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Posttraumatic stress disorder and other consequences of a PICU admission

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POSTTRAUMATIC STRESS DISORDER AND OTHER
CONSEQUENCES OF A PICU ADMISSION

by

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A dissertation submitted in partial fulfillment
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ABSTRACT

Posttraumatic Stress Disorder and Other Consequences of a PICU Admission

by

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Currently, there is a paucity of literature regarding children's experiences in a pediatric intensive care unit (PICU) relative to caregivers' experiences. Children admitted to a PICU and their caregivers are at risk for various psychopathology. Disorders commonly identified in seriously ill children include depression, anxiety, acute stress disorder, and posttraumatic stress disorder. Caregivers of seriously ill children are at increased risk of depression, generalized anxiety disorder, acute stress disorder, and posttraumatic stress disorder. Researchers often fail to examine all relevant psychopathology and contributing factors and stressors, such as family environment, in seriously ill children and their caregivers. This study assessed 54 children admitted to a local PICU and their caregivers for relevant psychopathology. The mediating factors between the development of acute stress disorder and posttraumatic stress disorder were examined.

The first hypotheses was parental psychopathology, specifically symptoms of anxiety, depression, and ASD, would mediate the relationship between (1) youth ASD symptoms

during PICU admission and (2) the development of PTSD symptoms 4-7 weeks after discharge from the PICU. The second hypothesis was a child's psychological functioning prior to admission, specifically symptoms of anxiety and depression, would mediate the relationship between (1) youth ASD symptoms during PICU admission and (2) the development of PTSD symptoms 4-7 weeks after discharge from the PICU. The third hypothesis was that parental psychopathology, specifically symptoms of anxiety and depression, will mediate the relationship between (1) parental ASD symptoms during their child's PICU admission and (2) the development of PTSD symptoms 4-7 weeks after their child is discharged from the PICU. The fourth hypothesis was that family environment impacted symptoms of psychopathology in both the youth and the caregiver. Specifically, control and conflict were hypothesized to be positively correlated with symptoms of depression and anxiety. With respect to cohesion and expressiveness a negative relationship was hypothesized. A relationship between independence and the symptoms of depression and anxiety was also hypothesized. Analyses did not confirm hypotheses one or three. For hypothesis three, results supported a full mediation by youth anxiety as measured, however, a subsequent Sobel test for the model was not significant.

ASD symptoms were a predictor for PTSD, replicating findings of previous research. Study findings also implicate subjective experience and anxiety in the development of ASD and PTSD. A discussion of study results indicate children admitted to a PICU and their parents are at increased risk for psychopathology and assessment should occur as well as intervention consideration.

TABLE OF CONTENTS

ABSTRACT.....	ii
CHAPTER 1 INTRODUCTION.....	1
CHAPTER 2 LITERATURE REVIEW.....	15
Psychopathology and Severely Ill Children.....	15
Depression.....	21
Anxiety.....	39
Seriously Ill Children, Caregivers, and Psychopathology.....	71
Purpose of the Study.....	106
Hypotheses.....	108
CHAPTER 3 METHODOLOGY.....	112
Participants.....	112
Measures.....	112
Procedure.....	129
Data Analyses.....	131
CHAPTER 4 DATA ANALYSIS.....	137
Hypothesis One.....	137
Hypothesis Two.....	139
Hypothesis Three.....	142
Hypothesis Four.....	146
Additional Analyses.....	146
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS.....	150
Clinical Implications.....	158
Conclusions and Recommendations for Further Study.....	161
APPENDIX.....	164
Appendix I: Severity of Illness and Demographic/Information sheets.....	164
Appendix II: Tables.....	169
REFERENCES.....	178
VITA.....	217

CHAPTER 1

INTRODUCTION

Pediatric Intensive Care Unit Information

In the United States, each year approximately 150,000 to 200,000 children are admitted to pediatric intensive care units (PICU) (Board & Ryan-Wenger, 2002). The largest regional hospital in Southern Nevada reports 600-800 admissions to their PICU each year (K. Daphtary, personal communication, June 15, 2007). A pediatric intensive care unit is a specialized unit of a hospital that provides concentrated care and monitoring of a child or adolescent. The age range of patients in a PICU is 0-16 years. However, admittance to a neonatal intensive care unit is standard for newborns in need of care (Colville, 2001). Children admitted to a PICU experience highly invasive technological interventions necessary to help their recovery from illness (Rennick, Johnston, Dougherty, Platt, & Ritchie, 2002). Children admitted to a PICU have needs met with more supervision and interventions not available in the general unit of a hospital. An example of therapy only provided under close supervision of medical staff on a PICU is a ventilator.

Chronic conditions that may warrant admission to a PICU include pulmonary, endocrine, neurological, and oncologic disorders. These chronic conditions may include severe breathing difficulties such as asthma, heart defects, and complications of diabetes (Colville, 2001). Acute illnesses and conditions that typically warrant PICU admission

include post-operative recovery from major surgery, head trauma, and serious burns. The length of stay in a PICU depends on a child's condition. The average length of stay in a PICU is under five days. Children who require use of a ventilator may attend the unit for several months.

A disproportionate number of children of lower socioeconomic families are represented in PICUs. Naclerio, Gardner, and Pollack (1999) examined 526 cases in 5 PICUs in the Washington, DC area. Rate of emergency PICU admissions for children under age 14 years was 16.6 per 10,000 children annually. An overall examination of PICU admissions revealed children were more often from families living below the federal poverty level. In cases of severe admissions, differences between education and employment of family members were significant. Children living in poverty are at high risk for serious illness. In the United States, 22% of children are below the federal poverty level and about 10 million are uninsured (Naclerio et al., 1999). Children of lower SES families have higher morbidity from diseases such as asthma and sickle cell disease, poorer nutrition, and lower immunization rates. These children may also experience a stressful environment based on SES.

The stress of illness and strain of a PICU environment may trigger a crisis in PICU admitted children and their parents. Invasive procedures in a PICU may produce greater stress than admission to a general care unit. Unfamiliarity of surroundings and apprehension of increased medical equipment and monitoring may add to the stress of a PICU environment (Board & Ryan-Wenger, 2003; Colville, 2001; Diaz-Caneja, Gledhill, Weaver, Nadel, & Garralda, 2005).

Children admitted to a PICU are at risk for developing or further exacerbating

psychopathology because of their admittance (Rees, Gledhill, Garralda, & Nadel, 2004). The most common psychological problems experienced by children after admittance to a PICU are anxiety and mood disorders (Graves & Ware, 1990; Tomlinson, Harbaugh, Kotchevar, & Swanson, 1995). Children in PICUs may exhibit anxiety, withdrawal, resistance, fear, anger, hostility, and sleep disturbances during admission (Rennick et al., 2002). Children's quality of sleep often becomes disturbed in a PICU due to constant monitoring by medical personal and the unnatural environment. Normal sleep and REM stages are often not seen (Rennick et al., 2002). Although the aforementioned behaviors may occur during admission, research has primarily focused on examining development of posttraumatic stress disorder (PTSD) after a PICU admission.

Rees and colleagues (2004) performed a retrospective cohort study examining psychiatric outcome of children aged 5-18 years admitted to a PICU compared to children admitted to a general pediatric ward during the same period. Twenty-one percent of children admitted to a PICU met criteria for PTSD and none children admitted to a general unit met criteria for PTSD. Children who experienced PTSD symptoms were more likely to show symptoms of avoidance as opposed to re-experiencing the event. Avoidance symptoms may be more common in medical trauma. These avoidance symptoms may lead a child to miss follow-up appointments, show distress, or misbehave during medical appointments.

Severity of illness alone does not predict a child or adolescent's adjustment to an illness and hospitalization. A complex process involving the interrelationship of the disease, personal, familial, social and medical factors determines adjustment to illness and hospitalization (O'Dougherty & Brown, 1990). The child or adolescent's

developmental level will also impact adjustment to hospitalization. O'Dougherty and Brown (1990) described the implications of illness and hospitalization for various developmental periods. For infants (aged 0-1.5 years) and toddlers (age 1.5-3 years), a hospital setting may be frightening and unsatisfying to their needs. During this period, separation anxiety may be intensified. Regression may occur and parents may become overprotective or more permissive.

Preschoolers (age 3-5 years) may view illness and hospitalization as punishment for being "bad." Parents may exhibit overprotection or permissiveness. Children aged 6-12 years believe illness may be punishment for misbehavior and become withdrawn. Combative and resistive behaviors are examples of poor coping. During adolescence, illness and hospitalization may impact a youth's self-worth and self-image. Adolescent's desire for privacy may be lost in a hospital setting when they must discuss private details with medical personnel. Youths may fear becoming dependent on parents and have concerns regarding their prognosis.

Parents with a child in a PICU face many stressors such as a PICU environment, changes in child's behavior, and alteration in the parental role (Board & Ryan-Wenger, 2002; Colville, 2001). For days to months in the hospital, parents are no longer in a role of authority. A lack of parental authority becomes a potentially anxiety-provoking situation for a parent. A family, upon a child's admittance to a PICU, feels an immediate emotional impact. Diaz-Caneja and colleagues (2005) found that parents sometimes report siblings of children admitted to a PICU display behavioral changes during admission. Changes included nightmares, behavioral changes in school, and refusal to visit the hospital. Following PICU-discharge, additional familial impacts may be seen.

Youngblut and Lauzon (1995) found parental dissatisfaction with family functioning and negative perceptions toward family cohesion and adaptability at post-PICU discharge.

A child's admission to a PICU may result in parental symptoms of stress, anxiety, anger, depression, and PTSD (Colville, 2001; Graves & Ware, 1990; Tomlinson, Harbaugh, Kotchevar, & Swanson, 1995). Each family member's perception of stressful experiences is key to adjustment and adaptation (Board & Ryan-Wenger, 2003).

Researchers examining the impact of PICU admission on families often evaluate mothers because they are more likely to participate in research of this nature (Board & Ryan-Wenger, 2002). Berenbaum and Hatcher (1992) found that mothers of children in a PICU experienced more state anxiety, anger, depression, and confusion than mothers of children in a general care unit or mothers with a nonhospitalized child.

Board and Ryan-Wenger (2003) compared 31 mothers with a child in a PICU and 32 mothers with a child in a general care unit. Mothers of children in a PICU found injections/shots, sudden sounds of monitor alarms, seeing heart rate on a monitor, and sounds of monitors and equipment to be stressful. Mothers of children in a PICU reported the overall total experience as stressful. Other events rated stressful by many mothers of children in a PICU were seeing needles and tubes in their child as well as conversing with too many medical personnel. Additionally, mothers reported repeated unpleasant thoughts, irritation, low energy, poor appetite, crying, and overworry.

PICU admissions often occur unexpectedly, leaving parents unable to get advice or help with the care of their child. Unexpected PICU admissions opposed to a general ward admission involves an illness or injury in which treatment is time sensitive. PICU admissions are more disruptive to schedules of parents and the child, leading to a change

in work and school schedules. Research to improve the quality of care in a PICU for the medical and psychological care of the patients and their families is continually conducted. Research examining the impact of childhood medical illnesses is increasing, particularly in areas of chronic health problems and serious illness such as cancer and impacts of burns (Rees et al., 2004). Less research has focused on psychopathology associated with acute physical illnesses in pediatric populations. Specifically, examination of the impact of potentially life threatening illnesses that require PICU admission as well as impact of a PICU environment itself on children is needed (Rennick et al., 2002).

Psychopathology, Seriously Ill Children, and their Caregivers

Experiencing a serious acute or chronic illness that requires hospitalization and invasive medical procedures may lead to distress and psychopathology in youth and caregivers (Colville, 2001; Melamed, 1998). An interaction of factors, including nature of an illness, coping abilities of a youth and parent, pre-existing parental and youth psychopathology, and controllability of a medical event and environment are key in the development of psychopathology during and after admission to a pediatric intensive care unit. During and after a PICU admission, the most common psychological problems in youth are mood disorders, anxiety disorders such as acute stress disorder and posttraumatic stress disorder, sleep disorders, and conduct disorder (Caffo & Belaise, 2005). Most children exposed to a traumatic event, such as a serious illness and admission to a PICU, will adapt and not exhibit psychopathology. However, a large proportion of children will develop clinically significant levels of psychological distress.

Children and adolescents with serious illnesses and hospitalization may react to

stressors related to their illness and a hospital environment with negative affect (Tarnowski & Brown, 2000). Negative affect includes symptoms of anxiety and depression, poor coping skills, and regressive behaviors. Seriously ill or injured children are at increased risk for separation anxiety disorder, anxiety due to a general medical condition, generalized anxiety disorder, specific phobias, acute stress disorder, and posttraumatic stress disorder. Some researchers reveal a heightened level of anxiety and behavioral differences in children during admission and up to 3 months post-discharge (Barnes, Kenny, Call, & Reinhart, 1972; Rennick et al., 2002).

Caregivers may also exhibit symptoms of depression and anxiety in response to a child's illness and hospital environment (Colville, 2001). Parents of children admitted to a PICU show higher levels of anxiety than parents of children admitted to a general care unit (Berenbaum & Hatcher, 1992; Melnyk, Alpert-Gillis, Hensel, Cable-Beiling, & Rubenstein, 1997). The appearance of a child in a hospital, the severity of an illness, and the environment of a hospital are main stressors for parents of children admitted to a PICU. Additionally, unplanned PICU admissions appear to be significantly more stressful for parents than planned admissions (Board & Ryan-Wenger, 2002). A strong family support system and coherent family functioning may protect a child from some short- and long-term consequences of being seriously ill or injured. However, a weak family support system may put the child at further risk.

Children admitted to a PICU, as well as their caregivers, are at increased risk for various psychological disorders. Acute stress disorder (ASD) and posttraumatic stress disorder (PTSD) are particularly relevant in this population. Seriously ill children who require PICU hospitalization and their caregivers are at increased risk for ASD and PTSD

relative to other anxiety disorder and mood disorders (Colville, 2001). Ill children and their caregivers are also at increased risk relative to the general population due to their illness or injury and exposure to invasive medical procedures.

Acute Stress Disorder

Information regarding prevalence rates is still being collected on acute stress disorder (ASD). Prevalence rates range from 6-33% and 14-33% depending on the type of trauma and the population (American Psychiatric Association, 2000; Bryant & Harvey, 2000). Children with serious illnesses and injuries requiring hospitalization are at increased risk for ASD relative to the healthy children, with prevalence rates of 7-22% (Daviss et al., 2000). DSM-IV-TR criteria for diagnosis of ASD includes experiencing or witnessing a traumatic event. A traumatic event should involve real or threatened injury or death and be uncontrollable or fearful. Symptoms of ASD must cause significant distress in social, occupational, academic, or other areas of functioning. Symptoms must occur for at least 2 days and no more than 4 weeks. ASD symptoms must also occur within 4 weeks of a traumatic event (American Psychiatric Association, 2000).

Additional diagnostic criteria for ASD include experiencing dissociative symptoms (American Psychiatric Association, 2000). At least three of the following dissociative symptoms must be experienced: emotional numbing, reduction in awareness of surroundings, derealization, and depersonalization or dissociative amnesia. Reexperiencing trauma via recurrent images, thoughts, dreams, illusions, flashbacks, reliving the experience, or distress when exposed to reminders of the event must also occur. Children may exhibit reexperiencing symptoms through repetitive play (American Psychiatric Association, 2000; Vogel & Vernberg, 1993).

ASD diagnostic criteria also require avoidance of stimuli that are reminders of trauma (American Psychiatric Association, 2000). Increased arousal or symptoms of anxiety are also required for a diagnosis. Increased arousal or anxiety may include sleep difficulty, irritability, or motor restlessness. Tantrums or overall irritability may be a sign of increased arousal in children (Vogel & Vernberg, 1993).

For some children and caregivers who experience a traumatic event, such as serious illness and hospitalization, ASD may be a precursor to PTSD. ASD may be a predictor of PTSD in hospitalized children, particularly burned children (Difede et al., 2002). Progression from ASD to PTSD occurs when symptoms persevere for a minimum of 1 month. Additionally, the individual must meet full criteria for PTSD (American Psychiatric Association, 2000).

Posttraumatic Stress Disorder

PTSD Diagnostic Criteria

DSM-IV-TR criteria for PTSD require exposure to a traumatic event that involves serious injury or threatens death to themselves or others. Response to the event must include fear, helplessness, or horror. In children, the reaction may manifest itself as agitation or disorganized behavior (American Psychiatric Association, 2000). Traumatic events that may be directly experienced include military combat, assault, natural disasters, maltreatment, trauma, and serious illness. Indirectly experienced events may include observing a serious illness or injury, learning of an accident, injury or illness of a close family member or friend, or one's child having a serious illness or injury (American Psychiatric Association, 2000).

PTSD diagnosis requires symptoms of reexperiencing, avoidance, and arousal (American Psychiatric Association, 2000). Symptoms must be experienced for at least one month and cause significant distress or impairment in social, occupational, academic, or other areas of functioning. A PTSD diagnosis requires at least one reexperiencing symptom, at least three avoidance/numbing symptoms, and at least two arousal symptoms. Reexperiencing symptoms include recurrent distressing memories of an event, recurring dreams of the event, flashbacks, and distress at exposure to cues of the event, or physiological reactivity to cues of the trauma. Children may exhibit reexperiencing symptoms by reenacting trauma through repetitive play or nightmares that are frightening without recognizable content (American Psychiatric Association, 2000; Vogel & Vernberg, 1993).

A PTSD diagnosis requires at least three avoidance or numbing symptoms. Avoidance symptoms include evading internal and external reminders of the trauma (American Psychiatric Association, 2000). Avoidance includes evading thoughts, feelings, activities, places, or people associated with trauma. Other avoidance symptoms include difficulty recalling aspects of the trauma, lack of interest in activities, feelings of detachment, restricted range of affect, and sense of foreshortened future.

Two arousal symptoms must also be present for a PTSD diagnosis (American Psychiatric Association, 2000). Symptoms of arousal include sleep difficulties, irritability or anger, concentration problems, hypervigilance, and enhanced startle response. Increased tantrums or general irritability are considered an expression of arousal symptoms in youth (Vogel & Vernberg, 1993). Increased somatic symptoms such as

headaches or stomachaches may also reflect distress in children with PTSD (American Psychiatric, 2000).

PTSD Prevalence

Results from the 2001-2003 national comorbidity survey replication indicated that lifetime prevalence rates of PTSD were approximately 6.8% among community sampled adults in the United States (Kessler et al., 2005a). PTSD 12-month prevalence rates of PTSD were approximately 3.5% (Kessler, Chiu, Demler, & Walters, 2005b). Females were more likely to experience PTSD than males. Lifetime prevalence rates for youth range from 2-9% (Breslau, Davis, Andeski, Peterson, 1991; Cuffe et al., 1998; Giaconia et al., 1995).

Pediatric patients with acute and chronic conditions and their parents experience posttraumatic stress symptoms and posttraumatic stress disorder at high rates. Heptinstall (1996) found that 20% of children who experienced a traffic accident had PTSD. Yule (2001) found 10-12% of children admitted to a hospital casualty department following a common childhood mishap experienced PTSD. Parents of children with serious or life threatening illness are at a greater risk of developing PTSD than their children (Landolt, Vollrath, Ribbi, Guehm, & Sennhauser, 2003). Studies examining parents of pediatric cancer survivors found PTSD rates of 10-33% (Kazak et al. 1997; Stuber, Christakis, Houskamp, & Kazak, 1996).

A meta-analysis conducted by Cabizuca and colleagues (2009) examined prevalence rates of PTSD in parents of children with chronic illnesses or who underwent invasive medical procedures. The study included 16 studies, 14 of which were in the United States with sample sizes ranging from 15 to 522 parents. Ten of the studies assessed both

mothers and fathers together and the pooled PTSD prevalence rate was 22.8%. Mothers were at a higher risk than fathers. In studies that examined mothers separately, mothers were found to have a 19.6% prevalence rate as compared to the 11.6% rate for fathers. It should be noted that in all studies when fathers were assessed, fewer were assessed than mothers (Cabuzica, Marquez-Portella, Mendlowicz, Coutinho, & Figueiro, 2009).

PTSD Risk and Resilience Factors

The majority of those exposed to trauma do not develop PTSD. Copeland, Keeler, Angold, and Costello (2007), in a longitudinal study of 1420 youth, found over two-thirds experienced trauma by age 16 years. Posttraumatic symptoms, but not full PTSD criteria, were experienced by 23% of youth diagnosed with an illness or in an accident. Less than 1% of youth met PTSD criteria. Youth who met PTSD criteria were likely to be older, experience multiple traumas, history of anxiety and depressive disorders, and family dysfunction. Green (1994), in a comprehensive literature review, found 75% of participants exposed to trauma did not develop PTSD. Green (1994) found PTSD rates varied by type of trauma exposure, population (i.e., youth, adult), and risk and resilience factors.

Risk factors for development of PTSD include childhood sexual or physical trauma, low self-esteem, separation of parents before age 10 years, prior psychiatric disorders, psychiatric disorders in a first-degree relative, and being female. Other factors may include family stress, coping styles, experience with stressful events in the past, and low socioeconomic status. An association exists between the development of PTSD and level of anxiety and emotionality a child experiences (Lonigan, Shannon, Taylor, Finch, & Sallee, 1994).

Family factors may also impact the development of PTSD. Family factors include marital status, education, social support, and psychological functioning of the parent(s) (Amaya-Jackson & March, 1995). Additional family factors include parental psychopathology, lack of supervision, marital discord, maladaptive mating, recent unemployment, alcohol or substance abuse by caretakers, and witnessing family violence (Pynoos, 1994). Parents' reaction to traumatic events may also impact the development of PTSD and serve as a mediator of distress for children. A parent's anxiety may produce anxiety in a child. Anxious and distressed parents are also less likely to provide needed emotional support to seriously ill children compared to non-anxious parents of seriously ill children (Colville, 2001).

Age, gender, and family and community environments contribute to a child's risk of exposure to traumatic stress (Pynoos, 1994). As a child ages, school and neighborhood environments increasingly become risk factors for PTSD. Davidson and Smith (1990) found that PTSD was three times more likely to occur when experiencing a traumatic event prior to age 11 years. Additionally, personality factors may impact development of PTSD. Some children place themselves in situations that are more prone to violence or injury.

Although the DSM-IV-TR recognizes children as being at high risk for psychopathology following trauma, young children may not understand the danger and thus not have a strong emotional reaction (Creamer, McFarlane & Burgess, 2005). In this instance, being younger may be a protective factor. Other protective factors include coping skills, availability of social supports, and ability to utilize supports (Davis & Siegel, 2000).

Resilience refers to a child's early and ongoing processes to effectively tolerate, manage, or alleviate psychological, physiological, behavioral, and social consequences of traumatic experiences (Pynoos, 1994). Factors associated with resilience in children with respect to psychopathology, such as PTSD, include parental responsiveness, realistic expectation about recovery in child and parent, positive relationship with caregiver, problem-solving skills, and engaging personality. Additional resilience factors include self-efficacy, positive school experiences, mastery motivation, previous successful experiences, and high IQ. IQ in general is a resilience factor. However, in the development of PTSD, intelligence may increase risk if the child is more aware of a life-threatening situation (Pynoos, 1994).

CHAPTER 2

REVIEW OF RELATED LITERATURE

Psychopathology and Severely Ill Children

Over 50% of children are hospitalized at least once by age seven years (Melamed, 1991). A serious medical illness or injury requiring hospitalization and invasive medical procedures may lead to significant distress and psychopathology in youth and their caregivers (Colville, 2001; Melamed, 1998). Depending on many factors, some youth and their caregivers will develop or exacerbate psychopathology during admission to a pediatric intensive care unit (PICU) or shortly after discharge. These factors may include nature of the illness, coping abilities and psychopathology levels of the child and parent, and controllability of the medical event. During and after a PICU admission, most common psychological problems in youth are mood disorders, acute stress disorder, posttraumatic stress disorder, sleep disorders, conduct disorders, and learning and attention disorders (Caffo & Belaise, 2005). Most children exposed to a traumatic event, such as a serious illness and admission to a PICU, will adapt and not exhibit psychopathology. However, some children will develop clinically significant levels of psychological distress.

With respect to children, age is an important factor in the development and diagnosis of psychopathology. Deviations from age appropriate norms are one way to conceptualize psychopathology in children and adolescents (Popper, Ross, & Jennings, 2000).

Behaviors considered normal during certain age periods may be perceived as pathological during other age periods. Normal behavior for a preschool aged child includes difficulty separating from his mother when going to preschool. The same marked difficulty separating from a mother by an adolescent may be considered pathological.

Exaggerations of normal developmental trends in children and adolescents may be an expression of psychopathology (Popper et al., 2000). Deviant behavior consists of more severe forms of “normal” behavioral trends typically exhibited by youth at that developmental level. Normal behavior in adolescents may include negative attitudes and acting out. Acts of violence or delinquency are severe and exaggerated forms of behavior and would be considered pathological. In addition, many children display some degree of shyness or inhibition but extreme inhibition has been associated with development of anxiety disorders (Rosenbaum et al. 1993).

Psychopathology in youth may also involve behaviors that interfere with normal development (Popper et al., 2000). Problematic developmental outcomes often result from maladaptive behaviors. For example, some infants may use adaptive avoidance when experiencing negative parenting. Continued avoidance, however, may contribute to lack of trust and an insecure attachment that will impact future relationships and choices (Popper et al., 2000).

The relationship of a child to his environment will also determine psychopathology (Popper et al., 2000). A child whose parent is depressed is at a greater risk for developing depression than children without a depressed parent due to this environment and genetic factor. A child will also impact his environment. For example, a difficult child who is often angry and difficult to interact with may repel peers and be at a higher risk for

developing psychopathology (i.e. social phobia) compared to children with easy temperaments.

Although useful to examine factors associated with psychopathology in youth, such as temperament and genetics, this does not fully capture the etiology or development of psychopathology. Theories of psychopathology examine various aspects of the development of psychopathology. These aspects include interaction of an individual and an environmental system, balance of risk and protective factors, family adjustment in crisis, and reaction to uncertainty. Theories vary in perspective, however, all focus on providing an explanation for the development of psychopathology.

Theories of Psychopathology

Theorists go beyond identifying factors related to the development of psychopathology and hypothesize the etiology and development paths of psychopathology. Researchers have focused heavily on the impact of parental factors and the development of psychopathology in youth. However, other environmental factors may also contribute to child psychopathology. Bronfenbrenner's (1992) ecological theory emphasizes the role of the environment and its interaction with a developing individual. Other theories specifically examine an individual's response to serious illness or injury. These models may be useful for examining the development of psychopathology in children with serious illness and their caregivers.

Bronfenbrenner's Ecological Theory

Bronfenbrenner (1992) proposed that the environment impacts human development and an interaction of the person and the environment exists. This theory proposes five environmental systems that impact the development of the individual: microsystem,

mesosystem, exosystem, macrosystem, and chronosystem. The development of psychopathology or dysfunction, as well as adaptation, can in part be due to the interaction between these five systems (Bronfenbrenner, 1994).

The microsystem includes patterns of activities and interpersonal relations experienced by a person in a given setting as well as characteristics such as temperament, personality, and beliefs (Bronfenbrenner, 1992). This system is the direct context for an individual. This may include family, friends, classmates, and neighbors. At the microsystem bi-directional influences exist. A child's parents may affect his beliefs and behavior and a child affects the behavior and beliefs of the parents (Bronfenbrenner, 1994). The mesosystem links processes occurring between the child and two or more settings that impact the child. These settings include home and school. Examples of the mesosystem are a school counselor who is a resource for the child and the connection between a teacher and a parent, both of which impact a child's well being. The mesosystem can directly or indirectly influence an individual's well-being.

The exosystem links two or more settings and at least one setting does not contain the youth. Despite one setting not containing the child, the environment will still impact the child directly. The child is impacted by this system as the structures in this system may impact the child's development and interact with structures in the microsystem. An example provided by Bronfenbrenner (1992), is the relationship between a child's home and a parent's workplace. A relationship between the home environment and the parent's workplace exists. This will impact the child, despite the child not being in the workplace environment. Specifically, a parent's workplace may partially determine their mood and will directly impact the child's home environment.

The macrosystem reflects the culture of an individual (Bronfenbrenner, 1992). This will include the behavioral patterns, beliefs, and customs of cultural groups to which an individual is affiliated. An example of a cultural belief encompassed in the macrosystem may be raising children as a community effort reflected in resources and support systems available to parents in the community.

Finally, the chronosystem includes environmental events that occur across the lifespan. For example, exposure to severe trauma, such as a serious burn at a young age, may lead to increased psychological effects in adulthood. Serious psychological effects found in adults exposed to severe trauma early in life include PTSD and depression.

Bronfenbrenner's ecological theory examines the development of psychopathology from a systems level approach. With respect to illness and injury, the impact will vary depending on which system level(s) it occurs. Specifically, does the illness impact the individual, someone else but the illness impacts him indirectly, or does the illness impact him across the lifespan. This approach is in contrast to other theories that look at limited factors such as risk and protective factors, family coping capabilities, and outcome of illness uncertainty.

Disability, Stress, and Coping Model

The disability, stress, and coping model was proposed by Varni and Wallander (1988) to examine psychological adjustment to serious illness and integrate components of several models of stress and coping. Risk factors hypothesized to increase the likelihood of adjustment problems in youth with serious illness include disease or disability, child's functional independence and psychosocial stressors related to disability, major life events, and daily hassles. The existence of protective factors or coping resources are

hypothesized to moderate the impact of risk factors. Identified protective factors include stable individual factors such as temperament, stress-processing or coping ability, and social-ecological influences such as quality of interpersonal relationships. Family functioning and adjustment to stress may be a protective or risk factor. Positive family functioning serves as a protective factor while negative family adjustment and functioning can be a risk factor. The degree of psychopathology a child develops is related to risk and protective factors.

Family Adjustment and Adaptation Response Model (FAAR)

The FAAR (Patterson, 1988) is an extension of the double “ABCX” model of family behavior by McCubbin and Patterson (1983). In the ABCX model, the “A” represents a stressor event such as a child’s illness. “A” interacts with B, which represents the family’s crisis-meeting resources. Crisis-meeting resources include any resources a family has to respond to a stressor, including family, financial, and medical support for an ill child. “C” is the family’s definition of the stressor event and X is the actual crisis. The FAAR model proposes that, in time of crisis, such as a child’s serious illness, stressors may exceed a family’s coping resources. Families engage in active processes to balance demands with capabilities and, as these interact, arrive at a level of adjustment or adaptation. Family demands comprise normative and nonnormative stressors, ongoing family strains, and daily hassles. Family capabilities include tangible and psychosocial resources and coping behaviors. In crisis, family members will attempt to restore equilibrium by acquiring new coping behaviors, reducing stressors, or changing their perceptions of the situation. The FAAR model views the development of psychopathology from limited resources in times of crisis.

Illness Uncertainty Theory

The illness uncertainty theory (Mischel, 1991, 1999) focuses on uncertainty; a cognitive state created when a youth or parent cannot understand an event or predict an outcome. Uncertainty may result from ambiguity in illness diagnosis, complexity of treatments and procedures, lack of information with respect to illness or treatment, and lack of information about the course or prognosis of an illness. When a youth or parent has illness-related uncertainty, psychological distress and symptoms such as depression and anxiety may arise. Illness uncertainty, coping style, and pattern of coping with past adversity will determine if a child or parent develops symptoms of psychopathology. This theory predicts that those with more uncertainty regarding illness are more likely to develop psychopathology, such as depression. Severely ill children and their caregivers often exhibit symptoms of depression (Colville, 2001).

Depression

Children and adolescents hospitalized for serious illnesses may react to stressors related to their illness and the hospital environment via negative affective responding (Tarnowski & Brown, 2000). This includes symptoms of anxiety and depression, poor coping skills, and regressive behaviors. Caregivers may also exhibit symptoms of depression in response to a child's illness and the hospital environment (Colville, 2001). A strong family support system and coherent family functioning may protect a child from some short- and long-term consequences of being seriously ill or injured. However, a weak family support system can put them further at risk for symptoms of anxiety and depression.

Symptoms of Depression

Depression is a disorder that has a serious negative impact on an individual as well as family members, friends, and others (Williamson & Schulz, 1995). DSM-IV-TR criteria for a major depressive episode consists of a two-week period in which an individual exhibits depressed mood or lack of interest in pleasurable activities (American Psychiatric Association, 2000). Children and adolescents may exhibit irritable mood as opposed to sad or depressed mood. Additional symptoms include at least four of the following: changes in appetite or weight, sleep difficulty, psychomotor activity changes, decreased energy, feelings of worthlessness or guilt, difficulty thinking and concentrating or making decisions, and recurrent thoughts of death or suicide.

Major depressive disorder is characterized by one or more major depressive episodes without a history of manic, mixed, or hypomanic episodes (American Psychiatric Association, 2000). The major depressive episode cannot be better accounted for by schizoaffective disorder. Major depressive disorder is 1.5-3 times more common among first-degree biological relatives than the general population. Those with general health conditions are also at an increased risk for major depressive disorder. Approximately 20-25% of those with medical conditions such as diabetes and myocardial infarction develop major depressive disorder during the course of their medical condition (Tarnowski & Brown, 2000).

Depression in Children

Age impacts both reporting and the manifestation of depressive symptoms. Children aged 6-8 years primarily report symptoms of sadness and helplessness. Older children aged 12-13 years are more likely to report feelings of guilt than younger children (Popper

et al., 2000). Depression symptoms in children may be manifested by a predominantly irritable mood, anger, and oppositional behavior (Stark, Bronik, Wong, Well, & Ostrander, 2000). Children also typically display somatic complaints, irritability, and social withdrawal. Adolescents and adults are more likely to experience symptoms such as psychomotor retardation, hypersomnia, and delusions (American Psychiatric Association, 2000).

