

CHILDREN WITH PSYCHOLOGICAL DISTRESS OR EPILEPSY:  
SOMATIZATION AND ADAPTIVE SKILLS

A Dissertation

by

NICHOLE WICKER VILLARREAL

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

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: School Psychology

Children with Psychological Distress or Epilepsy: Somatization and Adaptive Skills

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Approved by:

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## ABSTRACT

Children with Psychological Distress or Epilepsy: Somatization and Adaptive Skills.

(August 2012)

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The following study examines two samples of children; children diagnosed as having a chronic illness, and children experiencing psychological distress. Children from both samples are at risk for similar things: poor social skills, challenges in establishing peer relationships, and the later development of psychiatric disorders in adulthood. Adding to these negative outcomes is the development of somatic complaints within each sample. Little research has examined children experiencing psychological distress prior to diagnosis, nor has a comprehensive study been conducted on children with epilepsy examining each of the adaptive skill areas. Further study of the adaptive skill areas for each group provides a foundation for understanding the strengths and weaknesses that each sample has. The following study is a quantitative, multisource, retrospective research project using parent/guardian completed rating scales relating to child behaviors; medical history information was also obtained from the chronic illness group. The relationship between somatic complaints and adaptive skills for children

experiencing psychological distress ( $n = 128$ ) was explored utilizing nonparametric statistical analysis. Additional nonparametric analyses were used for children with chronic illness ( $n = 94$ ) to understand the relationship between adaptive skills and somatic complaints with the added medical factors of duration of illness and age of onset.

The results of the children experiencing psychological distress suggest that age and sex play a role in adaptive skills, with both groups sharing common deficits in functional communication and adaptive skills. Internalizing and externalizing disorders were both positively correlated with somatic complaints, while adaptability and leadership were negatively correlated. The results of the epilepsy group indicate differing adaptive skill profiles for the complex partial (CP) and secondary generalized (SGTC) tonic clonic group. SGCT group had deficits in the areas of activities of daily living and leadership, while the CP group had no reported adaptive skill concerns but elevations in somatization. For both groups, onset and duration of illness were correlated with adaptability, functional communication and activities of daily living. Exploratory analysis utilizing teacher reports yielded negative correlations between somatization and functional communication, and deficits in the area of adaptability for the CP seizure group.

DEDICATION

To my husband

## ACKNOWLEDGEMENTS

I would like to thank my committee chairs, Dr. Riccio and Dr. Rae, and my committee members, Dr. Brossart and Dr. Heffer, for their guidance and support throughout the course of this research.

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## NOMENCLATURE

BASC-2 Behavior Assessment System for Children-Second Edition

YOQ Youth Outcome Questionnaire

PRS Parent Rating Scale

TRS Teacher Rating Scale

CP Complex Partial Seizures

SGTC Complex Partial Secondary Generalized Tonic Clonic



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## INTRODUCTION

Children with both chronic illness and children experiencing psychological distress are at risk for much the same things: psychiatric problems in adulthood, poor social skills, and challenges in peer relationships. Compounding these issues within each of the samples is the presence of somatic complaints. Somatic complaints are not limited to otherwise physically healthy children, they occur in samples of children with chronic illness as well.

For children with chronic illness and children experiencing psychological distress, the literature is unclear as to the developmental sequence of psychological disorders and the occurrence of somatic complaints. It has been suggested that somatic complaints occur before the development of the disorder, whereas other theorists suggest that they develop together. Still others suggest that the psychological diagnosis comes before, followed by the addition of somatic complaints. Their explanation behind these differing timelines is threefold: (1) children have lower verbal skills than adults; as a result their ability to express themselves when confronted with emotional distress results in somatic complaints, (2) specific personality and familial characteristics reinforce the somatic behaviors in the child or adolescent, and (3) the presence of specific risk factors (i.e., age, gender, ethnicity, socioeconomic status, cognitive ability, medication) affects the child's ability, both with and without a chronic illness such as epilepsy, to effectively adapt to different environments.

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

There is a muddled understanding of the relationship between psychological disorders and somatic complaints. The information documented in the literature that suggests a direct relationship between adaptive functioning and psychological wellbeing. This suggests that the understanding the specific domains in adaptive functioning for both of these groups (children with epilepsy and children psychological distress) prior to the development of a psychological disorder is an essential component in the later orchestration of effective practices to intervene.

It has been well documented in the literature that both samples have deficits in social skills and are at risk for psychiatric illnesses in adulthood; however, little research has been done examining children experiencing psychological distress prior to a psychiatric diagnosis. Nor, has a comprehensive study been conducted on children with epilepsy in each of the adaptive skill areas. Specifically, further study into each of the Adaptive Skill domains as measured by the Behavior Assessment Scale for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004) parent report (Leadership, Adaptability, Social Skills, and Functional Communication) provides a foundation for understanding the strengths and weaknesses that each sample has within the given domains. A better understanding of both children with epilepsy and children experiencing psychological distress lays the foundation for identifying effective interventions in the home, school, and community environment.

Examining somatic complaints and their relationship to adaptive scales from two differing perspectives (i.e., children with epilepsy and children experiencing psychological distress) adds to the literature in several unique ways. First, somatic

complaints in combination with adaptive skills have not been explored for either sample. Second, although the BASC-2 Parent Report has been widely regarded as an effective measure for examining the behavior of children, it has not been utilized within the context of understanding specific adaptive skills in either sample. Although concurrent validity studies have been conducted on other child behavior rating scales used to measure similar constructs, the BASC-2 has not been utilized in studies to comprehensively examine adaptive skills. Third, the instrumentation used in previous studies for both samples is often used to determine the presence of a psychological disorder, rather than measure adaptive skills. Fourth, in both samples, the previous measures used to explore adaptive skills only examined one component of adaptive skills: social skills. This is commonly done in the literature using one instrument with limited items measuring the construct, whereas the BASC-2 examines multiple components of adaptive skills (Leadership, Adaptability, Functional Communication, and Social Skills) using significantly more items.

A detailed literature review is provided in Appendix A. To add to the knowledge base, two independent studies are proposed. The first article is specific to children in psychological distress. This study attempts to address the relationship between somatic complaints and psychological distress, and the relationship that these two factors have to adaptive skills within this sample. The second article examines a sample of children diagnosed with a seizure disorder. This article addresses the deficits in the literature by comprehensively exploring the relationship between somatic complaints in this sample and adaptive skills.



An understanding of the factors contributing to the relationship between somatic complaints and adaptive skills functioning will lead to better understanding of these two samples of children and adolescents. As a result, school and community professionals will be better able to identify and implement effective interventions for each group in order to build adaptive skills. Likewise, it is the hope of the researcher that an exploration of this relationship prior to the development of a psychological diagnosis may inform other researchers regarding the function of somatic complaints as it relates to adaptive skills.

