003a). These descriptive statistics are displayed in Table VI. The children with diabetes in this study generally obtained scores consistent with those from the other sample, with one exception. The children in the sample provided by Varni et al. (2003a) obtained a mean score on the Diabetes Symptoms scale that was significantly greater than the mean score found in the sample of children with diabetes in this study.

Table VI. Descriptive Statistics on the PedsQL™ Diabetes Module: Diabetes Sample in This Study and Diabetes Sample from Varni et al. (2003a).

Variable	Diabetes		Other Diabetes	
	n	Mean (*SD*)	*n*	Mean (*SD*)
Diabetes Symptoms	81	59.95 (16.94)	147	65.31 (15.79)
Treatment Barriers	80	75.15 (21.89)	146	73.72 (20.91)
Treatment Adherence	81	79.75 (17.50)	145	80.81 (15.50)
Worry	81	68.25 (26.30)	145	71.54 (22.48)
Communication	79	72.25 (23.74)	143	74.07 (25.08)

Note. Standard Deviations are in parentheses. PedsQL™ scores are presented as linearly transformed scores. Higher values equal better health-related quality of life. Descriptive statistics for the other diabetes sample were obtained from Varni et al. (2003a).

The descriptive statistics obtained on the PedsQL™ Asthma Module in this study also were compared to those found in a study conducted by Varni, Burwinkle, Rapoff, Kamps, and Olson (2004) through independent samples t-tests. The means and standard deviations found in Varni et al.'s (2004) study and those found in the children with asthma from this study are displayed in Table VII. Independent samples t-tests revealed no significant results. Thus, the children with asthma in this study obtained scores consistent with those obtained from the other asthma sample on all scales.

Table VII. Descriptive Statistics on the PedsQL™ Asthma Module: Asthma Sample in This Study and Asthma Sample from Varni et al. (2004).

Variable	Asthma		Other Asthma	
	n	Mean (*SD*)	*n*	Mean (*SD*)
Asthma Symptoms	34	67.00 (15.81)	149	64.15 (19.22)
Treatment Problems	35	81.03 (15.91)	151	80.55 (14.23)
Worry	35	72.37 (26.86)	151	76.32 (21.86)
Communication	35	72.60 (23.47)	152	73.68 (24.85)

Note. Standard Deviations are in parentheses. PedsQL™ scores are presented as linearly transformed scores. Higher values equal better health-related quality of life. Descriptive statistics for the other asthma sample were obtained from Varni et al. (2004).

In terms of parenting stress, the parents of children with diabetes reported experiencing total stress between the 40th and 45th percentile. The total parenting stress experienced by the parents of children with asthma fell between the 35th and 40th percentile. Based on these results, the parents of children with asthma and children with

diabetes indicated they were experiencing a Normal degree of stress related to the parenting role.

Effects of Age, Ethnicity, Gender, Duration of Illness

Univariate Analysis of Variance (ANOVA) was used to examine group differences across age, ethnicity, gender, and duration of illness. These variables were employed as the dependent variables and medical condition (asthma, diabetes) was used as the factor in order to make comparisons between these two illness types. Significant effects were found for age [F (1, 149) = 4.90, p = .03], ethnicity [F (1, 139) = 11.01, p = .01], and illness duration [F (1, 129) = 14.16; $p < .001$]. To control for these effects, age, ethnicity, and illness duration were included as covariates for subsequent analyses. Due to the categorical nature of ethnicity, this variable was recoded into contrasts and these contrasts were employed as covariates in these analyses.

Internal Consistency of Measures

Internal consistency analyses were calculated for each measure and subscale used with the total sample (both asthma and diabetes groups). Alpha coefficients ranged from 0.38 to 0.96, and were generally found to be high for most measures and subscales. Coefficient alpha values are reported in Table VIII. The Spearman-Brown correction was performed on the scales that had inadequate reliability (less than 0.70). Coefficient alpha values for these scales, after correcting for test length, are presented in Table IX.

Table VIII. Reliability Coefficients for Scores on All Measures.

Measure	*n*	Coefficient Alpha
BASC-PRS Child Form	73	0.84
Anxiety Subscale	79	0.80
Depression Subscale	80	0.82
BASC-PRS-Adolescent	12	0.74
Anxiety Subscale	15	0.72
Depression Subscale	15	0.86
BASC-SRP-Child	55	0.95
Anxiety Subscale	80	0.88
Depression Subscale	82	0.89
BASC-SRP-Adolescent	15	0.90
Anxiety Subscale	22	0.79
Depression Subscale	22	0.86
FACES-II	97	0.69
Adaptability	99	0.58
Cohesion	101	0.38
PedsQL™-General Module	102	0.92
Physical Functioning	116	0.81
Emotional Functioning	32	0.84

Table VIII. Continued

Measure	*n*	Coefficient Alpha
PedsQL™-General Module	102	0.92
Social Functioning	114	0.80
School Functioning	109	0.82
Psychosocial Functioning	105	0.89
PedsQL™-Asthma Module	30	0.90
About My Asthma	33	0.81
Treatment	32	0.84
Worry	36	0.82
Communication	36	0.69
PedsQL™-Diabetes Module	67	0.90
About My Diabetes	74	0.81
Treatment I	79	0.67
Treatment II	79	0.73
Worry	79	0.75
Communication	79	0.72
Parenting Stress Index	95	0.96
Child Domain	101	0.94

Table VIII. Continued

Measure	*n*	Coefficient Alpha
Parenting Stress Index		
Parent Domain	97	0.93
Total Parenting Stress	95	0.96

Note. BASC-PRS = Behavior Assessment System for Children – Parent Rating Scale; BASC-SRP = Behavior Assessment System for Children – Self-Report Form; FACES-II = Family Cohesion and Adaptability Scale – II; PedsQL™ = Pediatric Quality of Life Inventory.

Table IX. Reliability Coefficients for Scores on Scales with Inadequate Reliability after Spearman-Brown Correction.

Measure	*n*	Coefficient Alpha
FACES-II	97	0.82
FACES-II Adaptability	99	0.73
FACES-II Cohesion	101	0.55
PedsQL™-Asthma Communication	36	0.82
PedsQL™-Diabetes Treatment Barriers	79	0.80

Note: FACES-II = Family Cohesion and Adaptability Scale – II; PedsQL™ = Pediatric Quality of Life Inventory.

Group Differences on Dependent Variables

Multivariate Analysis of Covariance (MANCOVA) was performed to investigate mean differences in scores on the dependent variables between children with asthma and children with diabetes. Scores on BASC depression subscale (both parent and self-report), BASC anxiety subscale (both parent and self-report), total PedsQL™, total parenting stress, family cohesion, and family adaptability were employed as dependent variables. Medical condition (asthma, diabetes) was included as a fixed factor, while covariates included age, ethnicity (in the form of contrasts), illness duration, and interactions between age and illness group (asthma, diabetes), ethnicity and illness group, and illness duration and illness group. The covariates of age, illness duration, and illness group were first transformed into centered variables in order to ensure the sum of squares of main effects and interactions were dissociated from one another.

Results of this analysis revealed no significant differences between children with asthma and children with diabetes along any of the dependent variables. MANOVA was employed for these examinations due to its consideration of the correlations among dependent variables and due to its greater power to detect group differences relative to ANOVA. This analysis addressed research questions 1 and 2.

Contribution of Variance

Linear regression analyses were used to determine the extent to which scores on the depression and anxiety subscales (both parent and child report) can be predicted by total parenting stress scores, total family cohesion scores, total family adaptability scores, and the total general quality of life scores. Four analyses were performed for

each illness type. One analysis employed parent-reported depression as the dependent variable, one analysis used parent-reported anxiety as the dependent variable, one analysis utilized child-reported depression as the dependent variable, and one analysis used self-report anxiety as the dependent variable. These analyses addressed research question 3.

Regarding children with asthma, results indicate that a nonsignificant amount of the variance in parent-reported anxiety was explained by the PedsQL™ Total scores, the PSI - Total Parenting Stress scores, and scores on total Adaptability and total Cohesion. In contrast, a significant amount of the variance in self-reported anxiety was accounted for by these predictors [F (4, 18) = 7.01, $p < .01$, $R^2 = 66.7\%$; See Table X]. The amount of variance in parent-reported depression explained by these predictors approached significance [F (4, 19) = 3.56, $p = .03$, $R^2 = 48.7\%$; See Table XI]. No significant effect was found for self-reported depression.

Table X. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-SRP Anxiety with Asthma Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	0.36	0.69	0.08	0.61
Family Adaptability	9.40E-02	0.71	0.02	0.90
PSI-Total Stress	1.29E-02	0.04	0.05	0.75
PedsQL™ Total Score	-0.50	0.11	-0.78	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig = Level of significance. **p<.001.

Table XI. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-PRS Depression with Asthma Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	-0.14	0.92	-0.03	0.88
Family Adaptability	-0.25	0.97	-0.05	0.80
PSI-Total Stress	0.18	0.06	0.67	0.01*
PedsQL™ Total Score	-4.61E-02	0.16	-0.06	0.77

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig = Level of significance. *p <.01.

With respect to children with diabetes, results indicate that a significant amount of the variance in parent-reported anxiety scores [F (4, 59) = 4.19, p < .01, R^2 = 23.4%] was accounted for by this set of predictors (PedsQL™ Total scores, PSI - Total Parenting Stress scores, Total Adaptability scores, and Total Cohesion scores; See Table XII). A significant amount of the variance in self-reported anxiety scores [F (4, 59) = 10.92, p < .001, R^2 = 44.3%; See Table XIII] also was accounted for by these predictors. In terms of parent-reported depression scores, these predictors explained a significant amount of the variance [F (4, 59) = 13.96, p < .001, R^2 = 50.4%; See Table XIV]. A significant amount of the variance in self-reported depression [F (4, 59) = 5.16, p = .001, R^2 = 27.3%; See Table XV] also was explained by this set of predictors.

Table XII. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-PRS Anxiety with Diabetes Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	0.39	0.34	0.16	0.25
Family Adaptability	0.23	0.59	0.05	0.70
PSI-Total Stress	6.91E-02	0.03	0.32	0.02
PedsQL™ Total Score	-7.74E-02	0.07	-0.13	0.29

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig = Level of significance. * $p < .01$.

Table XIII. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-SRP Anxiety with Diabetes Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	0.47	0.28	0.18	0.10
Family Adaptability	0.54	0.51	0.11	0.29
PSI-Total Stress	9.91E-03	0.03	0.04	0.69
PedsQL™ Total Score	-0.38	0.06	-0.63	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig = Level of significance. ** $p < .001$.

Table XIV. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-PRS Depression with Diabetes Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	1.71E-02	0.33	0.01	0.96
Family Adaptability	0.82	0.57	0.15	0.15
PSI-Total Stress	0.15	0.03	0.57	0.00**
PedsQL™ Total Score	-0.14	0.07	-0.21	0.04

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig = Level of significance. ** $p < .001$.

Table XV. Regression Analysis of Family Cohesion, Family Adaptability, PSI-Total Stress, and PedsQL™ Total Score to BASC-SRP Depression with Diabetes Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	0.10	0.31	0.04	0.75
Family Adaptability	0.80	0.57	0.17	0.16
PSI-Total Stress	4.54E-02	0.03	0.20	0.11
PedsQL™ Total Score	-0.25	0.07	-0.42	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. ** $p = .001$.

Due to the significance of many of these models and the number of predictors employed, subsequent linear regression analyses were performed in order to determine whether a simpler model could produce similar results. Separate analyses were

conducted using only independent variables that had been significant predictors in the previous models. Regarding children with asthma, a linear regression analysis indicated that total scores on the PedsQL™ significantly predicted self-reported anxiety [F (1, 29) = 41.16, $p < .001$, $R^2 = 59.5\%$; See Table XVI]. When analyzed separately, none of the remaining predictors accounted for a significant amount of the variance in self-reported anxiety. Due to the results of the previous model including BASC-PRS depression scores as the dependent variable approaching significance for children with asthma, an additional linear regression analysis was conducted. Results indicated that PSI -Total Parenting Stress scores were the best predictor, explaining a significant amount of the variance [F (1, 23) = 17.12, $p < .001$, $R^2 = 43.8\%$; See Table XVII]. The remaining predictors did not significantly predict scores on parent-reported depression.

Table XVI. Regression Analysis of PedsQL™ Total Score to BASC-SRP Anxiety in Asthma Sample.

Variable	B	SE B	*B*	Sig.
PedsQL™ Total Score	-0.44	0.07	-0.77	0.00**

Note. B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. ** $p<.001$.

Table XVII. Regression Analysis of PSI-Total Stress to BASC-PRS Depression in Asthma Sample.

Variable	B	SE B	*B*	Sig.
PSI-Total Stress	0.16	0.04	0.66	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. **$p<.001$.

Linear regression analyses with children diagnosed with diabetes revealed that the only significant predictor of parent-reported anxiety was scores on the PSI – Total Parenting Stress Index [F (1, 73) = 12.79, p = .001, R^2 = 15.1%; See Table XVIII]. The only significant predictor of self-reported anxiety was PedsQL™ Total Scale scores [F (1, 73) = 49.96, p < .001, R^2 = 41.0%; See Table XIX]. Regarding parent-reported depression, the following independent variables were significant predictors: PSI – Total Parenting Stress scores [F (1, 73) = 42.19, p < .001, R^2 = 36.9%; See Table XX], PedsQL™ Total Scale score [F (1, 61) = 11.19, p = .001, R^2 = 15.7%; See Table XXI], and Total Cohesion [F (1, 73) = 8.94, p < .01, R^2 = 11.0%; See Table XXII]. In terms of self-reported depression, the PedsQL™ Total Scale scores served as the only significant predictor [F (1, 73) = 16.47, p < .001, R^2 = 18.6%; See Table XXIII].