Prevalence of Depression

The prevalence of youth experiencing depression at earlier ages is increasing (Stark et al., 2000). Changes in family structures in which children and families face increased stressors may have contributed to the increased prevalence rate. These stressors include increasing parental work and financial demands and less time and resources to devote to the family (Stark et al., 2000). The prevalence rate for major depression and dysthymic disorder for children in the general population ranges from 2-5% (Chrisman, Egger, Compton, Curry, & Goldston, 2006; Stark et al., 2000). Higher rates of depression have been reported for African American and Hispanic youth relative to Caucasian youth (Emslie, Weinberg, Rush, Adams, & Rintelmann, 1990; Garrison, Jackson, Marsteller, McKewon, & Addy, 1990).

Thombs, Bresnick, and Magyar-Russell (2006) conducted a literature review on the prevalence of depression among burn survivors and found major depression in 4-10% of adult patients during their hospital admission and in the year following discharge. Rates varied by assessment measure, with use of the depression subscale of the Hospital Anxiety and Depression Scale yielding rates of 4-13%. The Beck Depression Inventory

yielded higher rates of 13-26% for moderate to severe symptoms of depression and 22-54% for mild symptoms of depression.

The National Comorbidity Survey Replication (Kessler et al., 2005a) cites a lifetime prevalence of major depressive disorder in adults from community samples as 16.6%. A one year prevalence rate of 6.7% was found for major depressive disorder (Kessler et al., 2005b). Major depressive disorder is twice as common in adult females as adult males, with lifetime risk varying from 10-25% for women in community samples versus 5-12% for men (American Psychiatric Association, 2000). These rates will increase in the presence of a major life event, such as the serious illness of one's child. Ben-Amitay and colleagues (2006) found parents' depression symptoms increased immediately after a child's medical procedure and declined after a six-month period.

Risk Factors for Depression

Children with psychiatric, educational and learning problems, a family history of depression and medical illness or injury are at increased risk for depression. Research has found even a minor condition such as a cold will impact a child's behavior, reducing cognitive efficiency and increasing dysphoric mood (Tarnowski & Brown, 2000).

Children with serious injuries or illness are at increased risk for depression. Individuals with serious burn injuries, a subset of medically ill individuals, are at even higher risk for depression than medically ill individuals (Thombs et al., 2006). Rates of PTSD in burn survivors may contribute to the higher prevalence of youth burn victims with depression as PTSD is a risk factor for major depression.

Children whose parent has depression are also more likely to have a lifetime diagnosis of major depression, substance abuse disorder, and earlier age of onset for

mood disorders than children without a parent with depression (Klein, Clark, Dansky, & Margolis, 1988; Stark et al., 2000; Weissman et al., 1984). Children have a 15% risk of developing a mood disorder if one parent has a history of depression. Risk of developing a mood disorder increases to 40% if both parents have a history of depression (Beardslee, 1998). A youth's risk of developing a mood disorder compared to the general population does not increase when having a second-degree relative with a mood disorder (Stark et al., 2000). Twin studies reveal three times greater concordance rates among monozygotic twins than dizygotic twins for depressive disorders (Stark et al., 2000).

Depression is more common among post-pubertal youth than pre-pubertal youth (Thapar & Rice, 2006). Environmental factors contribute more to depression symptoms in children. Stress is hypothesized to produce depressive symptoms and potentially a depressive disorder in vulnerable children. Vulnerabilities include genetics, negative cognitive styles, and negative family environments (Stark et al., 2000). Negative family environments include negative parent-child interactions, poor communication, poor parenting skills, and/or substance use in the home. These vulnerabilities may interact with stressors such as major life events and daily struggles such as school difficulties or chronic illness to produce depressive symptoms. In adolescents and adults, genetic factors become a major contributing factor to depression symptoms (Eley & Stevenson, 1999; Rice, Harold, & Thapar, 2002; Silberg et al., 1999). Stressful life events are more prevalent during adolescence and adulthood, as opposed to earlier in life, and contribute to the genetic-environment interaction. Stressful life events during adolescence and adulthood include interpersonal and relationship difficulties, educational and/or employment difficulties and financial difficulties.

Researchers have focused on the impact of mothers' emotional states on children's well being and emotional/psychological states. The use of psychological instruments to assess for depression, anxiety, and overall functioning to assess emotional/psychological states is common (El Hamaoui, Yaalaoui, Chihabeddine, Baoukind, & Moussaoui, 2006). A child's emotional state will often heavily depend on the emotional state of their parent (El Hamaoui et al., 2006). Mothers of children who are seriously ill often experience depression and feelings of guilt and overprotectiveness. El Hamaoui and colleagues (2006) examined 28 mothers of seriously burned children and found 35.7% met criteria for major depressive disorder. Over half (53.6%) had at least several clinical symptoms of depression. A significant relationship between depression in mothers and severity of burn in the child was also found. Risk factors for depression included low socioeconomic status and behavioral disorders in the burned child. Victims' successful or unsuccessful life adjustments after trauma were directly related to the mother's reaction to the problem and ability to help and support the child through treatment and the associated physical, psychological, and social problems (El Hamaoui et al., 2006). Mothers of children with severe medical problems, such as burns, are at increased risk for depression which may impair their ability to support a child with physical, psychological, and social problems.

Risk factors, such as maternal emotional state, genetic predisposition, and negative family interactions are associated with the presence of youth depression. Risk factors indicate merely a relationship exists between depression and the various factors. Conversely, theories of depression provide models of how depression may develop. Theories of depression are based on concepts such as reinforcement and information processing.

Theories of Depression

Lewinsohn's Model of Depression

Lewinsohn (1974) proposed a model of depression in which a lack of contingency between adaptive behavior and subsequent reinforcement causes symptoms. Adaptive behavior thus becomes extinguished. Depressed individuals are also reinforced for poor adaptive behavior when they receive attention. The low rate of response-contingent positive reinforcement can lead to depressed mood, fatigue, and somatic symptoms. Cognitive symptoms may include low self-esteem and guilt. Individuals with symptoms of depression such as guilt, low self-esteem, and isolation may have difficulty labeling their feelings, consequently describing their feelings as just “sick” (Lewinsohn, 1974). According to this theory, individuals correctly able to label their emotions and take a more positive approach to their situation are more likely to address symptoms of depression. Initially, attention, sympathy, and concern from peers and family reinforces depressed behavior. However, reinforcement does not last because interactions with depressed individuals are typically negative. Subsequently, significant others withdraw and remove reinforcement (Stark et al., 2000).

According to Lewinsohn (1974), three variables determine the amount of positive reinforcement an individual receives. First, those prone to depression tend to have a restricted range of reinforcing events due to biologically or experiential differences. Second, those prone to depression may have fewer positive reinforcements in their environment. A sudden loss in availability of reinforcers due to loss of a loved one or physical or financial limitations may also occur. The final variable is how socially skilled an individual is and if he can demonstrate appropriate social skills to receive positive

reinforcement. Depressed individuals may not receive positive reinforcement as they are not socially skilled or fail to perform behaviors to elicit positive reinforcement. This theory examines the development of depression based on fewer positive reinforcements which are in part due to limited social skills. Other theories also focus on reinforcement and limited social skills in the development of depression.

Learned Helplessness Model of Depression

Seligman (1975) proposed the learned helplessness model of depression. This model speculates motivational, cognitive, and emotional symptoms of depression are a result of learning of uncontrollable outcomes. Learned helplessness produces and maintains depression as an individual is unable to recognize available choices or make constructive changes in his life (Seligman, 1990). An expectation that participation in a social environment will be unsuccessful may trigger depression. As uncontrollable events occur, the individual is reinforced that he does not have control over the environment. The lack of control of the environment leads the individual to stop trying to make choices or changes.

Abramson, Seligman, and Teasdale (1978) identified four main limitations to Seligman's original model of learned helplessness (1975) and addressed these in a reformulated model. The expectation of uncontrollability as sufficient to produce depressed affect in the original model is inadequate. In the original model, depressed affect arises from uncontrollability in which the estimated probability of a desired outcome is low or the estimated probability of an aversive outcome is high (Abramson et al., 1978). The second limitation is how low self-esteem leads to depression is not explained. The third limitation is failure of the original model to explain the tendency of

individuals with depressive symptoms to make internal attributions for failure. The final limitation is lack of explanation of variations in generality, chronicity, and intensity of depression symptoms all impacted by attributions. The stability of attributions determines the chronicity of depression and the global or specific nature impacts generality of depression. Aversiveness of events and resulting attributions contribute to intensity of depression symptoms (Rehm, Wagner, & Ivens-Tyndal, 2001).

The reformulated theory by Abramson and colleagues (1978) also deems the expectation of response-outcome independence to be a determinant of learned helplessness. Abramson and colleagues (1978) further expanded the original learned helplessness theory and hypothesized noncontingency must be perceived. Causal attribution made based on noncontingency determine expectations for the future which impact generality, chronicity and type of helplessness and depression symptoms. Essentially, an individual will question why he is helpless and his attributions will determine the severity of depressive symptoms.

Three attributional dimensions further modified the original theory. The dimension of specificity views attributions as specific, occurring in situations very similar to the original situation, or global, recurring across many situations. The dimension of stability describes attributions as chronic or unstable in which the expectations will not recur after a time lapse. The dimension of internality describes attributions as personally or universally experienced. Internal attributions for failure result in personal helplessness, whereas those who make external attributions for failure are universally helpless. Internal attributions contribute to lower self-esteem as related to depression (Stark et al., 2000). According to Abramson and colleagues (1978), individuals with depression make

internal, global, and stable attributions for failure. When success does occur, these individuals attribute it to external sources and specific situations and do not expect success to recur. This model of depression, while focusing on helplessness and reinforcement, also examines the role of distorted attributions in the development of depression. Other theories of depression have focused primarily on distorted information processing, which is similar to distorted attributions.

Beck's Cognitive Model of Depression

Beck (1967, 1972, 2002) proposed a model of depression based on negatively distorted information processing. According to Beck's model, individuals with depression distort their evaluations of situations to fit dysfunctional schema. Structurally, a schema is a cluster of knowledge about the domain of interest derived from experience (Beck, 1972). Functionally, a schema acts as a filter to interpret incoming stimuli. Individuals with depression tend to have negative schema that lead to negative automatic thoughts and may distort information processing.

According to Beck's model, individuals with depression tend to have negative thoughts about themselves, the world, and the future. Negative thoughts are hypothesized to contribute to and support depressive symptoms. Depressive or negative schemas distort an individual's experience about themselves, the world, and the future in a negative direction (Beck, 2002). The schematic inferences a person makes in a particular situation are automatic thoughts. The person is unaware of the automatic negative interpretation. According to Beck (2002), reactivation of depressive schema formed early in life occur leading to symptoms of depression. Loss is the basis of the depressive schema. Reactivation of depressive schema occurs when loss is again perceived later in life. To

relieve depression, according to this model, more realistic and positive schema should replace negative schema.

Models of depression, such as Beck's cognitive model of depression (2002), provide a theoretical perspective on the development and progression of depression symptoms. Children with serious illness or injury as well as their caregivers are at an increased risk for depression. Assessment measures identifying depression symptoms further aid in the understanding of depression in these individuals.

Assessment of Depression

Assessment of Depression in Adults

With respect to the assessment of depression symptoms, self-report measures are typically utilized as they provide information regarding the individual's mood state and are time efficient to administer and score (Harrington, 2002). Commonly utilized self-report measures of depression in parents of children with serious illness or injury include the Beck Depression Inventory-II (BDI-II) (Beck, Steer, Brown, 1996), Hamilton Depression Inventory (HDI) (Reynolds & Kobak, 1995), examination of the Depression symptom dimension of the SCL-90-R (Derogatis, 1994) or Brief Symptom Inventory (BSI) (Derogatis, 1993). Scores on scale 2 (Depression) of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 2001) may also be examined to assess depression.

The BDI-II is a 21-item self-report measure that corresponds to diagnostic criteria for DSM-IV depressive disorders. This measure examines symptoms occurring in the past two weeks. The BDI-II assesses an individual's mood, pessimism, sense of failure, loss of pleasure, guilt, punishment, self-dislike, self-accusations, suicidal ideas, crying,

irritability, indecisiveness, worthlessness, insomnia, loss of appetite, concentration difficulty, fatigue, and loss of libido (Beck et al., 1996). The BDI-II is administered in 5-10 minutes and is a viable choice when working with adults who are in stressful situations. The BDI-II has demonstrated high internal consistency and test-retest reliability (Beck, Steer, & Brown, 1996; Whisman, Perez, & Ramel, 2000).

The HDI is a 23-item self-report measure that corresponds to DSM-IV diagnostic criteria for depressive disorders (Kobak & Reynolds, 2004). The HDI distinguishes itself from other rating scales by combining several questions in each item, such as assessing frequency and severity. For instance, item 1 assesses depressed mood through frequency and severity ratings of sadness, crying, and pessimism. The HDI has an administration time of 10 minutes and is a viable measure for use in parents who have limited time with ill or injured children. The HDI has high internal consistency and test-retest reliability (Kobak & Reynolds, 2004).

The SCL-90 is a 90-item self-report symptom inventory that examines primary symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism (Derogotis, 1994). Three global indices give a global severity index, a positive symptom index, and a positive symptom total. The SCL-90 provides information on numerous types of psychopathology but may be time consuming. Parents of ill and injured children generally have restricted availability, thus limiting the use of the SCL-90.

The BSI is a 53-item brief form of the SCL-90 and provides the same primary symptom dimensions and global indices as the SCL-90. A depressive disorder determination is not made solely on the elevation of the Depression symptom dimension.

Instead, accompanying symptoms are examined. An individual with an elevated Depression dimension who is also exhibiting loss of interest, high levels of guilt, and changes in sleep patterns indicates a likely depressive disorder. The BSI is completed in less than 15 minutes but does not provide a complete picture of all depressive symptoms according to DSM-IV criteria. The SCL-90 and BSI have demonstrated internal consistency and test-retest reliability (Derogatis & Fitzpatrick, 2004).

The MMPI-2 consists of 370 items. The depression scale (scale 2) of 57 items has content focusing on brooding, physical slowness, apathy, feelings of depression, and physical malfunctioning (Groth-Marnat, 1999). High scores on this scale ($T \geq 65$) indicate difficulty in one or more of these areas. Elevations on the depression scale indicate a self-critical, withdrawn, and silent nature. An individual's scores are examined in relation to other MMPI-2 scores. Individuals with high scores on scale 2 often have elevations on scale 7 (Psychasthenia), the scale most closely related to an anxiety disorder with obsessive compulsive features. Individuals with both scales elevated often experience anguish, anxiety, and discomfort and these two scales are referred to as the "discomfort scales" (Groth-Marnat, 1999). The MMPI-2 has moderate internal consistency and test-retest reliability (Greene & Clopton, 2004; Groth-Marnat, 1999). The MMPI-2 provides insightful information regarding the respondent's personality and potentially the presence of depression symptoms and other psychopathology symptoms. However, the 370 items and approximate 90-minute administration time make it prohibitive for use in time sensitive situations, such as with caregivers who are in the hospital with their children.

Time efficiency of test assessment measures limits duress on a caregiver but the BDI-II, HDI, SCL-90, BSI, and the MMPI-2 vary on level of time efficiency. The MMPI-2 and SCL-90 are time consuming, potentially limiting the use of these instruments with caregivers of seriously ill or injured children in a hospital environment. The BSI is time efficient, however, does not provide a complete picture of all depressive symptoms. The HDI and BDI-II are time efficient and may be viable choices when working with caregivers of ill or injured children who have limited time for depression assessment. In pediatric research, in addition to assessing the caregiver for depression, ratings of depression from the ill or injured child are also desirable.

Assessment of Depression in Children

For children and adolescents, assessing depression often involves self-report (Harrington, 2002; Thapar & Rice, 2006). The most commonly utilized self-report measures of depression in ill or injured youth are the Child Depression Inventory (CDI) (Kovacs, 1992), Reynolds Child Depression Scale (RCDS) (Reynolds, R.M., 1989), and the Reynolds Adolescent Depression Scale (RADs) (Reynolds, R.M., 1987). The BDI-II is used as a self-report measure of depression for adolescents aged 14 years and older.

The CDI is a 27-item self-report measure of depression symptoms for children and adolescents aged 7-17 years. The CDI examines depressive symptoms of disturbed mood, vegetative functions, low self-evaluation, hopelessness, and difficulties in interpersonal behavior (Sitarenios & Stein, 2004). The CDI has internal consistency and test-retest reliability (Kovacs, 1992; Sitarenios & Stein, 2004). The CDI was used across a broad range of populations, including those who have experienced trauma related to a serious

illness. The CDI demonstrated valid psychometric properties in these medically traumatized children (Sitarenios & Stein, 2004).

The RCDS is a 30-item self-report measure of depression for children aged 8-12 years. The RADS is a 30-item self-report measure of depression for adolescents aged 13-18 years. Items on the RCDS and RADS represent symptoms of depression based on DSM-III diagnostic criteria. The RCDS and RADS have internal consistency and test-retest reliability (Nezu, Ronan, Meadows, & McClure, 2000).

Researchers ideally obtain information regarding mood and mental state from self-report. However, self-report with youth is not always plausible. Parental report provides information regarding a youth's mood when information from the youth cannot be gathered. Parental report may also supplement youth self-report. This information can provide a different perspective and, in some instances, be more accurate. Researchers have raised concerns about depressed caregivers and their ability to provide accurate perceptions of their child's mood. Some researchers believe negativity may bias depressed caregivers' perceptions (Renouf & Kovacs, 1994). Proponents of depressive realism, however, posit depressed caregivers provide accurate, not biased, perceptions of their child's mood (Haaga & Beck, 1995). The most commonly utilized measure for parental reports of child depression, as well as other symptoms of psychopathology, is the Child Behavior Checklist (CBCL/6-18) (Achenbach & Rescorla, 2001).

The CBCL/6-18 is an 113-item rating scale for parents of children aged 6-18 years along eight factors: Withdrawn/Depressed, Somatic Complaints, Anxious/ Depressed, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and

Aggressive Behavior. Additionally, the CBCL/6-18 has two broadband factors, Internalizing and Externalizing (Achenbach & Rescorla, 2001). Parents who perceive symptoms of depression in their child will provide higher ratings on the Withdrawn/Depressed, Somatic Complaints, and/or Anxious Depressed factors. These three factors comprise the Internalizing broadband factor. A clinically significant level of psychopathology on a factor is a T score ≥ 70 . The CBCL/6-18 has internal consistency and test-retest reliability (Achenbach & Rescorla, 2001).

Assessment measures determine the presence of depression symptoms. Elevations in depression symptoms may warrant treatment. Seriously ill or injured children and their caregivers may experience depression immediately after the child's illness. Length of depression symptoms may vary by illness chronicity, prior psychopathology, and family functioning. Treatment options will thus vary for ill children and their caregivers.

Treatment of Depression

Many effective ways exist to treat depression in seriously ill children and their caregivers, including pharmacological interventions and psychosocial treatments. Psychopharmacological treatment may be used solely or in combination with other interventions such as cognitive behavioral therapy. Most effective in treating depression is a multimodal approach that includes psychosocial and pharmacological interventions (Stark et al., 2000). Psychopharmacological interventions for depression mainly include tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs) and monoamine oxidase inhibitors (MAOIs). Psychopharmacological interventions are empirically more effective than placebo (Nemeroff & Schatzberg, 2002; Stark et al., 2000). TCAs and SSRIs offer long-term pharmacological treatment but have negative

side effects. MAOIs provide short-term intermittent treatment but produce dangerous side effects such as increased risk of overdose. SSRIs are the preferred psychopharmacological treatment in adults due to fewer side effects (Nemeroff & Schatzberg, 2002).

Promising results obtained with the use of SSRIs indicate a reduction of depression symptoms in youth. However, studies have linked certain SSRIs and other antidepressant medications to an increase in suicidal thoughts and agitation in some children and adolescents (Reinherz et al., 2006). Based on these results, researchers and clinicians suggest not using psychopharmacological treatments as a first-line approach for mild to moderate youth depression. Other approaches suggested for depressed youth include cognitive behavioral or behavior therapies.

The most common forms of psychosocial treatment for depression are behavior therapy, cognitive behavior therapy, and interpersonal psychotherapy. These treatments produce a significant reduction in scores on the Beck Depression Inventory and Hamilton Rating Scale for Depression (Craighead, Hart, Craighead, & Ilardi, 2002). Behavior therapy focuses on monitoring and increasing positive daily activities, improving social and communication skills, increasing response-contingent positive reinforcement for adaptive behaviors, and decreasing negative experiences within an individual's control (Craighead et al., 2002).

The most evaluated psychosocial treatment for depression is Beck's cognitive therapy. Cognitive therapy for depression focuses on modifying faulty cognitions about self, world, and future (Beck, Rush, Shaw, & Emery, 1979). Additionally, cognitive therapy focuses on errors in information processing such as overgeneralization,

personalization, and dichotomous thinking. For those with severe depression, cognitive behavior therapy may be more effective when combined with antidepressant medication (Feldman, 2007).

Interpersonal therapy focuses on difficulties with unresolved grief, interpersonal disputes, and interpersonal deficits. In adults, interpersonal therapy is an efficacious treatment (Craighead et al., 2002; de Mello, de Jesus Mari, Bacaltchuk, Verdeli, & Neugebauer, 2005). Interpersonal therapy may be used alone or in combination with antidepressant medication.

With respect to research on treating depression in children, a paucity of literature exists compared to adult literature (Stark et al., 2000). Parental involvement often maximizes the therapeutic experience for a child. It is suggested, parents be involved in a child's treatment in varying capacities. Parent involvement may include assisting in cognitive-behavioral techniques for a child's personal therapy, and/or being involved in family therapy (Stark et al., 2000). Children, depending on their cognitive level, may also benefit from treatment approaches used with adults with modifications. Cognitive therapy is an example of a modified treatment approach for children.

Beck's cognitive approach for depression has been adapted for use with children. Stark (1990) added affective education to allow youth to recognize and label emotions before identifying and restructuring faulty cognitions. Affective education allows youth to link their negative thoughts to subsequent negative feelings and behaviors. Other components of this approach include daily tracking of events and subsequent affect and reactions (Stark & Kendall, 1996). Children eventually become familiar with traditional cognitive therapy techniques that identify maladaptive cognitions. Children are then

taught the link between negative thoughts and depression symptoms. The modified cognitive approach for children also involves challenging maladaptive cognitions and developing alternatives.

Symptoms of anxiety often become apparent during the assessment and treatment of depression in seriously ill children and their caregivers. Anxiety and depression often are comorbid with one another (Thapar & Rice 2006). Youth admitted to a PICU may manifest anxiety symptoms differently than their caregivers. Youth may experience anxiety disorders such as separation anxiety disorder, specific phobias, and posttraumatic stress disorder. Caregivers are more likely to experience posttraumatic stress disorder or generalized anxiety (Rennick et al., 2002; Shemesh et al., 2003; Thapar & Rice 2006).

Anxiety

Children and adolescents admitted to a PICU face anxiety-provoking situations due to illness or injury as well as the hospital environment. This may lead to anxiety or depression symptoms or exacerbate current symptoms (Carrion, Weems, Ray, & Reiss, 2002; Thapar & Rice, 2006). Seriously ill or injured children are at increased risk for separation anxiety disorder, anxiety due to a general medical condition, generalized anxiety disorder, specific phobias, acute stress disorder, and posttraumatic stress disorder. Researchers found heightened anxiety and behavioral differences, such as hostility, restlessness, fearfulness and withdrawn behavior, in children during a PICU admission and up to 3 months post-discharge compared to children admitted to a general ward (Barnes et al., 1972; Rennick et al., 2002).

Caregivers of hospitalized children are also at risk for anxiety disorders or exacerbated symptoms. A substantial amount of literature exists regarding the

psychological impact of a child's hospital admission on caregivers. However, a paucity of information exists with respect to the psychological impact of a PICU admission on a child relative to research conducted on parents (Rennick et al., 2002). Parents of children admitted to a PICU show higher levels of anxiety than parents of children admitted to general care units (Berenbaum & Hatcher, 1992; Melnyk et al., 1997). The appearance of a child in the hospital, the severity of his illness, and hospital environment are main stressors for parents of children admitted to a PICU. Additionally, unplanned PICU admissions are a significant source of stress for caregivers. Researchers find planned PICU admissions, such as post-operative recovery for planned surgery, to be less stressful on caregivers (Board & Ryan-Wenger, 2002).

Anxiety can be described as apprehension accompanied by bodily sensations that signal danger or fear when no actual threat exists (Veeraraghavan & Singh, 2002). From a physiological standpoint, anxiety may include accelerated heart rate and blood pressure, increased sweating, rapid respiration, inhibition of digestion, and dilation of pupils. These sensations may be described as a "knot" or "butterflies" in the stomach.

In addition to the physiological component of anxiety, a cognitive component exists. The cognitive component consists of subjective interpretations of situations. Each person has a set of beliefs regarding situations that impact level of anxiety (Veeraraghavan & Singh, 2002). For example, if an individual has a strict set of beliefs that all dogs regardless of size will bite and harm her, then she will experience a high level of distress and anxiety when near a dog.

Anxiety disorders are the most prevalent psychiatric disorders in the United States according to the National Comorbidity Survey Replication (Kessler et al., 2005).

Approximately 10-20% of children in the United States will develop an anxiety disorder at some time (Vasa & Pine, 2006). Prevalence rates vary by population and methodology used. Clinical studies have demonstrated high prevalence of anxiety disorders compared to other disorders. In primary clinics, the most common anxiety disorder is generalized anxiety disorder (Stein, 2004). Children and adolescents who experience a serious illness or injury are particularly prone to posttraumatic stress disorder. Prevalence rates of PTSD in ill or injured children vary from 5-35% depending on the specific medical population and methodology used (Bryant, Mayou, Wiggs, Ehlers, & Stores, 2004; Casswell, 1997; Hepstinall, 1996; Yule, 2000). Parents of children admitted to a PICU are at even higher risk for PTSD than their children (Bryant, et al., 2004; Yule, Perrin, & Smith, 2001).

Anxiety prevalence rates will also vary by developmental level or age of the youth. Cartwright-Hatton, McNicol, and Doubleday (2006) conducted a literature review examining prevalence rates of anxiety disorders in children aged 12 years and younger. The most common anxiety disorder was separation anxiety disorder, with prevalence rates ranging from 0.5-20%. Generalized anxiety disorder had prevalence rates of 0.16-11%. Social anxiety and specific phobias were relatively uncommon, indicating a late childhood or early adolescent onset. The National Comorbidity Survey Replication (Kessler et al., 2005) found a 12.5% lifetime prevalence of specific phobia in adults aged 18 years and older, indicating specific phobia to be more common among adults.

Developmental differences may impact type and severity of anxiety symptoms (Strauss, 1993). The number of fears and anxieties reported by children generally decline from young childhood to adolescence (Strauss, 1993). As children become older, anxieties and fears related to separation, animals, and the dark decrease while anxieties

related to school and social situations increase (Strauss, 1993). Developmental factors also impact cognitive expression and management of anxiety. Children become able to manage severe anxiety through cognition as relevant cognitive operations and structures develop (Prins, 2001). Mattis and Ollendick (1997) found children as young as 8 years old to attribute external, somatic symptoms to internal, catastrophic cognitions.

Age is a factor in the development of psychological disorders in seriously ill children. Rennick and colleagues (2002) conducted a prospective cohort study with 120 children from a PICU and a general ward. Child age was the factor most closely related to psychological outcomes, followed by number of invasive procedures and illness severity. At six months, the effect of age became less important but the interaction of age with invasive procedures remained significant. Results indicated younger children with a high degree of invasive procedures were at high risk for fearfulness and anxiety.

Children of anxious parents are prone to develop anxiety disorders. High rates of anxiety in children of anxious parents may be due to common experiences and genes (Boer & Lindhout, 2001). Research has found some genetic basis for panic disorder and agoraphobia (Veeraraghavan & Singh, 2002). Specific phobias, particularly those related to the sight of blood, taking injections, and getting injured also have a biological predisposition (Veeraraghavan & Singh, 2002).

Various factors related to parents and family environment can place a child at risk for anxiety disorders. Parents may impact the development of an anxiety disorder by activating cognitive structures related to threat by exposing a child to anxious ideas (Chorpita & Albano, 1996). Parents may model anxious behavior and reward anxious

cognitions. Negative child rearing practices such as excessive punishment can also lead to the development of anxiety symptoms in children (Veeraraghavan & Singh, 2002).

Family relationships with problematic communication are more prevalent in anxious children (Crawford & Manassis, 2001). Families of children with anxiety disorders also exhibit more control, are more rejecting, and have a less warm style of interaction than families of children without anxiety disorders. Family dysfunction correlates to negative treatment outcomes for anxious children as well as stress and frustration for parents (Crawford & Manassis, 2001).

Anxiety and depression are often comorbid with one another. Depression is a risk factor for further psychopathology such as anxiety. However, childhood anxiety often precedes depression (Thapar & Rice, 2006). Genetic factors are a major contributing factor in this relationship (Rice, van den Bree, & Thapar, 2004; Thapar & Rice, 2006). The link between anxiety and depression may be indirect. Depression may arise through gene-environment correlation as well as increased risk of life events and sensitivity to events related to anxiety disorders (Eaves, Silberg, & Erkanli, 2003).

In addition to risk factors, correlates, and comorbid disorders, theories provide useful information for researchers examining the development of anxiety disorders. Theories of anxiety provide models for the development and progression of anxiety symptoms and disorders. Commonly utilized anxiety theories utilize information processing and learning models.

Theories of Anxiety

Cognitive-behavioral Theory

Beck (1967, 1972, 2002) proposed a cognitive-behavioral model based on negatively

distorted information processing. Despite the typical application of this model to depression, the model also applies to anxiety. Cognitive-behavioral theory involves the role of negative thoughts in the onset and maintenance of anxiety disorders. Cognitive schemas are guides to information processing. If schemas are dysfunctional, the result will be biased interpretations of external events. Distorted cognitive operations result in distorted environmental input. Distorted input leads to distorted information processing and biased interpretation of external events. Negative cognitive products or thoughts are the outcome of distorted cognitive processes. This theory assumes anxiety disorders result from chronic overactivity of schemas of threat of danger (Prins, 2001).

Cognitive behavioral theory assumes dysfunctional schemas form in early childhood. Cognitive distortions, such as overestimations of threat, may be learned through family interactions. As cognitive distortions may be learned, evaluation of family psychopathology is often key. Research suggests low perception of control to be a core feature of anxiety. Early experience with uncontrollability may be a factor in the development of anxiety. Parents often play a key role in developing feelings of uncontrollability (Prins, 2001). Although learning and observation of anxiety is only a small component of cognitive behavioral theory, other theories such as social learning and classical conditioning place more emphasis on learning.

Social Learning Theory

According to Bandura's (1969, 1977) social learning theory, the acquisition of fears, anxiety symptoms, and anxiety disorders occurs through observation. In some children, the basis of anxiety may involve vicariously learned or modeled behavior. The child must first observe the reaction of a significant person, such as a caregiver, displaying fear or

anxiety when encountering a stimulus and then escaping the situation, thus reinforcing the fear response. Additionally, modeling of information is transferred by warnings to escape from threatening situations. The combination of observation of anxiety and escape behavior as well as receiving information that invokes anxiety instills fear-arousing anxiety and avoidance over time (Verrarahaven & Singh, 2002).

Classical Conditioning Theory

Watson and Rayner (1920) and Pavlov (1927) described the process of learning through classical conditioning. Watson's and Rayner's (1920) study demonstrated the ability of a young child, "Albert B," to fear previously neutral stimuli (white rat) by pairing its appearance with a fear-provoking stimulus (clanging of a bell). The child showed fear of the rat even when the sound of the bell was not present. The researchers determined pairing previously neutral stimuli with anxiety provoking stimuli on several occasions results in anxiety. Over time, conditioned stimulus will evoke the capacity to provoke anxiety. Not all people who experience this process develop anxiety symptoms. Researchers have proposed multiple pathways to the development of anxiety disorders that include conditioning, modeling, and verbal instruction (Rachman, 1991).

Theories of anxiety, such as cognitive behavioral, social learning, and classical conditioning theories of anxiety, provide a theoretical perspective on the development and progression of anxiety symptoms. Children with serious illness or injury as well as their caregivers are at an increased risk for anxiety. Assessment measures identifying anxiety symptoms aid in the understanding of anxiety.

Assessment of Anxiety

Assessment of Anxiety in Adults

Commonly utilized assessments of anxiety are self-report instruments and interview measures (Stein, 2004). Self-report measures are time- efficient and provide information regarding mood state. Interview measures are generally less time efficient but may provide more detailed information regarding mood state and symptomatology.

Commonly utilized self-report measures of anxiety in adults include the Beck Anxiety Inventory (BAI) (Beck, 1993), State-Trait Anxiety Inventory for Adults (STAI) (Spielberger, 1983), Endler Multidimensional Anxiety Scale (EMAS) (Endler, Edwards, & Vitelli, 1991), Multidimensional Anxiety Questionnaire (MAQ) (Reynolds, 1999), and examination of the Anxiety and Phobic Anxiety symptom dimensions of the SCL-90-R (Derogatis, 1994) or Brief Symptom Inventory (BSI) (Derogatis, 1993). Anxiety is also measured on scale 7 (Psychasthenia) of the Minnesota Multitphasic Personality Inventory-2 (MMPI-2) (Butcher et al., 2001). The most commonly used structured interview in the assessment of adult anxiety disorders is the Anxiety Disorders Interview Schedule (ADIS-IV) (Brown, DiNardo, & Barlow, 2004).

The BAI is a 21-item self-report measure of anxiety in adults aged 17-80 years. BAI items regarding subjective, somatic, and panic-related symptoms address physiological and cognitive components of anxiety. The BAI has differentiated anxious and non-anxious groups in various settings (Veeraraghaven & Singh, 2002). The BAI has demonstrated internal consistency and test-retest reliability (Beck, 1993; Veeraraghaven & Singh, 2002).