## MANUSCRIPT 1

**Somatic Complaints and Their Impact on Adaptive Skill Functioning in Children  
Experiencing Psychological Distress**

Parents often report that their children experience aches and pains. It has been well documented in the literature that these aches and pains will frequently increase in reporting severity among school aged children, resulting in distressing, somatic symptoms (Antipova, 2000; Campo & Fritsch 1994; Campo, Jansen-McWilliams, Comer & Kelleher, 1999; Garralda, 1996, 1999, 2010; Masi, Favilla, Millepiedi, & Mucci, 2000; Reif, Hennings, Riemer, & Euteneuer, 2010). If these complaints persist to a significant degree, a psychological diagnosis may be warranted and is called somatization disorder. The diagnosis of a somatization disorder is a complex one, but is generally characterized by the presence of persistent somatic complaints significant enough to impact daily functioning for at least three consecutive months (Antipova, 2000; Campo & Fritsch 1994; Campo et al., 1999; Garralda, 1996, 1999, 2010; Masi et al., 2000; Reif et al., 2010). The literature has explored possible correlates to the expression and maintenance of somatic complaints. One potential factor is the role of the parent and family constellation in the reinforcement and maintenance of somatic complaints, as well as their level of support and involvement in the child's life. With regards to adaptive skills, little research has focused on adaptive skills (social skills, activities of daily living, adaptability, functional communication, and leadership skills). A better understanding of the adaptive functioning in this sample and its relation to

somatic complaints could assist in working with children who are experiencing these problems.

### **Somatic Complaints in Children**

Somatic complaints are physical symptoms that are unaccounted for by pathological findings. Many times the symptoms are not significant enough to seek medical help or to be attributed to physical illness. Although these symptoms do not typically prompt a visit to the physician, the instance of somatic complaints appears to be on the rise. Research by both Antipova (2000) and Santalahti, Aromaa, Sourander, Helenius, and Piha (2005) suggested that more children and adolescents are experiencing somatic complaints at present than in the past. Parents are increasingly reporting recurrent somatic symptoms in their children (Antipova, 2000).

The prevalence and severity of children experiencing somatic complaints is a problematic one, with symptoms significant enough to impact all areas of function (e.g., academic and interpersonal). Goodman and McGrath (1991) found that between 2 to 10% of children have “functional” aches and pains for which there is no cause (p. 826). For children who are old enough to attend school, 10% had three occurrences of somatic complaints with severity significant enough to impact their daily activities. The prevalence rate of somatic complaints among males and females is unequal, with girls reporting more somatic symptoms than boys (Garber, Walker, & Zeman, 1991; Eminson, Benjamin, Shortall, Woods, & Faragher, 1996). Similarly, Offord et al. (1987) found this to be the case in 11% of girls and 4% of boys within the age ranges of 12-16 years. With increasing age, these gender differences appear to become more evident

(Libow, 2000). Irrespective of gender, somatic complaints in children play a significant role in their general psychological functioning.

### **Psychological Problems and Somatic Complaints**

Most children with somatic complaints do not have associated psychiatric disorders; however, approximately one-third to one-half has emotional problems. The most commonly diagnosed problems are anxiety and depression (Campo & Fritsch, 1994; Campo et al., 1999; Siegel, 1990; Tsao, Allen, Lu, Myers, & Zeltzer, 2009; Walker, Garber & Green, 1994). In some instances, the psychological disorder precedes the development of somatic symptoms, but more commonly than not the psychological disorder will begin to develop as the individual experiences somatic complaints (Campo & Fritsch, 1994; Campo et al., 1999).

Specific risk factors, including communication skills, personality, academic achievement, and behavior have been explored in relation to somatization and psychopathology (Kingery, Ginsburg & Alfanso, 2007; Lloyd, 1986; Tsao et al., 2009; Miers, Rieffe, Terwogt, Cowan, & Linden, 2007; Garralda & Rangel 1999). With regards to communication skills, children with somatic complaints typically have an impaired ability to verbalize distress, and as a result communicate this distress through somatic symptoms (Lloyd, 1986; Tsao et al., 2009). Increased stress, coupled with the inability to cope with emotions, leads to somatic complaints.

Additionally, specific personality characteristics may be precursors to the development of somatic complaints. Clinicians have consistently found that children identified with somatic complaints are typically conscientious, sensitive, insecure, and

anxious (Kingery, Ginsburg & Alfanso, 2007; Miers, Rieffe, Terwogt, Cowan, & Linden, 2007; Riangel, Garralda, Levin, & Roberts, 1999). These children are also described by others as “good” and focused on excelling in academic areas (Kingery et al., 2007; Miers et al., 2007). This creates a destructive cycle where high academic standards lead to stress resulting in an increased frequency in somatic complaints (Masi et al., 2000; Murberg & Bru, 2007).

In addition to academics, familial dysfunction also plays a role in the maintenance and initiation of somatic complaints. High levels of negative events (e.g., repeated failures, family discord, trauma, and death) are predictive of increased somatic symptoms. Campo, Jansen-McWilliams, Comer & Kelleher (1999) reported that non-intact families and families with lower parental education were associated with perceived health impairment, and more frequent use of physical and mental health services. Additionally, parental reinforcement of somatic symptoms and discouragement of alternative methods of coping with stress were reported to play a part in the maintenance and onset of the somatic symptoms (Gilleland, Suveg, Jacob, & Thomassin, 2009; Routh & Ernst, 1984; Walker, Garber, & Greene, 1989, 1994). In terms of parent-child relationships within the family systems, it has been suggested that children with somatic complaints experience a marked degree of closeness and togetherness in situations surrounding health issues; however, there is a lack of emotional intimacy in all other areas (Gilleland, Suveg, Jacob, & Thomassin, 2009; Routh & Ernst, 1984; Walker, Garber, & Greene, 1989, 1994). This combination of reduced parental involvement may

lead to the development of inadequate coping strategies and the later development of a somatization disorder in adulthood.

### **Statement of the Problem**

The relationship between somatic complaints and psychological functioning is a complex one. The literature reports that children experiencing psychological distress are at greater risk for developing psychological disorders. In the same way, children experiencing somatic complaints are also at greater risk for developing psychological problems (Campo & Fritsch, 1994; Campo et al., 1999; Siegel, 1990; Tsao et al., 2009; Walker, Garber, & Green, 1994). Complicating the matter is the development of somatic complaints and psychological problems in children. The literature indicates that psychological disorders and somatic complaints may develop at the same time as one another, prior to the development of psychological problems, or after. Although both problems significantly impact all areas of a child's life, including: home, school, and social relationships. While it is documented that the presence of somatic complaints and the later development of a somatization disorder occurs more often in females than males; familial factors and traumatic experiences have also been found to impact the severity and persistence of the somatic complaint. Little research has been done exploring the relationship that somatic complaints and psychological distress may have on adaptive skills (i.e., social competence, leadership, goal setting in social, educational and community settings, and resiliency when faced with changes and setbacks). Also of note, little research has been done exploring the adaptive skills of children experiencing psychological distress. Instead, the majority of studies have focused on samples of

children already diagnosed with a psychological condition. The focus of previous research has focused been limited to information gathered about the child to the number of activities and friends a child has, rather than through the use of psychometric measures that include a range of adaptive skills. Further, studies examining psychological distress are relatively nonexistent. Instead, it has been suggested that the absence of a psychological diagnosis is conclusive evidence that no problems exist in the area of social competence (Rantanen et al., 2009). This means that for children who are in the metaphorical gray area (i.e., do not meet specific DSM-IV-TR criteria for a psychological diagnosis but demonstrate several behaviors associated with a disorder, or children experiencing psychological distress as measured by another instrument), there have been no studies conducted regarding specific patterns of adaptive skills and levels of somatic complaints. This study examines both children and adolescents seeking psychological services at an outpatient counseling clinic. The participants have no previous psychological diagnosis, and data gathered for the purposes of this study was collected during the intake session, prior to any formal diagnosis.