Table XVIII. Regression Analysis of PSI-Total Stress to BASC-PRS Anxiety in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
PSI-Total Stress	8.65E-02	0.02	0.39	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. **p=.001.

Table XIX. Regression Analysis of PedsQL™ Total Score to BASC-SRP Anxiety in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
PedsQL™ Total Score	-0.39	0.06	-0.64	0.00**

Note. B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. **p<.001.

Table XX. Regression Analysis of PSI-Total Stress to BASC-PRS Depression in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
PSI-Total Stress	0.16	0.02	0.61	0.00**

Note. PSI = Parenting Stress Index; B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. ** $p < .001$.

Table XXI. Regression Analysis of PedsQL™ Total Score to BASC-PRS Depression in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
PedsQL™ Total Score	-0.28	0.08	-0.4	0.00**

Note. B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. ** $p = .001$.

Table XXII. Regression Analysis of Family Cohesion to BASC-PRS Depression in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
Family Cohesion	0.96	0.32	0.33	0.00*

Note. B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. * $p < .01$.

Table XXIII. Regression Analysis of PedsQL™ Total Score to BASC-SRP Depression in Diabetes Sample.

Variable	B	SE B	*B*	Sig.
PedsQL™ Total Score	-0.26	0.06	-0.43	0.00**

Note. B = Unstandardized coefficient; SE B = Standard error of the unstandardized coefficient; *B* = Standardized Coefficient; Sig. = Level of significance. ** $p < .001$.

Path Models

In order to determine whether parenting stress mediated the relation between family cohesion (or adaptability) and psychological adjustment (depression, anxiety), path analysis was used (this addressed research question 6). Four path analyses were conducted for each illness type. Each path model involved three steps, each of which was a separate linear regression analysis. Each analysis resulted in a beta weight (β) and an R^2 value that explained the amount of variance in the dependent variable accounted for by the independent variable.

In order for mediation to take place, the following criteria must be met: 1) significant beta weights must be obtained from both the initial and second linear regression analyses, as well as between total parenting stress and the dependent variable for the third linear regression analysis, and 2) the third linear regression analysis must result in an nonsignificant relation between the other independent variable (i.e., family cohesion or adaptability) and the dependent variable. If both of these criteria are not met, then it can be concluded that total parenting stress is not serving as a mediator in the relation between the other two variables. If both of these criteria are met and the Beta weight between either family cohesion (or family adaptability) and the dependent variable approaches a value of zero, then it can be concluded that total parenting stress is mediating the relationship between the other two variables. If this Beta weight has a value of .100 or greater (and the initial two criteria were met), then it can be concluded that total parenting stress is partially mediating the relationship between the other two variables.

Path Analyses with Diabetes Sample

In the case of diabetes, the first path analysis included the depression subscale scores (BASC-PRS parent report), the total parenting stress scores, and the family cohesion scores (See Figure 1). The first step was to run the linear regression analysis using the family cohesion scores as the independent variable and the depression subscale scores as the dependent variable. Results of this analysis indicated that family cohesion accounted for a significant amount of variance in parent-reported depression ($\beta = .33$, $R^2 = 11.0\%$, $p = .004$). The second step was a linear regression analysis, employing total parenting stress as the dependent variable and family cohesion as the independent variable. This analysis revealed that a significant amount of the variance in total parenting stress was explained by family cohesion ($\beta = .41$, $R^2 = 17.2\%$, $p < .001$).

Next, a third linear regression analysis was performed using BASC-PRS depression as the dependent variable and both family cohesion and total parenting stress as independent variables. Results indicated that total parenting stress accounted for a significant amount of variance in BASC-PRS depression scores ($\beta = .60$, $p < .001$); however, this was no longer the case with family cohesion ($\beta = .09$, $p = .393$). This model explained a total of 41% of the variance in BASC-PRS depression scores. The resulting change in β was examined to determine whether parenting stress served as a mediator in the relation between family cohesion and depression. Based on the resulting change in beta weights (i.e. the relation between family cohesion was no longer significant once parenting stress was added into the model), it can be concluded that total

parenting stress scores mediated the relation between family cohesion and BASC-PRS depression scores.

The steps utilized in this path analysis were repeated for the second path model and the variables were depression subscale scores (BASC-SRP child self-report), total parenting stress scores, and family cohesion scores (see Figure 2). Results from the first linear regression analysis were not significant ($\beta = .09$, $R^2 = 8.6\%$, $p = .50$). Results from the second linear analysis were significant and indicated that 17.2% of the variance in total parenting stress scores was accounted for by family cohesion scores ($\beta = .41$, $p < .001$). The relation between family cohesion and BASC-SRP depression scores remained nonsignificant following the third regression analysis ($\beta = .03$, $p = .83$). Additionally, total parenting stress scores did not explain a significant amount of the variance in BASC-SRP depression scores ($\beta = .27$, $R^2 = 8.1\%$, $p = .04$). Based on this model's inability to meet the required criteria for mediation, it can be concluded that total parenting stress scores did not mediate the relation between family cohesion and BASC-SRP depression.

For the third path analysis, the steps were again repeated, employing the total family adaptability scores (rather than total family cohesion score), total parenting stress scores, and the parent-reported depression scores (BASC-PRS parent report) as variables (See Figure 3). Results of the first linear regression analysis were not significant ($\beta = .27$, $R^2 = 7.5\%$, $p = .02$), suggesting that family adaptability scores did not explain a significant amount of the variance in BASC-PRS depression scores. The second linear regression analysis resulted in a significant effect ($\beta = .28$, $R^2 = 8.0\%$, $p < .05$). When

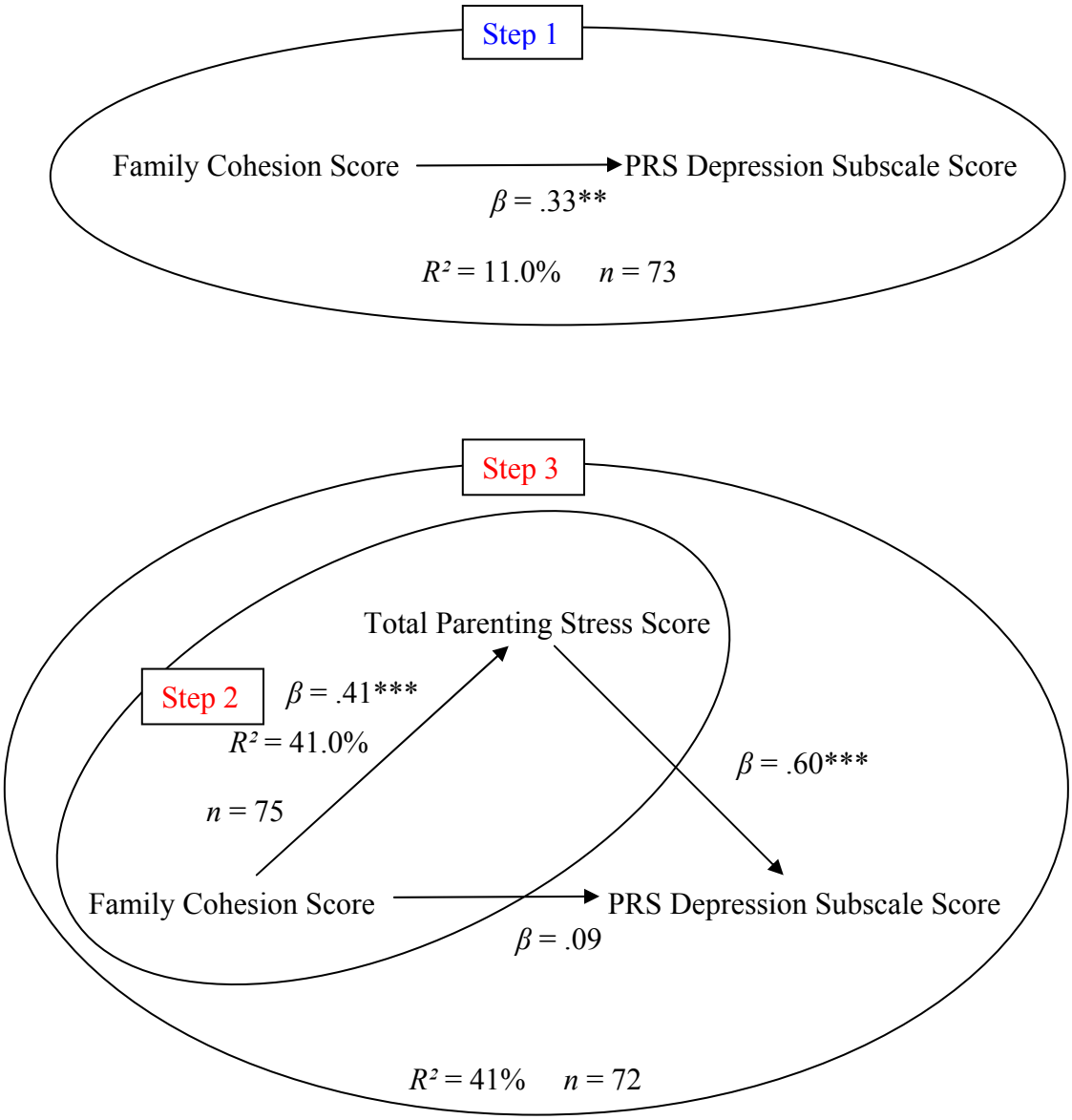

Figure 1. Path Analysis Model for Diabetes (Family Cohesion as Independent Variable, BASC-PRS Depression as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Cohesion score as independent variable and BASC-PRS Depression Subscale score as dependent variable). Step 2 is linear regression analysis (Family Cohesion as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-PRS Depression Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

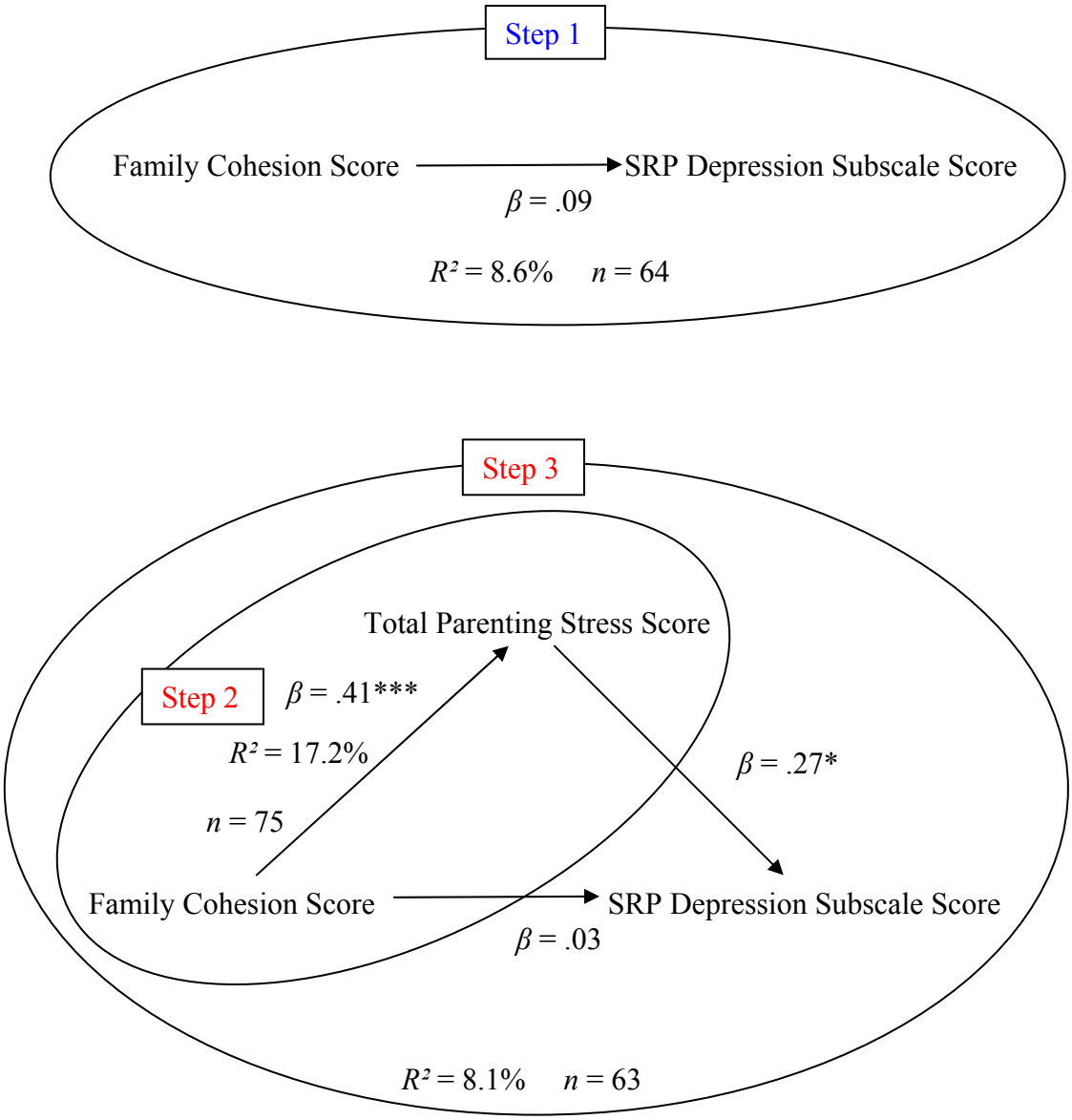

Figure 2. Path Analysis Model for Diabetes (Family Cohesion as Independent Variable, BASC-SRP Depression as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Cohesion score as independent variable and BASC-SRP Depression Subscale score as dependent variable). Step 2 is linear regression analysis (Family Cohesion as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-SRP Depression Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

total parenting stress scores were added in as an independent variable for the third analysis, the relation between family adaptability and BASC-PRS depression scores remained nonsignificant (β = .11, p = .24); however, the total parenting stress scores accounted for a significant amount of the variance in BASC-PRS depression scores (β = .60, R^2 = 41.5%, p < .001). Based on these results, it can be concluded that total parenting stress scores did not mediate the relation between family adaptability and BASC-PRS depression scores.