The STAI is a self-report measure of state and trait anxiety in adults and adolescents from grade 9 (Spielberger, 1983). State anxiety is a transitory condition of subjective feelings of tension and apprehension and heightened autonomic nervous system activity. Trait anxiety is a general and stable tendency to respond anxiously to perceived threats. The STAI has internal consistency. The trait scale of the STAI also has test-retest reliability. The state scale has demonstrated lower stability with respect to test-retest reliability (Spielberger, 1983), which is expected because this scale reflects the influence of situational factors at time of testing.

The EMAS is a set of three self-report anxiety scales for adolescents or adults with at least an eighth-grade reading level (Endler et al., 1991). The first scale, the EMAS-State (EMAS-S), assesses state anxiety. This scale includes cognitive and physiological responses. The second scale, EMAS-Trait (EMAS-T), examines an individual's tendency to experience anxiety in four situations: socially-evaluative, physically dangerous, new or ambiguous, and routine. The third scale, EMAS-Perception (EMAS-P), evaluates perception of type and intensity of threat in an immediate situation. The EMAS-Social Anxiety Scales (EMAS-SAS) may be used in conjunction with the EMAS. The EMAS-SAS measures separation anxiety, self-disclosure anxiety related to family and friends, perception of a given situation involving separation anxiety, and perception of a given situation involving self-disclosure anxiety. The EMAS has demonstrated internal consistency and test-retest reliability (Endler et al., 1991).

The MAQ is a 40-item self-report measure of anxiety symptoms during the previous month (Reynolds, 1999). The MAQ contains four subscales: Physiological-Panic, Social-Phobia, Worry-Fears, and Negative Affectivity. The MAQ effectively identifies anxiety

symptoms in private practice, medical settings, and outpatient settings. The MAQ has demonstrated internal consistency and test-retest validity (Reynolds, 1999).

The Anxiety and Phobic Anxiety symptom dimensions of the SCL-90-R and BSI indicate the presence of anxiety symptoms. The SCL-90-R scales are particularly effective for discriminating between those with and without anxiety symptoms and disorders (Derogatis & Fitzpatrick, 2004). The SCL-90-R and BSI have demonstrated internal consistency and test-retest reliability (Derogatis & Fitzpatrick, 2004). Another self-report assessment of multiple types of psychopathology is the MMPI-2. Anxiety symptoms are usually found as elevations on scale 7 (Psychasthenia), which is the scale most closely related to an anxiety disorder with obsessive-compulsive features (Groth-Marnat, 1999). Clinically significant levels are T scores ≥ 65 .

The ADIS-IV is a structured interview for current anxiety disorders based on DSM-IV criteria (Brown, DiNardo, & Barlow, 1994). The ADIS-IV is intended to provide differential diagnosis of anxiety disorders and rule out disorders such as substance abuse and mood disorders. The ADIS-IV has modules for PTSD, generalized anxiety disorder, acute stress disorder, panic disorder, agoraphobia, specific and social phobias, and obsessive-compulsive disorder, as well as other modules for mood disorders and substance abuse and dependence. The ADIS-IV has been found reliable in the diagnosis of anxiety disorders (Lyneham, Abbott, & Rapee, 2007). The ADIS-IV is not the first choice of assessment instruments despite the breadth of information provided because of extended administration time. In some instances, such as a parent caring for an ill child who has limited time, a more time efficient method (i.e. self-report) may be optimal.

Assessment of Anxiety in Children

Commonly used self-report measures of anxiety in children include the Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, & Conners, 1997), Screen for Child Anxiety Related Emotional Disorders-Revised (SCARED-R) (Birmaher, et al., 1997), Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1985), and the State-Trait Anxiety Inventory for Children (STAIC) (Spielberger, 1973). Additionally, parental reported information may be gathered using measures such as the Child Behavior Checklist (CBCL/6-18) and the Anxiety Disorders Interview Schedule for DSM-IV- Child and Parent Version (ADIS-IV-C/P) (Silverman & Albano, 1996), a semi-structured interview that has a child and parent version. Visual analogue scales also provide a method of self-report of anxiety symptoms, particularly for youth with limited verbal expression.

The MASC is a 39-item self-report multidimensional assessment of anxiety in youths aged 8-19 years. The MASC examines physical symptoms, harm avoidance, social anxiety, and separation/panic (March, 1998; March, Parker, Sullivan, Stallings, & Conners, 1997). The MASC assesses anxiety through four main factors, three of which have two subfactors: Physical Symptoms (tense/somatic), Social Anxiety (humiliation fears/performance fears), Harm Avoidance (perfectionism/anxious coping), and Separation Anxiety. The MASC has internal consistency and test-retest reliability (March, 1998; March et al., 1997).

The SCARED-R is a 66-item self-report assessment of anxiety corresponding to DSM-IV criteria for generalized anxiety disorder, social phobia, separation anxiety, panic disorder, obsessive compulsive disorder, traumatic stress disorder, blood-injection-injury,

animal, and environmental phobias. A parent version is also available. The child and the parent versions have internal consistency and test-retest reliability (Birmaher et al., 1997; Muris et al., 1999).

The RCMAS is a 37-item measure of anxiety for youth aged 6-19 years. The RCMAS yields a total anxiety score as well as four subscale scores. Subscales of the RCMAS are worry/oversensitivity, physiological anxiety, social concerns/concentration problems, and a lie scale (Reynolds & Richmond, 1985). The RCMAS has internal consistency and test-retest reliability (Gerard & Reynolds, 1990; Wisniewski, Jack, Mulick, Genshaft & Coury, 1987).

The STAIC is a 40-item assessment measure of state and trait anxiety for children aged 9-12 years. The STAIC has two 20-item scales, one focusing on state anxiety and the other focusing on trait anxiety. The state anxiety scale examines how a child feels at a particular moment, including transitory anxiety states. The trait anxiety scale examines how a child generally feels, including overall anxious tendencies (Spielberger, 1973). The STAIC has internal consistency and test-retest reliability (Spielberger, 1973).

The CBCL/6-18 provides information on various psychological symptoms, including anxiety. The CBCL/6-18 is a 113-item rating scale for parents of youth aged 6-18 years. Parents who perceive symptoms of anxiety in their children may provide higher ratings on the Anxious/Depressed factor and Internalizing broadband factor. The CBCL/6-18 has internal consistency and test-retest reliability (Achenbach & Rescorla, 2001).

The ADIS-IV-C/P (Silverman & Albano, 1996a; Silverman & Albano, 1996b) is a semi-structured interview to assess DSM-IV anxiety disorders in youth. Researchers or clinicians administer the ADIS-IV-C/P separately to youth and parent(s). Parent and

youth information combine to facilitate differential diagnosis. The ADIS-IV-C/P focuses on anxiety symptoms (i.e., social phobia, separation anxiety, panic disorder, posttraumatic stress disorder). However, the ADIS-IV-C/P also serves as a screen for other conditions such as mood disorders, attention-deficit hyperactivity disorder, developmental delays, and disruptive behavior disorders (Greco & Morris, 2004). The ADIS-IV-C/P has internal consistency and test-retest reliability (Greco & Morris, 2004).

Visual analogue scales provide a method of self-report of anxiety symptoms that require limited verbal expression, minimal time to complete, and are appropriate for many ages (Bernstein & Garfinkel, 1992). Visual analogue scales are useful in situations in which describing a subjective experience or state may be difficult. Difficulty describing a subjective experience may be due to limited verbal ability or difficulty defining and/or labeling emotions or experiences (Quay & LaGreca, 1986). Difficulty describing subjective experiences may be particularly relevant for children with trauma symptomatology. Visual analogue scales usually have ratings ranging from 0-10 or 0-100.

Numerous studies indicate the reliability and validity of analogue scales (Aitken, 1969; Francis & Stanley, 1989; Lang, Melamed, & Hart, 1970; Luria, 1975; Price, McGrath, Rafii, & Buckingham, 1983). Analogue scales that examine pain, dental fear, and anxiety have been found particularly useful. Ratings are generally presented on a straight line or next a picture such a thermometer or faces that depict various emotions. The advantages of pictorial scales include the presentation of a familiar picture (a thermometer) and the presence of anchor points. One example of a thermometer analogue scale is the dental fear thermometer proposed by Francis and Stanley (1989). This scale

has demonstrated test-retest reliability and convergent reliability.

General anxiety assessment measures such as self reports, semi-structured interviews, and analogue scales help identify symptoms of anxiety disorders. Anxiety disorders commonly identified in seriously ill children include separation anxiety disorder, anxiety due to a general medical condition, generalized anxiety disorder, specific phobia, acute stress disorder and posttraumatic stress disorder. Commonly identified anxiety disorders in caregivers of seriously ill and injured children include generalized anxiety disorder, acute stress disorder, and posttraumatic stress disorder (Rennick et al., 2002; Shemesh et al., 2003; Thapar & Rice, 2006).

Separation Anxiety Disorder (SAD)

Separation anxiety disorder (SAD) is characterized by excessive anxiety concerning separation from home or a major attachment figure (American Psychiatric Association, 2000). Children with SAD may experience excessive worry regarding loss, harm, or separation from attachment figures. Additionally, youth may resist attending school or being alone. Reluctance to be away from an attachment figure may also occur at night when a child refuses to sleep alone or has nightmares with themes of separation. Youth may also present with physical symptoms when separated from attachment figures.

Excessive anxiety must occur for at least 4 weeks and symptoms must begin before age 18 years to meet criteria for SAD. Separation anxiety is beyond what is expected for a youth at his developmental level. Significant distress or impairment in social, academic, or vital areas of functioning is also required (American Psychiatric Association, 2000).

Lifetime prevalence estimates for SAD are about 4% according to the National Comorbidity Survey Replication (Shear, Jin, Ruscio, Walters, & Kessler, 2006).

Prevalence rates decrease from childhood through adolescence. In clinical samples, SAD is equally common among males and females. SAD is more frequent among females in epidemiological studies. SAD is common in childhood and many factors can increase likelihood of occurrence. Life stressors, such a severe illness that requires hospitalization and separation from attachment figures, can trigger the development of SAD. Goodwin and colleagues (2005) found the prevalence of SAD among pediatric asthmatics to be 8.1%, twice that of the general population.

Onset of SAD may occur as early as preschool, but adolescent onset is rare. Younger children typically do not exhibit specific fears related to threats to their caregiver or themselves. As children get older, they develop fears and worries that something may occur to them or a caregiver that may lead to separation. Adults with the disorder are often concerned with the well-being of children and spouses. The majority of adults with separation anxiety symptoms have onset in adulthood (Shear et al., 2006).

Developmental age may play an important role in the development of SAD in hospitalized children. Carson, Gravely, and Council (1992) examined the psychosocial adjustment of children aged 4-12 years prior to and during hospitalization.

Developmental age influenced youths' illness conceptualization and ability to cope with stress of illness, and the hospital environment. Specifically, illness concepts correlated highly with verbal skills, conservation ability, and age. Children more developmentally advanced had more sophisticated concepts of illness and better adjustment prior to hospital admittance. These children also showed significantly lower levels of SAD as well as lower levels of anxiety and withdrawal symptoms.

Risk factors for SAD include parental psychopathology and family socioeconomic status. Weissman, Leckman, Merikangas, Gammon, and Prusoff (1984) examined the prevalence of SAD in children aged 6-8 years. The prevalence of SAD was 24% in children whose parents had depression and agoraphobia and 6% in children whose parents had depression and generalized anxiety disorder. Last and colleagues (1987), examining a clinical sample, found the prevalence of SAD to be 24% and the overwhelming majority of children with SAD were under age 13 years and from families of lower socioeconomic status.

Anxiety Due to a General Medical Condition

In some instances, youth and adults may experience symptoms of anxiety due to a medical condition. This may include prominent anxiety, panic attacks, and/or obsessions or compulsions that cause significant impairment in social, school, occupational, or other important areas of functioning. A diagnosis of anxiety due to a general condition must include evidence based on history, medical examination, or laboratory findings that indicate symptoms result from a general medical condition. Symptoms cannot be better accounted for by another mental disorder or occur from delirium. These symptoms may occur with generalized anxiety, panic attack, or obsessive-compulsive symptoms (American Psychiatric Association, 2000). Conditions that cause anxiety symptoms include endocrine disorders such as hyper- and hypothyroidism and hypoglycemia, cardiovascular conditions such as congestive heart failure, respiratory conditions such as chronic obstructive pulmonary disease and pneumonia, and neurological conditions such as vestibular dysfunction and encephalitis (American Psychiatric Association, 2000).

Generalized Anxiety Disorder (GAD)

According to DSM-IV-TR, excessive worry that is difficult to control and occurs more often than not for at least six months about various events or activities characterizes generalized anxiety disorder (GAD) (American Psychiatric Association, 2000).

Generalized anxiety and worry is associated with at least three of the following (one in children): restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance. The generalized anxiety must cause significant distress or impairment in social, school, occupational, or other areas of functioning. Symptoms must not result from a substance, general medical condition, or occur exclusively during a mood disorder, psychotic disorder, or pervasive developmental disorder.

The National Comorbidity Survey Replication found a 3.1% one-year prevalence rate for GAD and lifetime prevalence rate of 5.7% (Kessler et al., 2005a; Kessler et al., 2005b). In clinical settings, females are more frequently diagnosed with GAD. In children, prevalence rates based on strict diagnostic criteria in the general population are 2-4% (Flannery-Schroeder, 2004). Children with medical conditions have slightly higher prevalence rates. Prevalence rates of GAD in pediatric asthmatic patients were 4.1% (Goodwin et al., 2005).

Adults with GAD often focus worry and anxiety on routine life occurrences such as employment, finances, and health of friends and family members (American Psychiatric Association, 2000). Major stressors can exacerbate symptoms in adults and children (Huppert & Rynn, 2004). A child's serious illness may exacerbate parents' preexisting symptoms of GAD. Children's worries often focus on performance issues, such as

performance in school and sports. GAD symptoms may also include concern of catastrophic events such as natural disasters and serious illnesses.

Most research focuses on risk factors and course of anxiety in general and not GAD specifically. The limited research on GAD indicates that family factors and parental practices contribute to the development of GAD. Genetics are also a risk factor for GAD (Kerry, 2005). Cassidy (1995) found adults with GAD more likely to report high levels of family rejection, role reversal with parents, and family enmeshment as well as anger and vulnerability with respect to mothers compared to nonanxious participants. Muris and Merckelbach (1998) found child perceptions of parental control and anxious childrearing correlated to symptoms of GAD.

Specific Phobia

DSM-IV-TR diagnostic criteria for specific phobia includes marked and persistent fear of a specific object or situation that is excessive or unreasonable (American Psychiatric Association, 2000). When exposed to the phobic stimulus, individuals with specific phobia have an immediate anxiety response. In children, this response may include crying, tantrums, clinging, or freezing. Specific phobia also involves avoiding a phobic stimulus or enduring the stimulus with distress. The specific phobia must cause significant distress or impairment in social, school, occupational, or other areas of functioning. The distress or avoidance cannot be better accounted for by another mental disorder. In youth under age 18 years, the duration must be at least 6 months. Five types of specific phobia exist: animal, natural environment, blood-injection-injury, situational, and other.

The National Comorbidity Survey Replication found a 8.7% one-year prevalence rate of specific phobia in community samples and 12.5% lifetime prevalence rate (Kessler, et al., 2005a; Kessler, et al., 2005b). Specific phobia is more common in women, with female to male ratio of approximately 2:1. This ratio varies with the specific subtype of phobia. For example, approximately 55-70% of those with blood-injection-injury type are female. Prevalence rates for specific phobia appear to be inversely related to age (Boyd et al., 1990). Essau, Conradt, and Petermann (2000) found a 3.5% lifetime prevalence rate for specific phobia in adolescents, while Muris and Merkelbach (2000) found a prevalence of 17.6% among children aged 4-12 years.

Symptoms of specific phobia generally first occur in childhood or adolescence and occur at a younger age for women than men (American Psychiatric Association, 2000). Animal and blood-injection-injury type specific phobias usually have an onset in childhood. Phobic symptoms may persist up to 5 years and, in some cases, may persist into adulthood (King, Muris, & Ollendick, 2004). Phobias of darkness, animals, and insects generally have a childhood onset before age 7 years. Thunderstorm and medical personnel phobias typically have an early adolescent onset around age 12 years (Ginsburg & Walkup, 2004). Childhood specific phobias persisting into adulthood remit approximately 20% of the time.

Factors that contribute to the onset of specific phobias include traumatic events, panic attacks in the presence of a feared stimulus, observation of others exhibiting fear, and information from parents or others that instill worry and anxiety about a situation or object (Ginsburg & Walkup, 2004). Seriously ill or injured children may develop blood-injection-injury type specific phobia. This may occur through one traumatic experience or

continually painful experiences in a hospital or medical setting that instill fear and anxiety in a child (King et al., 2004). Children who develop this type of phobia may resist medical care and demonstrate anticipatory anxiety to upcoming medical procedures. Anticipatory anxiety in some instances results in more anxiety for a child than the medical procedure (Chedekel, Rizzone, & Antoon, 1998).

Risk factors for specific phobia include having a family member with specific phobia. A genetic relationship to type of phobia exists. Fears of blood and injury have a strong familial component (Lichtenstein & Annas, 2000). Other risk factors include difficult temperament, parental psychopathology, and parenting practices. Those exposed to a stimulus while experiencing fear and anxiety are more likely to develop a specific phobia (King, et al., 2004).

Ill and injured children are at risk for anxiety disorders, such as separation anxiety disorder and specific phobias, may require treatment. Caregivers of seriously ill and injured children are also at risk for anxiety disorders that may necessitate treatment. Psychopharmacological and psychosocial treatments are used for adults and children with anxiety disorders.

Treatment of Anxiety

Commonly utilized therapeutic techniques for anxiety disorders include psychopharmacological, behavior, and cognitive behavioral therapy (Veeraraghavan & Singh, 2002). The most efficacious psychopharmacological treatment depends on the specific anxiety disorder and population in question. With respect to generalized anxiety disorder (GAD) in adults, benzodiazepines are superior to placebo. Buspirone has been found to have comparable results to benzodiazepines. Tricyclic antidepressants as well as

paroxetine have also shown efficacy in the treatment of GAD (Roy-Byrne & Cowley, 2002). Selective serotonin reuptake inhibitors (SSRIs) and benzodiazepines have shown efficacy in the treatment of panic disorder (Roy-Byrne & Cowley, 2002).

In children and adolescents, SSRIs are generally the first line of psychopharmacological treatment for GAD, separation anxiety disorder, and social phobia (Vasa & Pine, 2006). SSRIs have some side effects, including sleep disturbance. SSRIs also do not impact behavior immediately and may take 4-6 weeks to take effect. The use of SSRIs and other anti-depressants by children and adolescents may increase risk of suicidal ideation. Benzodiazepines or neuroleptics may effectively treat severe symptoms of anxiety in children (Vasa & Pine, 2006). In general, the most effective anxiety treatments combine psychopharmacological and some form of psychosocial interventions.

One effective psychosocial treatment for anxiety symptoms is behavior therapy. Behavior therapy involves modifying actions based on the premise that behavior is learned and can therefore be unlearned (Veeraraghavan & Singh, 2002). A therapist first identifies target behavior(s) for modification, settings and conditions under which target behavior(s) occur, factors that contribute to the persistence of the target behavior(s), and treatment goals. Behavior therapy includes various techniques for anxiety, including relaxation training, systematic desensitization, and positive and negative reinforcement (Veeraraghavan & Singh, 2002).

The most efficacious behavioral treatments for specific phobias are systematic desensitization and in vivo exposure (Barlow, Raffa, & Cohen, 2002). Systematic desensitization involves exposure to fear-arousing stimuli in a graduated manner. First,

the therapist conducts instruction in methods of relaxation training, guided imagery, and deep breathing. Next, a hierarchy of anxiety-provoking situations ranging from low to high is constructed. The process of desensitization involves working through the hierarchy. Relaxation methods are used to counter anxious feelings (Veeraraghavan & Singh, 2002).

Additional components may be necessary to ensure exposure-based procedures are effective when treating phobias such as blood-injection-injury. Blood-injection-injury phobia is often associated with a vasovagal syncope, which is an immediate increase in heart rate and blood pressure when one encounters a phobic stimulus. A dramatic decrease in heart rate and blood pressure, and often a fainting response, follows the increase in heart rate and blood pressure (Barlow et al., 2002). Applied tension is thus added to exposure-based procedures. This technique consists of tensing large muscle groups for approximately 15 seconds and releasing tension for 15 seconds prior to exposure to the phobic stimulus (Barlow et al., 2002).

Cognitive behavioral therapy (CBT) is an effective therapeutic technique for anxiety symptoms and disorders (Norton & Price, 2007). The goal of CBT for anxiety is to identify and modify anxious thoughts, feelings, and behaviors. An example of an anxious thought is “I’m having a heart attack” when heart rate increases. CBT may also include exposure therapy in which exposure to feared stimuli follows techniques to reduce anxiety, such as progressive muscle relaxation, guided imagery, and deep breathing.

Seriously ill or injured children are at risk for anxiety disorders such as separation anxiety disorder and specific phobias that may require treatment. Caregivers of ill children are also at risk for anxiety disorders and may require treatment. Ill children and

their caregivers are also at increased risk for trauma symptomatology. Acute stress disorder and posttraumatic stress disorder are more prevalent among ill children and their caregivers than the general population (Rennick, et al., 2002).

Acute Stress Disorder (ASD)

Acute stress disorder (ASD) occurs after experiencing or witnessing a traumatic event involving real or threatened injury or death viewed as uncontrollable and fearful (American Psychiatric Association, 2000). At least three dissociative symptoms, one reexperiencing symptom, one avoidant symptom, and one arousal symptom must be exhibited. DSM-IV-TR criteria require ASD symptoms be present for at least two days up to one month after trauma (American Psychiatric Association, 2000). If the symptom pattern persists after one month, a diagnosis of posttraumatic stress disorder may be considered.

Information regarding the prevalence and validity of ASD is still being collected. According to the American Psychiatric Association (2000), prevalence rates of ASD range from 14-33%. Prevalence rates of ASD for children with serious illnesses and injuries that require hospitalization range are 7-22% (Daviss et al., 2000). These prevalence rates are based on few studies and rates may change as more research becomes available.

One primary risk factor of ASD in seriously ill youth is parental distress (Daviss et al., 2000). The developmental path of ASD in ill children whose parents experience distress is unclear. A child's illness may create distress in their parent and increase the risk of ASD in the child and subsequently the risk of ASD in the parent. Conversely, a parent may be experiencing distress and develop ASD symptoms increasing the child's

risk of developing ASD symptoms. In pediatric burn patients, risk factors identified for ASD are size of burn, pain, pulse rate, lowered body image, parental ASD symptoms, and general parental psychopathology (Saxe et al., 2005; Stoddard et al., 2006).

ASD is generally viewed as a potential predictor of PTSD (Difede, et al., 2002; McKnight, Compton, & March, 2004). ASD symptoms predict PTSD symptoms in seriously ill and injured patients (Birmes, Arrieu, Payen, Warner, & Schmitt, 1999; Burleson et al., 2000). Birmes and colleagues (1999) found major depression to co-occur early after a traumatic event. Some researchers consider ASD a provisional PTSD diagnosis as many individuals with ASD go on to develop PTSD (McKnight et al., 2004). Some researchers question the current validity of the ASD diagnosis due to limited empirical support of the diagnosis (Pynoos, Steinberg, & Piacentini, 1999). However, further examination of factors that mediate and contribute to the relationship between ASD and PTSD symptoms is needed (March, 2003).

Posttraumatic Stress Disorder (PTSD)

Posttraumatic stress disorder (PTSD) occurs after exposure to a traumatic event that involves or threatens death or serious injury to oneself or others. Diagnosis of PTSD requires symptoms of reexperiencing, avoidance, and arousal after exposure to trauma (American Psychiatric Association, 2000). Traumatic events include maltreatment, natural disaster, assault, experiencing a serious illness, or witnessing a serious illness in your child. Individuals must experience PTSD symptoms for at least four weeks.

PTSD Symptoms in Children

Children may express reexperiencing, avoidance/numbing, and hyperarousal symptoms of PTSD differently than adults. DSM-IV criteria require at least one

reexperiencing symptom to meet diagnosis of PTSD (American Psychiatric Association, 2000). Although adults may reexperience a traumatic event through flashbacks, children rarely reexperience trauma in flashbacks (March et al., 2004). Indeed, children are more likely to reexperience trauma in intrusive thoughts, dreams, and traumatic play than flashbacks. Children's dreams often include repetitions of certain aspects of trauma. Younger children dream of general representations of fear such as monsters (Cohen & Mannarino, 2004).

Traumatic play is a common manifestation of reexperiencing trauma for children (Husain & Kashani, 1992; March, 1999). Traumatic play involves themes or elements in play that retell or refer to trauma. A child involved in a car accident may use cars to act out an automobile accident. Some children develop alternate "endings" in traumatic play.

DSM-IV PTSD diagnostic criteria require at least three avoidance/numbing symptoms (American Psychiatric Association, 2000). Avoidance includes a conscious effort to avoid reminders of a traumatic event. Young children exhibit less emotional numbing than adolescents and adults (Dyregrov & Yule, 2006). Young children also have difficulty reporting avoidance symptoms. Difficulty reporting symptoms may be due to difficulty understanding symptoms. Youth may avoid specific thoughts, locations, items, behaviors, or people that are reminders of a specific event (March et al., 2000; Perrin, Smith, & Yule, 2004). Some children may manifest avoidance symptoms in play, avoiding themes that are reminders of trauma. A child with an illness and hospital trauma may avoid themes of doctors, hospitals, and other illness-related concepts. In extreme cases of avoidance, children may become less verbal and act like a younger child not wanting to know or express their feelings (March et al., 2000).

Two arousal symptoms are also required for PTSD. In children, hyperarousal may involve sleep difficulty, irritability, separation difficulties, trouble concentrating, hypervigilance, exaggerated startle response, and increased aggression. Children may also experience shortened attention span, hyperactivity, and somatic complaints (Cohen & Mannarino, 2004; March et al., 2000). Young children may not understand the connection between arousal symptoms and trauma. A relationship may exist between specific arousal symptoms in children. Sleep difficulties may lead to concentration difficulties and increased irritability. Hypervigilance and exaggerated startle response may alter behavior. Altered behavior may include increased irritability or aggression. Others may respond negatively to irritability and hostility of the child, which may impact symptoms.

Associated Features of PTSD

Verbal memory and learning deficits have been associated with PTSD. Some researchers report verbal memory deficits among adults with PTSD compared to trauma-exposed individuals without PTSD and non-trauma exposed subjects (Bremner, Vermetten, Afzal, & Vythilingam, 2004; Sachinvala, et al., 2000). Other researchers report conflicting evidence not supporting verbal memory deficits among adults with PTSD (Bremner, et al., 2003; Pederson, et al., 2004). Verbal learning deficits are associated with PTSD in adults after trauma and not in those with trauma-exposure without PTSD (Vasterling, et al., 2002; Yehuda, Golier, Halligan, & Harvey, 2004).

Limited information exists regarding memory and learning deficits in children and adolescents with PTSD. Beers and DeBellis (2002) found children with PTSD to have more impairment on the short delay and long delay free recall tasks of the California

Verbal Learning Test for Children (Delis, Kramer, Kaplan, & Ober, 1994) than healthy comparison children. Yasik, Saigh, Oberfield, and Halamandaris (2007) found verbal memory impairments associated with PTSD. Children with trauma exposure but not PTSD were less likely to have verbal memory impairment. Researchers observed general memory and learning deficits among youth with PTSD when compared with the nontraumatized group.

In addition to association with memory and learning impairment, PTSD is associated with increased rates of mood, anxiety, and other disorders (Marshall & Rothbaum, 2004). PTSD is associated with increased rates of major depressive disorder, substance-related disorder, panic disorder, agoraphobia, obsessive-compulsive disorder, generalized anxiety disorder, social phobia, specific phobia, and bipolar disorder. Major depressive disorder, substance-related disorder, panic disorder, agoraphobia, obsessive-compulsive disorder, generalized anxiety disorder, social phobia, specific phobia, and bipolar disorder may precede, follow, or emerge concurrently with PTSD (Stein & Hollander, 2002).

One study examining anxiety and mood disorder comorbidity with PTSD among adolescents found significant risk for social anxiety, specific phobia, major depression, and alcohol and drug dependence (Giaconia et al., 1995). The onset of PTSD preceded or co-occurred with the onset of these disorders, suggesting PTSD may trigger them. Copeland and colleagues (2007), in a sample of children from the general population, found exposure to trauma doubled the rate of psychiatric disorders compared to those not exposed to trauma. Co-occurrence of posttraumatic stress symptoms was greatest with affective disorders.

Subjective Experience

Trauma researchers are focusing on the role of subjective experience in the development of PTSD symptoms (Creamer et al., 2005). Subjective experience is an appraisal of an event and considered crucial to the development of PTSD by many researchers. The subjective experience criteria of a PTSD diagnosis require an experience of fear, helplessness, or horror in response to trauma (American Psychiatric Association, 2000). The subjective experience component of a PTSD diagnosis is predictive of later full-PTSD symptomatology. Breslau and Kessler (2001), in a community sample, found those who did not have a subjective experience of fear, helplessness, or horror in response to trauma rarely developed symptoms of PTSD. Subjective experiences of fear, helplessness, or horror varied with type of trauma. Fear, helplessness, and horror at time of trauma were more common with rape and illness of one's child.

Many factors can impact subjective experience and thus development of PTSD (Creamer et al., 2005; Davidson, 1994). Researchers believe an intense emotional response or subjective experience plays a vital etiological role in development of PTSD (Rasmussen, Rosenfeld, Reeves, & Keller, 2007). Factors that may impact subjective experience of an event include preparedness for an event, denial, avoidance, and developmental level (Breslau & Kessler, 2001).

Developmental level may impact how youth perceive a situation (Cohen & Mannarino, 2004; Dyregrov & Yule, 2006). Infants and toddlers rely on social references and attachment figures to determine how to respond in situations of uncertainty. Reliance on social references and attachment figures for cues is particularly true in situations involving risk and danger. If a caregiver exhibits anxiety and fear, a child will most likely

emulate these responses. Preschool children watch attachment figures for cues on how to respond in addition to natural cues that elicit fearful responses. School-age children rely less on caretakers and more fully understand threatening situations. Adolescents rely on their own appraisals of threat and harm when making subjective appraisals.

Assessment of PTSD

The assessment of PTSD in adults includes instruments such as the Impact of Events Scale-Revised (IES-R) (Weiss & Marmar, 1997), PTSD Checklist-Civilian Version (PCL-C) (Weathers, Litz, Herman, Huska, & Keane, 1994), and the Minnesota Multiphasic Personality Inventory PTSD (MMPI-PTSD) (Keane, Malloy, & Fairbank, 1984). The IES-R is a 15-item self-report assessment of subjective distress of a life event and DSM-IV symptoms of PTSD. The IES-R yields a total score and intrusion and arousal subscale scores. The IES-R has internal consistency and test-retest reliability (Weiss & Marmar, 1997).

The PTSD Checklist Civilian Version (PCL-C) is a 17-item PTSD measure that inquires about stressful experiences and the subsequent impact of the stressful event. The PCL-C has demonstrated internal consistency and test-retest reliability (Weathers et al., 1994). The MMPI-PTSD is a 46-item scale for detection of PTSD. The MMPI-PTSD is a stand-alone measure and can be used in combination with the MMPI-2. The MMPI-PTSD has internal consistency and test-retest reliability (Herman, Weathers, Litz, & Keane, 1996).

Assessment of PTSD in youth is most commonly by self-report, parental report, and interview. Commonly utilized self-report measures in youth include the Trauma Symptoms Checklist for Children (TSCC) (Briere, 1996) and the Child PTSD Symptom

Scale (Foa, Johnson, Feeny, & Treadwell, 2001). The Trauma Symptom Checklist for Young Children (TSCYC) (Briere et al., 2001) is a commonly used parental report measure of PTSD. Commonly utilized interviews for PTSD symptoms include the Childhood PTSD Interview and Children's PTSD Inventory (Fletcher, 1996; Saigh et al., 2000).

The TSCC is a 54-item self-report measure of posttraumatic distress in children aged 8-16 years. The TSCC includes six clinical scales: Anxiety, Depression, Anger, Posttraumatic Stress, and Dissociation. The TSCC also has two validity scales. The TSCC has internal consistency and test-retest reliability (Briere, 1996). The TSCYC is a 90-item caretaker report measure for assessment of trauma symptoms in youth aged 3-12 years. The TSCYC includes 9 clinical scales: Posttraumatic stress- intrusion, Posttraumatic stress- avoidance, Posttraumatic stress- Arousal, Posttraumatic stress- total, Sexual concerns, Anxiety, Depression, Dissociation, and Anger/Aggression. The TSCYC also has two validity scales (Briere et al., 2001). The TSCYC has internal consistency (Briere et al., 2001).

The Child PTSD Symptom Scale is a 24-item measure of PTSD symptoms for youth aged 8-18 years (Foa et al., 2001). The Child PTSD Symptom Scale also assesses general functioning. The measure contains three subscales related to PTSD symptoms of reexperiencing, avoidance, and arousal. The Child PTSD Symptoms Scale has internal consistency (Foa et al., 2001).

The Childhood PTSD Interview is a 95-item semi-structured interview based on DSM-IV PTSD symptoms for youth aged 7-18 years (Fletcher, 1996). A parent and child version of the Childhood PTSD Interview is available. The parent version assesses a

parent's perception of PTSD symptoms in his child. In addition to measuring PTSD symptoms, the Childhood PTSD Interview also assesses symptoms of anxiety, depression, self-blame, self-destructive behavior, antisocial behavior, and changed eating behavior. The Childhood PTSD Interview has internal consistency and test-retest reliability (Fletcher, 1996).