### **Purpose of this Study**

The purpose of this current study is to address the gaps in the literature by exploring the relation between somatic complaints and adaptive skills, as measured by the Behavior Assessment System for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004) for a sample of children and adolescents experiencing psychological distress, as measured by the Youth Outcome Questionnaire (YOQ; Burlingame, Wells & Lambert, 1996b). More specifically, the study seeks to develop an understanding of the

sample by examining somatic complaints, psychological functioning, and the subsequent relationship psychological distress has on a child's adaptive functioning. Understanding somatic complaints and the differences in adaptive skills for a sample of children experiencing psychological distress is important because somatic symptoms occur at an early age and over time may be related to psychological problems. Additionally, understanding whether somatic complaints are more indicative of certain types of mental health problems in specific samples is important in tailoring effective and appropriate prevention and intervention programs. A clearer understanding of risk factors and adaptive skills and their relationship to somatic complaints may provide an initial framework for effectively working with children within this group who are at risk for developing a psychiatric disorder.

## **Method**

### **Research Design**

The following study was a quantitative, multisource, retrospective research project using parent/guardian completed rating scales related to child behaviors. The purpose of this study was to conduct an analysis of the relationship between somatic complaints and adaptive skills as measured by the BASC-2 for children referred to an out-patient clinic. Psychological distress was measured by the YOQ. The other variables that were examined in this study included adaptive skills (as measured by adaptability, activities of daily living, functional communication, leadership, and social skills subscales of the BASC-2) and level of somatic complaints (as measured by the BASC-2 somatization subscale) for each of the participants as reported by their parents.



Additionally, the potential impact of gender, age, and race/ethnicity were included in the analysis as possible covariates. Income was not coded into the database as a continuous variable; rather it was entered as an ordinal variable, with income ranges being equivalent to an assigned numerical code (i.e., dummy coded). Specifically, each participant was assigned a value based on the number of dependents living in the home and the annual income of the household. Based on this data each participant fell within the following categories: 100% poverty, 100-150% poverty, 150-185% poverty, and 185% poverty and above. The participants of this study were those consecutive cases in an already established archival database who meet selection criteria; there was no randomization or experimental conditions, and no adverse events were expected. Approval for the study was obtained from the Texas A & M Institutional Review Board.

### **Participants**

This study used archival information gathered from a de-identified data set. The group of subjects consisted of those consecutive referrals for counseling services to a university-based training clinic in the southwest. The children referred to this clinic were predominantly referred due to concerns with depression, anxiety, defiance, familial relationships, behavior problems, grief, abuse, and divorce. At the initial counseling session a parent of each participant was administered the YOQ. The YOQ was used to establish a baseline of severity for the child and adolescent client at the initiation of therapy. Children and adolescents with scores of 46 or higher are indicative of psychological distress (Burlingame, Mosier, Wells, Atkin, Lambert, Whoolery & Latkowski, 2001); other potential participants scoring below 46 were excluded from the

study. The selection criteria for participants included children ages 6 years 0 months to 17 years 11 months, completed parent form for the BASC-2 using combined norms, and a completed YOQ with a total score greater than 46.

### **Procedures**

Because the data used for the purposes of this study is archival, collection and coding systems were already established. The data were collected from intake reports and questionnaires completed by the clients' parents while in therapy at the training clinic. Intake reports consisted of individually administered questionnaires including measures of psychological severity, internalizing and externalizing disorders, adaptive functioning, social skills and parental relationships. Demographic information, including age, gender, race/ethnicity, and socioeconomic status, was also gathered. The information obtained was entered into a computer database and coded by graduate students formally in data collection and counseling. Only authorized individuals had access to the database; the database was de-identified to ensure the confidentiality of the information. The majority of the participants were primarily Caucasian males living in poverty and experiencing significant levels of psychological distress. Tables 1 and 2 provide further the demographic information for the sample.

Table 1  
*Individual Demographic Characteristics of the Sample*

Characteristic	<i>n</i> (%)
Sex	
Male	74 (57.8)

Table 1 Continued.

Characteristic	<i>n</i> (%)
Female	54 (42.2)
SES	
100% Poverty or Below	72 (56.3)
100 - 150% Poverty	28 (21.9)
150-185% Poverty	6 (4.7)
Above 185% Poverty	22 (17.2)
Ethnicity	
Caucasian	70 (54.7)
African American	15 (11.7)
Hispanic	32 (25.0)
Other	11 (8.6)

Table 2  
*Age and Psychological Functioning of the Sample*

Characteristic	<i>M</i> ( <i>n</i> = 128)	<i>SD</i>
Psychological Functioning		
YOQ Total	61.54	35.01
Range	47 - 150	
Age (years)	10.58	2.98

*Note.* YOQ = Youth Outcome Questionnaire.

## Measures

**Behavior Assessment System for Children, Second Edition (BASC-2).** The Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004) is a "multi-method, multidimensional system used to evaluate the behavior and self-perceptions of children and adults aged 2 through 25 years of age"

(Reynolds & Kamphaus, 2004, p. 1). This instrument is used to measure a variety of both positive and negative behaviors. The BASC-2 and its previous edition, the BASC, have been well documented as an appropriate instrument for the evaluation of behavior in children and adolescents (Merydith, 2001).

The administration of the BASC-2 is based on the age of the individual with separate forms for preschoolers (2-5 years), children (6-11 years), and adolescents (12-21 years). For the purposes of this study, the variables of interest include the Parent Rating Scale: the adaptive skills composite and subscales and the somatization complaints subscale. The adaptive skills composite includes the following measures: adaptability, social skills, functional communication, Leadership (Child and Adolescent reports only), Study Skills (Teacher Rating Scales-Child and Adolescent only), and activities of daily living (Parent Rating Scales only).

The BASC-2: Parent Report Scale is designed to be completed by the parent, guardian, or caregiver. The respondent then provides ratings based on a 4-point response scale, ranging from never to almost always to never. Each of the statements on the form concerns the student's behavior and adaptive functioning at home and in the community (Reynolds & Kamphaus, 2004). Higher scores on clinical scales indicate the presence of clinically significant behavior. A T-score of 70 or higher indicates clinically significant levels of concern for the clinical scales. A T-score between 60 and 69 indicates an at-risk level of behavior. On the adaptive scales, at-risk status is indicated at 31-40, and a T-score of 30 or less is significant and reflective of skill deficits observed by the parent.

In terms of reliability, coefficient alpha scores for the Parent Rating Scale are within satisfactory limits, ranging from .70 to .88. Coefficient alpha scores for somatization have a coefficient value of .83 (Reynolds & Kamphaus, 2004). For adaptive skills, coefficient alphas range from .92-.94. Within this composite scale are four subscales (with their respective coefficient alphas) adaptability (.76-.90), social skills (.86-.93), functional communication (.83-.91), and leadership (.86-.88).

The authors of the BASC-2 provide evidence of validity through scale intercorrelations, factor analysis, and concurrent validity. Correlations within scales are strong and positive indicating that as scores on one subscale increase scores on the other subscales within the scale increase. Of note, two subscales, somatization and anxiety on the Parent Report scale are less related to the other subscales. The highest intercorrelations are found within the externalizing scales (Reynolds & Kamphaus, 1992, 2004).

With regards to adaptive scales, the BASC-2 scales and composites for both the parent and teacher reports were correlated with the Social Skills and Problem Behaviors scales on the Social Skills Rating Scales (SSRS; Gresham & Elliot, 1990) for the purpose of establishing convergent validity for both (Flanagan et al., 1996). When the SSRS Social Skills scale was used as the criterion, convergent validity evidence was identified for the parent form of the BASC Social Skills scale. In a test review of the BASC-2, Stein (2007) reported that the thoroughness of the tests' authors has resulted in an impressive measure with strong reliability and validity.