The same steps were followed for the fourth path analysis, using the family adaptability scores, total parenting stress scores, and BASC child self-report depression scores as the variables (See Figure 4). Results of the first linear regression analysis were not significant (β = .12, R^2 = 1.5%, p = .33). The second regression analysis produced significant results, suggesting that family adaptability explained a significant amount of the variance in total parenting stress scores (β = .28, R^2 = 8.0%, p < .05). Results from the third step revealed the relation between family adaptability and BASC-SRP depression scores remained nonsignificant (β = .14, p = .25), whereas a significant relation was found between total parenting stress scores and BASC-SRP depression scores (β = .28, p < .05). This model accounted for 10% of the variance in BASC-SRP depression scores (p = .04). Total parenting stress scores did not serve a mediating role in this model.

Path Analyses with Asthma Sample

For asthma, these same steps were again repeated for four separate analyses that employed different independent and dependent variables. In contrast to the path analyses

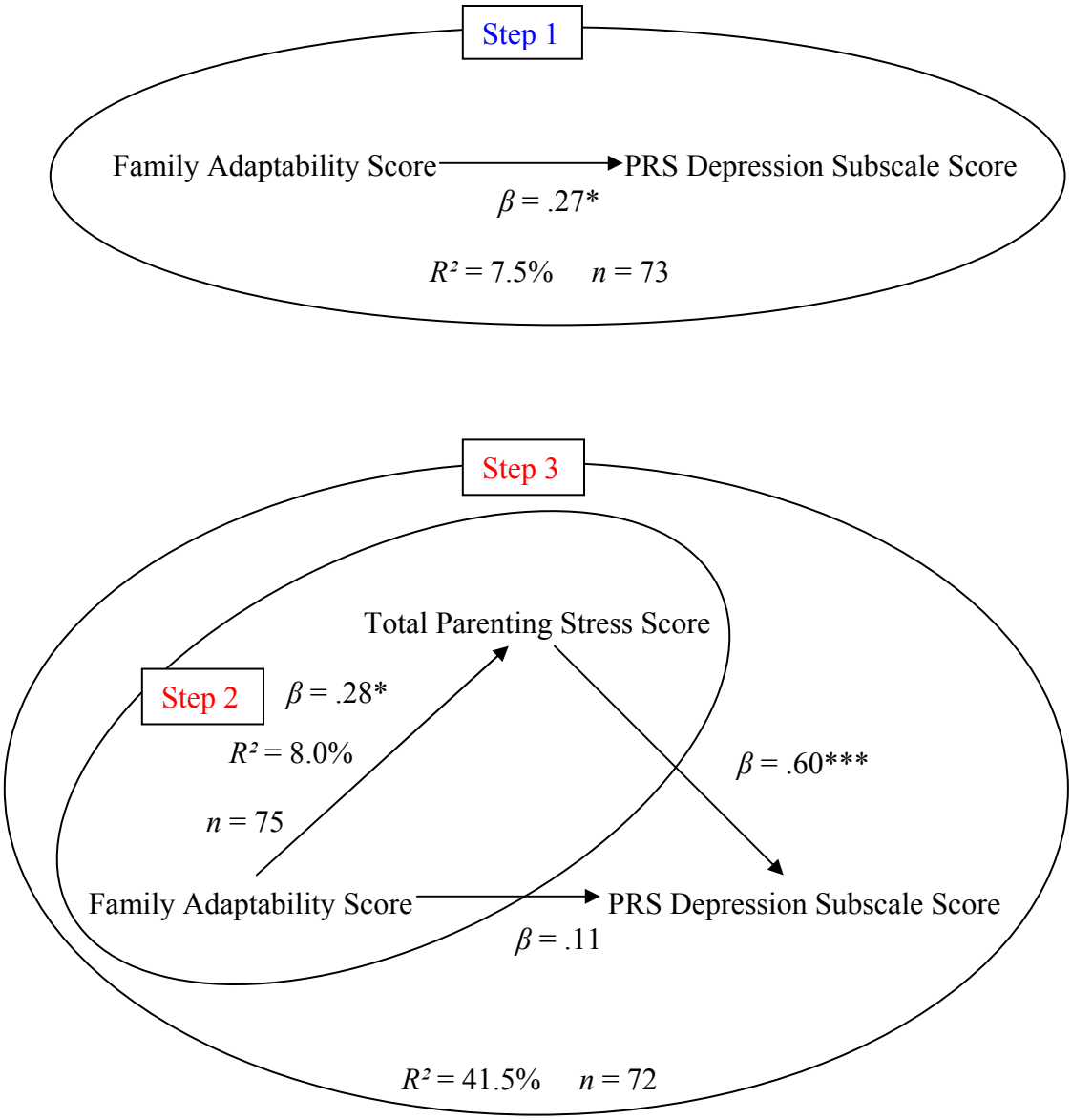

Figure 3. Path Analysis Model for Diabetes (Family Adaptability as Independent Variable, BASC-PRS Depression as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Adaptability score as independent variable and BASC-PRS Depression Subscale score as dependent variable). Step 2 is linear regression analysis (Family Adaptability as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-PRS Depression Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

performed with the diabetes sample, these path models included scores on the BASC anxiety subscale (both parent and self-report) instead of BASC depression subscale scores. This difference in dependent variables was selected based on research suggesting elevated anxiety in children with asthma (Ortega et al., 2002; Vila et al., 2000; Gillaspy et al., 2002) and elevated rates of depression in children with diabetes (Northam, 1997; Grey et al., 2002).

The first path analysis employed the following variables: family cohesion scores, total parenting stress scores, and BASC-PRS anxiety scores (See Figure 5). Results of the first (β = -.22, R^2 = 4.8%, p = .32), second (β = .39, R^2 = 15.4%, p = .05), and third linear regression analyses were not significant [β (family cohesion and BASC-PRS anxiety) = -.33, β (total parenting stress and BASC-PRS anxiety) = .31, R^2 = 12.8%, p = .16 and .19 respectively]. These results suggest that total parenting stress did not serve as a mediator in this model.

The second path model included the scores on family cohesion, total parenting stress, and BASC child self-report anxiety as the variables of interest (see Figure 6). Results of the first (β = .20, R^2 = 3.8%, p = .40) and second linear regression analyses (β = .39, R^2 = 15.4%, p = .05), were not significant. The third analysis also produced no significant results, suggesting the lack of a significant relationship between family cohesion and self-reported anxiety (β = .11, p = .65), and between total parenting stress scores and BASC-SRP anxiety scores (β = .33, R^2 = 13.5%, p = .18). Based on these results, scores on total parenting stress did not mediate the relation between family cohesion and BASC-SRP anxiety scores.

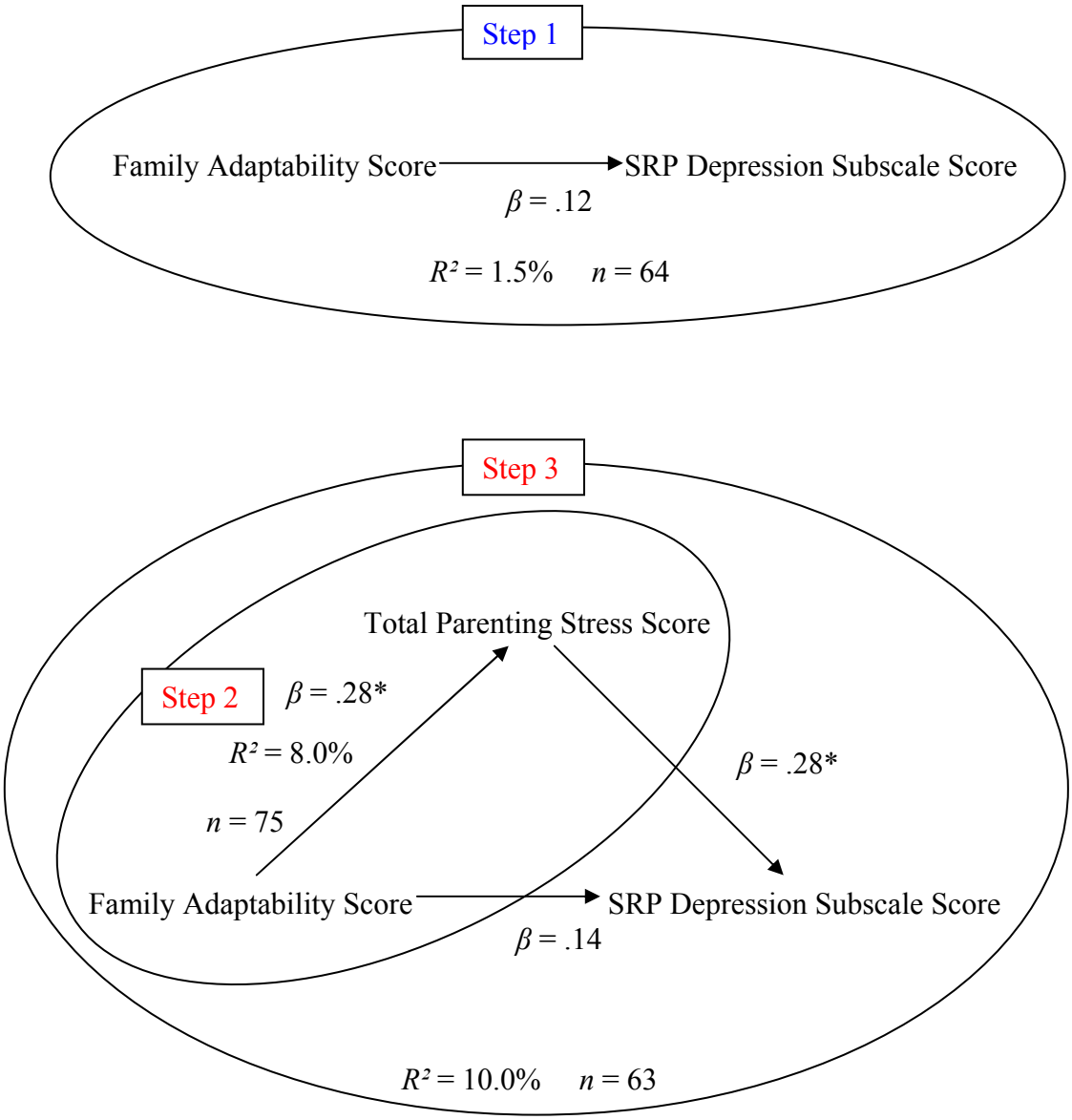

Figure 4. Path Analysis Model for Diabetes (Family Adaptability as Independent Variable, BASC-SRP Depression as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Adaptability score as independent variable and BASC-SRP Depression Subscale score as dependent variable). Step 2 is linear regression analysis (Family Adaptability as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-SRP Depression Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

In the third path model, family adaptability scores, total parenting stress scores, and BASC-PRS anxiety scores were employed as variables (see Figure 7). No significant results were obtained for any of the three analyses [First analysis: β = -.10, R^2 = 1.0%, p = .65; Second analysis: β (family adaptability and BASC-PRS anxiety) = .20, R^2 = 4.0%, p = .34; Third analysis: β (total parenting stress and BASC-PRS anxiety) = -.16, p = .48, β (family adaptability and BASC-PRS anxiety = .23, R^2 = 5.9%, p = .32]. These results suggest that total parenting stress scores did not serve a mediating role in this model.

The last path analysis was performed using the family adaptability, total parenting stress, and BASC-SRP anxiety scores (see Figure 8). Again, no significant results were found for any of the analyses [First analysis: β = -.03, R^2 = .10%, p = .90; Second analysis: β (family adaptability and BASC-SRP anxiety) = .20, R^2 = 4.0%, p = .34; Third analysis: β (total parenting stress and BASC-SRP anxiety) = .35, p = .14, β (family adaptability and BASC-SRP anxiety) = -.02, R^2 = 12.5%, p = .92]. Based on these results, total parenting stress scores are not mediating the relationship between family adaptability and BASC-SRP anxiety.