The CPTSD-I is a semi-structured interview of PTSD symptoms in youth aged 6-18 years based on DSM-IV criteria (Saigh et al, 2000). The CPTSD-I is divided into five sections and questions correspond to symptom clusters for PTSD identified in DSM-IV-TR. CPTSD-I scores yield 5 potential PTSD diagnoses: PTSD Negative, Acute PTSD, Chronic PTSD, Delayed Onset PTSD, and No Diagnosis. No Diagnosis refers to youth who experience trauma but do not acknowledge it during the interview. The CPTSD-I has internal consistency and test-retest reliability (Saigh et al., 2000).

Treatment of PTSD

Treatment for PTSD may include psychopharmacological, cognitive behavioral, family therapy, and combination treatments. With respect to psychopharmacological treatment of PTSD, selective serotonin reuptake inhibitors (SSRIs) are most effective at reducing PTSD symptoms during acute treatment (Marshall & Rothbaum, 2004). SSRIs are superior to tricyclic compounds (TCAs) and monamine oxidase inhibitors (MAOIs). Although research on the effectiveness of psychopharmacological treatment for PTSD symptoms in youth is limited, SSRIs appear more effective than TCAs and MAOIs at reducing symptoms of trauma in children and adolescents (McKnight et al., 2004).

Cognitive behavioral therapy (CBT) is also effective for PTSD symptoms (Marshall & Rothbaum, 2004; McKnight et al., 2004). The goal of CBT is to change emotional and

behavioral responses that occurred during trauma and generalized to non-threatening situations (Perrin et al., 2004). CBT is effective for adults and youth with PTSD (Cohen & Mannarino, 2004). One component of CBT is recognizing and changing negative and faulty cognitions. Negative and faulty cognitions may include guilt or self-blame for trauma. Relaxation techniques and self-monitoring of anxiety symptoms may be used for PTSD. In-vivo and imaginal exposure are also used in CBT regarding trauma-related stimuli. CBT is more effective for youth with PTSD when parents are involved in treatment (Perrin et al., 2004).

Family support is an important component for resolving PTSD symptoms in children and adolescents (Marshall & Rothbaum, 2004). Family therapy provides a therapeutic environment in which family emotional distress is examined. Family members are encouraged to express emotions and fears openly in family therapy. The therapist and the family discuss these emotions and fears. The therapist and family also discuss PTSD symptoms and triggers in family therapy. In some instances, a multifaceted approach to treatment that includes medication, family therapy, and individual cognitive behavioral therapy is utilized.

Seriously Ill Children and PTSD

Children hospitalized for an acute or chronic condition will experience some degree of psychological distress. If stress is severe, a child may develop posttraumatic stress symptoms or PTSD. Despite being at increased risk for PTSD and other psychological disorders, children admitted to a PICU may underreport psychological symptoms. Seriously ill children may use avoidance or denial as coping strategies to contain negative affect within manageable limits (Davis & Siegel, 2000).

Developmental level will impact the reporting and comprehension of psychological symptoms for ill children. Young children are less likely to understand the life-threatening aspect of a PICU admission. Young children are more likely to focus on each event that occurs in the hospital than older children. Older children are more likely to focus on abstract concepts and understand the life-threatening aspect of the hospital admission. Developmental level also impacts manifestation of trauma symptoms. Younger children are more likely to express trauma through play, while adolescents are more likely to engage in risk-taking behaviors as a form of reenactment (Davis & Siegal, 2000).

Landolt and colleagues (2003) examined children with either a chronic illness or who had experienced a serious accident, as well as their caregivers. Results indicated 11.5% of children scored in the clinical range for posttraumatic stress symptoms 5-6 weeks after the accident or diagnosis. The most common symptoms were intrusive recollections, distress at exposure to cues that resembled the trauma, and acting or feeling the traumatic event was recurring.

Parents of seriously ill and injured children are also an increased risk for PTSD compared to the general population. Landolt and colleagues (2003) found 25% of mothers of children newly diagnosed with type I diabetes met criteria for posttraumatic stress disorder (PTSD), and an additional 50% experienced subclinical symptoms. Subclinical PTSD is two of three DSM-IV PTSD symptom clusters. Mothers of children newly diagnosed with cancer were twice as likely as mothers with children newly diagnosed with diabetes to meet PTSD criteria. Stoppelbein and Greening (2006) examined mothers of children diagnosed with diabetes and cancer 1 year after diagnosis

and found both groups equally vulnerable for PTSD. Clinical interview yielded a 7% prevalence rate for PTSD and 17% with self-report among mothers of children diagnosed with cancer and diabetes. Subclinical symptoms of PTSD were experienced by 25% of mothers in the study. Comparison of the Landolt and colleagues (2003) study with Stoppelbein and Greening's (2006) indicates mothers may better cope with a child's illness after an extended period than during acute stages.

Seriously Ill Children, Caregivers, and Psychopathology

Children admitted to a PICU experiencing a severe chronic or acute illnesses or injury may experience adverse psychological consequences such as anxiety, depression, and PTSD (Caffo & Belaise, 2005; Tarnowski & Brown, 2000). Caregivers of children admitted to a PICU are also at risk for psychopathology (Colville, 2001). In some instances, caregivers are at increased risk for psychopathology relative to their ill child. Caregivers increased risk for psychopathology is particularly relevant for PTSD (Landolt et al., 2003). The specific symptoms children and caregivers experience vary by course of illness as well as specific nature of illness or injury.

Chronic Illness

Children who experience a chronic illness are at higher risk for psychosocial adjustment problems than healthy children (O'Dougherty and Brown, 1990). A chronic health condition is a condition that causes activity limitation and is not curable (National Center for Health Statistics, 2007b). Chronic health conditions may include, but are not limited to, heart disease, asthma, and diabetes. The condition must be present at least three months to be considered chronic. If a child is less than 1 year of age or if the condition is present since birth, the condition is also considered chronic. Chronic illness

impacts many children, however, few report significant limitations as a result of their illness (Hanan, Lohrmann, & Dassen, 2007).

Newacheck and Halfin (1998) conducted a cross-sectional descriptive analysis study on data from the 1991-1994 National Health Interview Survey (NHIS) that included information from 99,513 children under age 18 years. Approximately 6.5 % of children experienced some degree of disability. Some researchers contend that information yielded by the National Health Interview Survey underestimates the number of children suffering from one or more chronic diseases (Lenton, Stallard, Lewis, & Mastroyannopoulou, 2001). Newacheck and Halfin's (1998) results indicated the prevalence of children experiencing limitations in activity increased with age, particularly after age 5 years. Limitation in activity after age 5 years may be related to increased school-related demands on a child. Prevalence of limitations in activity was also higher among African Americans, boys, children in impoverished families, and children in single-parent homes. Chronic conditions caused 39% of childhood activity limitations. Respiratory diseases, primarily asthma, constituted the majority of chronic conditions.

The presence of a chronic disease will impact a child, caregivers, and siblings. A child may have increased visits to physicians and hospitals, school absences, loss of time with peers, and feelings of isolation. Children with disabilities are four times more likely to be hospitalized over the course of a year than children without disabilities (Newacheck & Halfin, 1998). Caregivers are forced to meet the increasing medical demands of their chronically ill child. This may include financial responsibility for medical care and time missed from work. Parental attention being more focused on the ill child at times may also impact siblings.

Lavigne and Faier-Routman (1992) conducted a meta-analysis of 87 studies examining chronic childhood disorders such as asthma, cancer, cardiac conditions, neurological conditions, and diabetes. Children with chronic health problems were at an increased risk for overall adjustment, internalizing, and externalizing problems compared to control children without a disease. Children with sensory and neurological disorders were at greatest risk for psychological problems. Another meta-analysis examined children with chronic health conditions and found them to be at a slightly elevated risk for depressive symptoms (Bennett, 1994). Children with asthma and sickle cell anemia were at greater risk of depression than those with other disorders such as diabetes. Anthony, Gil, and Schanberg (2003) examined parental perceptions of child vulnerability to predict school absences and social anxiety in school age children with rheumatic and pulmonary diseases. Rheumatic and pulmonary diseases are the most common childhood chronic diseases with unpredictable courses and periods of acute illness. Child age negatively correlated with generalized social anxiety, higher physician-rated severity, and more school absences. Parental perceptions of vulnerability positively correlated with child social anxiety.

Pulmonary Disorders

Pulmonary disorders affect or occur within the lungs. According to the National Health Interview Survey that included data for 1991-1994, approximately 12.4% of children with respiratory diseases were hospitalized each year (Newacheck & Halfin, 1998). Respiratory diseases, primarily asthma, constituted the majority of chronic conditions that limited childhood activity. Respiratory conditions impose physical limitations on a child and cause family disruptions.

Nine million children in the U.S. aged 18 years and younger have asthma. Asthma is more prevalent in children of low income families (Dey & Bloom, 2005). Children with asthma often have repeated hospitalizations and use numerous medications. The effects of their condition may include school absences, anxiety, social stigma, and fear of dying by suffocation. Children with asthma in some instances may have a maladaptive coping mechanism of wheezing to express conflict (O'Dougherty & Brown, 1990). A meta-analysis by McQuaid, Kopel, and Nassau (2001) examined 26 studies of children with asthma. Children with asthma had significantly more internalizing and externalizing problems than children without asthma.

Severe complications of asthma are one of the most common reasons for admission to a pediatric intensive care unit. However, a PICU admission may also result from more extreme respiratory disorders. Acute respiratory distress syndrome can result from trauma, pneumonia, sepsis, and other disorders (Kapfhammer, Rothenhausler, Krauseneck, Stoll, & Schelling, 2004). Acute respiratory distress syndrome involves an initial phase in which an immediate threat of death by suffocation initiates an extreme stress reaction (Kapfhammer et al., 2004). This disorder often requires mechanical ventilation. When ventilation is removed, the patient is partially awake and may experience some pain, stress, and anxiety. Anxiety and fear may also result from a breathing apparatus and impaired ability to communicate during intubation (Kapfhammer et al., 2004). Kapfhammer and colleagues (2004) examined 46 adults with acute respiratory distress syndrome. Forty-four percent of the patients had PTSD when dismissed from an intensive care unit. At follow up, a mean of 8 years later, 24% continued to exhibit PTSD. The duration of stay in the intensive care unit positively

correlated with the prevalence of PTSD.

Another less common but serious pulmonary disorder is cystic fibrosis. Cystic fibrosis is a genetic disease that causes dehydration of the mucus in the respiratory tract, resulting in chronic and potentially lethal obstruction of the lungs (Patterson, Budd, Goetz, & Warwick, 1993). Children with cystic fibrosis require daily physical therapy to clear mucus in their chest as well as antibiotic and aerosol treatments (Campbell, 1995). Patterson and colleagues (1993) conducted a 10-year follow up study of 91 patients with cystic fibrosis and their families. Poorer prognosis and pulmonary functioning was found in patients with families emphasizing family member independence. Balanced family coping, in which a family balanced individual needs, family needs, and medical issues, was associated with the best pulmonary functioning in patients. This study illustrates the impact of family functioning on a child. However, consideration of the impact of a child's illness on caregivers and family members is also important.

A child's symptoms and hospitalization in a PICU also impact caregivers and other family members of children with respiratory disorders. Diaz-Caneja and colleagues (2005) examined the psychological outcome of parents with children admitted to a PICU and those admitted to a general care unit. Respiratory problems were the most common reason for admission in both units. Most parents reported symptoms developed suddenly and contributed to an increase in parental anxiety. In children previously admitted for similar symptoms, parents' feelings of anxiety and helplessness were less severe. Parents in a PICU reported more anxiety over separation from their child during hospitalization. After hospitalization, PICU parents were more likely to report feelings of overprotection

or conversely more tolerant of misbehavior. PICU parents were also more likely to report their child as withdrawn, anxious, and difficult to manage post-discharge.

Summary of psychological consequences for children with pulmonary disorders.

Children who experience a severe pulmonary disorder and require hospitalization are at risk for anxiety, fear, and externalizing disorders (McQuaid et al., 2001; O'Dougherty & Brown, 1990). Pulmonary disorders also increase the risk of PTSD in a pediatric patient and their caregivers (Diaz-Caneja et al., 2005; Kapfhammer et al., 2004). Additionally, a child's illness and hospitalization stresses the overall family and increases risk of parental anxiety (Kapfhammer et al., 2004).

Endocrine Disorders

Endocrine disorders affect the endocrine system, which secretes hormones into the bloodstream. The endocrine system consists of the pituitary gland, pineal gland, thyroid gland, parathyroid glands, thymus, adrenal glands, and pancreas (Sandberg & Zurenda, 2006). Endocrine disorders include diabetes mellitus, hypoglycemia, thyroid disorders, adrenal disorders, and pituitary disorders. Children affected by endocrine disorders may experience psychological symptoms from a chronic condition, stress associated with a chronic condition, or treatment related to the disorder (Delamater & Eidson, 1998).

Newacheck and Halfin (1998) reported that in a given year, 36.3% of children with endocrine, metabolic, and blood disorders were hospitalized.

Diabetes encompasses type 1 and type 2 diabetes. In 2006, the U.S. prevalence of diabetes in adults was almost 8%. Prevalence rates increase with age. Adults aged 65 years and older have higher rates of diabetes (National Center for Health Statistics, 2007). Type 1 diabetes mellitus, or insulin dependent diabetes, is an autoimmune disorder

impacting 5-10% of individuals with diabetes in the United States (Levenson, 2006). Type 2 diabetes is related to insulin resistance, a common etiology of obesity, sedentary lifestyle, and diet. Type 2 diabetes impacts approximately 90-95% of individuals with diabetes in the United States (Levenson, 2006). Children with diabetes may have diet restrictions, insulin injections, and hospitalizations for acute episodes. Potential effects of the disease may be struggles with parents over insulin and diet. These struggles may lead to complications with the disease and further need for medical involvement. Most children with type 1 diabetes will become acutely ill and have an increased likelihood of hospitalization in an intensive care unit relative to children with type 2 diabetes (Landolt et al., 2002).

Children with diabetes often struggle with pain over injections. This may lead to anxiety regarding injections and medical visits. Some children with diabetes who have a more extensive knowledge of the disease may have a fear of coma from insulin shock (O'Dougherty & Brown, 1990). Children may also have anxiety over long-term complications from their condition. Depression is 2-3 times more common among individuals with diabetes than the general population (Levenson, 2006). Depression is associated with poor diet, reduced physical activity, increased cortisol, and poor ability to self-monitor, all of which could exacerbate a diabetic condition. When children with diabetes experience depression, symptoms typically diminish within a 6-month period but may recur (Sandberg & Zurenda, 2006).

The development of diabetes in a child may be a traumatizing experience (Landolt et al., 2002). Stressors faced by parents of children with diabetes include episodes of hyperglycemia, hypoglycemia, long term sequelae, and shortened life expectancy of their

child. Parents required to administer treatments that produce stress in their children, such as insulin injections, may experience anxiety and depression. Daily insulin injections may be painful and perceived as a threat to a child's physical well-being. Landolt and colleagues (2002) examined mothers and fathers of 38 children newly diagnosed with type 1 diabetes. Twenty-four percent of mothers and twenty-two percent of fathers met criteria for PTSD. Additionally, 51% of mothers and 42% of fathers met criteria for partial PTSD. Partial PTSD is two of three PTSD symptom clusters. In two families, both parents showed PTSD symptoms simultaneously. Mothers reported slightly numerous and more severe symptoms than fathers. However, differences were not significant. Results indicated, witnessing a chronic illness in a child and participating in a medical regime significantly impacts parents. Additionally, a parent can be traumatized and suffer psychological consequences due to their child's chronic illness.

Less common endocrine disorders include thyroid and adrenal disorders. Hypothyroidism is the most common thyroid disorder (Levenson, 2006). Hypothyroidism is a condition in which the thyroid is underactive and produces an insufficient amount of hormones. Hypothyroidism left untreated in a newborn may lead to mental retardation. Individuals with hypothyroidism may experience depression and cognitive dysfunction at any age related to their chronic condition (Levenson, 2006). A rare but serious adrenal disorder is hyperadrenalism, also known as Cushing's syndrome. Cushing's syndrome is estimated to affect 10-15 million people a year. Less than 10% of new cases a year are children (Keil, Batista, & Stratakis, 2007). The most common cause of Cushing's syndrome in children over age 7 years is an ACTH secreting pituitary adenoma. Children with Cushing's syndrome may exhibit problems with sleep, depression, anxiety,

hypomania, cognitive dysfunction, and psychosis (Keil et al., 2007; Levenson, 2006). Psychological and behavioral problems correlate to endocrine disorders in children. A PICU admission may exacerbate psychological and behavioral problems due to stressful environment, invasive medical procedures, and disturbances to a family unit.

Summary of psychological consequences for children with endocrine disorders.

Children with endocrine disorders may experience various psychological problems, including anxiety and depression (Levenson, 2006; O'Dougherty & Brown, 1990). In youth with endocrine disorders, an anxiety or mood disorder may contribute to poor diet, lack of physical activity, and trouble adhering to a strict medical regimen dictated by their condition (Levenson, 2006). Parents of children with endocrine disorders are also at increased risk for mood and anxiety disorders. Children with endocrine disorders and their parents are also at increased risk for posttraumatic stress disorder (Landolt et al., 2002).

Neurological Disorders

Neurological disorders impact the central nervous system, peripheral nervous system, and/or the autonomic nervous system. The central nervous system is comprised of the brain and spinal cord. The peripheral nervous system is comprised of the peripheral nerves. The autonomic nervous system is comprised of parts located in both central and peripheral nervous systems. The most common neurological disorders in children are epilepsy, cerebral palsy, and muscular dystrophies (O'Dougherty & Brown, 1990).

Epilepsy is a chronic condition involving recurrent seizures (O'Dougherty & Brown, 1990; Rodenburg, Stams, Meijer, Aldenkamp, & Dekovic, 2005). Children often require medication and, in severe cases, brain surgery and hospitalization. The unpredictable and

distressing aspect of seizures can lead to poor quality of life and psychopathology (Rodenburg et al., 2005). Possible psychological impacts of epilepsy include anxiety and fear about unconsciousness, fear of social stigmatization, and heightened dependency on caregivers (O'Dougherty & Brown, 1990).

Children with epilepsy show more psychopathology relative to children in the general population and children with other chronic illness such as asthma and diabetes. Higher prevalence of psychopathology for children with epilepsy indicates that factors specific to the illness and not the chronicity of illness play a role in development of psychopathology (Rodenburg et al., 2005; Rodenburg, Meijer, Dekovic, & Aldenkamp, 2006). Rodenburg and colleagues (2005) conducted a meta-analysis of 46 studies of 2,434 children with epilepsy. Children with epilepsy were at increased risk for psychopathology, particularly externalizing problems, compared to children from the general population. Family factors, specifically those related to quality of parent-child relationship, were strong predictors of child psychopathology in children with epilepsy.

Caplan and colleagues (2004) examined 101 youths with complex partial seizures (CPS) and 102 normal youth. Youth with CPS were at greater risk for psychopathology, cognitive deficits, and linguistic deficits. Youths with CPS were more likely to have a psychiatric diagnosis, Child Behavior Checklist scores in the clinically significant range, and lower IQ scores than normal youth. Verbal IQ scores predicted the presence of a psychiatric diagnosis and CBCL scores in the borderline range/clinical range for the CPS group. Minority status and seizure factors were also predictors of cognitive and linguistic deficits. For children with CPS, verbal IQ may be a key indicator of psychopathology.

Cerebral palsy is a condition that appears in infancy or early childhood and permanently impacts muscle coordination. Abnormalities in portions of the brain that control muscle movement cause cerebral palsy. Children may have cerebral palsy at birth or as the result of brain damage in the first few months or years of life, brain infections such as bacterial meningitis or viral encephalitis, or head injury from a motor vehicle accident, a fall, or abuse. The most common symptoms of cerebral palsy are a lack of muscle coordination when performing voluntary movements (ataxia), stiff or tight muscles, exaggerated reflexes (spasticity), walking with one foot or leg dragging, walking on toes, crouched gait, and muscle tone that is too stiff or floppy (Barlow, Cullen-Powell, & Cheshire, 2006).

Mothers of children with cerebral palsy experience more stressful family relationships and parent-child dynamics compared to mothers of children without disabilities (Barlow et al., 2006). Parents, particularly mothers, report a decrease in social activities and feeling their lives revolve around the care of their child. Predictors of maternal distress include lack of partner support, marital dissatisfaction, and child's disease dissatisfaction (Barlow et al., 2006). One study found 30% of mothers of children with cerebral palsy in the United States had depressive symptoms, which exceeds the general population norm (Manuel, Naughton, Balkrishnan, Paterson, & Koman, 2003). Barlow and colleagues (2006) found mothers of children with cerebral palsy had greater levels of clinically anxious and depressed moods compared to population female norms. Levels of maternal anxiety and perception of child's sleep difficulty were correlated. Sleep difficulties are common among children of normal development but particularly more common among children with disabilities.

Muscular dystrophy is a heterogeneous group of inherited muscle disorders with progressive muscle wasting and weakness associated with different gene mutations. Duchenne muscular dystrophy (DMD) is the most common muscular dystrophy, occurring in 1 in 3500 live male infants (Tsao & Mendell, 2006). In the United States, 12,000 to 20,000 children have DMD (Eng, 1989). DMD is a progressive disability of an early onset that typically impacts males. DMD initially affects muscles of the lower limbs and lumbar spine, gradually worsening and spreading to the upper limbs. Some paralyzed muscles become enlarged and hyperplasia of the interstitial connective tissue in the paralyzed muscles with scarring and adipose tissue deposition occurs in late stages (Eng, 1989). A restrictive lung disease may also accompany DMD, and as the disease progresses muscles of the heart may become impacted.

The psychological aspect of DMD for a parent and child varies with a child's development and progression of the disorder. Toddlers often react with frustration and dependency. Parents may react with shock, disbelief, anger, and grief during this early stage (Eng, 1989). School-aged children aged 5-7 years often react with anger, frustration, misbehavior, and awareness that something is wrong. Mothers during this period generally feel guilty while fathers may exhibit acceptance. During late childhood and early adolescence, children may have difficulty with self-image and show symptoms of depression. Parents may have difficulty coping with daily life, and siblings may feel resentful of the extra attention a child with DMD receives (Eng, 1989; Taso & Mendell, 2006).

During the crisis period, about age 12-20 years, youths with DMD struggle for independence while relying on others. Children with DMD may be in denial about their

terminal condition. Parents at this crisis stage are often physically and emotionally exhausted, exhibiting signs of hopelessness and depression. The terminal stage is the last stage in which a child is likely in the PICU struggling for survival. During the terminal stage, parents grieve for the loss of their child. Parents may also feel relief due to the end of their ongoing emotional struggles and the physical and psychological struggles of their child (Eng, 1989). While this process describes children and parents with DMD, parents and children with other serious chronic illnesses may experience a similar process.

Summary of psychological consequences for children with neurological disorders.

Youth with neurological disorders who present with psychopathology most likely demonstrate symptoms of anxiety and fear (O'Dougherty & Brown, 1990; Rodenburg et al., 2005). Children with neurological conditions may also be at an increased risk for mood disorders relative to the general population (Barlow et al., 2006). Caregivers of children with neurological disorders are also at increased risk for anxiety and mood disorders compared to the general population (Barlow et al., 2006; Manuel et al., 2003).

Oncologic Disorders

Childhood cancer at one time was automatically considered a fatal illness. Advances in medicine have changed the conceptualization of childhood cancer to a life-threatening chronic disease (Varni, Blout, & Quiggins, 1998). Childhood cancer encompasses various malignant diseases involving the uncontrolled proliferation of abnormal cells. The most prevalent forms of pediatric cancer are acute leukemia, brain tumors, Hodgkin's lymphoma, non-Hodgkin's lymphoma, neuroblastoma, soft tissue sarcomas, and bone tumors (Varni, et al., 1998). Each year approximately 11,000 cases of pediatric cancer are newly diagnosed. As the mortality rate declines, approximately one in 1,000 young adults

aged 20-29 years is a survivor of childhood cancer (Varni, et al., 1998).

Leukemia is the most common childhood malignancy, including acute lymphoblastic and nonlymphoblastic forms. Acute lymphoblastic leukemia occurs when a leukemic cell replaces normal marrow. An uncontrolled and exaggerated growth and accumulation of lymphoblasts occur. Production of normal marrow cells ceases, leading to a deficiency of red cells (anemia), platelets (thrombocytopenia), and normal white cells in the blood (Varni et al., 1991).

Cancerous tumors are malignant tumors within the body. The most common pediatric malignant tumors are brain tumors. The prognosis for a brain tumor varies with specific subtype. The five-year survival rate of low grade astrocytomas is approximately 70%, and brain stem tumor survival is between 15-20% (Varni et al., 1998). Other tumors, such as Wilm's tumor (kidney), rhabdomyosarcoma (solid muscle tumor), osteosarcoma (tissue tumor), and Ewing's sarcoma (bone tumor), are less common childhood malignancies.

Lymphoma refers to a group of cancers that originate in the lymphatic system (Phipps, 2006). Lymphomas are a result of an injury to the DNA of a lymphocyte. The damaged DNA in one lymphocyte produces a malignant change that produces uncontrolled and excessive growth of malignant lymphocytes. These cells accumulate and develop into tumor masses in the lymph nodes. Hodgkin's lymphoma usually begins in the lymph nodes in one area of the body and progresses to other areas of the body. The lymphoma then moves into organs including the lungs, liver, bone, and bone marrow. An abnormal cell called the Reed-Sternberg cell, a large malignant cell found in Hodgkin lymphoma tissues, is also present.

As survival rates for pediatric cancer improve, examining psychological and physical needs of children with cancer is a high priority for researchers (Dejong & Fombonne, 2006; Phips, 2006). Early studies examining psychopathology in adult cancer survivors found high rates of depression (Mermelstein & Lesko, 1992). At the time, researchers believed pediatric patients would have similar results to adults. Kashani and Hakami (1982) were one of the first researchers to examine depression in pediatric cancer patients. Their sample consisted of 25 boys and 10 girls aged 6–17 years. Seventeen percent of the sample met DSM-III criteria for major depressive disorder.

Brown and colleagues (1992) used a relatively homogeneous sample of mild to moderate Acute Lymphoblastic Leukaemia (ALL) patients in a cross-sectional design to examine 3 groups of children: at diagnosis (mean age 6 years, 2 months), one year post-diagnosis (mean age 7 years, 11 months), and one year post-treatment (mean age 7 years, 7 months). An increase in depression symptoms was found between the newly diagnosed group and one-year post diagnosis group but did not reach the threshold for diagnosis. Duration of illness and depression has been generally unrelated (Dejong & Fombonne, 2006). However, pessimism and depression are related in cancer patients (Dejong & Fombonne 2006; Schoenherr, Brown, Baldwin, & Kaslow, 1992).

Criteria for major depressive disorder partially rely on evaluating somatic symptoms. Physically ill children may experience somatic symptoms secondary to their illness or treatment, complicating assessment of depression (Dejong & Fombonne, 2006). Fatigue and lethargy are common in children with cancer. Pain, discomfort, and treatment related to illness in addition to fatigue and lethargy may contribute to loss of interest in normal activities. Nausea, loss of appetite, and weight loss are symptoms of depression but are

also associated with chemotherapy, a treatment for children with cancer. The disease process may exacerbate nausea and weight loss associated with chemotherapy. Pediatric cancer-related symptoms as well as treatment side effects can help lower the threshold for diagnosing major depression.

In addition to depression, posttraumatic stress symptoms and posttraumatic stress disorder (PTSD) are associated with pediatric cancer for youth and their caregivers. A cancer patient experiences threat of death, aversive treatments, and hospitalization, contributing to cancer qualifying as a traumatic event that may result in PTSD.

Epidemiological research has found rates of PTSD of 5-24% for adult cancer survivors and 2-20% for pediatric survivors of cancer (Stoppelbein, Greening, & Elking, 2006).

Risk factors for PTSD among childhood cancer survivors include painful treatments such as chemotherapy, time since treatment termination, stressful life events, subjective ratings of treatment intensity, anxiety, parents' level of posttraumatic stress symptomatology, and parents' perceptions of treatment intensity (Stoppelbein et al., 2006).

Parents of pediatric cancer survivors, just as parents of children with many other chronic illnesses, tend to be at a greater risk for posttraumatic stress symptoms than pediatric cancer survivors. Stuber and colleagues (1996) found one-third of parents of childhood cancer survivors had posttraumatic stress symptoms. Kazak and colleagues (1997) found 10% of parents of childhood cancer survivors had severe posttraumatic stress symptoms. Thirty percent of mothers and twenty-one percent of fathers of childhood cancer survivors were within the moderate range of posttraumatic stress symptoms. Risk factors for posttraumatic stress symptoms among parents of pediatric cancer patients include subjective experience, disease-related factors (e.g., intensity of

treatment), stressful life events, family cohesion, social support, perceived constraints about discussing cancer-related issues, and individual differences such as trait anxiety. One of the strongest correlates of PTSD development in pediatric cancer patients and their parents is perceived life threat (Stoppelbein et al., 2006).

Manne and colleagues (2002) examined 90 mothers of children undergoing bone marrow transplant or hematopoietic stem cell transplantation. Anxiety and depression symptoms predicted PTSD symptom severity. A combination of mothers' perceptions of child's risk of death from cancer, potential for suffering, and number and frequency of fears exhibited by the mother prior to the child's bone marrow transplant predicted mother's posttraumatic stress symptoms 6 months after transplant.

With respect to parents of children with cancer, one factor related to psychological distress and potentially posttraumatic stress symptoms is social support (Manne, DuHamel, & Redd, 2000; Wijnberg-Williams, Kamps, Klip, & Hoekstra-Weebers, 2006). Wijnberg-Williams and colleagues (2006) assessed 164 parents (79 fathers, 85 mothers) of pediatric cancer patients for psychological distress related to social support. Parents were assessed at time of diagnosis and 6 months, 12 months, and 5 years post-diagnosis. Psychological distress decreased over time for mothers and fathers of pediatric cancer patients. The amount of supportive interactions also significantly decreased over time, particularly from diagnosis to 5 years later. Mothers received more social support over time than fathers. Amount of social support did not impact amount of distress fathers exhibited. For fathers, predictive factors of long-term psychological distress were dissatisfaction with support at diagnosis and negative interactions at diagnosis. This study provides valuable information because relatively limited information is available in

pediatric health research regarding fathers.

Summary of psychological consequences for children with oncologic disorders.

Pediatric cancer patients are at risk for developing psychopathology, especially major depressive disorder (Kashani & Hakami, 1982; Mermelstein & Lesko, 1992; Schoenherr et al., 1992). Pediatric cancer patients are also at risk for posttraumatic stress symptoms (Stoppelbein et al., 2006). Parents of children with oncologic disorders are at increased risk for depression, anxiety, and posttraumatic stress symptoms (Manne et al., 2006; Stoppelbein et al., 2006; Stuber et al., 1996).

Acute Illness

An acute health condition is an illness or injury that lasts less than 3 months and is serious enough to impact one's behavior (National Center for Health Statistics, 2007a). Most children with acute health conditions require general care by a physician, in an emergency room, or in the general unit of a hospital. Less than 1% of children with acute illnesses require specialized care in a PICU or pediatric trauma unit (Durch & Lohr, 1993). Children with acute illnesses are generally admitted to a PICU on an emergency basis. A pediatric trauma unit provides specialized services, including surgical teams, for youth who have suffered severe trauma. Examples of acute health conditions that may necessitate admission to a PICU include pneumonia and other temporary respiratory illnesses, post-operative recovery, various infections such as meningococcal disease, severe trauma, and burns.

The presence of an acute health condition or illness creates stress for a child and their family. A child may experience physical pain from the illness, psychological reactions such as fear and anger, and altered personal relationships and daily routines (Lemanek &

Koontz, 1999). Parents and medical providers report that children with acute illness demonstrate internalizing behaviors such as withdrawal while ill (Carey, 1992).

Externalizing behaviors, such as defiance of authority figures, may also be present in children with acute health conditions.

Families of a child with an acute illness may also experience stress. This may include financial burden of treatment expenses, anxiety related to separation from their child, marital conflict, and parental depression (Lemanek & Koontz, 1999). Parents may also exhibit fear, anxiety, anger, and sadness with respect to their child's acute illness (Carey, 1992). A child's acute illness may also impact parental relationship with a child. Parents may show greater leniency of child behavior, or conversely, more restricted activity during an acute illness or condition (Lemanek & Koontz, 1999).

Post-Operative Care

Children who undergo surgical procedures often require post-operative care in a hospital. Serious procedures such as organ transplants and cardiothoracic surgery may necessitate recovery in a PICU. The amount of distress a child experiences when undergoing an operation is not based solely on invasive medical procedures. Rather, the amount of distress experienced is a complex interrelationship between child age, parental anxiety, coping skills of a child, intensity of the operation, and controllability of the medical event (Melamed, 1998). The child may experience distress at separation from family and friends for surgery. Unfamiliar surroundings as well as physical pain from an operation may result in child anxiety (Melamed, 1998). Lumley, Melamed, and Abeles (1993) found children with a difficult temperament or a tendency to withdraw during stressful situations responded more negatively during anesthesia for surgery compared to

children with easy temperaments who did not withdraw during stressful situations.

Developmental factors impact the stress experienced by children recovering from a surgical procedure. Younger children, particularly those under age 5 years, may be more prone to anxiety about separation from parents and caregivers during hospitalization and surgical procedures compared to older children and adolescents. Younger children also have less knowledge of hospital procedures and surroundings, which may lead to fear of immediate events such as injections. Older children, who have more knowledge of procedures and surroundings, may fear long-term consequences such as disfigurement (Melamed, 1998).