**The Youth Outcome Questionnaire 2.0 (YOQ).** The Youth Outcome Questionnaire-2.0 (YOQ; Burlingame et al., 1996a) is a measure composed of 64 items. It is intended for repeated administration throughout a client's course of treatment, particularly at intake and termination, in order to track the general growth and progress of children and adolescents between the ages of 6 to 17 years old. It is completed by the child's parent, guardian, or other adult. Each of the 64 items is rated on a five point Likert-type scale (0 = never or almost never, 1 = rarely, 2 = sometimes, 3 = frequently, 4 = always or almost always).

The YOQ was developed as the child and adolescent version of the Outcome Questionnaire- 45 ([OQ-45] Lambert, Hansen, Umpress, Lunnen, Okiishi, and Burlingame, 1996) Like the OQ-45, it is intended to evaluate behavior, not psychopathology, and as a result, is not intended to be used as a diagnostic tool. It is comprised of six discrete subscales that include: Intrapersonal Distress (ID) = 18 items, Somatic (S) = 8 items, Interpersonal Relations (IR) = 10 items, Social Problems (SP) = 8 items, Behavioral Dysfunction (BD) =11 items, and Critical Items (CI) = 9 items. The total score is considered the most reliable index of change (Burlingame, Wells, Lambert, & Cox, 2004) and will be used as the basis for determining the level of distress experienced by the participants in the second group experiencing psychological problems in the current study.

Total scores on the YOQ can range from -16 to 240, with higher scores indicating endorsement of more problematic symptoms and less positive behaviors. The recommended YOQ cutoff score for distinguishing between community normal and

clinical scores is 46 (Burlingame et al., 1996a; Burlingame et al., 1996b). The YOQ is psychometrically sound, as it has been shown to meet recommended standards for reliability (Durlak, Wells, Cotton, & Johnson, 1995; Reisinger & Burlingame, 1997) and validity (Vermillion & Pfeiffer, 1993), and also demonstrates adequate sensitivity and specificity (Durlak, Wells, Cotton, & Johnson, 1995). With regards to reliability, for the YOQ, internal consistency of the total score across four samples using Cronbach's coefficient alpha was 0.94 (Burlingame, Mosier, et al., 2001). Another study (N = 467) reported the internal consistency of the YOQ total score to be 0.96 (Wells, Burlingame, Lambert, Hoag, & Hope, 1996). YOQ test-retest reliability, assessed using the Pearson product moment correlation has been shown to be  $r = .84$  average test-retest reliability (Burlingame, Mosier, et al., 2001).

The internal consistency for the YOQ-SR, has been found to be 0.95, and has been compared with the Child Behavior Checklist (CBCL; Achenbach, 1991) and Conners' Parent Rating Scale-93 (CPRS-93; Conners, 1990) both of which are commonly used parent report measures of child and adolescent psychosocial or behavioral dysfunction, with well-documented reliability and validity (Burlingame, Mosier, et al., 2001). The Pearson product moment correlation between CBCL total score and YOQ total score was shown to be 0.78 in both a community ( $n = 423$ ; Atkin, 2000) and clinical sample ( $n = 61$ ; Burlingame, Mosier, et al., 2001).

### **Data Analysis**

All of the data used was entered into SPSS statistical software for analysis by the primary researcher. Prior to analyses, the amount and type of missing data was

determined and subsequently excluded. Of the 170 available cases, 42 were excluded due to incomplete BASC-2 parent reports on the child. Initially 12 cases were eliminated from analysis due to missing BASC parent reports. Of these children the mean age was 12.58. Next 30 additional cases were excluded because YOQ scores were less than 46. Of these children the mean age was 10.37. Descriptive statistics were generated for demographic information. Demographic statistics, including frequency counts, means, and SD values were collected on the participants completing the YOQ and BASC-PRS. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The results of the normality tests for the variables: age, sex, race, and SES were significant. Initially descriptive statistics were run on the continuous variable of age to ascertain kurtosis (.307) and skewness (-.951). The results of the subsequent Kolmogorov-Smirnov test was significant ( $p < .01$ ) suggesting a violation of the assumptions of normality. Chi-square test also indicated an unequal distribution of the categorical variables: sex  $\chi^2(1, n = 128) = 3.125, p = .04$ ; SES  $\chi^2(3, n = 128) = 74.75, p < .01$ ; race  $\chi^2(3, n = 128) = 67.93, p < .01$ . As a result nonparametric techniques were utilized for further analyses of the data.

## **Results**

### **Research Question 1**

Are there any differences in adaptive scales (i.e., leadership, functional communication, adaptability, social skills, and activities of daily living, as measured by the BASC-2 Parent Report) between males and females? It was hypothesized that males would have lower levels of functional communication and social skills, but would



perform better than females in the areas of adaptability and leadership. Females were predicted to have higher scores in functional communication, social skills, activities of daily living and adaptability.

**Descriptive Summary of BASC-2 Scores.** Table 3 shows the means and standard deviations for each of the adaptive skill subscales for each sex as measured by the BASC-2 PRS as well as the results of the Mann-Whitney U test. In general, male children and adolescents were reported by their parents as having more adaptive deficits than their female peers. Specifically, male children had an at-risk composite score in the overall adaptive skills index (median T-score 37.00). Within the specific subscale areas, parents reported at-risk scores in the areas of adaptability (median T-score 37.00) activities of daily living (median T-score 36.00) and functional communication (median T-score 34.50). In contrast, female participant's overall adaptive skills index fell within average ranges. However, parents indicated at-risk levels of concern in two areas of adaptive skills functioning: adaptability (median T-score 38.50) and functional communication (median T-score 38.00). Male/female results are presented graphically in Figure 1.

Table 3  
*Descriptive Statistics by Sex for Parent BASC-2 (Mean, Median and SD)*

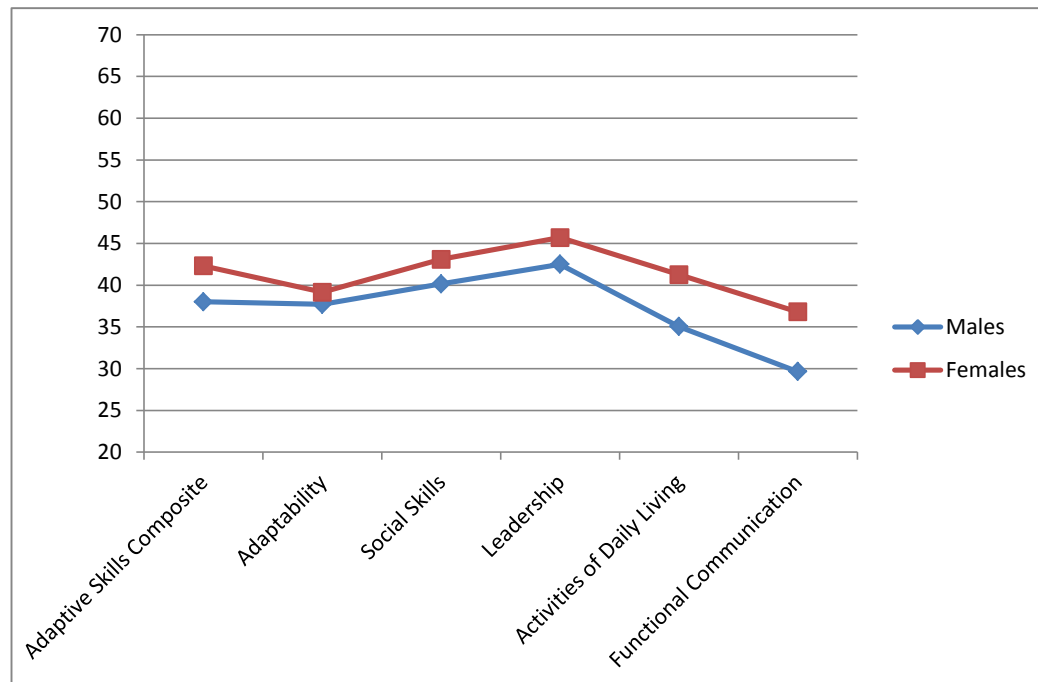
Variable	Males		Females		Z	p
	n	M/Md(SD)	n	M/Md(SD)		
<b>BASC-2 PRS</b>						
<b>Adaptive Skills Index</b>	74	38.00/37** (11.53)	54	42.31/39.5 (11.23)	-1.79	.07

Table 3 Continued.