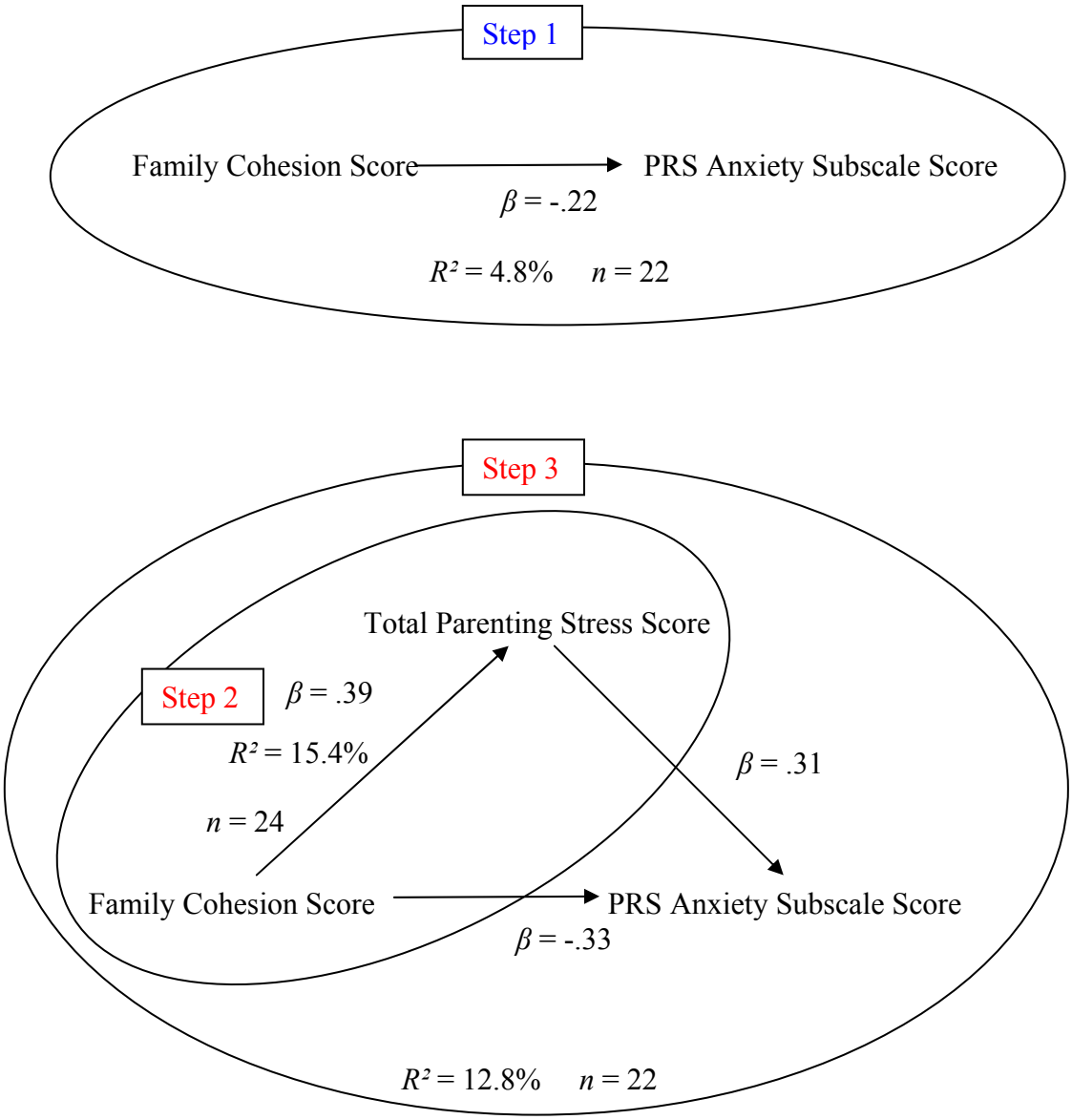

Figure 5. Path Analysis Model for Asthma (Family Cohesion as Independent Variable, BASC-PRS Anxiety as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Cohesion score as independent variable and BASC-PRS Anxiety Subscale score as dependent variable). Step 2 is linear regression analysis (Family Cohesion as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-PRS Anxiety Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

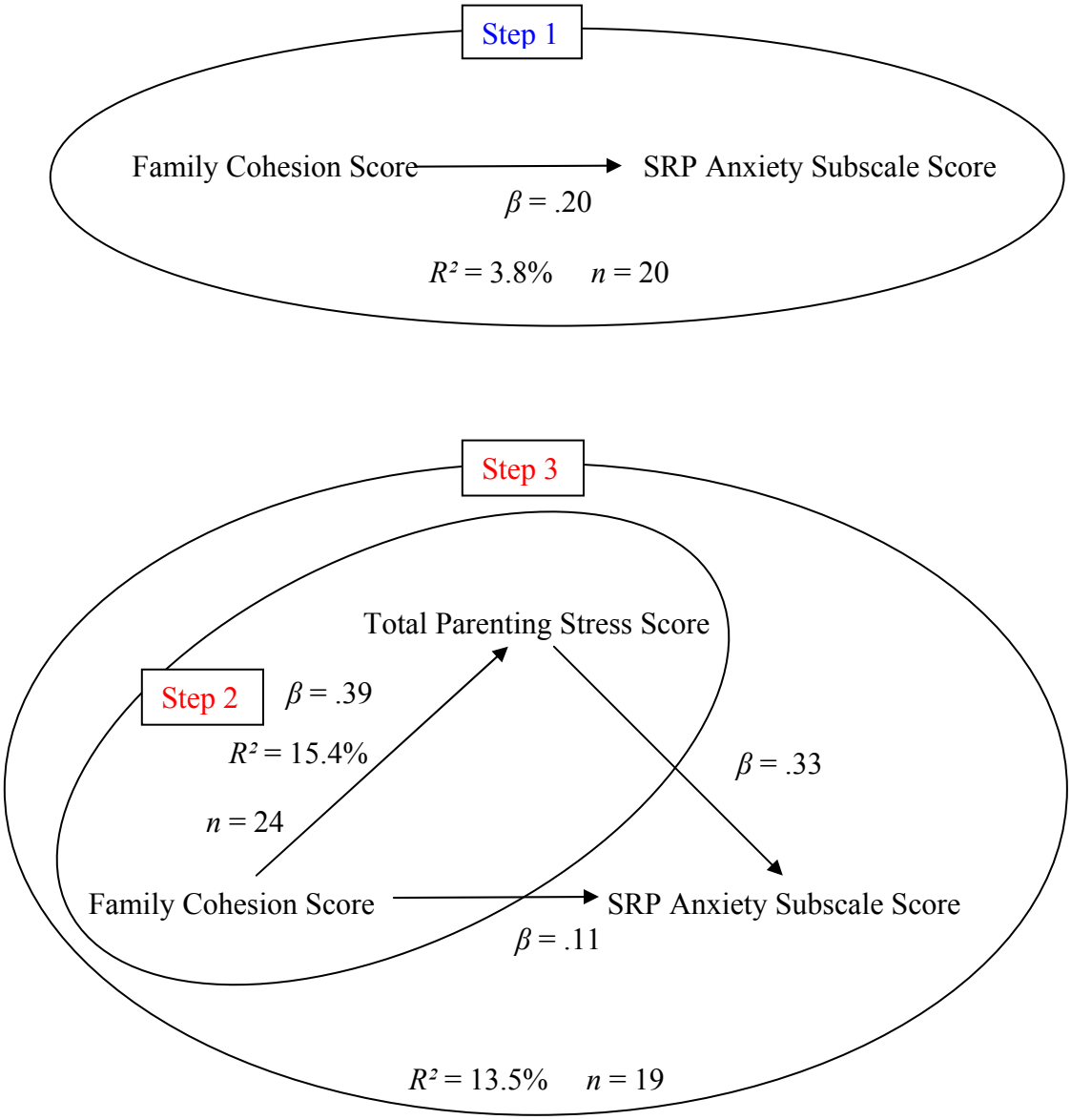

Figure 6. Path Analysis Model for Asthma (Family Cohesion as Independent Variable, BASC-SRP Anxiety as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Cohesion score as independent variable and BASC-SRP Anxiety Subscale score as dependent variable). Step 2 is linear regression analysis (Family Cohesion as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-SRP Anxiety Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

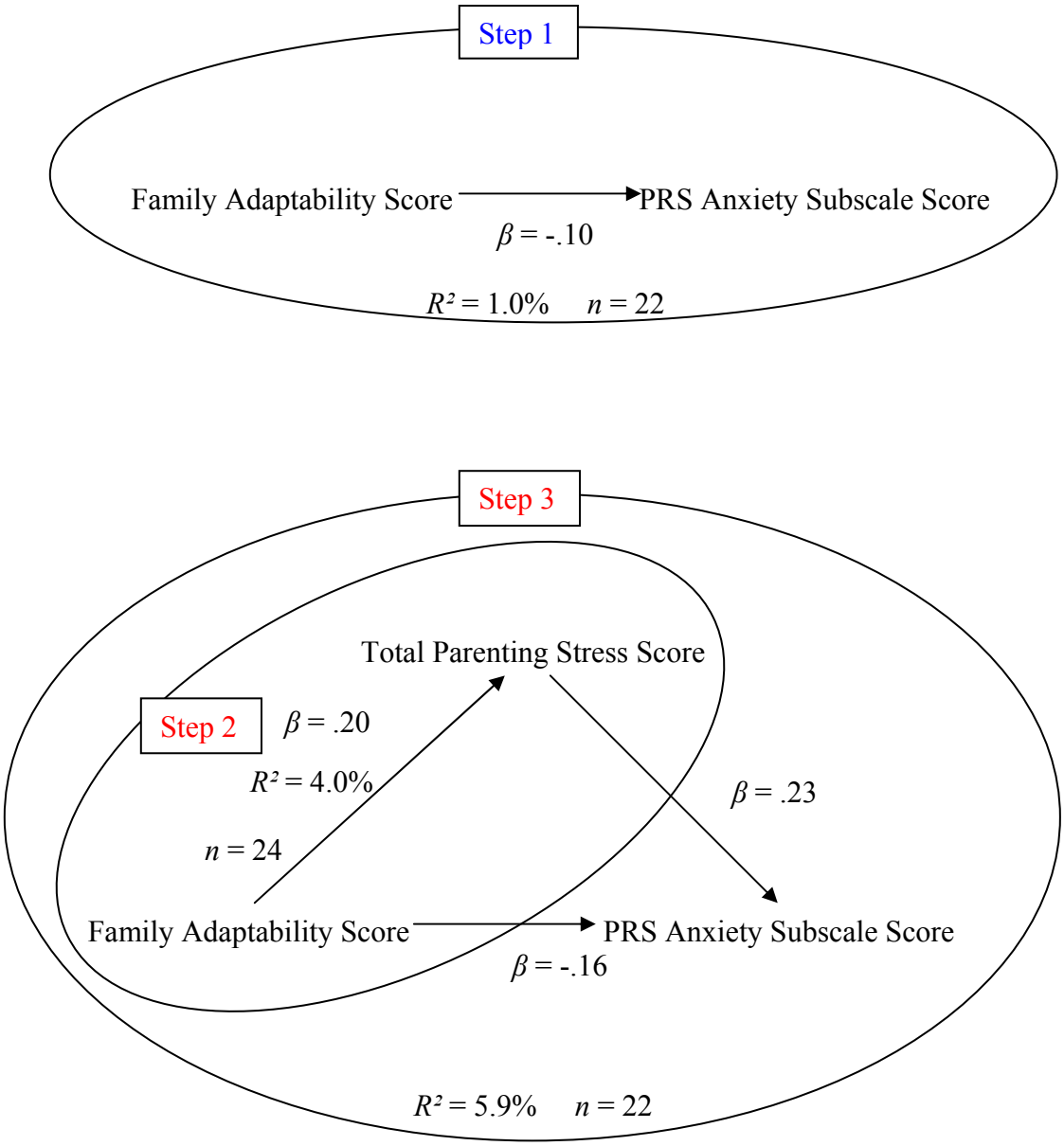

Figure 7. Path Analysis Model for Asthma (Family Adaptability as Independent Variable, BASC-PRS Anxiety as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Adaptability score as independent variable and BASC-PRS Anxiety Subscale score as dependent variable). Step 2 is linear regression analysis (Family Adaptability as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-PRS Anxiety Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