Organ transplant surgery is a complicated procedure that can have a serious physical and psychological impact. Acceptance for an organ transplant by physicians does not guarantee survival. Potential organ recipients generally must wait for an organ. Mortality rates for patients on organ waiting lists are as high as 20-25% (Thompson, DiGirolamo, & Mallory, 1996). Additional stressors for youth undergoing organ transplants include medical complications, possible rejection of the organ, and a strict medication regimen to avoid organ rejection. Adolescent age and female sex increase risk of poor adjustment to illness and transplantation (Sexson & Rubenow, 1992; Stuber, 1993).

Mintzer (2001) examined 104 adolescent liver, heart, and kidney transplant recipients. The main goal of the study was to examine the prevalence of PTSD among adolescent organ transplant recipients. Some (34%) of the sample met criteria for full PTSD and had symptoms occurring at least twice each month. A smaller percentage of the sample (14%) met full criteria and had symptoms occurring at least six times each month. Avoidance symptoms were the most prevalent and severe compared to arousal

and reexperiencing symptoms. Hispanic ethnicity increased odds of being classified with full PTSD symptoms, though this was found to be only a trend. Youths' worst memories during hospitalization were analyzed. Most worst moments centered on the transplant hospitalization and the theme of bodily harm.

Thompson and colleagues (1996) examined 45 children and adolescents with a mean age of 12.4 years who were undergoing a lung transplant. Youth who underwent a lung transplant had a range of pulmonary conditions including cystic fibrosis, pulmonary hypertension, and pulmonary fibrosis. One child in the sample was in the clinically significant range for depression. No youth scored in the significant range on a self-report for total behavior problems and internalizing symptoms. One child's scores were in the significant range for externalizing symptoms. With respect to parental reports of child behavior, one child's scores were in the borderline range for total score, two were in the borderline range for internalizing symptoms and none were significant for externalizing symptoms. Eight mothers (21%) and four fathers (14%) scored in the clinically significant range for global psychological distress. Parents of lung transplant youth exhibited more psychological distress than youth who underwent a transplant.

Summary of psychological consequences for children with post-operative care.

Children who undergo serious operations that require PICU admission, such as organ transplants, are at risk for psychological consequences such as PTSD (Mintzer, 2001). Some youth may also experience symptoms of depression and externalizing symptoms. Parents are likely to experience a higher level of psychological distress than their child (Thompson et al., 1996). Parents of children undergoing transplant surgeries are at

greater risk for anxiety and mood disorder symptoms than children undergoing surgical procedures.

Meningococcal Disease

Meningococcal disease is a severe illness most common in young children and has an acute onset. Meningococcal disease is a life threatening bacterial infection that can spread throughout the bloodstream and cause meningitis. If meningococcal disease is associated with septic shock, the disease may be life threatening and require hospitalization in an intensive care unit. The progression of the illness is typically rapid with a child progressing from full health to critical illness in hours (Shears, Nadel, Gledhill, & Garralda, 2005). An increasing number of children are admitted to pediatric intensive care units with this condition. Most children make a full medical and neurological recovery. However, the nature of the illness and a PICU stay has an emotional and biological impact on a child as well as parents (Shears et al., 2005).

Judge and colleagues (2002) conducted a pilot study of children treated in a pediatric intensive care unit for meningococcal disease. Children and mothers had high rates of psychiatric symptoms, specifically PTSD symptoms. Ten percent of children had PTSD symptoms and fifty percent of mothers had PTSD symptoms. This study failed to assess premorbid functioning, which impacts risk of PTSD.

Shears and colleagues (2005) examined 60 children admitted to a pediatric intensive care and general pediatric units for meningococcal disease as well as 60 mothers and 45 fathers. Based on parental report, children admitted to a PICU but not a general pediatric unit showed increased emotionality and hyperactivity. Mothers in the PICU group, but not fathers, exhibited significantly higher distress than parents in the general unit group.

Psychopathology may be higher in mothers of children admitted to a PICU as women tend to react to stress with emotional release (Shears et al., 2005). Number of days in the hospital was associated with maternal and paternal PTSD.

Summary of psychological consequences for children with meningococcal disease. Children with meningococcal disease are at increased risk for PTSD symptoms (Judge et al., 2002). These children may also be at risk for other behavioral and psychological consequences such as increased hyperactivity and emotional reactivity (Shears et al., 2005). Parents of children with meningococcal disease are also at increased risk for PTSD (Judge et al., 2002). Mothers of children with this disorder also report an overall higher level of distress than mothers in the general population.

Severe Traumatic Injury

Injury is defined by the National Center for Injury Prevention and Control (1989, p. 4) as "unintentional or intentional damage to the body resulting from acute exposure to thermal, mechanical, electrical, or chemical energy or from the absence of such essentials as heat or oxygen." In some instances, traumatic injury is distinguished from a broader class of injuries by excluding near-drowning and poisoning injuries (Durch & Lohr, 1993). Motor vehicle crashes account for the greatest number of childhood injuries (Zink & McCain, 2002). Unintentional injuries are the leading cause of death among children over the age of 1 year (Durch & Lohr, 1993). In 2001, unintentional injuries led to 45% of deaths in children aged 3-18 years. Non-fatal unintentional injuries led to over 7.5 million emergency room visits (National Center for Injury Prevention and Control, 2006).

The National Hospital Discharge Survey, with data from 1990, indicated injury was associated with 468,000 hospitalizations among children under age 15 years (National

Center for Health Statistics, 1992). The same survey with data from 2006, indicated 211,000 youth under the age of 15 years were hospitalized for injury related illnesses (National Center for Health Statistics, 2008). According to the National Highway and Traffic Safety Administration (NHTSA) (2005), in 2004, 42,636 individuals were killed in the United States and 2,788,000 were injured in motor vehicle accidents. Five-hundred and ten children aged 0-3 years and 487 children aged 4-7 years were killed in motor vehicle accidents, representing an increase from the previous year. In 2004, 1,608 children aged 8-15 years were killed in motor vehicle accidents and 44,000 children aged 0-3 years were injured in motor vehicles. Sixty thousand children aged 4-7 years and 178,000 children aged 8-15 years were injured in motor vehicle accidents. Overall, over 3 million Americans are injured in motor vehicle accidents in the United States each year (Jones-Alexander, Blanchard, & Hickling, 2005).

At all ages, males are more likely to die from injuries than females. Injuries associated with motor vehicles account for the largest number of deaths. The specific motor vehicle risks, however, vary with age. Children aged 1-4 years die in about equal numbers as pedestrians and as motor vehicle occupants, while 5-9 year-olds are more likely to die as pedestrians. Deaths of older children are more likely to occur as occupants of motor vehicles (Children's Safety Network, 1991).

Severe injury is associated with psychiatric problems post-injury in adults and youth (Aaron, Zagul, & Emery, 1999; Kassam-Adams, Garcia-Espana, Fein, & Winston, 2005; Vasa et al., 2002). Anxiety symptoms and disorders are the most commonly experienced disorders after a severe trauma, including posttraumatic stress symptoms and posttraumatic stress disorder. Vasa and colleagues (2002) found a statistically significant

increase in mean number of anxiety symptoms after a closed head injury compared to number of anxiety symptoms prior to injury. One year after injury, many children experienced anxiety symptoms unrelated to the traumatic event. The most frequent anxiety symptoms were, in order, overanxious symptoms, obsessive compulsive symptoms, separation anxiety symptoms, and specific phobia symptoms. Younger age at injury correlated with post-injury anxiety symptoms. Posttraumatic stress symptoms are a common reaction in youth who have sustained injury (Aaron et al., 1999; Kassam et al., 2005). Injury, preinjury psychiatry morbidity, and psychosocial adversity are risk factors that contribute to development of psychiatric disorders (Vasa et al., 2002).

The relationship between heart rate in the first hours and days after a traumatic event and subsequent development of posttraumatic stress symptoms in adults and children has been a subject of interest for some researchers. The interaction of physiological and psychological factors is a growing area in pediatric research. A challenge in examining physiological and psychological relationships in children is the varying resting heart rates of children. Resting heart rates are higher in younger children and decrease in early adolescence (Kassam-Adams et al., 2005). Researchers examining heart rate and PTSD generally focus on one age group because of varying heart rates in youth. Another challenge is the injury a child sustains, or medication received to treat the injury, may impact heart rate.

Kassam-Adams and colleagues (2005) examined 190 children aged 8-17 years admitted to a pediatric trauma center for traffic-related injuries. Thirty-two percent of children had an elevated heart rate at triage. Eleven percent of children were classified with partial PTSD and 6% had full PTSD. At three months post-injury, children and

adolescents in the partial and full PTSD groups had a higher heart rate at triage than the non-PTSD group. Twenty-eight percent of children with an elevated heart rate met criteria for partial or full PTSD at follow-up. Elevated heart rate predicted partial or full PTSD. Children with elevated heart rate were more likely to meet symptoms of hyperarousal than reexperiencing or avoidance.

Jones-Alexander and colleagues (2005) also examined physiological responses and psychological symptoms in youth who had experienced a severe trauma. Participants were 21 children and adolescents who had been in a motor vehicle accident and 14 matched controls. Heart rate, blood pressure, and skin conductance were measured during mental arithmetic and visual imaging exercises. The visual imaging exercise required the participant to imagine a motor vehicle accident while listening to an audiotape of an accident. Eight youth met criteria for PTSD and reported significantly more subjective distress to an audiotape of a motor vehicle accident than those without PTSD and the control group. Significant differences existed in physiological responses among the groups to the stimuli, including stimuli to provoke memories of trauma.

Other researches have examined the prevalence of posttraumatic stress symptoms and PTSD after severe trauma. Zink and McCain (2002) examined 143 children and adolescents who suffered unintentional motor-vehicle related injury and were subsequently hospitalized. At 2 months post-injury 18% of the children and adolescents met criteria for PTSD. In children with PTSD, a significant increase in behavioral problem scores on the CBCL from pre- to post-injury was reported. Results indicated no significant differences in behavioral problem scores from pre- to post-injury for children without PTSD.

Aaron and colleagues (1999) examined 40 children admitted to a pediatric intensive care unit and general pediatric unit after a physical injury. Some (22.5%) participants met diagnostic criteria for PTSD. Additionally, CBCL Internalizing scores were associated with PTSD symptomatology. Children with more pretrauma internalizing behavior, as reported by a parent, experienced greater peritrauma fear response. Child-reported peritrauma fear and life threat and child-reported thought suppression correlated with PTSD symptoms. A child's tendency to suppress thoughts and feelings, as related to injury, was strongly associated to manifested symptoms of PTSD a month after injury.

Summary of psychological consequences for children with severe traumatic injury. Children who experience a severe trauma are at an increased risk for psychopathology. Youth who do experience psychological consequences after a trauma often experience anxiety, including separation anxiety, specific phobia, and posttraumatic stress disorder (Aaron et al., 1999; Kassam et al., 2005; Vasa et al., 2002). Factors associated with development of psychopathology in youth after an injury include pre-injury psychological functioning, psychosocial adversity, perception of life-threat of injury, and physiological responses such as heart rate (Jones-Alexander et al., 2005; Kassam-Adams et al., 2005; Vasa et al., 2002).

Burns

Half of the two million people who suffer from burn injuries each year in the United States are children (Saxe, et al. 2005). Fire and burn injuries are the third leading cause of death in children in the United States (Saxe et al., 2005). The American Burn Association (2006) compiled information from 70 American burn centers from 1995-2005. The most commonly reported burn etiologies were flame burns and scalds. Hot liquids and vapors

or boiling tap water represented about 30% of injuries. Children under age 2 years were particularly vulnerable to scald injuries, accounting for 28% of those injuries and 70% of all reported injuries. Infants accounted for 10% of all burns, and 32% of hospital admissions for burns were for patients under age 20 years. The average hospital stay was nine days and the average ICU stay was 3 days. Additionally, average days on a ventilator were 2. Criteria for a pediatric hospitalization require burns with greater than 15% total burn surface area (TBSA), inhalation injury, high tension electrical burn, suspicion of abuse or neglect, or inadequate home environment for a child to be admitted (Chedekel et al., 1998).

Due to recent medical advances, survival rates for burn patients have increased. Increased survival rates have led to increased focus on psychological aspects of burn injury and survival (Sgroi, Willebrand, Ekselis, Gerdin, & Andersson, 2005). Twenty-five years ago, less than half of children with 50 percent or greater TBSA burns survived. Now, over 50 percent of those with 85 percent TBSA burns and almost all those with smaller burns survive. Children with burns may develop mood, anxiety, sleep, conduct, learning, and attention problems. Only 20-30% of pediatric burn survivors demonstrate moderate to severe behavioral problems. However, a lack of overt psychopathology does not mean a child with a burn has an easy adjustment. The most common psychological diagnoses in burn patients are anxiety disorders, including social phobia and separation anxiety (Meyer et al., 1995).

Burned children often attract unwanted attention from others. Unwanted attention is unlikely to stop, making a child's coping abilities important in the development of psychopathology (Rose & Blakeney, 2006). Stigmatization has three likely effects on

people who have a difference in appearance: poor body-esteem, social isolation, and violation of privacy. A violation of privacy occurs when the child receives unwanted attention because of their appearance (Bull & Rumsey, 1988). Although attention focused on a child with health problems may intend to be positive, a child may feel people are intrusive. A child may also feel he is losing privacy as people can see he is ill or different based on physical characteristics. This theory is particularly relevant for children with burns.

Children and adolescents who are rejected or neglected by peers often report social anxiety. Burned children also report lower self-esteem than children without burns. A serious illness or accident that changes a child's physical appearance may increase peer rejection and social anxiety. Social anxiety is related to coping abilities and the stigmatization or attention received related to a burn (Rose & Blakeney, 2006). Coping abilities are impacted by developmental age of a child.

Developmental stage is an important factor in a child's coping ability with respect to pain and accompanying psychological distress (Chedekel et al., 1998). Infants may become withdrawn, irritable, and have sleep and appetite disturbances when in pain or distressed. Preschool children may regress, become needy, have nightmares, and become anxious when exhibiting pain or emotional distress (Garrison & McQuiston, 1989). Toddlers and children in early childhood normally experience separation anxiety when separated from caregivers and are apprehensive of strangers. A hospital setting may feel like punishment and produce anxiety as the child is removed from caregivers and surrounded by strangers.

Latency-age children may exhibit hyperactivity, nightmares, regression, demandingness, depression, and anxiety when experiencing pain and emotional distress. School-age children may act out, becoming aggressive and defying authority. Eating disturbances and body image issues after a burn may also become problematic for school age children. Adolescents may experience the same symptoms as latency age children and exhibit verbal and/or physical aggression when experiencing pain and emotional distress. Additionally, adolescents may have a lack of motivation and hopelessness after an injury. An adolescent may lose drive for future prospects, which increases risk for depression and suicidal ideation. Fears of rejection and anxiety over appearance are also concerns (Chedekel et al., 1998).

Difficulty with pain is common among burn patients. Pain is a subjective experience that arises from brain activity in response to bodily injury, disease, or biochemical changes (McGrath & Vair, 1984). Many physical and psychological factors can impact pain (Chedekel et al, 1998; McGrath & Vair, 1984). Physical factors that may impact pain include type and location of damage to the body, differences in pain threshold and tolerance, medication, electrical stimulation, and physical stimulation such as heat, cold, pressure, and electrical stimulation. Psychological factors include perception of what is causing the pain, previous experience with pain and reinforcement, the age and sex of the child, the reaction of others to the pain, anxiety, depression, and cultural and familial strategies observed to address pain.

In addition to a burn being a source of pain, treatment may be physically and psychologically painful for a child. Emotional distress and anxiety is often associated with pain (Chedekel et al., 1998). The changing of burn dressings for many children

becomes associated with pain and anxiety. Burn-related pain is likely to produce significant levels of anxiety in those hospitalized for burns. Many children will experience anticipatory anxiety before their dressing changes. Anticipatory anxiety is the anticipation of pain and can impact the level of physical discomfort and pain. The anxiety can be more intense than the physical pain. The combination of fear, anxiety, and pain can be very intense.

Assessment of pain in children may be difficult due to limited language or a child's inability to be verbally expressive because of pain. In some children, the only indicator of pain is behavior. Pain is often marked in children by crying, irritability, grimacing and/or a reduction in play or other pleasurable activities (McGrath & Vair, 1984). In instances of limited verbal expressiveness, a visual analogue scale may be used to reveal pain severity (McGrath & Vair, 1984). These scales have a list of numbers, generally 0-10, with 0 indicating no pain and 10 indicating the highest level of pain. The age of the child will impact the child's understanding and ability to deal rationally with pain (McGrath & Vair, 1984).

Burns are generally unexpected and very painful for children. During the critical stage of a burn injury, patients are faced with the stressors of pain, a hospital environment, separation from family and friends, and potentially a struggle for survival (Ehde et al., 2000). During the initial critical stages after a burn, patients may experience confusion, delirium, and psychotic reactions. During acute stages of a burn injury, after the critical periods have passed, a patient is more aware of the physical and psychological consequences of their injury and is likely undergoing painful treatments (Weichman & Patterson, 2004). During acute stages, depression and anxiety are common among burn

patients undergoing painful treatments. Premorbid mood disorders and female gender are associated with increased risk of psychopathology in burn patients. Stressor characteristics that occur during or after the burn injury include a patient's feelings regarding responsibility of the injury and duration of hospitalization (Rose & Blakeney, 2006).

Rose and Blakeney (2006) examined the long-term outcome of 101 survivors of childhood burns. The subjects differed significantly from the nonclinical reference group in several psychological and emotional areas. Burned males reported more somatic complaints than non-burned males. Burned females reported more somatic complaints, withdrawal, thought problems, aggression, and anger than non-burned females. Females had greater impairment than males.

According to Pitman (1989), during a traumatic event such as a burn, the body is in a hyperadrenergic state which is responsible for consolidation of traumatic memories in those who develop a traumatic stress response. Re-release of catecholamines and stress hormones that further enhance the traumatic memory occurs when a traumatic event is recalled. Saxe and colleagues (2005) examined 72 children admitted to a hospital for an acute burn. One-third of participants met DSM-IV criteria for acute stress disorder (ASD). Parents' symptoms of ASD, child's mean pulse rate, and a child's body image accounted for 41% of the variance. Heart rate was also an index of noradrenergic activity associated with posttraumatic stress disorder.

In youth with burn injuries, 25-33% develop PTSD and over 50% display some PTSD symptoms. Rates of PTSD in individuals with burn injuries vary due to methodological differences. The prevalence rates generally vary from 19-45% (Baur, Hardy, & Van

Dorsten, 1998; Ehde, Patterson, Wiechman, & Wilson, 2000; Madianos, Papaghelis, Ionnovich, & Dafni, 2001). PTSD symptoms do not appear to be associated with burn severity. Children hospitalized with burns with PTSD symptoms may have nightmares, flashbacks, regression, and posttraumatic play (Saxe et al., 2005).

Subjective perception of life threat is a strong predictor of long-term psychopathology in burn and trauma victims (Wiechman & Patterson, 2004). Willebrand and colleagues (2004) found subjective life threat during the burn incident predictive of PTSD symptoms of intrusion and arousal. Dissociation experiences are also related to poorer psychological outcome at discharge. Subjective life threat and dissociation are key features of acute stress disorder, a risk factor for later development of PTSD (Wiechman & Patterson, 2004). Panic symptoms during a trauma are related to acute stress disorder (Bryant & Panasetis, 2001).

Van Loey and colleagues (2003) examined 301 patients aged 16-70 years admitted to a burn center. The study was a prospective longitudinal cohort design that assessed participants 1, 2, and 3 weeks following injury and subsequently every 8 weeks. Twenty-five percent of participants developed severe stress reactions 2-3 weeks following initial burn injury. One year post-injury, 15% of participants had severe posttraumatic stress symptoms. Initial anxiety and dissociation predicted the development of posttraumatic stress symptoms. The impact of peritraumatic anxiety on posttraumatic stress significantly diminished over time. Contrary to most burn literature, female gender, hand injuries, and extent of injury predicted posttraumatic stress symptoms. Female gender is, however, a risk factor for posttraumatic stress.

Saxe and colleagues (2005) examined 72 children admitted for an acute burn during

hospitalization and 3 months after discharge. A path analytic strategy was conducted and two pathways to PTSD symptoms were found. One pathway was mediated by separation anxiety and the other by acute dissociative responses. The magnitude of trauma (size of burn) was unrelated to PTSD directly. The pathway mediated by separation anxiety was influenced by acute pain response. The pathway was also influenced by size of the burn and inversely related to child age. The pathway mediated by dissociative response was influenced only by the size of the burn. In this study, a child's level of acute separation anxiety was related to PTSD symptoms. PTSD symptoms were also influenced by child age, size of the burn, and degree of pain experienced.

Coping styles used previously, particularly in traumatic experiences, are important for developing and maintaining PTSD (Wiechman & Patterson, 2004). Coping styles, such as avoidance of trauma reminders and thought suppression, may contribute to the development of PTSD. Maladaptive coping may also contribute to the development of depression. A ruminating coping style in which a child is preoccupied with negative thoughts or feelings may increase risk of depression. The coping strategies used will vary depending on situation and environment. The strategies a child or adolescent utilizes in the hospital may be different than those used after discharge due to different challenges. Coping strategies habitually used have a stronger impact than those used in isolated incidents. A coping strategy is habitual if it is used in several situations across time.

Willebrand and colleagues (2004) found adult burn patients that primarily use avoidant coping strategies were at increased risk for psychological problems 3 months after a burn. Psychological outcomes included increased symptoms of anxiety and depression as well as avoidance of reminders of the burn compared to participants with

other coping strategies. The avoidant coping style was the most important coping variable in predicting poor psychological health.

The most important factor for pediatric burn survivors is family support (Blakeney, Portman, & Rutan, 1990). Another important factor for adolescents is peer support. Support from family and friends becomes important for youth burn survivors as self-worth appears to be adequate within these contexts. Outside of family and friend networks, burn survivors often express poorer self-esteem, anxiety, and withdrawal. Burn survivors have more social and emotional long-term impairments such as unhappiness with appearance, social anxiety, social discomfort, and problems with coping compared to physical impairments.

Summary of psychological consequences for children with burns. Pediatric burn patients are at risk for various psychological disorders, including PTSD, social anxiety, separation anxiety and mood disorder symptoms (Chedekel et al., 1998; Meyer et al., 1995; Rose & Blakeney, 2006; Saxe et al., 2005; Van Loey et al., 2003). Parents of pediatric burn patients are at increased risk for psychopathology. Parents of burn patients are at risk for anxiety symptoms and trauma symptomatology (Van Loey et al., 2003; Chedekel et al., 1998). Family environment may play a role in the development of psychopathology in burn survivors, serving as a protective or risk factor depending on the environment (Blakeney et al., 1990).

Purpose of the Study

Research studies concerning psychopathology and pediatric intensive care unit admissions are increasing. However, a paucity of literature exists regarding children's experiences in a PICU relative to caregivers' experiences (Board & Ryan-Wenger, 2003;

Diaz-Caneja et al., 2005; Rennick et al., 2002). Most research on children and families admitted to the PICU focus on the development of PTSD during and after admission (Rennick et al., 2002). Although PTSD is one of the most prevalent disorders among seriously ill or injured children, PICU hospitalized children are also at risk for other anxiety disorders and depression (Colville, 2001). Current studies primarily focus on the relationship between one disorder (i.e., PTSD) and hospitalization in a PICU.

Limited research is available on the relationship of acute stress disorder and a PICU admission in children and caregivers (Daviss et al., 2000; March, 2003; McKnight et al., 2004). The developmental path of ASD is unclear, though ASD may be a predictor of PTSD symptoms (Birmes et al., 1999; Burleson et al., 2000). Factors that mediate and contribute to the relationship between ASD and PTSD are unknown due to limited research on the topic (March, 2003). Further research is needed into factors that mediate the relationship between ASD and PTSD in PICU admitted children and their caregivers.

Children admitted to a PICU and their caregivers are at risk for various anxiety disorders. Anxiety disorders commonly identified in seriously ill children include separation anxiety disorder, generalized anxiety disorder, specific phobia, acute stress disorder, and posttraumatic stress disorder. Caregivers of seriously ill children are at increased risk of generalized anxiety disorder, acute stress disorder, and posttraumatic stress disorder (Rennick et al., 2002; Shemesh et al., 2003; Thapar & Rice, 2006). Many researchers fail to use methodology that adequately measures all disorders PICU admitted children and their caregivers may have.

Researchers that have examined children's experiences in a PICU generally focused on specific populations such as burn or cancer patients, limiting generalizability

(Chedekel et al., 1998; Dejong & Fombonne, 2006; Stoppelbein et al., 2006). Populations of most PICUs consist of children with various conditions. Research examining children's experience in intensive care should use samples representative of overall PICU populations.

Children that develop psychopathology following a PICU admission are likely to be older, have a history of anxiety and depressive disorders, and family dysfunction (Green, 1994). To develop greater understanding of psychological consequences of a PICU admission on children and caregivers, studies examining risk and resilience variables and potential mediating variables are needed. Many factors need to be considered when examining the impact of a PICU admission on children and their caregivers. Disease, personal, familiar, and medical factors will determine adjustment to hospitalization and should be examined (O'Dougherty & Brown, 1990).

The current study examined the presence of relevant psychopathology in youth and aimed to expand current literature on PICU admissions in children. Risk and resilience factors, particularly the contribution of family environment, were examined in the development of psychopathology in youth and caregivers. Methodology used to assess anxiety examined the presence of disorders which the child or caregiver was at an increased risk. The current study also examined mediating variables in the relationship of ASD and PTSD in children admitted to a PICU and their caregivers.

Hypotheses

This study examined trauma symptomatology related to pediatric intensive care unit admissions. The assessment of PTSD, ASD, and other anxiety and mood disorder symptoms was conducted in pediatric patients and their parents. Contributing factors to

the development of psychopathology was examined, including comorbid psychopathology, prior psychopathology, family factors, and demographic variables. Variables related to posttraumatic stress disorder, acute stress disorder, and other anxiety and mood disorder symptoms in the general population of a pediatric intensive care unit and their caregivers were examined. The current study also examined mediating factors between acute stress disorder and posttraumatic stress disorder.

The first hypotheses was parental psychopathology, specifically symptoms of anxiety, depression, and ASD, would mediate the relationship between (1) youth ASD symptoms during PICU admission and (2) the development of PTSD symptoms 4-7 weeks after discharge from the PICU. It was hypothesized a proportion of youth with ASD symptoms would develop PTSD symptoms 4-7 weeks after PICU discharge. However, it was theorized this relationship was mediated by levels of parental anxiety, depression, and ASD. This hypothesis was based on numerous studies supporting the relationship between parental psychopathology and the development of trauma symptomatology (Amaya-Jackson & March, 1995; Burleson, et al., 2000; Davis & Seigel, 2000; Pynoos, 1994; Stuber et al., 1996; Shemesh & Saxe, 2003).

The second hypotheses was a child's psychological functioning prior to admission, specifically symptoms of anxiety and depression, would mediate the relationship between (1) youth ASD symptoms during PICU admission and (2) the development of PTSD symptoms 4-7 weeks after discharge from the PICU. Some youth were theorized to continue to demonstrate trauma symptoms 4-7 weeks after discharge from the PICU and develop PTSD symptoms. This relationship was hypothesized to be mediated by the child's levels of anxiety and depression. This hypothesis was based on studies supporting

the relationship between prior child psychopathology and the development of trauma symptomatology (Burlison et al., 2000; Davis & Siegel, 2000; Pynoos, 2004).

The third hypothesis was that parental psychopathology, specifically symptoms of anxiety and depression, would mediate the relationship between (1) parental ASD symptoms during their child's PICU admission and (2) the development of PTSD symptoms 4-7 weeks after their child is discharged from the PICU. A proportion of parents of children admitted to the PICU with ASD symptoms were theorized to develop PTSD symptomatology. This relationship, however, was hypothesized to be mediated by symptoms of anxiety and depression. This hypothesis was based on studies supporting the relationship between previous psychopathology and the development of trauma symptomatology (Burlison et al., 2000; Davis & Siegel, 2000; Marshall & Rothbaum, 2004; Pynoos, 1994; Pynoos, 2004).

The fourth hypothesis was that family environment impacted symptoms of psychopathology in both the youth and the caregiver. Specifically, control and conflict were hypothesized to be positively correlated with symptoms of depression and anxiety. With respect to cohesion and expressiveness a negative relationship was hypothesized. A relationship between independence and the symptoms of depression and anxiety was also hypothesized. This hypothesis was based on studies supporting the relationship between family environment and psychopathology (Blakeney et al., 1990; Chorpita et al., 1996; Crawford & Manassis, 2001; Lemanek & Koontz, 1990; Lonigan et al., 1994; Patterson et al., 1993; Youngblut & Lauzon, 1995).

Numerous studies indicated negative family environment contribute to psychopathology in children and adults. This is particularly true in pediatric patients and

their caregivers (Chorpita et al., 1996; Patterson et al., 1993; Youngblut & Lauzon, 1995). Higher levels of conflict in families is associated with increased psychopathology (Blakeney et al., 1990; Lemanek & Koontz, 1990). Higher levels of control have also been associated with increased levels of anxiety and depression (Chorpita et al., 1996; Crawford & Manassis, 2001). Additionally, negative relationships with cohesions and levels of psychopathology have been identified in children admitted to PICUs and their caregivers (Youngblut & Lauzon, 1995). In some families with a seriously ill child and too much independence, a decrease of medical compliance and an increase in psychopathology is found (Patterson et al., 1993). Other areas of trauma research report that low levels of independence may lead to increases in psychopathology (Alexander & Shaeffer, 1994).

CHAPTER 3

METHODOLOGY

Participants

Participants were 53 children (and their caregivers) admitted to a pediatric intensive care unit (PICU) at University Medical Center (UMC) in Las Vegas, Nevada. Children were ineligible to participate if younger than age 8 or older than age 17 years, if severe head trauma was present, and if they could not read, write, and speak English. UMC provides the only Level 1 trauma and burn center in southern Nevada. As a Level 1 trauma center, UMC provides specialized services, equipment, and staff to all hospitals caring for burned and otherwise severely injured patients in the region.

Youths were 29 males and 24 females aged 8-17 years ($M=12.1$, $SD=2.8$). Parents were 34 females and 19 males aged 27-53 years ($M=39.0$, $SD=7.2$). Parents identified ethnicity as European-American (54.7%), Hispanic (18.9%), African-American (15.1%), Asian (7.5%), or Other (3.8%). Ethnicity of participants by gender is presented in Tables I and II. Parents were currently married (71.7%), divorced (13.2%), never married (9.4%), or separated (5.7%). Parents had graduated high school (32.1%), graduated college (30.2%), attended some college (18.9%), attended graduate school (11.3%), or attended some high school (7.5%). The primary language spoken in the home was English (92%), Spanish (4%), French (2%), or other (2%). Average annual income ranged from \$20,000-\$130,000 ($M=44,707.55$, $SD=26,721.76$). Participant income was

generally lower than the average income reported by the United States Census Bureau (2007) for Nevada residents (\$51,036). Children of lower socioeconomic families often represent a disproportionate number of patients in PICUs (Naclerio et al., 1999).

A UMC PICU physician reported the primary reason for admission to the PICU: respiratory illness/asthma (28.3%), trauma (26.4%), surgery and post-surgery recovery (18.9%), other (11.3%), infection (7.5%), or virus (7.5%). Youth were assessed in the PICU when in stable condition 2-17 days after admission ($M=4.9$, $SD=2.8$). Youth were discharged from the PICU 5-25 days after admission ($M=8.3$, $SD=4.2$).

Measures

Child Measures

Simplified Therapeutic Scoring System (TISS 28) (Reis, de Rijk, & Schaufeli, 1996).

The TISS 28 consists of 28 items completed by medical personnel (i.e., nurse or physician). Items are scored based on degree of medical effort required for a patient. A total TISS 28 score is calculated by adding the sum of all items. The total possible score is 79, with higher scores indicating a greater degree of medical intervention and medical time needed to address a patient's needs. Kwok, Chau, Low, and Thompson (2005) found the TISS 28 to have acceptable content validity and high construct validity and intrarater reliability. The TISS 28 was utilized in this study to measure severity of youth illness or injury during their PICU assessment.

The Children's Depression Inventory (CDI) (Kovacs, 1992). The Children's Depression Inventory is a 27-item self-report questionnaire for children and adolescents aged 7-17 years. The instrument covers a range of depressive symptoms, including disturbed mood, low self-evaluation, hopelessness, and difficulties in interpersonal

behaviors. Items are scored as 0 (absence of a symptom), 1 (mild symptom), or 2 (definite symptom), with higher scores indicating greater severity. The total scale score ranges from 0-54. The CDI yields scores for five subscales: negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem. The negative mood subscale reflects feeling sad, feeling like crying, worrying about bad things, being upset, and indecision. The interpersonal problems subscale reflects difficulties interacting with people, social avoidance, and social isolation. The ineffectiveness subscale reflects negative evaluation of one's ability and school performance. The anhedonia subscale reflects "endogenous depression," which includes impaired ability to experience pleasure, loss of energy, problems sleeping and with appetite, and sense of isolation. The negative self-esteem subscale reflects low self-esteem, self-dislike, feelings of being unloved, and thoughts of suicide (Kovacs, 1992).

Kovacs (1992) reported coefficients of .71-.89 that indicated good internal consistency for the CDI. Kovacs (1985) found similar results for a heterogeneous, psychiatric referred sample of children (.86), a pediatric-medical outpatient group (.71), and a large sample of public school students (.87). Smucker and colleagues (1986) also examined reliability of the CDI. Among youths (594 males, 658 females) aged 8-16 years ($M = 11.67$), internal consistency reliability in the form of coefficient alphas was .83-.89.