	Males		Females		Z	p
	n	M/Md(SD)	n	M/Md(SD)		
<b>Adaptability</b>	64	37.70/37** (11.43)	46	39.17/38.5** (9.06)	-0.39	.70
<b>Social Skills</b>	74	40.15/39.5 (10.59)	54	43.11/42 (11.41)	-1.15	.25
<b>Leadership</b>	74	42.91/41.5 (10.46)	54	45.70/46 (11.13)	-1.39	.16
<b>ADL</b>	49	35.04/36** (12.13)	33	41.27/39 (11.61)	-1.94	.05*
<b>Func. Comm.</b>	62	29.65/34.5** * (18.69)	40	36.80/38** (18.74)	-2.23	.02*

*Descriptive Statistics by Sex for Parent BASC-2 (Median and SD)*

Note. PRS = Parent Rating Scale. Scores with \* indicate  $p < 0.05$  level (2-tailed). \*\*At-Risk ranges as reported by the parent. \*\*\* Clinically significant ranges as reported by the parent. Func. Comm. = Functional Communication; ADL = Activities of Daily Living



**Figure 1. Comparison of BASC-2 Results by Sex (Mean Scores)**

**Group Comparison.** Additional exploratory analysis was conducted using age and ethnicity. The results of the analysis, including means and standard deviations, are presented in Table 4 and Figure 2. Parents reported at-risk levels of concern in adaptability (Child mean and median T-score = 39.10, 39.00; Adolescent mean and median T-score = 36.32, 37.00), activities of daily living (Child mean and median T-score = 38.31, 39.00; Adolescent mean and median T-score = 36.32, 35.00), and functional communication (Child mean and median T-score = 33.77, 39.00; Adolescent mean and median T-score = 30.40, 37.00) for both children and adolescents. With regard to ethnicity, a Kruskal-Wallis Test revealed no statistically significant differences between the different ethnic groups and overall adaptive functioning as measured by the Adaptive Skills Index (Gp1,  $n = 72$ : Caucasian, Gp2,  $n = 28$ : African American, Gp3,  $n = 6$ : Hispanic, Gp4,  $n = 22$ , Other),  $H(3, n = 128) = 3.72, p = .29$ .

The Mann-Whitney U test was chosen because the categorical variable only contained two groups and, as previously mentioned, nonparametric techniques were utilized for analyses of the variables due to violations of normality. The Mann-Whitney U test was used to evaluate the differences between males and females for the BASC-2 Parent Report. The dependent variables were the adaptive subscales as measured by the BASC-2 Parent Report (adaptive skills subscales: social skills, leadership, functional communication, activities of daily living, and adaptability). The independent variables were the grouping variables that represent the two genders (male and female). The demographic variables of age and ethnicity were included as covariates. The results of the Mann-Whitney U test indicated significant differences in the activities of daily living

subscales between males ( $M = 35.04$ ,  $Md = 36$ ,  $n = 49$ ) and females ( $M = 41.27$ ,  $Md = 39$ ,  $n = 33$ ),  $U = 603.50$ ,  $z = -1.94$ ,  $p = .05$ , and the functional communication subscale: males ( $M = 29.65$ ,  $Md = 34.50$ ,  $n = 62$ ) and females ( $M = 36.80$ ,  $Md = 42$ ,  $n = 40$ ),  $U = 916$ ,  $z = -2.23$ ,  $p = .02$ . The results revealed that parents of males reported more severe deficits in these areas than parents of females. For this test each of the individual adaptive skills was entered into the Test Variable Box. The categorical variable was entered into the Grouping Variables Box, in this case the variable was gender. The groups were then defined: '1' was selected for males and '2' for females, the Mann-Whitney U box was checked, and analyses run.

An additional exploratory analysis was conducted examining the differences between children and adolescents. The Mann-Whitney U Test revealed a significant difference in the area of leadership when comparing children ( $M = 45.15$ ,  $Md = 44$ ,  $n = 80$ ) and adolescents ( $M = 42.31$ ,  $Md = 39.50$ ,  $n = 48$ ),  $U = 1534.50$ ,  $z = -1.89$ ,  $p = .05$ . The results indicate that parents reported higher competency levels in the area of leadership for children than adolescents.

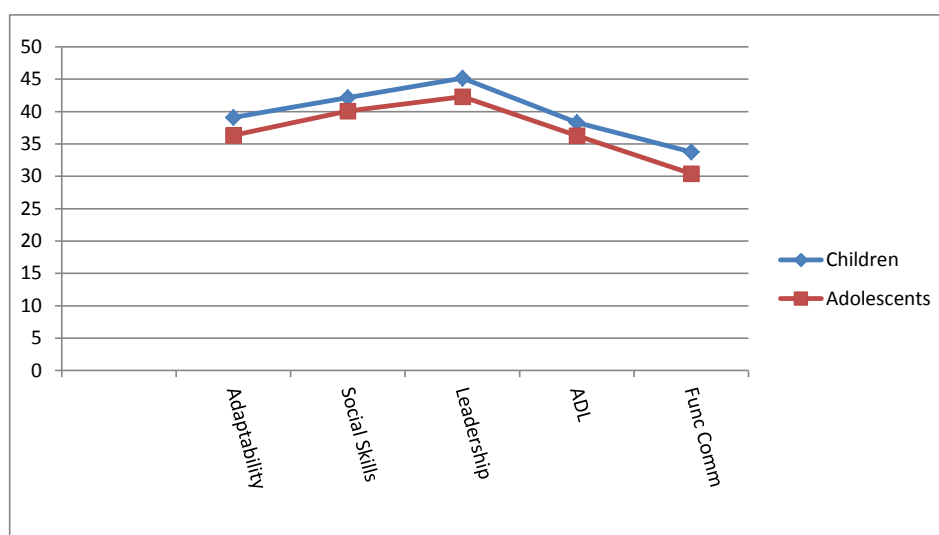
Table 4  
*Descriptive Statistics by Age Group for Parent BASC-2 (Mean, Median and SD)*

	Children		Adolescents		Z	p
	n	M/Md(SD)	n	M/Md(SD)		
<b>BASC-2 PRS</b>						
<b>Adaptability</b>	79	40.50/39 (10.51)	31	38.69/37** (10.31)	-1.11	.27
<b>Social Skills</b>	80	39.1/41** (11.55)	48	36.32/39** (9.99)	-1.15	.25

Table 4 Continued.