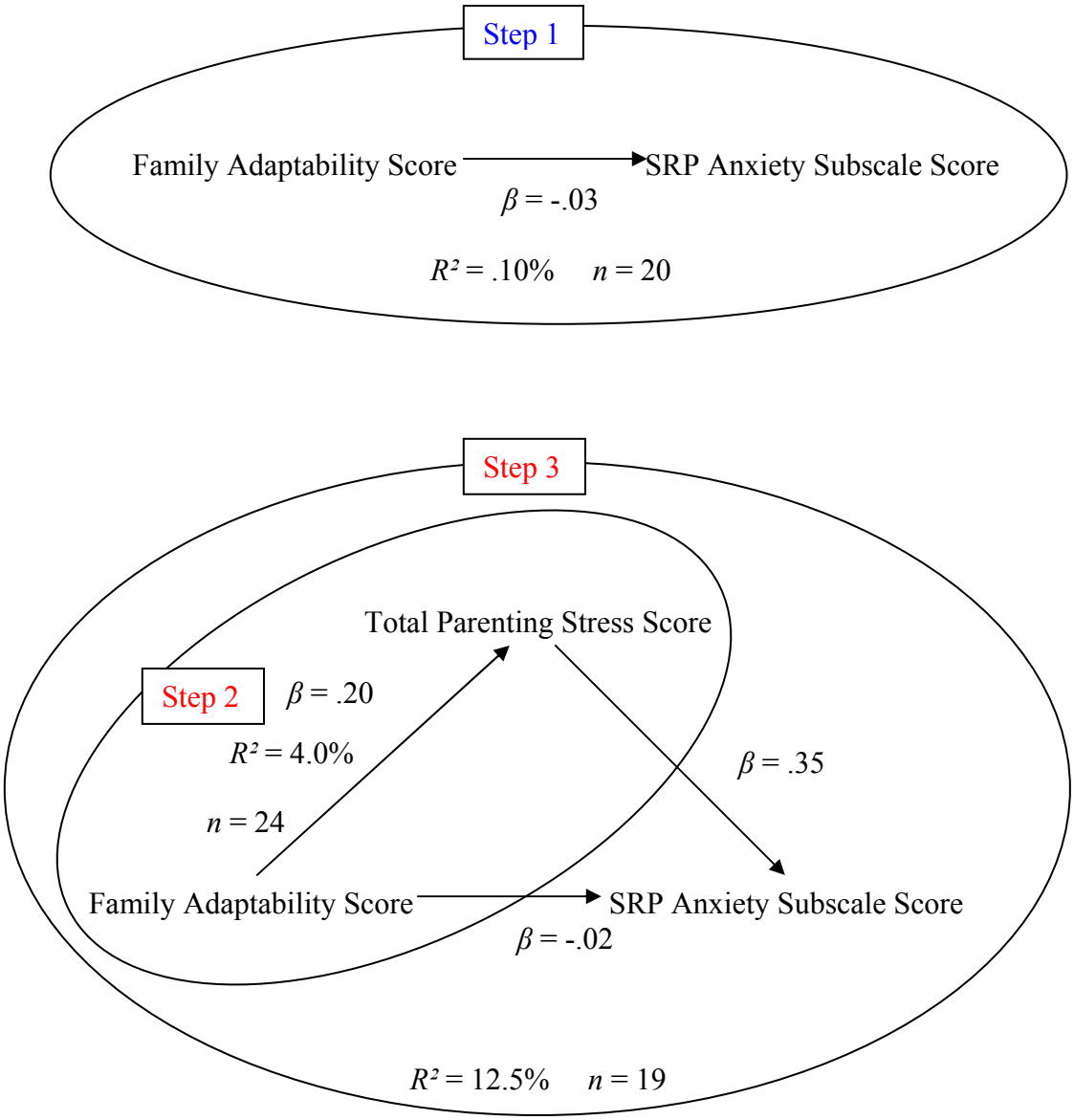

Figure 8. Path Analysis Model for Asthma (Family Adaptability as Independent Variable, BASC-SRP Anxiety as Dependent Variable). *Note.* Step 1 is linear regression analysis (Family Adaptability score as independent variable and BASC-SRP Anxiety Subscale score as dependent variable). Step 2 is linear regression analysis (Family Adaptability as independent variable and PSI-Total Parent Stress as dependent variable). Step 3 is multiple regression analysis, evaluating how much the Total Parenting Stress score adds to the prediction of the BASC-SRP Anxiety Subscale score. * $p < .05$, ** $p < .01$, *** $p < .001$.

Illness Severity and Health-Related Quality of Life

A discriminant analysis was performed in order to examine the relation between illness severity (i.e., mild or moderate) in children with asthma and total health-related quality of life scores. This analysis was used to determine whether children's total scores on the general module of the PedsQL™ could predict membership into one of these two illness groups. Results suggested that total scores on the PedsQL™ General Module did not classify children with asthma into either the mild or moderate illness severity groups (Wilks' $\lambda = .99$). A correlational analysis supported this result and found the variables of illness severity and total scores on the PedsQL™ general module were not significantly correlated ($r = 0.10$, $p = .67$). This analysis addressed research question 6.

Illness Severity and Psychological Adjustment

In order to examine whether the psychological adjustment (i.e. depression, anxiety) of children with asthma could be predicted by illness severity (i.e. mild or moderate), multiple regression analysis was performed. Both parent and child self-reported anxiety and depression subscales were included as the dependent variables and illness severity was employed as the independent variable. Results were not significant and suggest that illness severity did not account for a significant amount of the variance in psychological adjustment. This analysis addressed research question 5.

CHAPTER V

DISCUSSION: SUMMARY AND CONCLUSIONS

The primary purpose of this study was to investigate the relations among psychological adjustment, family functioning, and health-related quality of life in children with asthma and children with diabetes. Previous research on the psychological adjustment of children with asthma has suggested these children experience significantly greater anxiety than healthy children (Vila et al., 2000). Research also suggests that youth with diabetes have more elevated depression scores than do healthy children (Northam, 1997; Grey et al., 2002); however, results regarding the association between asthma and depression and the relation between diabetes and anxiety are inconsistent.

Conflicting evidence also exists regarding the relation between psychological adjustment and illness severity in children with asthma. Additionally, the relation between illness severity and health-related quality of life in children with asthma is unclear. Current research on the health-related quality of life of children with asthma has suggested they exhibit significantly poorer health-related quality of life than healthy children (Sawyer et al., 2000). Research on the health-related quality of life of children with diabetes is limited, but suggests that health-related quality of life decreases with an increase in symptoms indicative of the possible prevalence of long-term complications (Hahl et al., 2002).

Research on the family functioning of children with asthma and children with diabetes has suggested it is associated with psychological adjustment (e.g., Sawyer et al., 2000). Mothers of children with these illnesses also have been found to report greater

parenting stress than mothers of healthy children (Hauenstein et al., 1989; Carson & Schauer, 1992). Research on the potential role of parenting stress in the relation between family functioning and child psychological adjustment is absent in the current literature.

Due to the lack of research or conflicting findings in these areas, this study sought to clarify these relationships. Goals of the present study included evaluating family functioning (i.e. family adaptability and cohesion) in the families of children diagnosed with either asthma or diabetes, investigating the potential mediating effect of parenting stress in the relation between family functioning and psychological adjustment, comparing the psychological adjustment of youth with asthma to that of youth with diabetes (i.e., depression, anxiety), exploring the psychological adjustment of children with asthma in relation to illness severity, and investigating the perceived health-related quality of life of these children. Results of this study are addressed below.

Psychological Adjustment

Based on current research suggesting that children with asthma experience more internalizing problems than healthy children (Klinnert et al., 2000), and that children with diabetes are more affected by depression than healthy children (Grey et al., 2002), it was expected that children with asthma would have higher levels of anxiety when compared to children with diabetes. In contrast, it also was anticipated that children with diabetes would exhibit more elevated levels of depression than children with asthma. Results suggested that children with asthma and children with diabetes do not differ in the degree of anxiety and depression they experience. Additionally, the majority of children with asthma and children with diabetes reported experiencing normal amounts

of anxiety and depression. Similarly, the majority of parent-reported anxiety and depression scores fell within the normal range.

Although results regarding the levels of depression in children with diabetes are contradictory to some previous research (e.g., Grey et al., 2002), these results support the finding that children with diabetes appear similar to healthy children on some measures of psychological adjustment (Johnson, 2001; Kovacs et al., 1990b). These children may particularly experience adjustment difficulties either immediately following diagnosis or during adolescence. The majority of the children with diabetes in this study had been diagnosed with their illness more than one year ago. Additionally, no adolescents were included in this study. It is possible that had this sample included a greater number of children with recent onset of diabetes, higher levels of depression would have been found.

Alternatively, the methodological differences between this study and other studies on the psychological adjustment of children with asthma and children with diabetes may be contributing to the conflicting results obtained. For instance, the instruments used to measure depression and anxiety may vary across studies. This study assessed these constructs through the use of parent and child self-report rating scales. Though rating scales are often employed in studies evaluating psychological adjustment (e.g., Jacobson et al., 1997; Northam et al., 1996; Gillaspy et al., 2002), studies vary in the specific measures used. Notably, previous research on the psychological functioning of children with asthma and children with diabetes has not used the BASC to measure levels of depression or anxiety. Rather, instruments such as the Child Behavior Checklist

(Achenbach, 1992) and the Child Depression Inventory (Kovacs, 1980) often have been employed.

Additionally, some studies evaluating the psychological functioning of children with asthma and children with diabetes have measured anxiety and depression through interviews. In other studies, the use of interviews such as the Present Episode Version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (Puig-Antich & Ryan, 1986) and the National Institute of Mental Health Diagnostic Interview Schedule for Children (Shaffer et al., 1996) have been used alone or in combination with rating scales. The use of such different methods of assessing psychological adjustment is likely one reason why such different results are obtained from one study to another.

In terms of the psychological adjustment of children with asthma, the results obtained in this study suggest these children are not experiencing psychological difficulties. These results are contradictory to those of Gillaspy et al. (2002), who found high rates of anxiety disorders in their study of children with asthma. It is likely that the results obtained in this study are inconsistent with those of Gillaspy and colleagues due to the different nature of the samples used. Specifically, the study conducted by Gillaspy et al. employed a sample of asthmatic adolescents from a low socioeconomic status (SES) or ethnic minority group. In contrast, this study included children whose family annual incomes ranged from less than $10,000 to $200,000 or greater (*M* = $50,000-$74,999, *SD* = $15,000-$24,999). It may be that children with asthma from a low socioeconomic status are at greater risk for adjustment difficulties than children from a high socioeconomic status.

An alternative explanation for the lack of significant findings regarding psychological adjustment is the degree of illness severity found within this sample. The majority of participants were characterized by mild or moderate asthma. Research has suggested that children with severe asthma are at greatest risk for the development of psychopathology (Mrazek, 1992). The lack of children characterized by severe asthma in this study, coupled with the small sample size, may account for the discrepancies between these results.

Additional differences in the methodology employed in this study and other studies on the psychological adjustment of children with asthma and children with diabetes may be contributing to the conflicting results obtained. For instance, the instruments used to measure depression and anxiety may vary across studies. This study assessed these constructs through the use of parent and child self-report rating scales. Though rating scales are often employed in studies evaluating psychological adjustment (e.g., Jacobson et al., 1997; Northam et al., 1996; Gillaspy et al., 2002), studies vary in the specific measures used. Notably, previous research on the psychological functioning of children with asthma and children with diabetes has not used the BASC to measure levels of depression or anxiety. Rather, instruments such as the Child Behavior Checklist (Achenbach, 1992) and the Child Depression Inventory (Kovacs, 1985) often have been employed.

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Prediction of Psychological Adjustment

A number of regression analyses were performed in order to determine the extent to which scores on the depression and anxiety subscales (both parent and child report) could be predicted by total parenting stress scores, total family cohesion scores, total family adaptability scores, and the total general quality of life scores. Regarding children with asthma, results indicated these variables accounted for a significant amount of the variance in child self-reported anxiety scores. Subsequent analyses revealed that total scores on the PedsQL™ general module were the only significant predictor within this model.

These results reveal a strong association between health-related quality of life and children's self-reported anxiety scores. This supports previous research suggesting that the assessment of anxiety in children with asthma may be useful in identifying youth at risk for poor health-related quality of life (Hommel, Chaney, Wagner, & McLaughlin, 2002). The absence of a significant relationship between depression and health-related quality of life also is consistent with Hommel et al.'s research.

In terms of children with diabetes, results suggested that this set of predictors explained a significant amount of the variance in each of the variables of psychological

adjustment (parent and child self-reported anxiety and depression). Additional analyses were performed in order to determine whether a simpler model could produce similar results. These results revealed that only PSI-Total Parenting Stress scores significantly predicted parent-reported anxiety. In contrast, the only significant predictor of self-reported anxiety was PedsQL™ General Module scores. In the case of parent-reported depression, scores on the PSI-Total Parenting Stress, PedsQL™ General Module, and Family Cohesion were significant predictors. However, only PedsQL™ General Module scores significantly predicted self-reported depression.

Taken together, these results suggest the relationships between psychological adjustment and health-related quality of life, and between psychological adjustment and parenting stress are generally strong in children with diabetes. Family cohesion also was determined to have a significant relation with psychological adjustment. This result is consistent with previous research suggesting a significant association between family cohesion and psychological adjustment (Grey et al., 2002). Given the relationship between family cohesion and the metabolic control of children with diabetes (Hauser et al., 1990; Hanson, et al., 1989), and the relation between health status and psychological adjustment (English & Sills, 1998), this result was expected.

Health-Related Quality of Life

The diagnosis of diabetes brings about many changes in children's lives. Managing the various tasks of illness management can be challenging for these children and interfere with their regular activities. Similarly, children diagnosed with asthma must suddenly take on the challenge of managing their illness and are required to make

changes in their regular activities (e.g., limitation of exercise, sports). The potential difficulties children with these illnesses may experience related to social relationships, school functioning, emotional functioning, and physical health are believed to negatively impact their health-related quality of life (e.g., Varni et al., 2003a; Sawyer et al., 2000). Due to the potential impact of both of these illnesses on health-related quality of life, children with asthma were not expected to differ from children with diabetes on general health-related quality of life scores. Consistent with this hypothesis, results indicated that children from these illness groups did not report experiencing different levels of health-related quality of life.