Finch, Saylor, Edwards, and McIntosh (1987) administered the CDI at 2-, 4-, and 6-week intervals to 108 children aged 7-12 years. Test-retest correlation coefficients ranged from .66-.88, indicating adequate test-retest reliability. Smucker and colleagues (1986) found 3-week coefficients to be .74-.77 for fifth grade females and males (Smucker, Craighead, & Craighead, & Green, 1986).

Carey and colleagues (1987) examined construct and discriminant validity of the CDI among clinical inpatients and matched nonreferred participants (N = 306) aged 9-17 years (M = 13.9 years). CDI factor scores reliably discriminated clinical and nonreferred participants. The authors noted that the CDI misclassified many youths who had conduct disorder, however.

Liss, Phares, and Liljequist (2001) found discriminant validity for the CDI among 521 inpatient youths aged 7-17 years (M = 13.9). Youth were administered the CDI and significant differences were found among diagnostic groups. Groups included youth with depression, youth with depression and symptoms of aggression, and youth with aggression only. The depressive group reported the highest level of symptoms (M= 19.2), followed by the depressive and aggressive group (M = 15.7) and the aggressive group (M= 14.6).

Children's PTSD Inventory (CPTSD-I) (Saigh, 1997). The CPTSD-I is a semi-structured interview for youths aged 6-18 years to assess for PTSD symptoms based on DSM-IV/DSM-IV-TR criteria (Saigh, Yasik, Oberfield, et al., 2000; Ippen & Alley, 2005). The CPTSD-I is divided into five sections, and questions correspond to symptom clusters for PTSD identified in DSM-IV-TR. The first section consists of four questions regarding potential exposure to traumatic incidents and four questions regarding reactivity during stress exposure. The second section has 11 questions that examine presence or absence of reexperiencing symptoms. The third section consists of 16 items involving avoidance and numbing symptoms. The fourth section has seven questions denoting increased arousal. The fifth section has five questions examining significant distress or functional impairment (Saigh, 2004). The assessment of youth with no trauma

history is 5 minutes, but those with more complex trauma histories require 20 minutes (Ippen & Alley, 2005).

CPTSD-I items are scored on a dichotomous scale of “1” for presence and “0” for absence of a particular symptom (Saigh, et al., 2000). CPTSD-I scores yield 5 potential diagnoses pertaining to PTSD: PTSD Negative, Acute PTSD, Chronic PTSD, Delayed Onset PTSD, and No Diagnosis. Content validity of the CPTSD-I was established when three members of the DSM-IV PTSD Work Group independently rated CPTSD-I items for correspondence with DSM-IV PTSD criteria on a 0-100 Likert-type scale with 0 the lowest correspondence, 50 average correspondence, and 100 highest correspondence (Saigh et al., 2000). The situational reactivity subtest had a mean rating of 86.7 with a standard deviation of 10. The exposure, avoidance and numbing, increased arousal, and significant impairment subtests each had a mean rating of 90 with a standard deviation of 0. These ratings reflect high levels of concurrence between CPTSD-I and DSM-IV criteria.

Saigh and colleagues (2000) administered the CPTSD-I to 82 traumatized or stress-exposed and 22 untraumatized or non-stress-exposed youth at Bellevue Hospital. Participants included 53 males and 51 females with a mean age of 13.8 years. Internal consistency estimates at the subtest level ranged from moderate to high with Cronbach alphas of .53-.89. A high estimate of internal consistency at the diagnostic level had a Cronbach alpha of .95.

Interrater reliability of the CPTSD-I as measured by Saigh and colleagues (2000) at the diagnostic level was in the excellent range with a Cohen’s kappa of .96. Subtests of the CPTSD-I were also in the excellent range, with kappa coefficients of .84-1.00. The

Situational Reactivity subtest was an exception and yielded an interrater reliability kappa coefficient of .66.

With respect to test-retest reliability, Saigh and colleagues (2000) obtained excellent estimates at the diagnostic level with 97.6% agreement. A kappa coefficient of .91 was obtained. Excellent estimates of test-retest reliability were also evident at the subtest level, with the exception of the significant impairment subtest, with kappas of .78-1.00. The Significant Impairment subtest yielded a kappa of .66.

Validity of the CPTSD-I was assessed by Yasik and colleagues (2001) by comparing the CPTSD-I to three criterion measures. A high correspondence between the criterion measures and the CPTSD-I was found. Pearson product-moment correlation coefficients with the CPTSD-I were obtained for diagnostic efficiency and ranged from .93-.95 with the Diagnostic Interview for Children and Adolescents-Revised PTSD module (DICA-R) (Reich, Leacock, & Shanfeld, 1994), Structured Clinical Interview for DSM PTSD module (SCID) (First, Gibbon, Williams, & Spitzer, 1996), and clinician-derived diagnoses. High to moderate sensitivity (.91-1.00), specificity (.90-.97), diagnostic efficiency (.92-.95), and positive (.68-.94) and negative (.95-1.00) predictive power were found across the criterion measures.

Convergent and discriminant validity were also examined by Yasik and colleagues (2001) via the Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1985), Children's Depression Inventory (CDI) (Kovacs, 1992), Junior Eysenck Personality Inventory (JEPI) (Eysenck, 1963) and parent version of the Child Behavior Checklist (CBCL) (Achenbach, 1991; Yasik et al., 2001). Significant correlations were found with the RCMAS ($r=.7$) and CDI ($r=.7$), indicating convergent

validity with variables associated with PTSD. The Children's PTSD Inventory did not significantly correlate with the JEPI Extraversion scale, which yielded evidence for discriminant validity.

Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, & Conners, 1997). The MASC is a 39-item self-report multidimensional assessment of anxiety in children and adolescents aged 8-19 years. The MASC examines physical symptoms, harm avoidance, social anxiety, and separation/panic (March, 1998; March, Parker, Sullivan, Stallings, & Conners, 1997). The MASC assesses anxiety through four main factors, three of which have two subfactors: physical symptoms (tense/somatic), social anxiety (humiliation fears/performance fears), harm avoidance (perfectionism/anxious coping), and separation anxiety.

March and colleagues (1997) examined the MASC's internal consistency among 374 youth aged 8-17 years. Good internal consistency was found for the total scale for males (n= 178) and females (n= 188) and 12 who did not indicate gender (coefficient alpha of .90). Internal consistency of the MASC with respect to gender yielded comparable scores. Coefficient alpha for the total scale was .87 for males and .89 for females. Internal consistency with respect to individual scales and subfactors with the combined sample yielded adequate to good internal consistency with coefficient alphas of .60-.85.

Rynn and colleagues (2006) examined the internal consistency of the MASC among 193 youth with depression and anxiety. Mean age of the youth with depression (n= 77) was 13.5 years and mean age of those with anxiety (n= 116) was 12.2 years. There was good internal consistency for the total MASC scale with a Cronbach alpha of .87. There

was also good internal consistency indicated for MASC subscales, with Cronbach's alpha of .72-.86.

March and colleagues (1997) examined test-retest reliability of the MASC among 24 youth aged 8-16 years. Correlation coefficient for a three-week interval for the total MASC score was .79, indicating good test-retest reliability. Test-retest reliability was also examined at the subtest level. With the exception of the harm avoidance subscale, with a correlation coefficient of .34, remaining scales displayed correlation coefficients of .51-.84. The mean correlation coefficient for a three-month interval for the total MASC score was .93, indicating good test-retest reliability. Three-month test-retest reliability at the subtest level indicated good reliability, with correlation coefficients of .70-.93.

Convergent validity of the MASC was demonstrated by March and colleagues (1997) among 24 youth aged 8-16 years. The criterion measure was the Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Paget, 1981). MASC scores significantly correlated with RCMAS scores ($r = .60$), indicating adequate convergent validity. Subscales of the MASC also significantly correlated with the RCMAS, with the exception of the harm avoidance subscale, with correlation coefficients of .43-.71. With respect to discriminant validity, MASC scores compared to respondent scores on the Children's Depression Inventory (CDI) (Kovacs, 1985) and parents' scores on the Abbreviated Symptoms Questionnaire (ASQ) (Conners, 1995). The MASC did not significantly correlate with the CDI or the ASQ, indicating an ability to distinguish between anxiety, depression, and hyperactivity.

Rynn and colleagues (2006) examined convergent validity of the MASC among depressed and anxious youth. Criterion measures were the RCMAS, State Trait Anxiety Inventory for Children (STAIC) (Spielberger, 1973), and Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown & Steer, 1988). The MASC positively correlated with all criterion measures and demonstrated adequate convergent validity with correlation coefficients of .60-.69. With respect to discriminant validity, the MASC compared to measures of depression to determine if the instrument could discriminate depressed and anxious respondents. MASC scores did not significantly correlate with scores on the Hamilton Anxiety Rating Scale. In addition, the correlation coefficient was lower for the Child Depression Inventory than the anxiety measures, lending some support for discriminant validity.

Subjective experience. A measurement of subjective experience was obtained via a modified version of the dental fear thermometer (Francis & Stanley, 1989). Despite research indicating that analogue scales are reliable and valid, few studies have examined specific thermometer scales for reliability and validity. The dental fear thermometer, however, is one thermometer analogue scale for fear and anxiety that has been examined.

The dental fear thermometer is a visual analogue scale with anchor points of 0 and 100. Zero represents no fear or anxiety and 100 represents the most fear or anxiety possible in the situation. The child imagines the thermometer represents their fear of the dental situation. The child indicates the amount of fear or anxiety experienced in the dental situation by marking an 'x' on the scale within the thermometer.

Francis and Stanley (1989) examined the psychometric properties of the dental fear thermometer in 57 dental patients. The dental thermometer had 2-month test-retest

reliability of .78. Correlation with the Dental Anxiety Scale (Corah, Gale, and Illig, 1978) was .61, demonstrating convergent validity.

The modification involved changing instructions of the instrument to reflect the hospital environment and not a dental environment. The instructions were as follows: “Imagine this is a thermometer of your fear. Please indicate the amount of fear or anxiety you have experienced today in the hospital by marking an ‘x’ on the scale within the thermometer.”

Caregiver Measures

A background survey administered to the caregiver collected demographic information such as gender, age, and ethnicity of the caregiver and child (see Appendix I). The demographic/information sheet solicited information on gender, age, and race/ethnicity of both the caregiver and child. The parent marital status, family religious participation, and youth religiosity were also solicited. Demographic/information questions also concerned family size and fluent and primary languages spoken in the home. A UMC physician also completed a portion on the survey indicating the primary reason for the child’s PICU visit, days in the PICU, and other information regarding their medical care.

Acute Stress Disorder Scale (ASDS) (Bryant, Moulds, & Guthrie, 2000). The ASDS is a 19-item self-report inventory based on DSM-IV criteria to assess for acute stress disorder symptoms and predict posttraumatic stress disorder in adults. Five ASDS items relate to dissociation, 4 to reexperiencing, 4 to avoidance, and the remaining 6 to arousal. The ASDS asks respondents if they experienced a recent traumatic experience. The ASDS then asks respondents to rate 19 questions on a 1 (Not at all) to 5 (Very much)

scale. Research suggests using a cutoff score of 56 to determine acute stress disorder (Bryant et al., 2000).

Bryant and colleagues (2000) examined 107 adult survivors of a fire with a mean age of 38.6 years. Good internal consistency was found with a Cohen alpha coefficient of .96 for the ASDS total score. With respect to specific clusters, good internal consistency was obtained with alpha levels of .84-.93. Test-retest reliability over 2-7 days was .94. Test-retest correlation coefficients for specific clusters were .89-.94, indicating good test-retest reliability.

Bryant and colleagues (2000) examined 99 adults with a mean age of 31.6 years after accidents or assaults. ASDS scores correlated with the intrusion and avoidance subscales of the Impact of Event Scale with correlations of .81 and .87. These results indicate convergent validity.

Beck Depression Inventory-II (BDI-II) (Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report inventory based on DSM-IV criteria to assess symptoms of depression in persons aged 13-80 years. Each item has four statements about a specific symptom of depression. The respondent chooses the statement that best describes the way she felt the previous two weeks.

Storch, Roberti, and Roth (2004) examined the psychometric properties of the BDI-II in 414 undergraduate college students. Good internal consistency was found with a Cohen alpha coefficient of .90 for the BDI-II total scale. Convergent validity was also demonstrated when the BDI-II total score correlated significantly with the depression factor of the State-Trait Inventory-Trait Version ($r = .76$).

Osman, Downs, Barrios, Kopper, Gutierrez, and Chiros (1997) examined psychometric properties of the BDI-II in 230 young adults aged 17-25 years. Reliability estimates for the total BDI-II score resulted in an alpha coefficient of .90, similar to the high alpha index reported in the BDI-II manual (Beck, Steer, & Brown, 1996).

Multidimensional Anxiety Questionnaire (MAQ) (Reynolds, 1999). The MAQ is a 40-item self-report measure that assesses anxiety symptoms in the previous month (Reynolds, 1999). The MAQ is used for adults aged 18-89 years. The MAQ contains four subscales: physiological-panic, social-phobia, worry-fears, and negative affectivity. The MAQ demonstrated good internal consistency for the overall scale with a Cohen alpha coefficient of .96. Coefficients for the subscales are .88-91. The MAQ also demonstrated test-retest reliability for the overall scale (.95) and individual subscales, with correlation coefficients of .90-.93. Additionally, the MAQ demonstrated convergent validity, correlating highly with the Hamilton Anxiety Scale Clinical Interview ($r = .90$) (Reynolds, 1999).

Child Behavior Checklist (CBCL/6-18) (Achenbach & Rescorla, 2001). The CBCL/6-18 is a 113-item rating scale for parents of children aged 6-18 years along 8 factors: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attentions problems, rule-breaking behavior, and aggressive behavior. Two broadband factors, internalizing and externalizing, are included in the CBCL/6-18. The 8 general factors and 2 broadband factors of the CBCL/6-18 were derived during the development of previous versions of the checklist and further refined for the current version and supported through confirmatory factor analyses (Achenbach 1993; Achenbach & Rescorla, 2001). Each item is rated by the caregiver as 0 (not true in the

past 6 months), 1 (somewhat or sometimes true), or 2 (very true or often true). The CBCL also includes a “competency” component where parents rate the quantity and quality of recreational (e.g., sports), social (e.g., peer relationships) and academic (e.g., grades) performances.

Achenbach and Rescorla (2001) provided psychometric properties of the CBCL/6-18. The CBCL/6-18 demonstrates internal consistency for competence and problem scales. The alphas for the competence scales were .63-.79. With respect to the problem scales, alphas were .72-.97. The total problems scale had an alpha of .97 and the Internalizing broadband factor had an alpha of .90.

Achenbach and Rescorla (2001) also examined test-retest reliability over 8 days. With respect to the competence scales, Pearson correlations were .82-.93. The Pearson correlations for the problem scales were .82-.94. With respect to content validity, items discriminated significantly between referred (i.e., seeking mental health resources) and nonreferred children (Achenbach & Rescorla, 2000, pp. 109).

Construct validity of the CBCL/6-18 was examined by Achenbach and Rescorla (2001). Correlations of the CBCL/6-18 problem scales with the DSM-IV checklist, DSM-IV diagnosis, Conners Rating Scales (Conner, 1997), and the Behavior Assessment System for Children (Reynolds & Kamphaus, 1992) were conducted. Correlations of the scales with the DSM-IV checklist were .43-.80. Notably, the correlation for the CBCL Anxiety Problems score and the DSM-IV checklist was .43. Correlations of the scales with DSM-IV diagnosis were .27-.60. Correlations with the Conners Scales were .71-.80. Correlations with the Behavior Assessment System for Children were .79-.89. The

CBCL/6-18 demonstrated higher correlation with instruments similar in construction and administration and demonstrates construct validity.

Child Stress Disorders Checklist (CSDC) (Saxe, 1997). The CSDC is a 36-item observer response instrument to measure symptoms of acute stress disorder (ASD) and posttraumatic stress disorder (PTSD) in youth aged 7-18 years. The observer is typically a caregiver or someone familiar with the child's behavior. The CSDC consists of 1 traumatic event item, 5 immediate response items, and 30 symptom items. The 30 symptom items cover symptoms of ASD and PTSD and generate scores on 5 subscales that correspond with DSM-IV symptom groups for ASD and PTSD: reexperiencing (7 items), avoidance (5 items), numbing and dissociation (8 items), increased arousal (6 items), and impairment in functioning (4 items). The CSDC total score is the sum of ratings on the 30 symptom items (Saxe et al., 2003). Each symptom is rated on a 3-point scale (0 = "not true," 1 = "somewhat true," 2 = "very true").

Saxe and colleagues (2003) examined the psychometric properties of the CSDC among 84 youth who experienced a severe burn or traffic crash. The internal consistency for the sample as a whole (.84), youth with burns (.83), and those in a traffic crash (.86) was good. The test-retest reliability with a testing period of 2 days was .84. The test-retest correlations between subscales, .63-.89, indicated adequate test-retest reliability. Scores on the CSDS, as reported by parents, were significantly correlated with the PTSD scale of the CBCL ($r = .49$).

Family Environment Scale (FES) (Moos, 1974; Moos & Moos; 1994). The FES is a 90-item yes/no self-report questionnaire of family environment dimensions. The FES has ten subscales, comprised of nine items each. Three subscales examine an interpersonal

dimension (cohesion, expressiveness, and conflict), 5 subscales assess a personal growth dimension (independence, achievement, intellectual-cultural, active-recreational orientation, and moral-religious) and 2 subscales assess a maintenance dimension (organization and control).

Moos and Moos (1981) contended the FES has content and face validity as they carefully defined their constructs, selected items conceptually related to the 10 dimensions, and obtained data from 285 families, including a group of African-American and Hispanic families. Furthermore, the FES has internal consistency and test-retest reliability. Items met specified criteria for scale construction, and subscales had internal consistencies of .64-.79. Test-rest reliabilities were .68-.86.

Roosa and Beals (1990) studied the internal consistency of 5 FES subscales by administering the FES to 311 stressed and 74 control families with only one adult. Respondents were primarily middle-class females with some college education, leading to questions about the homogeneity of the sample versus the diverse sample examined by Moos and Moos (1980). Roosa and Beals reported that their reliability coefficients were lower than those Moos and Moos reported and the authors questioned the validity of the FES subscales.

Moos (1990) emphasized that Roosa and Beals studied a homogeneous population and used factor analytic techniques to develop circumscribed but highly internally consistent dimensions. Moos (1990) maintained that the FES has acceptable levels of construct, concurrent, and predictive validity as evidenced by the measures' wide use in various situations. The FES is used in situations such as adaptation to pregnancy and parenthood, childhood and adolescent adjustment to parental divorce, adjustment among

families of psychiatric and medical patients, and treatment outcomes for patients with alcoholism, depression, and other disorders (Peleg-Popko & Klingman, 2002; Perry, Harris, & Minnes, 2005; Sanford, Bingham, & Zucker, 1999).

Perosa and Perosa (1990) examined convergent and discriminant validity of the FES. The sample included 183 participants, 85 of whom were high school seniors and 98 were undergraduates with a majority aged 17-19 years. Convergent validity was examined by comparing respondents' scores on the FES to scores on the Family Assessment Device (FAD) (Epstein, Baldwin, & Bishop, 1982), the Structural Family Interaction Scale, Revised (SFIS-R) (Perosa & Perosa, 1987), and Family Adaptability and Cohesion Evaluation Scale (Faces III) (Olson, Portner, and Bell, 1982). Scores on FES scales correlated significantly with scales on criterion measures (.64-.89). Discriminant validity measures were uncorrelated to scores on FES scales. Internal consistency estimates from the cohesion scale of the FES were .88, which were in the excellent range.

Perosa and Perosa (1990) assessed discriminant validity of the FES by examining the cohesion and adaptability scales within the FES. The FES scales of cohesion (COH) and control (CON) had a correlation of .28. The relationship between cohesion and adaptability scales among measures was also examined. The relationship between the FES COH scale and the FACES III ADAP (L) scale was -.23. Scales measuring cohesion and adaptability should not be highly correlated because they measure dissimilar concepts.

PTSD Checklist (PCL) (Weathers et al., 1993). The PCL is a 17-item inventory that assesses for specific symptoms of posttraumatic stress disorder (PTSD). Several versions of the PTSD Checklist are available, including the PCL-C (Civilian), PCL-S (Specific),

and PCL-M (Military). The PCL-C, designed for civilians, is not focused on specific traumatic events. The PCL-M examines problems in response to "stressful military experiences." The PCL-S evaluates problems relating to an identified "stressful experience" (Orsillo, 2001). The version used in this study was the PCL-C, the most appropriate for the population. Respondents rate on a 1 (not at all) to 5 (extremely) scale how severely the situation described in the statement impacted him or her. This measure assesses for the presence of PTSD and asks how the individual has been bothered in the past month. The author suggests the time frame is modifiable to accommodate goals of the assessment (i.e., acute stress disorder). For research purposes, for a diagnosis of PTSD a cutoff score of 50 is suggested (Weathers, Litz, Herman, Huska, & Keane, 1993).

Weathers and colleagues (1993) examined the psychometric properties of the PCL. Test-retest reliability was .96 over an unspecified the time interval. Validity was indicated by a Cohen's kappa coefficient of .63 for diagnosis of PTSD from the Structured Clinical Interview for DSM-III-R (SCID) (Spitzer, Williams, Gibbon, & First, 1990). The results were obtained from 123 male Vietnam veterans. Weathers and colleagues (1993) investigated the internal consistency of the three symptom clusters of PTSD on the PCL. Alpha values were .89-.92, which were in the excellent range. The authors did not provide data on individual items. Weathers and colleagues' examined the PCL-S or specific version, so caution should be used in generalizing the results to the military or civilian version.

Blanchard and colleagues (1996) examined the correlation of the total PCL score with the Clinician-Administered PTSD Scale (CAPS) (Blake et al., 1990). Blanchard and colleagues (1996) used the recommended cutoff score and found an overall diagnostic

efficiency of .82. When the cutoff score was lowered, diagnostic efficiency increased to .90. The internal consistency coefficient or Cronbach's alpha for the total scale was .93. Pearson's r was also calculated for PCL individual item scores and CAPS scores. All items correlated significantly with CAP scores. Scores were in the moderate range, with the exception of the hypervigilant and psychogenic amnesia item, with scores of .57-.79. The hypervigilant item had a Pearson's r of .39 and psychogenic amnesia had an r of .48. The results overall indicated convergent validity of the PCL as a brief screening tool for PTSD.

Smith, Redd, DuHamel, Vickberg, and Ricketts (1999) specifically examined the validity of the PCL-C among 111 adults who had undergone bone marrow transplant. The mean age of participants was 39.3 years and the gender of participants was divided evenly. Smith and colleagues examined the reliability of the PCL-C and calculated Pearson product-moment correlations among PCL-C subscales. The internal consistency of the subscales was also assessed. The three subscales were strongly intercorrelated: .60 for intrusion and avoidance, .53 for intrusion and arousal, and .94 for arousal and avoidance. Alpha coefficients for internal consistency were in the excellent range for the subscales and total scale (.74-.89). However, internal consistency coefficients on the PCL-C subscales were lower than those reported by Weathers et al. (1993) for the PCL-M subscales. This discrepancy may reflect a difference in reaction to traumatic environments as opposed to active combat exposure. Differences in internal consistency may also be attributable to items themselves. The PCL-C items, as written, may be less accurate descriptors of trauma reactions and may evoke less reliable responses (McDowell & Newell, 1987).

Procedure

The study occurred in two phases. The first phase involved assessing the child and caregiver during the child's pediatric intensive care unit (PICU) stay. A PICU physician notified the caregiver of the research opportunity when the child was in stable condition. Recruitment of participants and administration of assessment protocols did not occur while children were in critical condition. Caregivers that expressed interest in the research opportunity were contacted within 1-3 days after notification of the opportunity to participate by the researcher and given details of the study. Upon consent, caregivers and children completed initial assessment measures of acute stress disorder, mood and anxiety disorders, and other psychopathology. Procedures followed UNLV and UMC policies regarding research with human subjects.

The child was administered the CDI and MASC as well as a modified version of the dental fear thermometer. The subjective experience measure was administered daily for 3 days to obtain an average of the ratings. A researcher was available to answer questions a child had regarding word meaning or question content. A UMC physician completed severity of illness, length of PICU admission, and primary diagnosis information.

Caregivers were administered a background survey, the CBCL, CSDS, ASDS, BDI-II, MAQ, and FES while their child was in the PICU. The researcher or a research assistant was available to answer questions regarding item content. Contact information was obtained from participants and coded with participant number for contacting purposes for the second phase of the study. Following the child's discharge from the PICU, a UMC physician completed the portion on the background survey regarding the child's medical information as well as the TISS 28.

Three family units completed only the PICU assessment measures. Those who did not complete the second portion were 3 female parents and 2 male youths and 1 female youth. The mean age for parents with incomplete assessments was 45.0 years and, for youth, 13.3 years. Family units with incomplete assessments identified themselves as African-American, Caucasian, and Other. Four family units were ineligible due to limited English proficiency and 2 declined to participate. An additional 4 female adolescents approached regarding participation declined to receive information regarding the study. Complete demographic information was not available on those families or adolescents that did not participate as they did not complete a background survey.

The second phase of this study involved re-assessment 4-7 weeks post-PICU assessment. Caregivers were reminded of the upcoming follow-up appointment by letter and/or email at 3-week post PICU assessment. This reminder stated the importance of the study and availability of the researcher to accommodate the caregiver's schedule and/or location. At the end of the third week, attempts to schedule a follow-up appointment began. If contact was not made after 4 weeks post-PICU assessment, voicemails were left. A letter or email notice was sent to caregivers at the end of the fifth week if contact was still not possible. Removal from the study and mailing of a debriefing form occurred after a lack of contact at the end of 8 weeks. The debriefing form included a list of available resources in the community to seek psychological assistance in case the child or a family member experienced psychological consequences from the traumatic event. Three family units were removed from the study during the second phase after caregivers could not be contacted after 8 weeks.

In the second phase, caregivers were administered the CBCL, FES, BDI-II, MAQ, and PCL-C. Youth were administered the CDI, MASC, and CPTSD-I. After parents and youth completed all measures, they were debriefed and a list of resources was given to the caregiver. The list outlined resources in the community to seek psychological assistance in the event the child or a family member experienced psychological consequences. The list of resources included sliding-scale, insurance, and Medicaid facilities.

Data Analyses

General Comparisons

Paired sample t-tests were used to examine differences between PICU assessment and post-PICU assessment (4-7 weeks later) depression and anxiety symptoms in youth and parents. Independent samples t-tests were used to examine differences in levels of anxiety and depression between male and female youth. Independent samples t-tests were also used to examine differences in levels of anxiety, depression, and PTSD symptoms among male and female caregivers.

Pearson correlational analyses were used to examine the relationship between caregiver age and PTSD symptoms. Pearson correlational analyses also examined the relationship among youth and caregiver psychopathology. Analyses were conducted to examine the relationship between youth and caregiver anxiety; caregiver ASD symptoms and youth anxiety, depression, and PTSD symptoms; youth ASD symptoms and caregiver anxiety, depression, and PTSD symptoms. Pearson correlational analyses examined the relationship between youth's subjective experience and ASD symptoms and PTSD symptoms. Linear and logistic regression analyses were also conducted to

examine the relationship between hypothesized mediators (anxiety, depression), independent variables (ASD symptomatology: CSDS scores, ASDS scores), and the dependent variable (PTSD symptomatology: CPTSD-I scores, PCL-C scores).

Hypothesis One

The first hypothesis was that symptoms of parental anxiety and depression would mediate the relationship between (1) youth ASD symptoms during PICU assessment and (2) the development of PTSD symptoms 4-7 weeks post-PICU assessment. To address this hypothesis, two mediation models were tested (see Table III). The first model tested determined if parental anxiety and depression, as measured by total scores on the MAQ and BDI-II, were significant mediators in the relationship between youth ASD symptoms and youth PTSD symptoms. The second model tested determined if specific aspects of parental anxiety, as measured by MAQ subscale scores, were a significant mediator in the relationship between youth ASD symptoms and youth PTSD symptoms. Increased youth ASD symptoms were expected to contribute to increased youth PTSD symptomatology. Parental anxiety and depression were hypothesized mediators in this model. An analytical approach recommended by Baron and Kenny (1986) was used to examine the hypothesized mediational model (see below).

Hypothesis Two

The second hypothesis was that youth symptoms of anxiety and depression would mediate the relationship between (1) youth ASD symptoms during PICU assessment and (2) the development of PTSD symptoms 4-7 weeks post-PICU assessment. To address this hypothesis, three mediational models were tested (see Table III). The first model tested determined if youth anxiety and depression, as measured by total scores on the

MASC and CDI, were significant mediators in the relationship between youth ASD symptoms and youth PTSD symptoms. The second model tested determined if specific symptoms of youth anxiety and depression, as measured by MASC and CDI subscale scores, were a significant mediator in the relationship between youth ASD symptoms and youth PTSD symptoms. The third model tested determined if youth anxiety and depression, as measured by CBCL scores, were a significant mediator in the relationship between youth ASD symptoms and youth PTSD symptoms. Increased youth ASD symptoms were expected to contribute to increased youth PTSD symptomatology. Youth anxiety and depression were hypothesized mediators in this model. An analytical approach recommended by Baron and Kenny (1986) was used to examine the hypothesized mediational model (see below).

Hypothesis Three

The third hypothesis was that parental anxiety and depression would mediate the relationship between (1) parental ASD symptoms during their child's PICU assessment and (2) the development of PTSD symptoms 4-7 weeks post-PICU assessment. To address this hypothesis, two mediations models were tested (see Table III). The first model tested determined if parental anxiety and depression, as measured by total scores on the MAQ BDI-II, were significant mediators in the relationship between parental ASD symptoms and parental PTSD symptoms. The second model tested determined if specific aspects of parental anxiety, as measured by MAQ subscales, were a significant mediator in the relationship between parental ASD symptoms and parental PTSD symptoms. Increased parental ASD symptoms were expected to contribute to increased parental PTSD symptomatology. Parental anxiety and depression were hypothesized mediators in

this model. An analytical approach recommended by Baron and Kenny (1986) was used to examine the hypothesized mediational model (see below).

Hypothesis Four

The fourth hypothesis was that family environment was related to symptoms of psychopathology in youth and caregivers. Higher levels of family control and conflict were expected to correlate with higher levels of youth and/or caregiver anxiety and depression. Lower levels of family cohesion and expression were expected to correlate with lower levels of youth and/or caregiver anxiety and depression. A relationship between independence and symptoms of depression and anxiety was also hypothesized. Pearson's r was used to examine the relationship between each family environment factor and symptoms of depression and anxiety. A large number of correlational analyses were necessary to examine hypothesis four. Alpha levels were not adjusted to correct for Type I error as the likelihood of Type II would likely increase. Instead, correlations were only interpreted as significant at alpha .01.

Mediation Analyses

The Baron and Kenny (1986) approach to mediation utilizes multiple regression, logistic regression, and linear regression analyses. Linear regression and logistic equations examined the paths of the independent variable (A), mediator (B), and dependent variable (C). The prediction of continuous dependent variables utilized linear regression and the prediction of dichotomous dependent variables utilized logistic regression. The first test examined the independent variable-dependent variable (A→C) path. If significance occurred, an additional test examined the independent variable-mediator (A→B) path with the mediator acting as the criterion variable. If this path

demonstrated significance, the $(A + B) \rightarrow (C)$ path was examined for significance using Sobel calculations. Results were considered consistent with a mediation model if they fulfilled the following steps: (1) the predictor was associated with the dependent or outcome variable ($A \rightarrow C$); (2) the predictor was associated with the hypothesized mediator(s) ($A \rightarrow B$); (3) the mediating variable was significantly associated with the dependent or outcome variable after controlling for the effects of the predictor variable [$(A + B) \rightarrow C$]. Linear and logistic regression analyses were used for Steps 1 and 2. Sequential (or hierarchical) regression analysis was used for Step 3. The fourth step was the Sobel test to test for significance.

The Sobel test is an approximate significance test for mediational analyses (Baron & Kenny, 1986). The Sobel test examines if the effect of the independent variable on the dependent variable has no effect or is significantly reduced by adding the mediator. Sobel test calculations help interpret the indirect effect of the independent variable on the dependent variable via the mediator. The Sobel test is a commonly used test to calculate significance of the indirect effect. The Sobel method is a conservative test (MacKinnon, Warsi, & Dwyer, 1995).

Pearson correlational analyses were used to assess for multicollinearity among continuous variables in hypotheses one, two, and three. The variance inflation factor was <4 and tolerance $> .20$ for all models. Multicollinearity was thus nonproblematic (Stevens, 1996). Alpha levels were not adjusted in mediational analyses because multivariate statistics are considered robust against Type I error.

Table III illustrates the models tested for each hypothesis. For the first hypothesis, several models were tested to determine if parental anxiety and depression (B) (MAQ

total scores and subscale scores, BDI-II scores) significantly mediated the relationship between the independent variable of youth ASD symptoms (A) (CSDS) and the dependent variable of youth PTSD symptomatology (C) (CPTSD-I). For the second hypothesis, three models were tested to determine if youth depression and anxiety (B) (CDI total and scores, MASC total and subscales, CBCL subscales) significantly mediated the relationship between the independent variable of youth ASD symptoms (A) (CSDS) and the dependent variable of youth PTSD (C) (CPTSD-I). For the third hypothesis, several models were tested to determine if parental anxiety and depression (B) (MAQ total and subscale scores, BDI-II total and subscale scores) significantly mediated the relationship between the independent variable of parental ASD symptoms (A) (ASDS) and the dependent variable of parental PTSD symptomatology (C) (PCL-C).