		Children		Adolescents		Z	p
	n	M/Md(SD)	n	M/Md(SD)			
<b>Leadership</b>	80	42.17/44 (10.47)	48	40.10/39 (11.19)	-1.90	.05*	
<b>ADL</b>	51	38.31/39** (12.39)	31	36.29/35** (12.11)	-1.12	.26	
<b>Func. Comm.</b>	62	33.77/39** (19.28)	40	30.40/37** (18.46)	-1.21	.23	
<b>YOQ Total</b>	80	53.5 (31.74)	48	67 (36.74)			

Note. PRS = Parent Rating Scale. Scores with \* indicate  $p < 0.05$  level (2-tailed). \*\*At-Risk ranges as reported by the parent. Func. Comm. = Functional Communication; ADL = Activities of Daily Living



**Figure 2. Comparison of BASC-2 Results by Age Group (Means)**

## Research Question 2

What is the relationship between psychological distress (as measured by the YOQ), somatic complaints (as measured by the BASC-2), and adaptive skills subscales ([adaptability, functional communication, social skills, activities of daily living] as measured by the BASC-2)? It was hypothesized that psychological distress would be inversely related to adaptive skills and somatic complaints would also be inversely related to adaptive skills. Spearman's *rho* correlations were determined for all variables.

**Correlational Analyses.** Spearman's *rho* correlation was used to determine the relationship between psychological distress (as measured by the YOQ), somatic complaints (as measured by the BASC-2), and adaptive skills subscales ([adaptability, functional communication, social skills, activities of daily living] as measured by the BASC-2). Two-tailed correlations were used because there was no strong prior theory to suggest whether the relationship between the variables would be positive or negative.

The results of the correlational analysis are presented in Table 5. Results indicated that there was a significant negative correlation between psychological functioning and all areas of adaptive skill functioning: activities of daily living, ( $rho = -.39, n = 89, p < .01$ ) functional communication ( $rho = -.39, n = 89, p < .01$ ), leadership ( $rho = -.36, n = 89, p < .01$ ), social skills ( $rho = -.33, n = 89, p < .01$ ), adaptability ( $rho = -.50, n = 89, p < .01$ ). In effect, increased levels of psychological distress were associated with lower reported adaptive skill behaviors in all areas. Likewise, the relationship between psychological distress and somatic complaints was also positively correlated, ( $rho = .424, n = 128, p < .01$ ). With regards to the relationship between somatic

complaints and adaptive skills, the BASC- 2 parent report indicated a negative correlation in the areas of adaptability ( $\rho = -.27, n = 110, p < .01$ ), and leadership ( $\rho = -.20, n = 110, p < .05$ ). Higher levels of reported somatic complaints were associated with lower levels of reported leadership and adaptability.

Table 5

*Summary of Correlations ( $\rho$ ) for Psychological Functioning, Somatization and the BASC-2 Parent Adaptive Subscales*

	<b>Psychological Functioning (YOQ)</b>	<b>Somatic Complaints</b>
<b>BASC-2 PRS</b>		
<b>Adap. Skills</b>	.46**	.20*
<b>Adaptability</b>	-.50**	-.27**
<b>Social Skills</b>	-.33**	-.04
<b>Leadership</b>	-.36**	-.20*
<b>ADL</b>	-.39**	-.01
<b>Func. Comm.</b>	-.39**	.00

Note. PRS = Parent Rating Scale; YOQ = Youth Outcome Questionnaire. Func. Comm. = Functional Communication; ADL = Activities of Daily Living  
Scores with \* indicate  $p < 0.05$  level (2-tailed). Scores with \*\* Indicate that the Correlation is significant at the 0.01 level (2- tailed)

### **Research Question 3**

What is the relationship between somatization levels (as measured by the BASC-2 Parent Report) and risk states as identified in the BASC-2 parent report (anxiety, depression, withdrawal and externalizing indices) for children and adolescents? It was hypothesized that higher somatization scores would be positively correlated with anxiety and depression and negatively correlated with each of the externalizing indices.

For this analysis a correlation using Spearman's  $\rho$  was run to examine the relationship between the somatization subscale (as measured by the BASC-2) and the anxiety, depression, and withdrawal subscales of the BASC-2). An additional exploratory analysis was conducted utilizing the subscales that comprise the externalizing and internalizing indices. It was hypothesized that higher somatization scores would be positively correlated with anxiety and depression and negatively correlated with the externalizing and internalizing Indices.

The results of the analyses (See Table 6) for both the internalizing and externalizing indices and subscales suggest a statistically significant positive relationship between somatic complaints and internalizing and externalizing behaviors. Specifically, parent reports indicated significance in the areas of anxiety ( $\rho = .51, n = 128, p < .01$ ) and depression ( $\rho = .45, n = 128, p < .01$ ). Additionally, exploratory analysis conducted utilizing the BASC-2 externalizing index and subscales also suggested a positive relationship: externalizing index ( $\rho = .20, n = 128, p < .05$ ), aggression ( $\rho = .22, n = 128, p < .05$ ), and hyperactivity ( $\rho = .24, n = 128, p < .01$ ). Specifically, the results suggest that the more significant the somatization symptoms the higher the likelihood that the child will behave in ways consistent with depression and anxiety, and are more likely to act out.



Table 6  
*Summary of Correlations (rho) for BASC-2 Parent Internalizing and Externalizing Subscales*

	<b>Internalizing Index</b>	<b>Anxiety</b>	<b>Depression</b>
<b>BASC-2</b>			
<b>Somatization</b>	.73**	.51**	.45**
<b>BASC-2 Externalizing Aggression Index</b>			
<b>Somatization</b>	.20*	.22*	.14
			.24**

Note. Scores with \* indicate  $p < 0.05$  level (2-tailed). Scores with \*\* indicate that the Correlation significant at the 0.01 level (2- tailed)

## Discussion

The literature surrounding somatic complaints and psychological distress is expansive. Numerous studies have documented the variables contributing to the development of a psychological disorder. Likewise, risk factors have been identified in the development and maintenance of somatic complaints and the later development of somatization disorder. However, the relationship that exists between the two has not been explored in depth and the impact that each has on a child's ability to successfully function and adapt in his/her environment is unknown. The purpose of this study was to further explore the relationship between somatic complaints and adaptive skills for a sample of children and adolescents experiencing psychological distress. This study included data on participants experiencing psychological distress and was retrospective in nature.

When exploring the differences in adaptive scales between males and females, males were expected to have at-risk scores in the areas of functional communication and

social skills, while females would demonstrate at-risk levels of performance in the area of leadership. The results of the analysis did not support the hypothesis. Both males and females were reported by their parents as having deficits in the areas of functional communication and adaptability; however males also were reported as having deficits in activities of daily living. Additionally, both males and females were reported by their parents as performing within typical ranges in social skills and leadership, with females also demonstrating competency in the area of activities of daily living. Notably, significant differences were found between gender groups in the areas of activities of daily living and functional communication with females evidencing less impaired functioning than males.

An exploratory analysis of the adaptive skill levels of children and adolescents was also conducted. The results of the analysis indicated similar areas of strength and weakness. Parents of both groups reported deficits in the areas of adaptability, activities of daily living and functional communication. However in terms of severity, parents of the adolescent group reported mean scores that were lower than the child group. Additionally, it was found that parents of the child group reported higher levels of leadership skills than that of the parent group. Higher mean scores in the child group relative to the adolescent group may reflect the participants' social development. Where children are highly supervised and structured during their daily activities, adolescence is often a time when more freedoms and new responsibilities are introduced. These results may be a reflection of the transition from childhood to adolescence rather than general deficits.