Due to the lack of a healthy control sample in this study, statistical comparisons could not be made between these children's scores on health-related quality of life and those of healthy children. Despite this limitation, comparisons between previous research using the PedsQL™ and the results from this study could be made through independent samples t-tests. These analyses revealed children with diabetes obtained lower mean scores across all scales of the general module than did healthy children, and children with asthma obtained lower mean scores across all scales of the general module with the exceptions of Social Functioning and Emotional Functioning. These results suggest that children with these illnesses are experiencing poorer health-related quality of life than their healthy peers. Additionally, the mean scores of both illness groups on the general module were consistent with scores of children with asthma and children with diabetes found in previous studies, with the exception of Diabetes Symptoms (Varni et al., 2003a & 2003b).

Family Functioning

Due to the influence of family functioning on children's adjustment (Sawyer et al., 2000), this study included an examination of how family functioning may be impacted by having asthma or diabetes. Family cohesion and family adaptability were the dimensions of family functioning of interest in this study. Strong family cohesiveness has been associated with higher overall diet and metabolic monitoring adherence (Hauser et al., 1990), and good overall metabolic control in children with diabetes (Hanson, et al., 1989). Therefore, an understanding of the degree of family cohesion in families of children with diabetes has important ramifications for the health status of these children.

Research is lacking on the degree of family cohesion in the families of children with asthma, and its impact on psychosocial adjustment. Due to this absence of literature on family cohesion, it was expected that children with asthma would not differ from children with diabetes on this dimension of family functioning. Results indicated that no differences existed between the two illness groups, consistent with this hypothesis. Parents of both children with asthma and children with diabetes reported their families had a healthy degree of cohesiveness. In contrast, previous research has suggested that families of adolescents with diabetes are characterized by a pattern of low cohesion and high organization (Seiffge-Krenke, 1998). The difference in these results may be partially explained by the differences in methodology employed. The study conducted by Seiffge-Krenke employed a sample of German adolescents with diabetes and used a different measure of family functioning.

Scores on family adaptability were expected to differ significantly between families of children with asthma and families of children with diabetes. Results indicated the groups did not differ on this variable and therefore did not find support for this hypothesis. This result is contradictory to research suggesting that families of children with asthma are more adaptable than families of children with diabetes (Holden et al., 1997). Holden and colleagues conducted their research with a sample similar in nature to that used in this study (e.g., at summer camps for children with these illnesses, majority Caucasian, high mean family annual income) and used the third edition of the FACES; therefore, the conflicting nature of these results is surprising.

One difference between these two studies lies in the age of participants. While this study was limited to children ages 8-12 years, the age range of participants in Holden et al.'s (1997) study extended to age 15 years. It may be that developmental differences are accounting for the difference in these results. Research has suggested the most difficulties with metabolic control in diabetes are experienced during adolescence (Daneman, Wolfson, Becker, & Drash, 1981). During this time, adolescents demonstrate a desire for autonomy and families may need to renegotiate roles and reorganize family routines in order to successfully manage illness-related demands. Both the parents and the adolescent often experience conflict during this time period. It may be that successful illness management is more easily obtained when the family adopts a rigid style of family adaptability during adolescence.

An alternative explanation is that the sample of diabetic youth in Holden et al.'s (1997) study were experiencing psychological adjustment difficulties and this

maladjustment is related to a less flexible style of family functioning. This explanation is consistent with Grey et al.'s (2002) finding that adolescents who reported lower family adaptability and lower family cohesion were more likely to have depressive symptoms than adolescents with higher family functioning. This argument also is supported by the fact that children with diabetes in this study were from families characterized as having an adaptive degree of cohesion and did not evidence psychological adjustment difficulties.

Parenting Stress

Limited research has been conducted on the total stress parents of children with asthma and parents of children with diabetes experience related to the parenting role. Furthermore, this study is the first to directly compare the parenting stress levels of the parents of these two illness groups. It was hypothesized that parents of children with asthma would not differ significantly from parents of children with diabetes in their degree of parenting stress. Results supported this hypothesis, indicating these groups did not differ along this variable.

Additionally, results suggested that parents in both illness groups reported a normal amount of stress related to the parenting role. This result contradicted the hypothesis that they would be experiencing greater than normal levels of total parenting stress. This hypothesis was based on research suggesting that mothers of youth with asthma reported a greater degree of parenting stress than a comparison group of mothers of healthy children (Carson & Schauer, 1992), and that greater parenting stress has been

reported by mothers of children with diabetes than by mothers of healthy children (Hauenstein, et al., 1989).

Given the increase in the demands placed on these parents to assist in managing their children's illness, it is surprising that these parents do not report greater stress than parents of healthy children. One possible explanation for these results is that illness duration impacts the degree of parenting stress. Since the vast majority of children with asthma and children with diabetes in this study were not recently diagnosed with their illness, it may be that their parents had time to adapt to their expanded role in illness management. Additionally, these families reported having high mean annual incomes and may therefore have greater access to resources. The availability of these resources may contribute to the ability of these families to cope with the crises and changes associated with their children's chronic illness (Hamlett et al., 1992).

This study also sought to examine whether parenting stress mediated the relationship between family functioning variables (cohesion, adaptability) and psychological adjustment (anxiety, depression) in the families of children from both illness groups. Results suggested that parenting stress only served as a mediator in the relationship between family cohesion and parent-reported depression in children with diabetes. This result was expected due to the combination of research demonstrating relationships between family cohesion and good health status in youth with diabetes (Wysocki, 1997; Hauser et al., 1990), and between good health status and psychological adjustment (English & Sills, 1998). When parents are experiencing high levels of stress related to the parenting role, this may negatively impact the extent to which a family is

cohesive and exhibits emotional togetherness. The association between family cohesion and children's psychological adjustment may therefore depend on the degree of parenting related stress experienced by the parents of children with diabetes. Since previous research has not tested the mediating effects of parenting stress in this particular relationship, this is the first time such an effect has been found.

In contrast to expectations, when child self-reported depression was substituted for parent ratings, total parenting stress no longer served as a mediator in the relationship. This result was due to the lack of a relationship found between family cohesion and child self-reported depression. Parenting stress also did not serve a mediating role in the relation between family adaptability and depression in children with diabetes. A significant relation existed between family adaptability and parenting stress; however, there was not a significant relationship between family adaptability and either parent-reported or child self-reported depression. Due to this lack of relationship, the question of whether parenting stress served as a mediator was moot.

Results of the path models with the asthma sample suggested that parenting stress does not serve as a mediator in the relationships between family functioning and psychological adjustment. Due to the limited sample size of children with asthma, caution is warranted when interpreting these results. While it may be that parenting stress does not serve as a mediator in this relationship, it also may be that these effects were unable to be detected due to a lack of statistical power.

Illness Severity

Based on the conflicting results found in research on the relation between illness severity in asthma and psychological adjustment, an additional goal of this study was to investigate this relationship. However, caution is warranted in the interpretation of the results regarding illness severity in this study. Due to the small sample size, as well as the lack of children with severe asthma, limited statistical power was available to detect main effects. Illness severity was expected to be a significant predictor of psychological adjustment in children with asthma; however, results suggested that illness severity is not a good predictor of psychological adjustment in children with asthma. This result is contrary to the findings of Maclean et al. (1992), who found that less optimal psychological adjustment was predicted by illness severity. However, in their study, illness severity was not predictive of psychological outcomes alone; rather, it was accompanied by the variables of low socioeconomic status and negative life change. It is likely that the addition of these two variables in their model accounts for the difference in these findings from the results obtained in this study.

A relationship between illness severity and health-related quality of life also was explored due to the impact illness severity may have on health-related quality of life (Fayers & Machin, 2000). A significant negative correlation between illness severity and quality of life was expected to be found, such that quality of life would decrease as illness severity increased. Results did not support this hypothesis ($r = 0.099$, $p = .670$) and further indicated that total scores on the PedsQL™ General Module did not classify children with asthma into either the mild or moderate illness severity groups. There is a

dearth of research on the impact of illness severity on health-related quality of life; thus, these results are unable to be compared to those of others. Clearly, this is an area of research that needs to be explored further.

Strengths and Limitations

It is important to note both the strengths and limitations associated with this study. This study was the first to investigate this particular set of variables in children with asthma and children with diabetes. Additionally, this study allowed for comparisons to be made between these two illness groups. This study also included the first attempt to evaluate the potential mediating role of parenting stress in the relationship between family functioning and psychological adjustment. The results presented in this study were able to further knowledge on the psychological functioning, family functioning, and health-related quality of life of children with asthma and children with diabetes. Contributing to the research base in these areas is important due to the ramifications these variables may have on the physical health status and overall functioning of children with these illnesses.

This study also possessed a number of limitations that must be noted. First, parent-report and self-report measures were employed in this study to assess the variables of interest. Thus, there is concern regarding the accuracy of responses obtained, which limits conclusions drawn from these results. Second, a healthy control group was not included in this study. The inclusion of a group of healthy children would have benefited this study by allowing for comparisons between these children and the illness groups. Third, the size of the sample of children with asthma was small. Due to

the high number of variables included in this study and the high number of statistical analyses performed, this study was limited by its power to detect significant effects. In order to minimize the risk of a Type 1 error, alpha levels were reduced; however, this increased the risk of a Type 2 error. Additionally, the majority of children were Caucasian and came from families with high annual incomes, and of the children with asthma, very few were characterized by severe asthma. Due to the inability to assess for non-respondent bias in this study, it also is unknown whether there are differences between those children and primary caregivers who chose to participate and those who declined. Taken together, caution must be used when generalizing the results of this study to children with these illnesses from other socioeconomic and ethnic backgrounds.

Suggestions for Future Research

Though the results presented in this study contributed to current knowledge in the areas of childhood asthma and childhood diabetes, suggestions for future research may be provided. Due to conflicting results regarding the psychological adjustment of children with asthma and children with diabetes, additional research in this area is needed. To improve upon this research, future research in this area should investigate the extent to which socioeconomic status places these children at risk for psychological difficulties. Studies comparing children from high and low socioeconomic statuses while matching them on other demographic variables would be particularly useful. Additionally, research on the psychological adjustment of children with diabetes would benefit from studies comparing children recently diagnosed with their illness to those who have significantly greater illness duration.

Additional research on the impact of illness severity on psychological adjustment and health-related quality of life in children with asthma also is needed. In particular, this research should employ large samples of children representing each of the illness severity categories (mild, moderate, and severe). This research is needed in order to clarify the relationships between illness severity, psychological adjustment, and health-related quality of life in children from this population. These studies also would benefit from controlling for the effects of socioeconomic status and negative life events. A better understanding of these relationships may assist in efforts to provide education and psychological intervention for these children and their families.

In terms of health-related quality of life research, more studies are needed that compare healthy children to children with diabetes, children with asthma, and children with other chronic illnesses. Specific areas of health-related quality of life that may be problems for these children need to be identified and in order to be able to target them for intervention. Additionally, research should attempt to determine whether there are certain aspects of the health-related quality of life of these children that are strengths. In general, strengths of certain subsets of these illness groups (e.g., mild asthma severity) need to be identified and should be emphasized during intervention efforts.

Due to the lack of support for previous research on the parenting stress levels of parents of children with asthma and children with diabetes, future research should attempt to clarify these mixed results. Additionally, research evaluating the impact of parenting stress on other child or parent outcome variables should account for potential correlates of parenting stress (e.g., negative life events, socioeconomic status, other

family functioning variables). Based on the result suggesting that parenting stress mediates the relation between family cohesion and parent-reported depression in children with diabetes, further research in this area should be pursued. It also would be useful to reevaluate the path models included in this study with a larger sample of children with asthma.

Research studies that make developmental comparisons between children with these illnesses also would be beneficial. For instance, studies are needed on the potential interaction between developmental factors and family factors in children with these illnesses. A study comparing the family cohesion of children and adolescents with diabetes at different developmental stages also is needed. Such studies could provide useful information on whether certain characteristics of family functioning are exhibited while children and adolescents are at specific developmental stages. Further, these studies should include measures of psychological adjustment in order to investigate whether specific patterns in family functioning present at different developmental stages are associated with specific psychological outcomes. For instance, this study would be able to address the question of whether good psychological functioning is associated with rigid family adaptability in families of adolescents with diabetes. Such research also could help clarify whether children at certain ages are at the greatest risk for adjustment difficulties, and therefore aid in the identification of children to target for intervention.

Finally, additional research is needed that is longitudinal in nature in order to obtain meaningful information on how the interplay between the variables of family functioning, psychological adjustment, and health-related quality of life changes over

time. Socioeconomic status, illness duration, and other demographic variables should be controlled for in such studies. This information is needed in order to better understand if children or adolescents with these illnesses are most at risk for psychological problems or poor health-related quality of life at certain developmental stages and when they exhibit a particular pattern of family functioning. These children could then be identified and targeted for intervention, with the ultimate goal of optimizing overall psychological and physical health.

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APPENDIX A

CLASSIFICATION SYSTEM FOR SEVERITY OF ASTHMA

(PERRIN ET AL., 1989)

	Level of Severity		
	Mild (A)	Moderate (B)	Severe (C)
I. *Medications*			
1. Epinephrine (or equivalent) in past year	0	1-2	4 or more
2. Steroid use (at any time)	No	No	Yes
3. Medications used between attacks	No	Yes	Yes
II. *Acute illness* – attacks in past year	0-2	3-6	7 or more
III. *School Absence* – school days missed because of more Asthma during the school year immediately prior to study entry	0-5	6-10	11 or more

* *Note.* The score for Medications was generated by meeting criteria for two of the three parts (e.g., 1-A, 2-A, 3-C is scored as A; 1-A, 2-B, 3-C is scored as B). For the generation of the final score, where at least two subscores occur in a single category, that severity category is assigned. When each subscore is different (A-B-C), score assigned is B.