CHAPTER 4

DATA ANALYSIS

Hypothesis One

Youth ASD and PTSD Mediated by Parental Anxiety and Depression (Total Scores)

A mediational model was tested to determine if parental anxiety and depression (B) (MAQ total score and BDI-II score respectively) were significant mediators in the relationship between the independent variable of youth ASD symptoms (A) (CSDC Post-Traumatic Symptoms Score) and the dependent variable of youth PTSD symptoms (C) (CPTSD-I). A model involving (1) youth ASD symptoms, parental anxiety, and parental depression as independent variables and (2) youth PTSD symptomatology as the dependent variable was significant ($R^2 = .24$; $\chi^2(3) = 8.62, p < .05$). An examination of the standardized coefficients of each independent variable, however, revealed that only youth ASD symptoms contributed significantly to this effect.

In addition, independent linear regression analyses were used to determine if youth ASD symptoms (CSDC Post-Traumatic Symptoms Score) predicted parental anxiety (MAQ total score) and parental depression (BDI-II score) during PICU assessment. The model was significant in the prediction of parental anxiety ($R^2 = .20$; $F(1, 48) = 11.72, p < .01$). The model was also significant in the prediction of parental depression ($R^2 = .49$; $F(1, 48) = 46.78, p < .001$). Both variables thus qualified as potential mediators.

Analyses were employed to determine if parental anxiety mediated (1) youth ASD symptoms and (2) youth PTSD symptomatology. In addition analyses were employed to determine if parental depression mediated (1) youth ASD symptoms and (2) youth PTSD symptomatology. The overall model of youth ASD symptoms (A) and parental anxiety and parental depression (B) significantly predicted youth PTSD symptomatology (C) ($p < .05$). The regression path of youth ASD symptoms (A) to PTSD symptomatology (C) was significant ($\beta = .14, p < .05$). The individual regression coefficients of parental anxiety and depression did not significantly predict youth PTSD symptomatology.

Youth ASD and PTSD Mediated by Parental Anxiety and Depression (Subscales)

A mediational model was also tested to determine if parental anxiety (B) (MAQ subscale scores) was a significant mediator in the relationship between the independent variable of youth ASD symptoms (A) (CSDC Post-Traumatic Symptoms Score) and the dependent variable of youth PTSD symptoms (C) (CPTSD-I). A model involving (1) youth ASD symptoms and parental anxiety as independent variables and (2) youth PTSD symptomatology as the dependent variable reflected a trend ($R^2 = .22; \chi^2 (4) = 8.18, p = .09$). An examination of the standardized coefficients of each independent variable revealed that only youth ASD symptoms contributed significantly to this effect.

In addition, independent linear regression analyses were used to determine if youth ASD symptoms (CSDC Post-Traumatic Symptoms Score) predicted parental anxiety (MAQ subscale scores) during PICU assessment. In the prediction of the MAQ Physiological-Panic subscale score, the model was significant ($R^2 = .09; F(1, 48) = 4.88, p < .05$). In the prediction of the MAQ Social Phobia subscale score, the model was also significant ($R^2 = .18; F(1, 48) = 10.62, p < .05$). In the prediction of the MAQ Worry-

Fears subscale score, the model was also significant ($R^2 = .23$; $F(1, 48) = 14.26$, $p < .001$). Finally, in the prediction of the MAQ Negative Affectivity subscale score, the model indicated a trend ($R^2 = .07$; $F(1, 48) = 3.84$, $p = .06$). The three significant MAQ subscales (physiological-panic, social phobia, worry-fears) were thus included in the next mediation steps.

An analysis was employed to determine if parental anxiety mediated (1) youth ASD symptoms and (2) youth PTSD symptomatology. The overall model of youth ASD symptoms (A), and parental anxiety (B) reflected a trend in predicting youth PTSD symptomatology (C) ($p = .09$). The regression path of youth ASD symptoms (A) to PTSD symptomatology (C) was significant ($\beta = .12$, $p < .05$). The individual regression coefficient of parental anxiety did not significantly predict PTSD symptomatology.

Hypothesis One Mediation Analyses Results

Results did not support mediation by parental anxiety and depression of the relationship between youth ASD symptoms during PICU assessment, and the development of PTSD symptoms 4-7 weeks after PICU assessment. Neither specific types of parental anxiety (subscales) or overall anxiety and depression (total scores) mediated the relationship between youth ASD and PTSD. Youth ASD did, however, significantly predict youth PTSD diagnosis.

Hypothesis Two

Youth ASD and PTSD Mediated by Youth Anxiety and Depression (Total Scores)

A mediational model was tested to determine if youth anxiety and depression (B) (MASC and CDI total scores respectively) were significant mediators in the relationship between the independent variable of youth ASD symptoms (A) (CSDC Post-Traumatic

Symptoms Score) and the dependent variable of youth PTSD symptoms (C) (CPTSD-I). A model involving (1) youth ASD symptoms, anxiety, and depression as independent variables and (2) youth PTSD symptomatology as the dependent variable was significant ($R^2 = .32$; $\chi^2(3) = 12.21, p < .01$). Despite the significance of the overall model, an examination of the standardized coefficients of each independent variable revealed that only youth anxiety contributed significantly to this effect.

In addition, independent linear regression analyses were used to determine if youth ASD symptoms predicted both youth anxiety and depression. In the prediction of youth anxiety, the model was significant ($R^2 = .10$; $F(1, 48) = 5.23, p < .05$). In the prediction of youth depression, the model was not significant ($R^2 = .00$; $F(1, 48) = 0.02, p = .90$). Only the overall measure of youth anxiety thus qualified as a potential mediator.

Analyses were employed to determine if youth anxiety mediated (1) youth ASD symptoms and (2) youth PTSD symptomatology. The overall model of youth ASD symptoms (A), and youth anxiety (B) significantly predicted youth PTSD symptomatology (C) ($p < .01$). The regression path of youth anxiety (A) to youth PTSD symptomatology (C) was significant ($\beta = .07, p < .05$). The individual regression coefficient of youth ASD symptoms did not significantly predict PTSD symptomatology. After controlling for the effect of youth anxiety, the association of youth ASD symptoms and PTSD diagnosis thus became weak and not significant. This result indicated mediation by youth anxiety at PICU assessment of the association between youth ASD symptoms PTSD symptoms. However, subsequent analysis using the Sobel test indicated only a trend (Sobel test statistic = 1.62, $p = 0.10$).

Youth ASD and PTSD Mediated by Youth Anxiety and Depression (Subscales)

A mediational model was tested to determine if youth anxiety and depression (B) (MASC and CDI subscale scores respectively) were significant mediators in the relationship between the independent variable of youth ASD symptoms (A) (CSDC Post-Traumatic Symptoms Score) and the dependent variable of youth PTSD symptoms (C) (CPTSD-I). Unfortunately, youth ASD symptoms did not significantly predict any MASC or CDI subscales (i.e., all $p > .05$). The lack of a significant direct effect of youth ASD symptoms on these youth anxiety and depression variables precluded further tests of mediation.

Youth ASD and PTSD Mediated by Youth Anxiety and Depression (CBCL Scores)

A mediational model was tested to determine if youth anxiety and depression (B) (CBCL scores) were significant mediators in the relationship between the independent variable of youth ASD symptoms (A) (CSDC Post-Traumatic Symptoms Score) and the dependent variable of youth PTSD symptoms (C) (CPTSD-I). A model involving (1) youth ASD symptoms, anxiety, and depression as independent variables and (2) youth PTSD symptomatology as the dependent variable was not significant ($R^2 = .19$; $\chi^2(4) = 6.69$, $p = .15$).

In addition, independent linear regression analyses were used to determine if youth ASD symptoms predicted both youth anxiety and depression. In the prediction of the Internalizing factor score, the model was significant ($R^2 = .45$; $F(1, 48) = 39.78$, $p < .001$). In the prediction of the CBCL Anxious/Depressed subscale score, the model was also significant ($R^2 = .39$; $F(1, 48) = 31.07$, $p < .001$). Finally, in the prediction of the CBCL Withdrawn/Depressed subscale score, the model was also significant ($R^2 = .14$;

$F(1, 48) = 7.94, p < .01$). All measures of youth anxiety and depression thus qualified as potential mediators.

Analyses were employed to determine if youth anxiety mediated (1) youth ASD symptoms and (2) youth PTSD symptomatology. The overall model of youth ASD symptoms (A) and youth anxiety and depression (B) did not significantly predict PTSD symptomatology (C) ($p = .15$).

Hypothesis Two Mediation Analyses Results

Results supported a full mediation by youth anxiety as measured by the MASC total score of the relationship between youth ASD symptoms during PICU assessment and the development of PTSD symptoms 4-7 weeks after PICU assessment. However, a subsequent Sobel test for the model was not significant. The subscales of the youth depression and anxiety measures (CDI, MASC) were not associated with ASD and mediation was thus not examined. The total score on the CDI also did not mediate the relationship between youth ASD and PTSD.

Hypothesis Three

Parental ASD and PTSD Mediated by Parental Anxiety and Depression (Total Scores)

A mediational model was tested to determine if parental anxiety and depression (B) (MAQ total score and BDI-II score respectively) were significant mediators in the relationship between the independent variable of parental ASD symptoms (A) (ASDS) and the dependent variable of parental PTSD symptoms (C) (PCL). A model involving (1) parental ASD symptoms, anxiety, and depression as independent variables and (2) parental PTSD symptomatology as the dependent variable was significant ($R^2 = .49; F(3, 45) = 14.11, p < .001$). An examination of the standardized coefficients of each

independent variable, however, revealed that only youth ASD symptoms contributed significantly to this effect.

In addition, independent linear regression analyses were used to determine if parental ASD symptoms (ASDS) predicted both parental anxiety (MAQ total score) and parental depression (BDI-II score) during PICU assessment. In the prediction of parental anxiety, the model was significant ($R^2 = .20$; $F(1, 48) = 11.91$, $p < .01$). In the prediction of parental depression, the model was also significant ($R^2 = .48$; $F(1, 48) = 43.51$, $p < .001$). Both variables thus qualified as potential mediators.

Analyses were employed to determine if parental anxiety mediated (1) parental ASD symptoms and (2) parental PTSD symptomatology. In addition, analyses were also employed to determine if parental depression mediated (1) parental ASD symptoms and (2) parental PTSD symptomatology. The overall model of parental ASD symptoms (A) and parental anxiety and parental depression (B) significantly predicted PTSD symptomatology (C) ($p < .001$). The regression path of parental ASD symptoms (A) to parental PTSD symptomatology (C) was significant ($\beta = .47$, $p < .01$). The individual regression coefficients of parental anxiety and depression did not significantly predict parental PTSD symptomatology.

Parental ASD and PTSD Mediated by Parental Anxiety and Depression (Subscale Scores)

A mediational model was tested to determine if parental anxiety (B) (MAQ subscale scores) was a significant mediator in the relationship between the independent variable of parental ASD symptoms (A) (ASDS) and the dependent variable of parental PTSD symptoms (C) (PCL). A model involving (1) parental ASD symptoms and parental anxiety as independent variables and (2) parental PTSD symptomatology as the

dependent variable was significant ($R^2 = .48$; $F(5, 43) = 7.77$, $p < .001$). An examination of the standardized coefficients of each independent variable revealed that only parental ASD symptoms contributed significantly to this effect.

In addition, independent linear regression analyses were used to determine if parental ASD symptoms (ASDS) predicted parental anxiety (MAQ subscale scores) during PICU assessment. In the prediction of the MAQ physiological-panic subscale score, the model was significant ($R^2 = .12$; $F(1, 48) = 6.77$, $p < .05$). In the prediction of the MAQ social phobia subscale score, the model was also significant ($R^2 = .19$; $F(1, 48) = 11.05$, $p < .05$). In the prediction of the MAQ worry-fears subscale score, the model was also significant ($R^2 = .17$; $F(1, 48) = 10.13$, $p < .01$). Finally, in the prediction of the MAQ negative affectivity subscale score, the model was also significant ($R^2 = .09$; $F(1, 48) = 4.43$, $p < .05$). All MAQ subscales (physiological-panic, social phobia, worry-fears, negative affectivity) were thus included in the next mediation steps.

Analyses were employed to determine if parental anxiety mediated (1) parental ASD symptoms and (2) parental PTSD symptomatology. The overall model of parental ASD symptoms (A), and parental anxiety (B) was significant in predicting PTSD symptomatology (C) ($p < .001$). The regression path of parental ASD symptoms (A) to PTSD symptomatology (C) was significant ($\beta = .59$, $p < .001$). The individual regression coefficient of parental anxiety did not significantly predict PTSD symptomatology.

Hypothesis Three Mediation Analyses Results

Results did not support mediation by parental anxiety and depression of the relationship between parental ASD symptoms during PICU assessment and the development of PTSD symptoms 4-7 weeks after PICU assessment. Neither specific

types of parental anxiety (subscales) nor overall anxiety and depression (total scores) mediated the relationship between parental ASD and PTSD. Parental ASD did, however, significantly predict parental PTSD symptomatology.

Hypothesis Four

Correlational Analysis

The fourth hypothesis was that family environment impacted symptoms of anxiety and depression in youth and caregivers. To address this hypothesis, calculations of Pearson product moment correlation coefficients (Pearson r) were conducted between the family environment variables and anxiety and depression symptoms (see Tables IV-VII). A positive correlation was expected between control and conflict and depression and anxiety. A negative correlation was expected between cohesion and expressiveness and depression and anxiety. A relationship was expected between independence and symptoms of depression and anxiety. Cohen's guidelines (1988) were used to evaluate magnitude of the correlation coefficients: small (0.10), medium (0.30), and large (0.50). Correlations were considered significant at alpha .01 to account for Type I error.

At PICU assessment, certain family environment factors significantly correlated with some symptoms of anxiety and depression in youth and caregivers. For youth (see Table IV), there was a significant moderate and negative relationship between family control and the negative self-esteem subscale of the CDI. For caregivers (see Table V), there were no significant results.

At follow-up, certain family environment factors significantly correlated with some symptoms of anxiety and depression in youth and caregivers. For youth (see table VI), there was a significant moderate and negative relationship between family conflict and

the ineffectiveness subscale of the CDI. There was a significant moderate and negative relationship between family intellectual-cultural orientation and performance fears in the MASC. Among the caregivers (see Table VII), there was significant moderate and negative relationship between family cohesion and having worries and fears in the MAQ.

Additional Analyses

Child symptoms of acute stress disorder were assessed based on the CSDC (Saxe, 1997) ($M=14.5$, $SD=8.2$). A diagnosis of PTSD negative (67.9%) or PTSD positive (26.4%) was given to each youth who completed the follow-up portion of the study. All youth diagnosed as PTSD positive had a classification of Acute PTSD. Parental symptoms of acute stress disorder were assessed using the ASDS (Bryant, Moulds, & Guthrie, 2000) ($M=44.5$, $SD=14.4$). Some (19%) parents qualified for a diagnosis of acute stress disorder at assessment in the PICU. Parental symptoms of PTSD were also assessed ($M=41.3$, $SD=13.2$). Other (28%) parents qualified for a diagnosis of PTSD.

Differences in Levels of Psychopathology Symptoms at PICU Assessment and Follow-Up

Multiple comparisons using paired samples t-tests were used to test differences in levels of anxiety and depression among youth and their caregivers. Comparisons were made regarding PICU assessment and follow-up. The means, standard deviations, and t-test statistics for the measures are in Tables VIII and IX. To address Type I error, a conservative approach was utilized; significant findings were defined as those with an alpha of $p \leq .01$.

There was a significant decrease ($p < .01$) in youth overall anxiety and in specific anxiety symptoms in the MASC physical symptoms and tense subscales from PICU assessment to follow-up 4-7 weeks later. There was also a significant decrease in overall

depression levels and in the negative mood subscale. In general, youth anxiety and depression decreased from PICU assessment to follow-up.

Among caregivers, there was also a significant decrease ($p < .01$) in overall anxiety and in specific anxiety symptoms on the MAQ social-phobia and worry-fears subscales from PICU assessment to follow-up 4-7 weeks later. There was also a significant decrease in overall depression levels. In general, caregiver anxiety and depression also decreased from the time of their children's PICU assessment to follow-up.

Gender and Differences in Youth's Psychopathology Symptoms

A chi-square analysis was conducted to discover if male ($n = 26$) and female ($n = 23$) youth differed with respect to Acute PTSD or PTSD Negative diagnosis at follow-up. Among male youth, 69.2% were PTSD Negative and 30.8% were Acute PTSD. Among female youth, 78.3% were PTSD Negative and 21.7% were Acute PTSD. This analysis yielded an insignificant result, $\chi^2(1) = 0.51, p = .48$. Male and female youth did not significantly differ in diagnosis as Acute PTSD or PTSD Negative after PICU admittance. A Pearson product moment correlation coefficient (Pearson r) indicated the extent of the relationship between the youth's age and their PTSD diagnosis. The relationship was weak and not significant ($r = 0.04$).

Multiple comparisons using independent samples t-tests were used to examine differences in levels of anxiety and depression between male and female youth. Comparisons were made with respect to PICU assessment and follow-up. No significant differences were found between male and female youth for any measure or time period.

Gender and Differences in Caregiver's Psychopathology Symptoms

Multiple comparisons using independent samples t-tests were used to test differences in levels of anxiety, depression, and PTSD between male and female caregivers. Comparisons were made with respect to PICU assessment and follow-up. No significant differences were found between male and female caregivers for any measure or time period. A Pearson product moment correlation coefficient (Pearson r) was calculated to discover the extent of relationship between caregiver age and PTSD diagnosis. The relationship was moderately negative ($r = -0.31, p < .05$). Older caregivers were less likely to have PTSD.

Correlation Analyses Among Psychopathology Variables

Pearson product moment correlation coefficients (Pearson r) were calculated among anxiety, depression, ASD, and PTSD measures for youth and caregivers during PICU assessment and follow-up. The magnitude of the correlation coefficients was evaluated using Cohen's (1988) guidelines: small (0.10), medium (0.30), and large (0.50). Only significant correlations with an alpha level of .01 are presented.

No relationship was found regarding youth and caregiver anxiety. The relationship between caregiver Acute Stress Disorder and child anxiety, depression, and PTSD symptoms was also evaluated. A moderate positive correlation between caregiver ASD symptoms at PICU assessment and a child humiliation fear was found ($r = 0.39, p < .01$) at follow-up.

The relationship between youth Acute Stress Disorder and caregiver anxiety, depression, and PTSD symptoms was evaluated. A strong positive correlation between youth ASD symptoms at PICU assessment and caregiver depression at PICU assessment

($r = 0.70, p < .01$) and follow-up was found ($r = 0.68, p < .01$). A moderate positive correlation between youth ASD symptoms at PICU assessment and caregiver anxiety at PICU assessment ($r = 0.44, p < .01$) and follow-up ($r = 0.47, p < .01$). A moderate positive correlation between youth ASD symptoms at PICU assessment and caregiver social-phobia ($r = 0.43, p < .01$) and worry-fears ($r = 0.48, p < .01$) at PICU assessment was found. A moderate to strong positive correlation between youth ASD symptoms at PICU assessment and physiological-panic ($r = 0.39, p < .01$), social-phobia ($r = 0.45, p < .01$), and worry-fears ($r = 0.57, p < .01$) at follow-up was found.

The relationship between youth subjective experience, Acute Stress Disorder, and PTSD symptoms was also evaluated. A moderate positive correlation between youth subjective experience at PICU assessment and ASD symptoms at assessment ($r = 0.42, p < .01$) and PTSD diagnosis at follow-up ($r = 0.43, p < .01$) was found.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This study examined posttraumatic stress disorder (PTSD) and acute stress disorder (ASD) symptoms in children admitted to a pediatric intensive care unit as well as their parents. Prevalence rates of both disorders as well as impact of gender and age on prevalence rates were also examined. A primary goal of this study was to examine the relationship among acute stress disorder symptomatology and posttraumatic stress disorder symptomatology and potential mediating variables among youth in a PICU and their parents. Depression and anxiety in youth and parents were expected to mediate the relationship between acute stress disorder and posttraumatic stress disorder symptomatology. A secondary goal involved examining the impact of family environment on symptoms of anxiety and depression in youth and their parents.

Prevalence of PTSD and ASD

Prevalence rates of PTSD in this study were fairly consistent with previous research on PTSD in pediatric populations. Rates of PTSD have been increasing as the DSM continues to modify what qualifies as a traumatic event. The DSM-IV expanded criteria from previous editions to include medical conditions in oneself and one's child as traumatic events (Beslau, 2001; Cabizuca, 2009). As criteria for PTSD change, overall prevalence rates will also likely change. Approximately 1.3-9.2% of the general population experiences PTSD (Cabizuca, 2009). These rates vary with age and more

specialized populations. Lifetime prevalence rates for youth range from 2-9% (Breslau, Davis, Andeski, Peterson, 1991; Cuffe et al., 1998; Giaconia et al., 1995). Pediatric patients with acute and chronic conditions and their parents experience posttraumatic stress symptoms and posttraumatic stress disorder at high rates. Pediatric populations have rates of PTSD ranging from 10-20% (Hepstinstall, 1996; Yule, 2001). Parents of children with serious illnesses tend to have higher rates of PTSD ranging from 10-33% (Cabuzica et al, 2009; Kazak, et al. 1997; Landolt et al., 2004; Stuber, et al., 1996). Males are more likely to be exposed to a traumatic event but females are at a much higher risk for PTSD (Breslau, 2001; Cabizuca, et al, 2009).

The overall rate of PTSD for youth in this study was 26.4%. This rate is somewhat higher than average for overall pediatric populations but is comparable to rates of children in traffic accidents (Hepstinstall, 1996). This particular study combined youth experiencing a wide range of illnesses and injuries, including trauma, respiratory conditions, and surgery recovery. Most studies addressing PTSD in youth address a specific population such as burn or cancer patients. The combination of children experiencing various physical symptoms may account for some of the increase in prevalence in PTSD. Male youth also experienced a higher rate of PTSD (30.8%) than female youth (21.7%) in this study, which is not consistent with prior research. In this study, no significant relationship was found between youth age and development of PTSD. Other researchers have found youth age to be associated with PTSD symptoms, particularly one's ability to understand and process the severity of a traumatic event (Pynoos, 1994). A restricted age range of youth participants may relate to a lack of

relationship between youth age and PTSD symptoms. Children under age 8 years were not included in this study and the mean age was 12.1 years.

The overall rate of PTSD for parents in this study was 28%. This rate is consistent with previous research (Cabuzica et al, 2009; Kazak, et al. 1997; Landolt et al., 2004; Stuber, et al., 1996). Significant differences were not found among rates of PTSD and fathers and mothers. A moderate negative relationship was found regarding parent age and the development of PTSD, indicating that older parents were less likely to develop PTSD. The relationship of parental age to PTSD symptoms may also relate to other factors linked to resiliency such as economic stability, social support, and coping skills (Davis & Siegel, 2000).

Prevalence rates of ASD in this study were consistent with previous research on ASD in populations exposed to trauma, including pediatric populations. The estimated prevalence of ASD in adults is 14-33% (American Psychiatric Association, 2000). The overall rate of ASD for parents in this study was 19%. The results of this study provide continuing support for the validity of ASD as a diagnosis (Pynoos et al., 1999).

Relationship Between PTSD and ASD

ASD is a significant predictor of youth and adult PTSD. ASD has been found to be particularly useful in the prediction of PTSD in pediatric populations (Difede et al., 2002). Bryant and colleagues (2007) found that 25% of children who were initially diagnosed with ASD were diagnosed with PTSD 6-months post-trauma. In the current study, youth ASD significantly predicted a youth PTSD diagnosis. This supports previous research in the role of ASD as a predictor of PTSD in children hospitalized in a PICU (Bryant et al., 2007; Difede et al., 2002; Harvey & Bryant, 1999).

ASD has also been found to predict PTSD in adults. In 12 studies that prospectively examined the relationship between ASD and PTSD, most adults with ASD subsequently developed PTSD (Brewin, Andrews, Rose, & Kirk, 1999; Bryant & Harvey, 1998; Creamer, O'Donnell, & Pattison, 2004; Difede et al., 2002; Harvey & Bryant, 1998; Bryant & Harvey, 2000; Holeva, Tarrier, & Wells, 2001; Kangas, Henry, & Bryant, 2005; Murray, Ehlers, & Mayou, 2002; Schnyder et al., 2001; Staab, Grieger, Fullerton, & Ursano, 1996). However, researchers have also found that a minority of people who eventually meet criteria for PTSD initially met criteria for ASD. ASD has utility for identifying some individuals that eventually develop PTSD but some will not develop symptoms until a later time (Harvey & Bryant, 1999). In the current study, parent ASD significantly predicted parental PTSD. This supports previous research in the role of ASD as a predictor of PTSD for parents of children in a PICU (Bryant et al., 2007).

Hypothesized Mediators: Depression and Anxiety

Depression

Depression did not mediate the relationship between ASD and PTSD in youth or their parents in this study. Depression was expected to be a mediator due to high rates of comorbidity among individuals with PTSD. Breslau (2001) examined 801 mothers and found the lifetime prevalence of comorbid disorders with PTSD to be 73%, especially depression and anxiety disorders. Depression was also hypothesized as a mediator because rates of depression increase in the presence of major life events such as serious illness or illness of a child (Ben-Amitay et al., 2006).

Depression did not mediate the relationship between ASD and PTSD but parental depression at PICU assessment and follow-up was positively correlated with youth ASD.

These results indicate that a relationship existed among a child's immediate stress reaction and a parent's level of depression. A causal relationship was not determined and it is unclear if the parent's level of depression impacted the child's stress or if the child's stress increased the parent's level of depression. Children with parents with depression are at increased risk for psychopathology (Klein et al., Stark et al., 2000, Weissman, et al., 1984). Parents are also at increased risk for depression immediately after a child's medical procedure (Ben-Amitay et al., 2006).

Females are at increased risk for depression (American Psychiatric Association, 2000). In this study, no significant differences were found in levels of depression in youth or parents based on gender. Similar rates of rates of life events such as illness, accidents, and a child's serious illness may have contributed to similar rates of depression.

Levels of depression changed significantly from PICU assessment to post-PICU assessment in youth and their parents. Depression levels and negative mood subscales decreased in youth from PICU assessment to post-PICU assessment. Experiencing even a minor physical event such as cold may lead to temporary depression symptoms (Tarnowski & Brown, 2000). As many of these children became physically healthier, their symptoms of depression may have improved. Depression levels decreased in parents from PICU assessment to post-PICU assessment. Ben-Amitay and colleagues (2006) found, immediately after a child's medical procedure, that parental depression increased and then declined within 6 months. Changes in levels of depression from PICU assessment to follow-up in this study are consistent with previous research findings (Ben-Amitay et al., 2006, Tarnowski & Brown, 2000).

Anxiety

In most analyses, anxiety did not mediate the relationship between ASD and PTSD. Parental anxiety did not mediate the relationship between youth ASD and PTSD. Parental anxiety also did not mediate the relationship between parental ASD and PTSD. Results did support mediation by youth anxiety between youth ASD and youth PTSD. However, the subsequent Sobel test was not significant. Given a larger sample size, the Sobel test would likely be significant and yield mediation for this model. Anxiety was expected to be a mediator due to high rates of comorbidity among individuals with PTSD (Breslau, 2001). Anxiety was hypothesized as a mediator because rates of anxiety increase in the presence of stressful and anxiety-provoking situations such as hospitalization, serious illness, or illness of a child (Carrion et al., 2002; Thapar & Rice, 2006).

Anxiety did not significantly mediate the relationship between ASD and PTSD but parental anxiety at PICU assessment and follow-up was positively correlated with youth ASD. Parental social phobia and worry at PICU-assessment were also positively correlated with youth ASD. Youth physiological-panic, social-phobia, and worry-fears at follow-up were positively correlated with youth ASD. These results indicate that a relationship existed among a child's immediate stress reaction and a parent's level of anxiety. A causal relationship was not determined and it is unclear if the parent's level of anxiety impacted the child's stress or if the child's stress increased the parent's level of anxiety. A relationship also existed between a child's immediate stress and anxiety at follow-up. Children who experience a medical condition and/or have a parent with psychopathology are at increased risk for developing symptoms of anxiety (Boar & Lindhout, 2001; Rennick et al., 2002, Thapar & Rice, 2006). Parents of hospitalized children are also at increased risk for anxiety symptoms (Rennick et al, 2002).

Levels of anxiety changed significantly from PICU assessment to post-PICU assessment in youth and their parents. Anxiety levels and physical symptoms and tense subscales decreased in youth from PICU assessment to post-PICU assessment. Children experience heightened anxiety, fearfulness, and behavioral differences for up to 3-months post-discharge after entering a PICU (Barnes et al., 1972; Rennick et al., 2002). Because these children became physically healthier, their physical and tense symptoms of anxiety may have improved. Anxiety levels and social-phobia and worry-fears subscales decreased in parents from PICU assessment to post-PICU assessment. The appearance of a child in the hospital, the severity of his illness, and the hospital environment are main stressors and contributors to anxiety for parents of children admitted to a PICU (Board & Ryan-Wenger, 2002). As a child is removed from the hospital environment and improves physically, a parent's stressors and anxiety rates are significantly reduced. Changes in levels of anxiety from PICU assessment to follow-up in this study are consistent with previous research findings (Board & Ryan-Wenger 2002; Rennick et al., 2002).

Anxiety, Depression, and Family Environment

Based on the current study and past research, aspects of family environment appear related to anxiety and depression in youth and their parents (Blakeney et al., 1990; Chorpita et al., 1996; Crawford & Manassis, 2001; Lemanek & Koontz, 1990; Lonigan et al., 1994; Patterson et al., 1993; Youngblut & Lauzon, 1995). Research with pediatric patients and their parents have found an even greater association of family environment and psychopathology (Chorpita et al., 1996; Patterson et al., 1993; Youngblut & Lauzon, 1995). The correlational results of this study do not represent causal relationships between family environment and anxiety and depression. A positive correlation was

expected between control and conflict and depression and anxiety. A negative correlation was expected between cohesion and expressiveness and depression and anxiety. A relationship was expected between independence and depression and anxiety. These hypotheses were partially supported.

In youth at PICU assessment, a negative correlation was found between family control and negative-self-esteem. At follow-up, a negative relationship was found between family conflict and ineffectiveness. A negative relationship was also found between family intellectual-cultural orientation and performance fears. Youths in families that exhibit less control appear to have better self-esteem. Families with less control may explore more individual interests. This may contribute to self-esteem by allowing the child to have a sense of accomplishment and choice in their activities. Higher levels of family conflict are generally associated with increased psychopathology and it is unclear why in this study a negative relationship existed between family conflict and ineffectiveness (Blakeney et al., 1990; Lemanek & Koontz, 1990). A family's intellectual cultural orientation may relate to a higher level of interest in intellectual-cultural activities that can increase pressure on a youth to participate in activities and in some cases relate to performance fears.

In parents at PICU assessment, no significant correlations were found between family environment and depression or anxiety. At follow-up, a negative correlation was found between family cohesion and worries and fears. Less family cohesion related to increased worries and fears in parents. A strong cohesive family unit in this study appeared to allow parents at follow-up to exhibit fewer worries and fears but did not lead to an overall lower level of anxiety.

Subjective Experience

Trends in PTSD research are focusing more on the role of subjective experience in the development of PTSD symptoms (Creamer et al., 2005). Previous research has found subjective experience to be predictive of PTSD (Breslau and Kessler, 2001). Subjective experience is believed to be an important contributor to the development of PTSD as many factors impact it, including preparedness for an event, denial, avoidance, and developmental level (Breslau & Kessler, 2001). The current study found subjective experience in youth during a PICU hospitalization to be correlated with both ASD symptoms and PTSD symptoms. The results of the current study provide further support of the role of subjective experience in the development of PTSD.

Clinical Implications

The present study provides important contributions to the study of pediatric acute stress disorder and posttraumatic stress disorder with particular importance on the relationship between the two disorders. The overall prevalence of psychopathology in youth in a PICU as well as their parents was also further illustrated. Further support was gleaned for the validity of ASD as a diagnosis because rates in this study were comparable to previous research (American Psychiatric Association 2000, Bryant & Harvey, 2000). This study also provides further support for the role of ASD in the prediction of PTSD.

The current study represents a first step in identifying mediating factors in the relationship between ASD and PTSD. This is in line with current trends in PTSD research involving early identification of those at risk for developing the disorder, including the use of ASD as a predictor (Bryant et al., 2007; Creamer et al., 2004; Difede

et al., 2002). The results of the current study concurred with previous research that many of those with ASD will go on to develop PTSD. Researchers should continue to examine factors that may contribute to the relationship of ASD and PTSD as this study only examined depression and anxiety. Youth anxiety was a mediating factor between youth ASD and PTSD, though the subsequent Sobel test was not significant. Anxiety is thus an aspect that should be considered as one that may impact the relationship between ASD and PTSD. Anxiety and depression were also correlated with ASD. Rates of depression and anxiety also significantly decreased from PICU assessment to follow-up. The results of the current study provided researchers with further evidence that anxiety is related to ASD and should be further explored in mediational models of ASD and PTSD. The current study also illustrated that, during a PICU admission, children and their parents are experiencing stressors that generally decrease after discharge. Further mediational models examining the relationship between ASD and PTSD may wish to explore additional stressors such as hospital environment (i.e., level of invasiveness), level of parent child-interaction during hospitalization, and externalizing behaviors.

This study provides further results that subjective experience is a vital component of PTSD as well as ASD. Youth's average level of anxiety or fear was correlated to their ASD and PTSD symptoms. Despite changes in hospital environment, such as hospital procedures, medications, and physical symptoms, the modified dental thermometer correlated positively with ASD and PTSD symptoms. Results of this study indicate that clinicians should assess a youth's level of anxiety on a regular basis as it provides an accurate indicator for the potential to develop further psychopathology.