When exploring the relation between psychological functioning and adaptive skills, and somatic complaints and adaptive skills, it was found that clients experiencing psychological distress were significantly linked to all areas of adaptive skill functioning. The results indicate that the higher the degree of psychological distress the poorer the child or adolescent performance in all adaptive skill areas. In contrast, somatic complaints were only associated with adaptability and leadership. This suggests that the more frequent and prevalent the somatic complaints, the poorer the performance in these skill areas.

An additional correlational analysis was conducted in order to ascertain whether a relationship existed between somatic complaints and the internalizing and externalizing subscales. The results indicated a positive relationship between the somatization subscale and both internalizing and externalizing indexes. Specifically, higher levels of somatic complaints were associated with increased anxiety, depression, aggression and hyperactivity. This supports current findings in the literature that somatic complaints are consistently associated with anxiety and depressive symptoms in childhood and adolescence (Campo, 2012).

### **Limitations**

This study has several limitations. First, the study is based on retrospective data and the participants are a sample of convenience. Next, the sample consisted only of children and adolescents with reports by their parents that they were experiencing clinically significant levels of psychological distress (as measured by the YOQ) and excluded less severe participants. This may impact the generalizability of the results.

Further, the majority of the participants were Caucasian; it is unclear, whether these findings will generalize to other ethnicities. As a result, it is important that these findings be replicated with a different and a more ethnically diverse sample. Additionally, the majority of the participants lived at 100% poverty; as a result it is also questionable as to whether or not these results can be generalized to children and adolescents in other socioeconomic categories. Likewise, the participants' detailed medical records and health history were not obtained during the time that they received services. As a result, it is unclear as to whether or not they also had a co-occurring medical condition or chronic illness at the time that they received services. The presence of medical conditions could have a significant impact on the interpretation of the somatization scale of the BASC-2. Another limitation is the exclusive examination of parent ratings with no self-report or teacher ratings. Multi-rater reporting of the participants may have provided better insight into the functioning of this sample.

There were several limitations to the analyses conducted as well. First, because of the skewed nature of the data statistical analyses were limited. Second, the sample included children ages 6 through 17, which required that multiple forms of the BASC-2 be utilized (e.g., child and adolescent parent report forms). The variation in the forms also resulted in differences in scale items by rater and by age. Third, the YOQ is not sensitive to age, as a result there may be an internal threat to the validity of the results. Additionally, several of the analyses were correlational in nature and as such no inferences regarding causality may be made.

### **Implications of the Study**

The findings of this study suggest that the age and sex of the children experiencing psychological distress is related to the adaptive skill areas that they will demonstrate competence and weaknesses in. Additionally, individuals experiencing somatic complaints are just as likely to demonstrate internalizing and externalizing disorders. Additionally, the likelihood of associated anxiety and depression increases with the number of reported somatic symptoms. Likewise, anxious and depressive symptoms and disorders in childhood are associated with subsequent multiple somatic complaints (Campo, 2012). Because of this, it is important to tailor therapy to address the different ways that the child chooses to cope with and manifest their feelings. Based on the data, it appears that the most impacted areas of adaptive skills functioning for both age and sex are functional communication and adaptability. As a result, these are the areas that should be considered as possible secondary targets for intervention.

### **Directions for Future Research**

The current study is an exploration of the cross-sectional findings of the adaptive skills subscales in a sample of children and adolescents experiencing psychological distress; however, it only provides the first indication of adaptive skills functioning at one point in time. Additional longitudinal studies are needed in order to fully establish the relationship between somatic complaints and adaptive skills in this sample. Future research should be directed toward further examination of the relationship between somatization externalizing and internalizing disorders. Understanding the specific factors that may contribute to a child developing one type of disorder over another may help in

better conceptualizing the development of somatic complaints and interventions to deter the later development of a somatization disorder. Also of importance is the potential developmental component of these adaptive skills. The results of this study indicate that competency levels in the area of leadership are different for children and adolescents. Future longitudinal research is needed to investigate age-based relationships. Specifically, whether or not the adaptive skill deficits are maintained, or become more significant as the child grows into adolescence and into adulthood. Lastly, further exploration into the gender differences in the tasks reflected in the activities of daily living subscale is needed. Specifically, studies that further explore competence in specific environments and social systems are important in understanding the different patterns of strengths and weaknesses females and males.

### **Conclusion**

In summary, the findings of this study suggest that age and sex do play a role in adaptive skills within a sample of children and adolescents experiencing psychological distress; however, both groups also have underlying similarities in their adaptive skill profiles, with deficits in both groups in the areas of functional communication and adaptability. Additionally, the positive relationship between somatic complaints and internalizing and externalizing disorders suggests that the behavioral manifestations for what is traditionally characterized as an internalizing disorder can also lead to acting out behaviors. Also of note was the negative relationship found between the somatization subscale and the adaptive skill areas of adaptability and leadership. The differences found in this study and commonalities based on age and sex may serve to better inform

interventions for a sample of children and adolescents experiencing psychological distress. Further research is necessary to better understand the adaptive skill profile associated with somatic complaints and psychological distress.

## MANUSCRIPT 2

**Somatic Complaints and Impact on Adaptive Skills in Children with Epilepsy**

It is not uncommon for children and adolescents to enter the medical system with persistent or recurrent physical complaints such as headaches, dizziness, or abdominal pain which, following a thorough medical evaluation, have no identified root organic cause. In some instances, the physical complaint may be interpreted as an emotional response (e.g., anxiety depression, anger) but may be physically based. This process of experiencing a physical complaint in place of an emotional response is known as a somatic complaint. The prevalence rates for somatic complaints in healthy children and adolescents ranges between 2 to 10%, with higher instances in girls compared to boys (Goodman & McGrath, 1991; Mash & Barkley, 2003).

Somatic complaints are not exclusively limited to otherwise healthy children; they are also present in children with chronic illness. Children diagnosed as having a chronic illness have been living with the illness for at least three months (Tidman, Saravanan, & Gibbs, 2003). Like healthy children with somatic complaints, children with a chronic illness are often prevented from participation in daily activities, and their chronic illness may alter their interaction with parents, teachers, and friends.

Among chronic illnesses, epilepsy is the most common neurological condition in childhood, and is diagnosed in children who experience two or more unprovoked seizures (Dreisbach, Ballard, Russo, & Schain, 1982). Children living with this illness experience the stress of ongoing medical interventions including medications, possible



surgeries, and therapies which take away from their participation in other environments (e.g., school, community). Added to the stress of coping with a chronic illness are the risks for psychological problems.