APPENDIX B

COVER LETTER FOR PARENTS

Department of Psychology
Texas A&M University
College Station, TX 77843-4235

Dear Parent or Legal Guardian,

This letter is to request your participation in the Illness Management and Coping Study, a project sponsored by Texas A&M University and the summer camp your child will be attending. The Illness Management and Coping Study is designed to investigate various ways in which the adjustment and quality of life of children living with a chronic illness can be improved. In addition, the results from this study will be used to help camps improve the services that they provide for children. We ask for the cooperation of both you and your child. If both of you agree to participate, you each will receive a $10 gift card to Wal-Mart. If you would prefer to grant permission for only your child, your child will receive a $10 gift card.

For this study, we plan to include a large number of parents and their children who are coping with various chronic illnesses. Specifically, the Illness Management and Coping Study will include separate questionnaire packets for parents and children. Questionnaires for children will be completed within a large group at the camp and will last approximately one hour. If camps grant permission, you may have the option of completing a packet of written questionnaires at a time when you visit the camp (for example, when you take your child to camp). Otherwise, these questionnaires will be mailed to your home for you to complete and return to us. These questionnaires should take approximately one hour for you to complete. Only one parent's participation per child is necessary. Camp staff will assist in selecting the time that is best for the children to complete the questionnaires at camp. Subject matter to be discussed in the questionnaires will include various topics relating to your child's experience with his or her illness and how he or she copes with it, both behaviorally and emotionally.

All of the information we gather is kept private and confidential. Only Dr. Heffer, Dr. Anhalt, and their research assistants will have access to the information we gather. The data will be coded by identification numbers instead of by name. You and your child will not be identified in any results that will be reported. Should you feel that some of the questions we ask are sensitive or personal, you may choose not to answer them. Your child also will have the option to skip any question he or she chooses not to answer. If you feel the need to ask for help or information about any issues raised by these questions, we can provide you with information about agencies in your community that can provide information or assistance.

Please sign the enclosed consent form to inform us of your decision about you and your child's participation in the study. If you consent, please also complete the Demographic Information form and the Medical History Information form, even if they are redundant with your other camp materials. Please return these three things in the enclosed envelope before the registration deadline for your camp. If you would like more information about the study, please feel free to contact Dr. Robert Heffer or Dr. Karla Anhalt, the project directors at Texas A&M University, using the numbers indicated below.

Thank you for taking the time to read this letter and for completing the enclosed consent form. Your cooperation is greatly appreciated!

Sincerely,

Dr. Robert Heffer
Department of Psychology
(979) 862-2228
rwh@psyc.tamu.edu

Dr. Karla Anhalt
Department of Educational Psychology
(979) 845-2324
kanhalt@coe.tamu.edu

APPENDIX C

CONSENT FORM - ASTHMA

Illness Management and Coping Study - Informed Consent

I, _____ (print name), the parent/legal guardian of _____ (print my child's name), understand that my child and I have been asked to participate in a research study called Illness Management and Coping. I was selected because I have registered my child for an asthma-related summer camp and that camp has agreed to participate in this study. The purpose of this study is to learn more about my child's experience with his or her asthma, how he or she copes with it both emotionally and behaviorally, and how it impacts my family. This study is being conducted through Texas A&M University and will be conducted during the summer of 2003. A total of approximately 250 children attending summer camps for asthma and their parents will participate in this study.

1. **Procedures to be Followed:**

In this study I will be asked to:

- Complete a written questionnaire containing demographic information and questions about my child's health.
- Complete a packet of written questionnaires regarding my child's behavior and how my family and I cope with my child's illness. If camps grant permission, I will have the option of completing the packet at a time when I visit the camp (for example, when taking my child to camp). Otherwise, these questionnaires will be mailed to my home for me to complete and return.
- My participation in this study is expected to take a total of one hour and fifteen minutes of my time.

My child will be asked to:

- Complete several questionnaires while at camp. These questions concern how he or she thinks, feels, and behaves about his/her asthma, and about his/her beliefs about our family.
- Use a peak flow meter to assess his/her breathing. He or she will be asked to blow in the peak flow meter on three occasions prior to answering the questionnaires and three occasions following the completion of the questionnaires.
- Again blow in the peak flow meter three times at the end of the camp session, predict the peak flow reading, record how much he or she is experiencing a brief list of symptoms related to asthma, and complete a brief survey about his/her camp experience.
- My child's participation in this study as described above is expected to take a total of one hour and fifteen minutes of his or her time.

- Pending camp approval, my child may be asked to predict his or her peak flow, record current symptoms, and provide a peak flow reading up to 3 times per day while at camp.

2. **Voluntary Participation:** I understand that participation is completely voluntary. I am free to withdraw from the study at any time, in which case any information that the researchers have collected about my child and me will be destroyed. Whether or not my child participates in this study will have no impact on the services provided by the camp or my child's status at the camp.

3. **Confidentiality:** I understand that steps will be taken to ensure confidentiality for my child and me. Identification numbers will be assigned and names will be removed from all responses to protect the identification of my child and me.

4. **Benefits and Compensation:** For my child's participation in his or her portion of the study, a $10 gift card to Wal-Mart will be mailed to my home. For my participation, an additional $10 will be added to the gift card. The gift card will be mailed to me within two weeks after both my questionnaires and those of my child have been collected. Should I choose to withdraw my child or myself from the study, I understand that I will not receive the associated compensation as described above. If I choose not to participate in this study, but permit my child to participate, then only my child will receive the $10 Wal-Mart gift card. There are no other benefits for participation.

 My Initials_____ Date_____

5. **Risks:** There are no known risks associated with these procedures. Most of the items contained in these questionnaires deal with normal variations in thoughts and behavior and generally are not disturbing. However, some questions such as those related to family relationships and concern about asthma may be considered sensitive. If there is a question that my child or I do not feel comfortable answering, that question may be skipped without penalty. This will be clearly explained to my child immediately before he or she begins the study. Compensation will still be awarded to my child and me if we choose not to answer questions that we are not comfortable answering. Mild physical discomfort may accompany the use of the peak flow meter in some cases. If my child or I report psychological distress as a result of having participated in the study, I may contact the Texas A&M Psychology Clinic (979-845-8017), Dr. Robert Heffer (979-862-2228), or Dr. Karla Anhalt (979-845-2324) for referral to a mental health professional in my area.

6. I understand that my child's responses or scores will not be shared with me.

7. Should I have any questions about this study, I understand that I may contact:

Dr. Robert Heffer OR Dr. Karla Anhalt
Department of Psychology
4235 Texas A&M University
College Station, TX 77843-4235
(979) 862-2228
rwh@psyc.tamu.edu

Department of Educational Psychology
4225 Texas A&M University
College Station, TX 77843-4225
(979) 845-2324
kanhalt@coe.tamu.edu

8. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction.

9. I have been given a copy of this consent form.

Please check **one** of the following:

_____ By my signature below, I consent to the participation of me and my child in the study as described above.

_____ By my signature below, I consent to the participation of my child, and to my completion of the 15-minute demographic and medical history questionnaire, but I refuse to complete the additional parent questionnaire packet.

_____ _____
Signature of Parent/Guardian Date

Below is information that must be provided for mailing gift cards to my home and/or for me to receive the parent packet:

My name: _____
Address: _____
City: _____ State: _____ Zip Code:_____

"I understand that this research study has been reviewed and approved by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, I can contact the Institutional Review Board through Dr. Michael W. Buckley, Director of Research Compliance, Office of Vice President for Research at (979) 845-8585 or mwbuckley@tamu.edu."

APPENDIX D

CONSENT FORM - DIABETES

Illness Management and Coping Study - Informed Consent

I, _____ (print name), the parent/legal guardian of _____ (print my child's name), understand that my child and I have been asked to participate in a research study called Illness Management and Coping. I was selected because I have registered my child for a diabetes-related summer camp and that camp has agreed to participate in this study. The purpose of this study is to learn more about my child's experience with his or her diabetes, how he or she copes with it both emotionally and behaviorally, and how it impacts my family. This study is being conducted through Texas A&M University and will be conducted during the summer of 2003. A total of approximately 250 children attending summer camps for diabetes and their parents will participate in this study.

1. **Procedures to be Followed:**

In this study I will be asked to:

- Complete a written questionnaire containing demographic information and questions about my child's health.
- Complete a packet of written questionnaires regarding my child's behavior and how my family and I cope with my child's illness. If camps grant permission, I will have the option of completing the packet at a time when I visit the camp (for example, when taking my child to camp). Otherwise, these questionnaires will be mailed to my home for me to complete and return.
- My participation in this study is expected to take a total of one hour and fifteen minutes of my time.

My child will be asked to:

- Complete several questionnaires while at camp. These questions concern how he or she thinks, feels, and behaves about his or her diabetes, and about his/her beliefs about our family.
- Test his or her blood glucose level according to his or her standard procedures. He/she will also be asked to predict the blood glucose level and record how much he or she is experiencing a brief list of symptoms related to blood sugar fluctuations.
- At the end of the camp session, to again test his or her blood glucose level, predict blood glucose level, to record how much he or she is experiencing a brief list of symptoms related to diabetes, and to complete a brief survey about his/her camp experience.
- My child's participation in this study as described above is expected to take a total of one hour and fifteen minutes of his or her time.

- Pending camp approval, my child may be asked to predict his or her blood glucose level, record current symptoms, and test blood glucose level at the time of any regularly scheduled blood glucose checks up to 4 times per day while at camp.

2. **Voluntary Participation:** I understand that participation is completely voluntary. I am free to withdraw from the study at any time, in which case any information that the researchers have collected about my child and me will be destroyed. Whether or not my child participates in this study will have no impact on the services provided by the camp or my child's status at the camp.

3. **Confidentiality:** I understand that steps will be taken to ensure confidentiality for my child and me. Identification numbers will be assigned and names will be removed from all responses to protect the identification of my child and me.

4. **Benefits and Compensation:** For my child's participation in his or her portion of the study, a $10 gift card to Wal-Mart will be mailed to my home. For my participation, an additional $10 will be added to the gift card. The gift card will be mailed to me within two weeks after both my answers and those of my child have been collected. Should I choose to withdraw my child or myself from the study, I understand that I will not receive the associated compensation as described above. If I choose not to participate in this study, but permit my child to participate, then only my child will receive the $10 Wal-Mart gift card. There are no other benefits for participation.

5. **Risks:** There are no known risks associated with these procedures. Most of the items contained in these questionnaires deal with normal variations in thoughts and behavior and generally are not disturbing. However, some questions such as those related to family relationships and concern about diabetes may be considered sensitive. If there is a question that my child or I do not feel comfortable answering, that question may be skipped without penalty. This will be clearly explained to my child immediately before he or she begins the study. Compensation will still be awarded to my child and me if we choose not to answer questions that we are not comfortable with answering. My child may also experience the physical discomfort typically associated with his or her regular test of blood sugar. If my child or I report psychological distress as a result of having participated in the study, I may contact the Texas A&M Psychology Clinic (979-845-8017), Dr. Robert Heffer (979-862-2228), or Dr. Karla Anhalt (979-845-2324) for referral to a mental health professional in my area.

6. I understand that my child’s responses or scores will not be shared with me.

7. Should I have any questions about this study, I understand that I may contact:

Dr. Robert Heffer OR Dr. Karla Anhalt
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Department of Educational Psychology
4225 Texas A&M University
College Station, TX 77843-4225
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kanhalt@coe.tamu.edu

8. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction.

9. I have been given a copy of this consent form.

   Please check **one** of the following:

   _____ By my signature below, I consent to the participation of me and my child in the study as described above.

   _____ By my signature below, I consent to the participation of my child, and to my completion of the 15-minute demographic and medical history questionnaire, but I refuse to complete the additional parent questionnaire packet.

   _____ _____ _____
   Signature of Parent/Guardian Date Signature of Researcher

Below is information that must be provided for mailing gift cards to my home and/or for me to receive the parent packet:

My name: _____
Address: _____
City: _____ State: _____ Zip Code:_____

"I understand that this research study has been reviewed and approved by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, I can contact the Institutional Review Board through Dr. Michael W. Buckley, Director of Research Compliance, Office of Vice President for Research at (979) 845-8585 or mwbuckley@tamu.edu."

APPENDIX E

DEMOGRAPHIC QUESTIONNAIRE

Dear Parent or Guardian,
The questions below are about you, your child, and your family. If there are any questions you would prefer not to answer, just skip them. Your answers to these questions will be treated in a confidential manner. Your answers will be known only to the researchers at Texas A&M University.