The results of this study clearly indicate that, during a PICU hospitalization, a child

and her parent may experience various symptoms ranging from depression, anxiety, and acute stress disorder. Many of the symptoms participants exhibited, such as anxiety and depression, decreased over time. However, some children and their parents are at increased risk for PTSD. Youth in the current sample exhibited higher prevalence rates of PTSD compared to many past studies of general pediatric populations, with rates comparable to those of traffic accident and trauma victims (Hepstinstall, 1996). Rates of PTSD in parents were consistent with previous research (Cabuzica et al, 2009; Kazak, et al. 1997; Landolt et al., 2004; Stuber, et al., 1996). Prevalence rates of ASD in youth and their parents were consistent with previous research. Given the results of the current study, clinicians should be aware of stressors of the pediatric population during hospitalization and take steps to assess for psychopathology.

Clinicians working with pediatric populations and their families should conduct comprehensive assessments of ASD, depression, anxiety, and family environment. However, assessments should be brief to not add additional stress to the child and family. Assessments such as the CBCL-6-18 (Achenbach & Rescorla, 2001) allow parents to provide information regarding a wide range of symptoms in one measure. A qualitative interview approach assessing the child's stressors and general symptoms may allow the clinician to have an understanding of what specific assessment measures would be useful. Obtaining assessment data from the both the parent and child regarding the child's symptoms is also useful. Assessment results may then guide clinicians if a child or parents may benefit from intervention.

The results of the current study also provide implications for early intervention. Youth and/or parents at risk for psychopathology could benefit from brief interventions

that may decrease the likelihood of subsequent psychopathology and not increase the demands on a child or parent during an already stressful time. This may be accomplished via brief interventions that include relaxation techniques and parenting strategies to reduce stress (Davis & Siegel, 2000; Rennick et al., 2002).

Conclusions and Recommendations for Further Study

The findings of the present study are directly relevant to youth hospitalized in a PICU and their parents. Limitations to study generalizability relate to sample demographics and size. Youth were age 8+ years ($M=12.1$ years, $SD=2.8$ years). Children admitted to a PICU generally vary more in age. Given a sample with more age variability, relationships between developmental level and psychopathology variables would have been more likely. Participants mainly consisted of European-American youth and parents. Low numbers across racial and ethnic groups posed limitations on statistical analyses for examining differences based on race and ethnicity. Primary reasons for admission to the PICU included respiratory illness and trauma. However, generally low numbers across all reasons for hospitalization in the PICU (i.e., respiratory illness, trauma, surgery, infection, virus) posed limitations on statistical analyses to examine differences based on reason for PICU admission.

The low participant sample size precluded the use of statistical analyses such as structural equation modeling. Mediation relationships were not significant among the study variables of depression and anxiety, likely as a result of low sample size. Additionally, multiple t-tests were conducted to examine relationships because other statistical analyses were unavailable due to sample size. This increased likelihood of Type I error. Increased sample sizes would allow for more sophisticated analyses and

further examination of mediation models.

An additional limitation concerned data sources. With respect to ASD in youth, the CSDS assesses a parent's perception of their child's reaction to a traumatic event. Gathering additional information on the child's perception and reaction to the traumatic event would be useful. A comparison of a child's perceptions with parental perception of their child's reaction may also be useful to examine ASD symptoms. Data may also be strengthened if youth were administered the FES in addition to parents. The FES is a measure of family environment, so perceptions from multiple family members may increase validity of the results.

Future areas of study include the continued identification of factors related to the development of PTSD and ASD in pediatric populations. The current study identified ASD as a predictor in the development of PTSD in youth and their parents hospitalized in a PICU. Depression and anxiety were also related to ASD. Examining the role of additional stressors during a PICU hospitalization in the development of PTSD and ASD is important for clinicians and researchers. The results of this study indicate that parents and children experience symptoms of psychopathology during the PICU hospitalization, which may relate to stressors such as the hospital experience, the child's illness, and being away from home. Examining a wider range of stressors in addition to depression and anxiety may be beneficial for treatment. For example, a brief assessment of youth and their parents when hospitalized that includes a qualitative interview to assess for potential stressors may identify those at risk for psychopathology.

Exploring the role of family factors in the development of psychopathology of pediatric patients is also important. Study results indicated some family factors to be

related to depression and anxiety. Future pediatric research should examine the role of family factors such as control, conflict, and cohesion with ASD and PTSD. Researchers should include multiple family members' perspectives. Additionally, family environment information may be useful. Family environment may be an additional stressor to contribute to the development of PTSD or ASD.

The current study supports the idea that children hospitalized in a PICU and their parents are at increased risk for ASD and PTSD compared to the general population. Results also support that fact that early ASD predicted the development of PTSD 4-7 weeks after initial assessment in youth and their parents. Depression and anxiety were related to ASD symptoms but a causal relationship was not established.

APPENDIX I

SEVERITY OF ILLNESS AND DEMOGRAPHIC/INFORMATION SHEETS

Information Sheet

Please fill this sheet out completely. The information you provide will be given a number so your name will not be on any papers you fill out. Please feel free to skip an item if you don't feel comfortable answering, but please try to honestly answer all questions the best you can.

1. Your birth date: _____
2. Are you: (circle one) Male Female
3. Your Race/ethnicity: (circle one)
Asian African-American Caucasian Hispanic Multiracial Native American
Other _____
4. Child's birth date: _____
5. Child's ethnicity: Asian African-American Caucasian Hispanic Multiracial
Native American Other _____
6. Highest level of education: (circle one)
Some high school Graduated high school Some college College graduate Graduate School
7. Did your mother/guardian graduate from high school? Yes No
How many years did mother/guardian go to college or trade school after high school? _____

8. Did your father/guardian graduate from high school? Yes No
How many years did father/guardian go to college or trade school after high school?

9. Age (in years) and gender of all children:
age: _____ gender: M F age: _____ gender: M F age: _____ gender: M F
age: _____ gender: M F age: _____ gender: M F age: _____ gender: M F
10. Are you married now? (circle one)
married never married separated
divorced
11. Were you married **1 year ago**? (circle one)
married never married separated
divorced
12. Do you have a good/stable marriage now? (circle one) very good/stable
somewhat good/stable not good/stable
13. Was your marriage good/stable 1 year ago? (circle one) very good/stable
somewhat good/stable not good/stable
14. If you are separated or divorced, who has custody of your child? (circle one)
joint custody (both parents) mother has custody father has
custody
15. What is your child's primary reason for being in the pediatric intensive care unit?

16. Have you ever been to a counselor or therapist? Yes No
Dates attended: _____ What problem? _____

17. Have your child ever gone to therapy for any behavioral problem or other reason? Yes

No

Dates attended: _____ What reason? _____

18. Does your family participate in religion on a regular basis? Yes No

19. Are you religious? Yes No

20. What is your family's average income for a year? _____

21. Is English the first language you learned? Yes No

19a. If English is not the first language you learned, what language did you first learn? _____

22. Please list all the languages you are fluent in (e.g., English, Spanish, etc.) _____

23. What language do you primarily speak in your home? _____

THANK YOU!

CONTACT INFORMATION

The following information will be used only to contact you for the follow-up session and will be kept confidential. It will also be kept separate from your questionnaire and interview responses.

Name: _____

Address: _____

Phone: _____

Best time to call: _____

Email: _____

Preferred method of contact (circle one): email mail phone

SEVERITY OF ILLNESS QUESTIONNAIRE
THE SECTION BELOW TO BE COMPLETED BY A PHYSICIAN (Kshama Daphtary, M.D.)

1. Number of days in PICU on first assessment (Date: _____) _____
 2. Number of days in PICU on discharge _____
 3. Primary diagnosis _____
-
-

4. For each activity or support the youth received, circle the points next to the corresponding item then total the points.

	Points
Basic Activities	
Standard monitoring. Hourly vital signs, regular registration and calculation of fluid balance	5
Laboratory. Biochemical and microbiological investigations	1
Single medication. Intravenously, intramuscularly, subcutaneously, and/or orally (e.g., gastric tube)	2
Multiple intravenous medication. More than one drug, single shots, or continuously	3
Routine dressing changes. Care and prevention of decubitus and daily dressing change	1
Frequent dressing changes. Frequent dressing change (at least one time per each nursing shift) and/or extensive wound care	1
Care of drains. All (except gastric tube)	3
Ventilatory Support	
Mechanical ventilation. Any form of mechanical ventilation/assisted ventilation with or without positive end-expiratory pressure, with or without muscle relaxants; spontaneous breathing with positive end-expiratory pressure	5
Supplementary ventilatory support. Breathing spontaneously through endotracheal tube without positive end-expiratory pressure; supplementary oxygen by any method, except if mechanical ventilation parameters apply	2
Care of artificial airways. Endotracheal tube or tracheostoma	1
Treatment for improving lung function. Thorax physiotherapy, incentive spirometry, inhalation therapy, intratracheal suctioning	1
Cardiovascular Support	
Single vasoactive medication. Any vasoactive drug	3
Multiple vasoactive medication. More than one vasoactive drug, disregard type and doses	4
Intravenous replacement of large fluid losses. Fluid administration >3 L/m ² /day, disregard type of fluid administered	4
Peripheral arterial catheter	5
Left atrium monitoring. Pulmonary artery flotation catheter with or without cardiac output measurement	8
Central venous line	2
Cardiopulmonary resuscitation after arrest; in the past 24 hrs (single precordial percussion not included)	3
Renal Support	
Hemofiltration techniques. Dialytic techniques	3
Quantitative urine output measurement (e.g., by urinary catheter à demeure)	2
Active diuresis (e.g., furosemide >0.5 mg/kg/day for overload)	3
Neurologic Support	
Measurement of intracranial pressure	4
Metabolic Support	
Treatment of complicated metabolic acidosis/alkalosis	4
Intravenous hyperalimentation	3
Enteral feeding. Through gastric tube or other gastrointestinal route (e.g., jejunostomy)	2
Specific Interventions	
Single specific intervention in the intensive care unit. Naso- or orotracheal intubation, introduction of pacemaker, cardioversion, endoscopies, emergency surgery in the past 24 hrs, gastric lavage. Routine interventions without direct consequences to the clinical condition of the patient, such as radiographs, echography, electrocardiogram, dressings, or introduction of venous or arterial catheters, are not included	3
Multiple specific interventions in the intensive care unit. More than one, as described above	5
Specific interventions outside the intensive care unit. Surgery or diagnostic procedures	5

Adapted from the TISS-28 (Miranda, de Rejk, & Schaufeli, 1996)

Total Points:

Criteria of exclusion are applied in four conditions: "Multiple intravenous medication" excludes "single medication"; "mechanical ventilation" excludes "supplementary ventilatory support"; multiple vasoactive medication" excludes "single vasoactive medication"; "multiple specific interventions in the intensive care unit" excludes "single specific interventions in the intensive care unit."

APPENDIX II

TABLES

Table I

Ethnicity of Participants (Youth) by Gender

<u>Ethnicity/Race</u>	<u>Male</u>	<u>Female</u>	<u>N</u>
Caucasian	18	11	29
Hispanic	5	5	10
African-American	3	5	8
Asian American	1	3	4
Other	1	1	2
<i>N</i>	28	25	53

Table II

Ethnicity of Participants (Parents) by Gender

<u>Ethnicity/Race</u>	<u>Male</u>	<u>Female</u>	<u>N</u>
Caucasian	11	18	29
Hispanic	5	5	10
African-American	2	6	8
Asian American	1	3	4
Other	0	2	2
<i>N</i>	19	34	53

Table III

Flow of Mediation Analyses Conducted to Test Hypotheses

Hypothesis and Model	Predictor	Mediator	Criterion
Hypothesis One	Youth ASD (CSDC ¹)	Parental Anxiety (MAQ total score ²) Parental Depression (BDI-II ³)	Youth PTSD (CPTSD ⁴)
			Youth PTSD (CPTSD)
Second Model	Youth ASD (CSDC)	Parental Anxiety (MAQ subscale scores)	
Hypothesis Two	Youth ASD (CSDC)	Youth Anxiety (MASC total score ⁵) Youth Depression (CDI total score ⁶)	Youth PTSD (CPTSD)
			Youth PTSD (CPTSD)
			Youth PTSD (CPTSD)
Second Model	Youth ASD (CSDC)	Youth Anxiety (MASC subscale scores) Youth Depression (CDI subscale scores)	
Third Model	Youth ASD (CSDC)	Youth Anxiety and Depression (CBCL ⁷)	
Hypothesis Three	Parental ASD (ASDS ⁸)	Parental Anxiety (MAQ total score) Parental Depression (BDI-II)	Parental PTSD (PCL-C ⁹)
			Parental PTSD (PCL-C)
Second Model	Parental ASD (ASDS)	Parental Anxiety (MAQ subscale scores)	

¹ Child Stress Disorders Checklist (Saxe 1997)

² Multidimensional Anxiety Questionnaire (Reynolds, 1999)

³ Beck Depression Inventory-II (Beck, Steer, & Brown, 1996)

⁴ Children's PTSD Inventory (Saigh, 1997)

⁵ Multidimensional Anxiety Scale for Children (March, Parker, Sullivan, Stallings, & Conners, 1997)

⁶ The Children's Depression Inventory (Kovacs, 1992)

⁷ Child Behavior Checklist 6-18 (Achenbach & Rescorla, 2001)

⁸ Acute Stress Disorders Checklist (Bryant, Moulds, & Guthrie, 2000)

⁹ PTSD Checklist (Weathers, Litz, Herman, Huska, & Keane, 1993)

Table IV

Correlation Matrix between Family Environment Variables and Symptoms of Psychopathology for Youth at PICU Assessment

Variable	Family Environment Variables									
	COH	EXP	CON	IND	ACH	INT	ACT	MOR	ORG	CON
MASC Total	-0.06	0.05	0.11	-0.09	0.11	-0.12	-0.21	0.14	-0.10	0.03
Physical Symptoms	-0.05	0.24	0.19	-0.26	0.20	0.03	-0.17	0.02	0.11	0.19
Tense	-0.06	0.24	0.22	-0.20	0.15	0.08	-0.19	0.04	0.11	0.19
Somatic	-0.04	0.22	0.16	-0.30	0.23	-0.03	-0.13	0.01	0.10	0.17
Social Anxiety	-0.07	0.15	0.11	0.06	0.16	-0.11	-0.10	0.20	-0.30	0.05
Humiliation Fears	-0.07	0.20	0.18	0.07	0.18	0.08	-0.05	0.20	-0.13	-0.01
Performance Fears	-0.05	0.03	-0.01	0.05	0.10	-0.32	-0.12	0.16	-0.42	0.10
Harm Avoidance	-0.04	-0.20	0.13	0.02	-0.18	-0.07	-0.21	0.03	0.04	-0.17
Perfectionism	-0.02	-0.21	0.00	-0.12	-0.05	-0.07	-0.05	-0.11	-0.09	-0.17
Anxious Coping	-0.05	-0.16	0.15	0.09	-0.21	-0.05	-0.25	-0.02	0.10	-0.14
Separation/Panic	0.14	0.04	0.06	-0.02	0.14	-0.09	-0.17	0.06	-0.09	-0.02
CBCL Internalizing	-0.16	-0.20	0.09	-0.13	0.09	0.04	-0.12	0.25	-0.39	-0.11
Anxious/Depressed	-0.09	-0.12	0.15	-0.15	0.09	0.09	-0.03	0.25	-0.31	-0.02
Withdrawn/Depressed	-0.09	-0.10	0.13	-0.08	0.06	-0.09	-0.13	0.09	-0.37	0.01
CDI Total	-0.10	0.08	-0.06	0.04	0.08	-0.04	-0.05	0.26	-0.04	-0.23
Negative Mood	0.03	0.09	0.10	-0.19	0.08	-0.09	-0.07	0.20	-0.06	-0.18
Interpersonal Problems	-0.10	0.04	-0.09	0.10	-0.08	-0.14	0.14	0.27	-0.02	-0.08
Ineffectiveness	-0.19	0.02	-0.23	0.14	0.08	0.10	-0.11	0.14	0.04	-0.18
Anhedonia	-0.08	0.13	-0.07	0.09	0.16	-0.00	-0.09	0.24	-0.02	-0.16
Negative Self-Esteem	-0.15	-0.05	-0.04	0.14	-0.04	-0.05	0.02	0.20	-0.11	-0.40**

Note. COH = Cohesion. EXP = Expressiveness. CON = Conflict. IND = Independence. ACH = Achievement. INT = Intellectual-Cultural Orientation. ACT = Active-Recreational Orientation. MOR = Moral-Religious. ORG = Organization. CON = Control.

** $p < .01$. Significant correlations are in **boldface**.

Table V

Correlation Matrix between Family Environment Variables and Symptoms of Psychopathology for Caregivers at PICU Assessment

Variable	Family Environment Variables									
	COH	EXP	CON	IND	ACH	INT	ACT	MOR	ORG	CON
MAQ Total										
Physiological-Panic	-0.25	-0.17	0.13	0.15	0.02	0.21	-0.11	0.11	-0.15	-0.12
Social-Phobia	-0.08	-0.28	0.16	-0.00	-0.02	0.25	0.06	0.13	-0.10	-0.07
Worry-Fears	-0.29	-0.24	0.09	0.05	-0.01	0.13	0.03	0.06	0.02	-0.03
Negative Affectivity	-0.14	-0.22	-0.08	0.16	0.10	0.18	-0.07	0.17	-0.16	-0.18
BDI-II	-0.22	-0.20	0.14	-0.14	0.15	0.03	-0.19	0.05	-0.30	-0.14

Note. COH = Cohesion. EXP = Expressiveness. CON = Conflict. IND = Independence. ACH = Achievement. INT = Intellectual-Cultural Orientation. ACT = Active-Recreational Orientation. MOR = Moral-Religious. ORG = Organization. CON = Control.

Table VI

Correlation Matrix between Family Environment Variables and Symptoms of Psychopathology for Youth at Post PICU Assessment

Variable	Family Environment Variables									
	COH	EXP	CON	IND	ACH	INT	ACT	MOR	ORG	CON
MASC Total	-0.15	-0.01	0.10	-0.21	0.24	-0.06	-0.23	0.08	-0.14	0.15
Physical Symptoms	-0.15	0.11	0.12	-0.33	0.17	-0.15	-0.21	0.08	-0.05	0.17
Tense	-0.14	0.04	0.13	-0.30	0.11	-0.13	-0.22	0.09	-0.06	0.15
Somatic	-0.15	0.17	0.11	-0.35	0.22	-0.16	-0.18	0.08	-0.04	0.18
Social Anxiety	-0.17	-0.06	0.19	-0.10	0.18	-0.23	-0.03	0.21	-0.36	0.14
Humiliation Fears	-0.18	-0.10	0.16	-0.11	0.17	-0.06	0.07	0.18	-0.16	0.09
Performance Fears	-0.08	-0.01	0.14	-0.06	0.10	-0.34*	-0.11	0.15	-0.44**	0.16
Harm Avoidance	-0.09	-0.11	0.05	-0.02	0.06	0.14	-0.23	-0.04	0.13	-0.09
Perfectionism	0.03	-0.01	0.07	-0.10	-0.02	0.04	-0.05	-0.04	0.19	0.02
Anxious Coping	-0.14	-0.15	0.03	0.04	0.09	0.17	-0.29	-0.04	0.07	-0.13
Separation/Panic	-0.03	-0.06	-0.01	-0.16	0.21	0.02	-0.12	0.01	-0.12	0.14
CBCL Internalizing	-0.07	-0.12	0.06	-0.17	0.01	-0.02	-0.13	0.20	-0.20	-0.04
Anxious/Depressed	-0.11	-0.09	0.09	-0.19	0.03	0.03	-0.10	0.18	-0.21	-0.04
Withdrawn/Depressed	0.06	0.05	0.02	-0.12	-0.09	-0.13	-0.13	0.07	-0.14	0.11
CDI Total	0.06	0.03	-0.27	0.17	0.11	-0.02	-0.04	0.21	-0.09	-0.16
Negative Mood	0.11	-0.06	-0.00	-0.04	0.00	-0.03	-0.04	0.25	-0.06	-0.09
Interpersonal Problems	0.03	-0.03	-0.08	0.13	0.09	0.02	0.16	0.35	-0.23	-0.14
Ineffectiveness	0.01	0.16	-0.38**	0.18	0.19	-0.06	-0.12	0.10	-0.08	-0.17
Anhedonia	0.02	0.10	-0.34	0.28	0.06	-0.07	-0.13	-0.05	-0.12	-0.15
Negative Self-Esteem	0.07	0.11	-0.28	-0.00	0.01	0.09	-0.30	-0.11	-0.21	-0.08

Note. COH = Cohesion. EXP = Expressiveness. CON = Conflict. IND = Independence. ACH = Achievement. INT = Intellectual-Cultural Orientation. ACT = Active-Recreational Orientation. MOR = Moral-Religious. ORG = Organization. CON = Control.

** $p < .01$. Significant correlations are in **boldface**.

Table VII

Correlation Matrix between Family Environment Variables and Symptoms of Psychopathology for Caregivers at Post PICU Assessment

Variable	Family Environment Variables									
	COH	EXP	CON	IND	ACH	INT	ACT	MOR	ORG	CON
MAQ Total	-0.29	-0.16	0.07	0.09	0.09	0.07	-0.03	0.27	-0.16	-0.21
Physiological-Panic	-0.25	-0.05	0.14	0.08	0.21	0.07	-0.06	0.29	-0.25	-0.27
Social-Phobia	-0.22	-0.18	0.18	-0.10	0.02	0.09	0.12	0.23	-0.13	-0.09
Worry-Fears	-0.38**	-0.29	0.20	0.04	-0.04	0.04	0.07	0.20	-0.04	-0.14
Negative Affectivity	-0.17	-0.05	-0.21	0.25	0.09	0.05	-0.17	0.21	-0.12	-0.18
BDI-II	-0.24	-0.03	0.11	0.01	0.11	0.04	-0.19	0.15	-0.26	-0.21

Note. COH = Cohesion. EXP = Expressiveness. CON = Conflict. IND = Independence. ACH = Achievement. INT = Intellectual-Cultural Orientation. ACT = Active-Recreational Orientation. MOR = Moral-Religious. ORG = Organization. CON = Control.

** $p < .01$. Significant correlations are in **boldface**.

Table VIII

Paired Samples *t* – Tests in Youth Psychopathology Symptoms at PICU Assessment and Follow-Up

Variable	Assessment		Follow-Up		<i>t</i> -test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
MASC Total (Anxiety)	46.02	15.68	43.61	15.67	2.74	.009
Physical Symptoms	12.76	7.43	11.00	7.00	2.47	.01
Tense	6.78	3.74	5.84	3.59	2.53	.01
Somatic	5.96	3.96	5.14	3.64	2.07	.044
Social Anxiety	8.00	5.19	8.24	4.72	-0.66	.512
Humiliation Fears	4.00	3.15	3.90	2.94	0.31	.758
Performance Fears	4.02	2.80	4.33	2.71	-1.75	.087
Harm Avoidance	16.43	5.14	15.55	5.10	1.88	.066
Perfectionism	7.47	2.06	7.12	2.20	1.34	.186
Anxious Coping	8.94	3.92	8.43	3.67	1.42	.164
Separation/Panic	10.51	5.18	9.71	5.91	2.25	.028
CBCL Internalizing	8.56	7.11	8.16	7.36	0.88	.383
Anxious/Depressed	3.10	2.69	3.27	2.91	-0.89	.377
Withdrawn/Depressed	2.18	2.11	2.35	2.04	-0.94	.351
Somatic Complaints	3.39	3.61	2.80	3.74	1.67	.101
CDI Total (Depression)	6.02	5.05	4.69	3.29	2.48	.01
Negative Mood	1.86	1.68	1.37	1.19	2.42	.01
Interpersonal Problems	0.57	0.79	0.43	0.79	1.27	.212
Ineffectiveness	0.71	0.87	0.49	0.77	2.86	.006
Anhedonia	2.24	1.91	2.04	1.17	0.95	.346
Negative Self-Esteem	0.63	0.91	0.55	1.40	0.37	.717

Note. *M* = mean. *SD* = standard deviation.

Table IX

Paired Samples *t* – Tests in Caregiver Psychopathology Symptoms at PICU Assessment and Follow-Up

Variable	Assessment		Follow-Up		<i>t</i> -test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
MAQ Total (Anxiety)	66.06	12.43	63.96	12.38	2.89	.006
Physiological-Panic	15.98	3.59	15.73	3.67	1.01	.315
Social-Phobia	16.02	3.96	15.39	3.42	2.88	.006
Worry-Fears	16.45	3.71	15.86	3.29	3.03	.004
Negative Affectivity	17.61	3.60	16.98	4.09	1.94	.058
BDI-II (Depression)	12.27	9.03	10.94	8.99	2.55	.01

Note. *M* = mean. *SD* = standard deviation.

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VITA

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EDUCATION

- 2002-Present PhD Candidate- Clinical Psychology
University of Nevada, Las Vegas
Dissertation Title: *Posttraumatic Stress Disorder and Other Consequences of a PICU Admission*
Dissertation Chair: Christopher Kearney
- 2005 Master of Arts- Psychology
University of Nevada, Las Vegas
Thesis Title: *Relevance of Age and Special Needs in Initial Development Phases of a Child Neglect Scale*
Thesis Chair: Christopher Kearney
- 2002 Bachelor of Science- Psychology and Political Science
Northern Arizona University
Magna Cum Laude

FELLOWSHIP TRAINING

- Sep. 2009- Present **Marshfield Clinic/ St. Joseph's Hospital**
Pediatric Psychology Fellow
Marshfield, WI
Duties: Conduct individual and family therapy on an outpatient therapy, utilizing cognitive behavioral and behavioral approaches. Conduct consultation and liaison services in a medical setting, brief behavioral interventions, and other services on pediatric, pediatric intensive care, neonatal intensive care units of the hospital as consulted.
Supervisors: Michael Miller, PhD Stephanie Kohlbeck, PhD

INTERNSHIP TRAINING

Aug. 2008- Aug. 2009 **Primary Children's Medical Center**

Outpatient/Inpatient Rotation

Salt Lake City, UT

Duties: Outpatient rotation: Conducted initial assessment/intake with child or adolescent and parents and continue providing appropriate therapy. Also conducted psychological and psycho-educational testing as needed. Utilized treatment approaches include brief cognitive behavioral therapy, behavioral, family systems, and integrative approaches.

Supervisor: Matthew Wenner, PhD

Duties: Inpatient rotation: Conduct psychological evaluations of adolescents with serious mental illnesses in a residential treatment center. Conduct individual, family, and group therapy. Treatment approaches to be utilized include cognitive behavioral, behavioral, and family systems.

Supervisors: Cathie Fox, PhD Bruce Poulsen, PhD

PRACTICUM TRAINING

Sep. 2007- May 2008 **UNLV School Refusal and Anxiety Disorders Clinic**

Las Vegas, NV

Duties: Conducted initial assessments using the ADIS parent and child versions, CBCL, FES, CDI, School Refusal Assessment Scale, and additional anxiety questionnaires. Provided therapy to children and adolescents with school refusal and anxiety disorders. Utilized cognitive behavioral, behavioral, family systems, and integrative approaches to therapy.

Supervisor: Christopher Kearney, PhD

Aug. 2006- June 2007 **Desert Willow Treatment Center**

Las Vegas, NV

Duties: Conducted psychological evaluations of children and adolescents with serious mental illnesses on the acute inpatient psychiatric unit. Conducted individual, family and group therapy, and intake interviews with children and adolescents in the acute and residential inpatient units. Utilized cognitive behavioral, behavioral, family systems, play, and integrative approaches to therapy.

Supervisor: Paula Squitieri, PhD

Jan.- June 2006

State of Nevada, Early Childhood Services

Las Vegas, NV

Duties: Assessed abused and neglected children removed from their homes, ages 6 years and younger, for developmental delays, social and emotional problems. Assisted families, foster parents, and staff with methods to address delays and social or emotional difficulties. Utilized behavioral, play, and family systems approaches to therapy. Specific techniques included contingency management and psychoeducation. Also provided therapeutic services (e.g. play and behavioral therapy) to medically fragile children.

Supervisor: Maggie Freese, PhD

Oct. 2004- Jan. 2006

Velasquez Psychological Corp.

Las Vegas, NV

Duties: Administered and scored psychological tests including WISC-IV, CMS, CPT-II, MACI, BASC, WIAT-II, WAIS III, WMS, MMPI II, and the MCMI. Conducted individual therapy and biofeedback to adults, adolescents and children. Utilized cognitive behavioral, behavioral and integrative therapy techniques. Assessment and therapy cases included clients with severe medical disorders (e.g. leukemia, Crohn's disease, and fibromyalgia).

Supervisor: Jo Velasquez, PhD

Aug. 2004- June 2005

UNLV School Refusal and Anxiety Disorders Clinic

Las Vegas, NV

Duties: Conducted initial assessments using the ADIS parent and child versions, CBCL, FES, CDI, School Refusal Assessment Scale, and additional anxiety questionnaires. Provided therapy to children and adolescents with school refusal, anxiety disorders, and selective mutism. Utilized cognitive behavioral, behavioral, family systems, and integrative approaches to therapy.

Supervisor: Christopher Kearney, PhD

Aug. 2003- Aug. 2004

Center for Individual, Couple, and Family Therapy

Las Vegas, NV

Duties: Conducted psychological assessments, individual therapy, and intake interviews with children,

adolescents, and adults. Utilized cognitive behavioral and behavioral approaches to therapy.
Supervisors: Christopher Kearney, PhD
Michelle Carro, PhD

RESEARCH

- June 2006- Present **Psychological Consequences of a PICU Admission**
Dissertation research examining psychological consequences (PTSD, ASD, depression, and anxiety disorders) in children admitted to a pediatric intensive care unit and their caregivers.
- Dec. 2002-Dec. 2005 **Child Neglect**
Thesis research examining child protective services professionals' perceptions of child neglect.
- Aug. 2003- July 2004 **Gender and Violence**
Assisted in research project that investigated women's risk potential for violence.

TEACHING

- Spring 2007 **University of Nevada, Las Vegas**
Part-Time Instructor
Introductory to Psychology Distance Education (3 sections)
- Spring 2006- Fall 2007 **University of Nevada, Las Vegas**
Part-Time Instructor
Childhood Behavioral Disorders (2 sections for 2 semesters)
- Fall 2004- Fall 2005 **University of Nevada, Las Vegas**
Part-Time Instructor
Introductory to Psychology (2 sections for 3 semesters)

EMPLOYMENT

- 2002 **Arizona House of Representatives**
Phoenix, AZ
Intern
Duties: Analyzed and summarized bills pertaining to social services and psychological issues. Presented proposed legislation to committees.
Supervisor: Kathi Knox, Deputy Director of Research

PROFESSIONAL AFFILIATIONS

American Psychological Association (2002- present)- Student member of Division 53 Society of Clinical Child and Adolescent Psychology and Division 54 Society of Pediatric Psychology

Nevada State Psychological Association (2002-present)- Student member

OFFICES/POSITIONS HELD WITHIN PROFESSIONAL ORGANIZATIONS:

2004- 2005 **American Psychological Association of Graduate Students-State Advocacy Coordinator: Nevada (Southern Region)**
Duties: Represented APAGS to psychology students in Southern NV; disseminated relative legislative information to students and faculty and requested action on issues when appropriate. Shared a vote with the Northern APAGS representative on the state psychological association executive board.

2004- 2005 **UNLV Campus Representative to Nevada Psychological Association**
Duties: Liaison between UNLV psychology students (graduate and undergraduate) and Nevada Psychological Association; Attended strategic planning and monthly executive board meetings; Informed students of upcoming events presented by the Nevada Psychological Association; Coordinated an event in collaboration with the Nevada Psychological Association for students regarding career options in psychology.

HONORS AND AWARDS

Ferguson Fellowship Recipient (\$20,000)
2007 GA Excellence in Teaching Award
UNLV Graduate College Summer Scholarship 2006
UNLV Graduate College Summer Scholarship 2005
2005 APA Convention Division 37 Poster Award
Nevada State Psychological Association, 2004, Annual Conference 3rd Place
Poster Award
UNLV Graduate and Professional Student Association Grant
UNLV Graduate Student Research Forum First Place Poster Award
Phi Kappa Phi National Honor Society
Golden Key International Honor Society
Psi Chi National Honor Society
Arizona Board of Regents Scholarship
Northern Arizona University Year of Literature Award

PUBLICATIONS

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- Lefforge, N., Donohue, B., Stowman, S., and Strada, M. (2003, May). Reliability of a systematic review of the literature using improvement of attendance as a model. Poster presented at the Western Psychological Association 83rd Annual Convention, Vancouver, Canada.
- Strada, M., Farley, A., Stowman, S., Miller, A., Murphy, H., & Donohue, B. (2003, May). Development of achievement center, a student-focused training center for undergraduate and graduate students. Symposium conducted at the Western Psychological Association 83rd Annual Convention, Vancouver, Canada.
- Stowman, S., Skeem, J., Mulvey, E., Lidz, C., & Beeson, S. (2004, March). Gender, violence, and risk assessment accuracy. Poster presented at the American Psychology-Law Society Annual Conference, Scottsdale, AZ.

Stowman, S., & Donohue B. (2004, March). Use of Interviews to Identify Child Neglect Situations. Poster presented at the University of Nevada, Las Vegas Graduate and Professional Student Research Forum, Las Vegas, NV.

Stowman, S., & Donohue, B. (2004, May). The Use of Individual Interviews to Develop Potential Child Neglect Scale Items. Poster presented at the Nevada State Psychological Association Annual Conference, Reno, NV.

Stowman, S., Kearney, C., & Donohue, B. (2005, August). Consideration of Age and Special Needs in Child Neglect Assessments. Poster presented at the American Psychological Association 113th Annual Convention, Washington, DC.

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