Today's date _____

CHILD INFORMATION

Child's age at time of camp_____

Name of Camp the Child is Attending _____

Child's birthday_____

Child's sex (check one): _____ M _____ F

Child's Ethnicity (check one):
_____ African American or Black
_____ American Indian or Alaska Native
_____ Asian-American
_____ Caucasian or White (Not of Hispanic origin)
_____ Hispanic or Latino
_____ Other (please specify) _____

Does the child participating in this study read, write, and speak English? ___yes ___no

PARENT INFORMATION

Your sex (check one): _____ M _____ F

Your age: _____

Your Ethnicity (check one):
_____ African American or Black
_____ American Indian or Alaska Native
_____ Asian-American
_____ Caucasian or White (Not of Hispanic origin)
_____ Hispanic or Latino

_____ Other (please specify) _____

Please indicate your marital status (check one):

_____ Divorced/Separated
_____ Married
_____ Single
_____ Widowed

Are you considered a primary caretaker for this child?

_____ Yes
_____ No

What is your relationship to this child?

_____ Mother
_____ Father
_____ Stepmother
_____ Stepfather
_____ Grandmother
_____ Aunt
_____ Grandfather
_____ Uncle
_____ Female other
(please specify relationship:_____)
_____ Male other
(please specify relationship:_____)

What is the primary language spoken at home? _____

Please indicate your total annual family income level (check one):

_____ Less than $10,000
_____ $10,000-$14,999
_____ $15,000-$24,900
_____ $25,000-$34,999
_____ $35,000-$49,999
_____ $50,000-$74,999
_____ $75,000-$99,000
_____ $100,000-$149,999
_____ $150,000-$199,999
_____ $200,000 or more

How many individuals are supported by this income? _____people

Please list the ages and genders of all children living in your home:
(for example, boys = 4, 6 girl =11)

_____

Please indicate the highest level of education YOU completed:

_____ Less than high school
_____ Some high school
_____ Graduated high school/GED
_____ Some college or vocational/technical school
_____ Graduated from vocational/technical school
_____ Associate's degree
_____ Graduated from a four-year college
_____ Some graduate work
_____ Completed a graduate degree

What is your employment situation?

_____ Employed full time Job title: _____
_____ Employed part-time Job title: _____
_____ Disabled Your disability: _____
_____ Unemployed
_____ Retired
_____ Full time homemaker
_____ Other (please specify)

APPENDIX F

MEDICAL HISTORY QUESTIONNAIRE - ASTHMA

Child's current height: _____feet _____inches Child's current weight: _____lbs

When was you child diagnosed with asthma? _____month _____year

Does your child have any other chronic health condition? ___Yes ___No

If yes, please specify_____

Please circle the number indicating the severity of your child's asthma:

Mild		Moderate		Severe
1	2	3	4	5

How often does your child have asthma symptoms?

_____daily _____weekly _____monthly _____less than monthly

Has your child EVER….

Had a pulmonary arrest (stopped breathing)? ___Yes ___ No

If yes, how many times? _____times

Been in ICU and/or placed on a ventilator? ___Yes ___ No

If yes, how many times? _____times

How many times IN THE PAST YEAR has your child…..

had to be taken to the doctor for an urgent visit because of asthma?

_____times in the past year

had to go to the emergency room because of asthma?

_____ times in the past year

been hospitalized because of asthma?

_____times in the past year

needed steroid medication (e.g., Prednisone) to control asthma?

_____times in the past year

missed school because of asthma?

_____days in the past school year

been awakened at night because of asthma?

_____times in the past year

used a peak-flow meter at home to test breathing?

_____seldom or never _____every few months _____once per month
_____several times per month _____once per week _____ every day

SINCE DIAGNOSIS, please estimate how many times your child has used a peak flow meter at home to test breathing:

_____seldom or never _____every few months _____once per month
_____several times per month _____once per week _____every day

If your child has used a peak flow meter, what is his or her normal range? _____

PLEASE COMPLETE THE OTHER SIDE

Please list all medications that your child has been prescribed in the past year for asthma, allergies, or to improve breathing. Please include the name of the medication, the dosage, and when he/she is supposed to take them.

Daily Oral Medications	**Name of Medication** 1. 2. 3. 4.	**Dosage**	**How Many Times Given Per Day**
As-Needed Oral Medications	**Name of Medication** 1. 2. 3. 4.	**Dosage**	**Condition Given**
Daily Metered-Dose Inhalers (Puffers)	**Name of Medication** 1. 2. 3. 4.	**Dosage**	**How Many Times Given Per Day**
As-Needed Metered-Dose Inhalers (Puffers)	**Name of Medication** 1. 2. 3. 4.	**Dosage**	**Condition Given**
Daily Nebulizer Medication	**Name of Medication** 1. 2. 3.	**Dosage**	**How Many Times Given Per Day**
As-Needed Nebulizer Medication	**Name of Medication** 1. 2. 3.	**Dosage**	**Condition Given**
Steroid Medication	**Name of Medication** 1. 2. 3.	**Dosage**	**Condition Given**
Other Medication (allergy shots, de-congestants, etc.)	**Name of Medication** 1. 2. 3.	**Dosage**	**How Many Times Given Per Day or Condition Given**

APPENDIX G

MEDICAL HISTORY QUESTIONNAIRE - DIABETES

Please indicate the type of diabetes your child has (check one):

____ diabetes mellitus Type I ____diabetes mellitus Type II ____diabetes insipidis

What month and year was you child diagnosed with diabetes? ____month ____year

Does your child have any other chronic health condition? ___Yes ___No
If yes, please specify_____

Has your child **EVER….**

Been in a diabetic coma? ___Yes ___ No
If yes, how many times? _____times

Been in hypoglycemic insulin shock? ___Yes ___ No
If yes, how many times? _____times

Suffered from ketoacidosis? ___Yes ___No
If yes, how many times? _____times

How many times per day has the doctor prescribed that your child:

Test his/her blood-glucose _____times per day

Have an insulin injection _____times per day

In the **PAST YEAR**, how many times has your child…..

had to be taken to the doctor for an urgent visit because of diabetes? _____times

had to go to the emergency room because of diabetes? _____ times

been hospitalized because of diabetes? _____times

needed to test his or her urine for ketones? _____times

missed school because of diabetes? _____days

Please list all medications that your child has been prescribed in the last year in order to control diabetes. Please include how they are given, and how frequently he/she is supposed to take them. Please include the type(s) of insulin that he or she is prescribed (e.g., short-acting such as Regular or Semilente) or intermediate-acting such as NPH or Lente).

Name of medicine (e.g., Semilente)	**How given** (e.g., pill, injection, etc.)	**How often should take** (e.g., as needed, 2 times a day, etc.)

APPENDIX H

ASSENT FORM - ASTHMA

I am being asked to take part in a Texas A&M University research study. The purpose of this study is to learn more about kids' experiences with asthma, how they feel about their asthma, and what they do about it. During this study, I will be asked to:

- answer questions about myself, my asthma, and my family. I understand that it will take about an hour to finish answering the questions.
- use a peak flow meter to test my breathing. I will do this three times before I answer the questions and three times after I answer the questions.
- to answer some of the questions again at the end of camp, and to fill out a short questionnaire about my camp, and to test my breathing with the peak flow meter again. This will take about 15 minutes.
- If my camp agrees, I may be asked to use a peak flow meter, guess what my peak flow will be, and rate how well I'm breathing up to 3 times per day during the days I am at camp.

I understand that I should not write my name on any page except this one. My answers will be kept confidential, and my answers will not be shown to my parents, my doctors, my camp counselors, or anyone else that I know. This means that I will be able to answer the questions honestly because my name will not be on the forms, and no one but the researchers could ever know which answers were mine. There will also be about 250 other young people from this camp and other camps answering the same questions.

I understand that:

- there are no known risks to this study, but some kids may not like how it feels when they blow into the peak flow meter.
- if I choose to take part in this study and complete it, a $10 Wal-Mart gift card will be mailed to my home.
- if I do not want to answer a question, I can skip it and I will still get my $10 gift card.
- I can get my own copy of this form if I want to by asking a researcher at my camp.

If I have any questions about this study, I can contact:

Dr. Robert Heffer
Department of Psychology
4235 Texas A&M University
College Station, TX 77843-4235
(979) 862-2228
rwh@psyc.tamu.edu

OR

Dr. Karla Anhalt
Department of Educational Psychology
4225 Texas A&M University
College Station, TX 77843-4225
(979) 845-4225
kanhalt@coe.tamu.edu

This form has been read aloud to me and I understand what it says. By signing my name, I agree to take part in this study.

_____	_____
Signature (Participant)	Date
_____	_____
Signature (Researcher)	Date

APPENDIX I

ASSENT FORM - DIABETES

I am being asked to take part in a Texas A&M University research study. The purpose of this study is to learn more about kids' experiences with diabetes, how they feel about their diabetes, and what they do about it. During this study, I will be asked to:

- answer questions about myself, my diabetes, and my family. I understand that it will take about an hour to finish answering the questions.
- to test my blood sugar as I normally do.
- to answer some of the questions again at the end of camp, to fill out a short questionnaire about my camp, and to test my blood sugar again. This will take about 15 minutes.
- If my camp agrees, I may be asked to guess my blood sugar, answer a few questions about how my body is feeling, and test my blood sugar up to 4 times per day while at camp. This would only happen during my planned blood sugar checks.

I understand that I should not write my name on any page except this one. My answers will be kept confidential, and my answers will not be shown to my parents, my doctors, my camp counselors, or anyone else that I know. This means that I will be able to answer the questions honestly because my name will not be on the forms, and no one but the researchers could ever know which answers were mine. There will also be about 250 other young people from this camp and other camps answering the same questions.

I understand that:

- there are no known risks to this study, but I may not like how it feels to test my blood sugar.
- if I choose to take part in this study and complete it, a $10 Wal-Mart gift card will be mailed to my home.
- if I do not want to answer a question, I can skip it and I will still get my $10 gift card.
- I can get my own copy of this form if I want to by asking a researcher at my camp.

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OR

Dr. Karla Anhalt
Department of Educational Psychology
4225 Texas A&M University
College Station, TX 77843-4225
(979) 845-2324
kanhalt@coe.tamu.edu

This form has been read aloud to me and I understand what it says. By signing my name, I agree to take part in the study.

_____	_____
Signature (Participant)	Date
_____	_____
Signature (Researcher)	Date

APPENDIX J

DEMOGRAPHIC QUESTIONNAIRE FOR NON-RESPONDENTS

Please answer the following questions about you and your child.

1. Child's age at time of camp_____

   Name of Camp the Child is Attending _____

2. Child's sex (check one): _____ M _____ F

3. Child's Ethnicity (check one):
   - _____ African American or Black
   - _____ American Indian or Alaska Native
   - _____ Asian-American
   - _____ Caucasian or White (Not of Hispanic origin)
   - _____ Hispanic or Latino
   - _____ Other (please specify) _____

4. Your sex (check one): _____ M _____ F

5. Your age: _____

6. Your Ethnicity (check one):
   - _____ African American or Black
   - _____ American Indian or Alaska Native
   - _____ Asian-American
   - _____ Caucasian or White (Not of Hispanic origin)
   - _____ Hispanic or Latino
   - _____ Other (please specify) _____

7. Please indicate your marital status (check one):
   - _____ Divorced/Separated
   - _____ Married
   - _____ Single
   - _____ Widowed

8. Please indicate your total annual family income level (check one):

_____ Less than $10,000	_____ $50,000-$74,999
_____ $10,000-$14,999	_____ $75,000-$99,000
_____ $15,000-$24,900	_____ $100,000-$149,999
_____ $25,000-$34,999	_____ $150,000-$199,999
_____ $35,000-$49,999	_____ $200,000 or more

9. How many individuals are supported by this income? _____people

10. Please indicate the highest level of education YOU completed:

_____ Less than high school
_____ Some high school
_____ Graduated high school/GED
_____ Some college or vocational/technical school
_____ Graduated from vocational/technical school
_____ Associate's degree
_____ Graduated from a four-year college
_____ Some graduate work
_____ Completed a graduate degree

11. What is your employment situation?

_____ Employed full time Job title: _____
_____ Employed part-time Job title: _____
_____ Disabled Your disability: _____
_____ Unemployed
_____ Retired
_____ Full time homemaker
_____ Other (please specify)

VITA

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B.A. Psychology, Tulane University, May 1999
Ph.D. School Psychology, Texas A&M University, December 2005

HONORS AND AWARDS

School Psychology Research Award, June 2004
School Psychology Research Award, June 2003
Outstanding Research Presentation Award, February 2002
Outstanding Research Paper Finalist, 2002
Cum laude, with honors in Psychology
Dean's List, Tulane University, Spring 1995, Spring 1996-1999

PUBLICATIONS

Rosenthal, E. N., & Anhalt, K. (2003). Sudden infant death syndrome. In E. Fletcher-Janzen, & C. Reynolds (Eds.), *The Childhood Disorders Diagnostic Desk Reference.* New York: John Wiley & Sons.

Rosenthal, E. N., & Anhalt, K. (2003). Tuberculosis. In E. Fletcher-Janzen, & C. Reynolds (Eds.), *The Childhood Disorders Diagnostic Desk Reference.* New York: John Wiley & Sons.

Rosenthal, E. N., & Anhalt, K. (2003). Werner's syndrome. In E. Fletcher-Janzen, & C. Reynolds (Eds.), *The Childhood Disorders Diagnostic Desk Reference.* New York: John Wiley & Sons.

O'Farrell, K. J., Rosenthal, E. N., & O'Neal, E. C. (2003). Relationship satisfaction and responsiveness to nonmates' flirtation: Testing an evolutionary explanation. *Journal of Social and Personal Relationships, 20,* 663-674.