Studies of psychological functioning of children with epilepsy have highlighted the relationship between seizure variables (e.g., cognitive ability, academic difficulties, parent relationships, and medications) and psychological well-being (Besag, 1995; Cornaggia & Gobbi, 2001; El Sabbagh, Soria, Escolano, Bulteau, & Dellatolas, 2006; Ellis, Upton & Thompson, 2000; Gledhill, & Garralda, 2006; Hooper, Murphy, Devaney, & Hultman, 2000; Masi et al., 2000; Murberg, & Bru, 2007; Rodenburg, Meijer, Dekovic, & Aldenkamp, 2006; Schilte, Portejijis, Blankenstein, Latour, & van Eijk, 2000). Of critical importance is the role that the different adaptive skills areas contribute to overall psychological functioning. Psychological functioning in children with epilepsy is influenced by a multitude of factors, and as a result, determining contributors to psychological functioning, and ultimately adaptive skills, is an important area of investigation. Most studies have focused exclusively social skills or their synonymous term, social competence. The definition of both terms is the same. Social skills or social competence emphasizes the role of interpersonal adaptation. That is, the ability to successfully interact with others in different interpersonal settings (e.g., offering assistance, encouraging others, engaging in cooperative behaviors, and having manners). Exploration of this single component of the adaptive skills subset suggests a significant relationship between the level of social skills, or social competence, and the child's level of psychological functioning. The research on social skills in pediatric

participants with epilepsy has several limitations. First, the available research has concentrated on the psychiatric aspects of behavior rather than the entire spectrum of adaptive skills that include social skills and competence (i.e., mastering developmentally appropriate peer relationships). For the purposes of this study, social skills will be the terminology utilized to describe the specific component of adaptive skills that relates social interaction and interpersonal relationships. Additionally, all other adaptive skill components will be examined as part of this study, this includes: adaptability, leadership, functional communication, and activities of daily living.

With regards to adaptive skills, little research has focused on specific areas of performance; instead the emphasis has been on the number of outside activities and friends the child reports, regardless of the individual child's skill level. Next, the literature mentions several terms, which include social skills, social competency, and social adaptation, all of which are interchangeable and represent only one component of adaptive skills (social skills) as used in this study. Lastly, there has been no examination of specific adaptive skill deficits in children with chronic illness. Studies have examined children with a psychological diagnosis and co-occurring somatic complaints, but none have looked at the somatic complaints of children with a chronic illness (Caplan et al., 2005a; Deater-Deckard, 2001; Jellesma et al., 2008).

A clearer understanding of levels of adaptive functioning within this sample and their relationship to somatic complaints could provide an initial framework for working with chronically ill children who are experiencing these problems. This paper examines the cognitive, psychological, and social functioning of children with epilepsy in relation

to somatic complaints. The first part of the paper briefly describes the etiology, diagnosis, epidemiology, and pharmacological treatment of epilepsy. The cognitive, parental and epileptic contributors to poor social outcomes in children with epilepsy are also explored.

### **Chronic Illness in Children: Epilepsy**

There are many forms of chronic illness ranging in severity of symptoms and medical treatments which include, among others, children living with diabetes, asthma, AIDS and epilepsy. The focus of this study is children living with epilepsy. Epilepsy is a broad term used to describe numerous features with variation in etiology and clinical characteristics. Childhood epilepsy cases are associated with multiple causes including neurological deficit present at birth, cerebrovascular disease, trauma or infection. With the diagnosis of epilepsy, there are risk factors for a multitude of problems including psychological disorders, cognitive and academic deficits, familial problems, adaptive skill deficits, and somatic complaints (Austin et al., 2001, 2004; Austin, 2005; Barry, Lembke, Gisbert, & Gilliam, 2007; Burack, 1997; Pless & Pinkerton, 1975; Rutter, Tizard, Yule, Grahm & Whitmore, 1970).

**Cognitive and Academic.** The cognitive functioning of a child with or without a chronic illness significantly impacts all aspects of life. This is especially evident in children with epilepsy. Within this sample as well as in the general sample, children with a low IQ are more likely to experience psychosocial and behavioral problems (Austin, Smith, Risinger & McNelis, 1994, Austin, Huster, Dunn & Risinger, 1996; Lewis et al., 2000; Rutter, 1989; Sabaz, Cairns, Lawson, Bleasel & Bye, 2001; Sabaz et al., 2001).

Among children with epilepsy, 28 to 38% have mental retardation (Sabaz et al, 2001). Additionally, there are a large percentage of children with epilepsy who have low (IQ 70-80) cognitive abilities, while the remaining individuals with epilepsy have an IQ that is 10 points lower than their healthy peers (Dodson, 2001) whose severity varies from one epilepsy syndrome to another (Cornaggia, Beghi, Provenzi & Beghi, 2006).

Likewise, somatic complaints have been found to have increased prevalence with lower cognitive abilities (Beulow et al., 2003). Even with normal intelligence, children with epilepsy have deficits in multiple areas (e.g., attention, reaction time, spatial and emotional memory, and reading, writing, and math) that may be directly related to cognitive function (Besag, 1995; Cornaggia & Gobbi, 2001; El Sabbagh, Soria, Escolano, Bulteau, & Dellatolas, 2006; Tidman, Saravanan, & Gibbs, 2003; Sillanpaa, 1992; Williams, 2003).

**Psychological Adjustment and Adaptive Functioning.** Epilepsy has been increasingly recognized as a risk factor for negative outcomes in numerous areas of the lives of children and their families. These include the psychological, emotional, and social comorbidities that children with epilepsy commonly experience (Austin et al., 1996; Mitchell, Scheier, & Baker, 1994). For children diagnosed with uncomplicated seizures, the prevalence rate of co-occurring psychological disorders is 28.6% and increases to 58.3% with central nervous system damage, while the prevalence rate of psychological disorders in otherwise healthy children is 6.6% (Freilinger, Reisel, Reiter, Zelenko, Hauser, & Seidl, 2006).

Long-term studies have shown that the social and psychological outcomes of adults with childhood onset of epilepsy are poor (Camfield, Camfield, Smith, Gordon, & Dooley, 1993; Jalava, Sillanpaa, Camfield, & Camfield, 2005). Specifically, studies conducted on cognitively normal, young adults with a history of epilepsy in childhood have indicated a high prevalence of poor psychosocial outcomes including: lower levels of educational attainment, greater unemployment, poorer SES, and lower marriage rates (Camfield et al., 1993; Jalava et al., 1997; Wirrell et al., 1997; Kokkonen, Kokkonen, Saukkonen, Pennanen, 1997; Sillanpaa, Jalava, Kaleva, & Shinnar, 1998). For children and adolescents, the incidence, frequency, and intractability of seizures have been found to be predictive of internalizing (e.g., anxiety and depression) and externalizing (e.g., aggression and disruptive behavior) behavior problems in children (Austin & Dunn, 2002; Austin, Dunn, Johnson, & Perkins, 2004; Austin, 2005; Austin & Dunn, 2006; Dunn, Austin, & Huster, 1999; Keene et al., 2005; 2000; Schoenfeld, Seidenberg & Woodard, 1999). Studies also report an increased prevalence of poor social competence and greater social isolation (Davies, Heyman, & Goodman, 2007; Drewel, Bell, & Austin, 2009; Ferrari, Matthews & Barabas, 1983)

In addition to the behavioral and cognitive relationships previously mentioned, children with epilepsy are confronted with social difficulties (Nassau & Drotar, 1997; Piazzini, & Canger, 2001). Relationships have been found in the literature examining social skills and social competence and chronic illness factors including pain, physical handicap, poor seizure control, treatment, and longer duration of illness (Herrman, Whitman, Hughes, Melyn & Dell, 1988; McCusker et al., 2007; Schoenfeld et al., 1999;

Williams, Sharp & Lange et al., 1996). Little, however, has been done to assess other adaptive and social skills specific to this sample of children.

### **Statement of the Problem**

Although, epilepsy is by far one of the most studied and explored chronic illnesses, research has not examined the relationship between somatic complaints, social skills, and psychological functioning (Austin et al., 2001; Austin & Dunn, 2006; Austin, 2005; Austin et al., 2004; Barry et al. 2007; Burack, 1997; Pless & Pinkerton, 1975). Current studies suggest that the presence of epilepsy contributes significantly to the child's inability to develop a positive sense of self and increases the likelihood of poor adaptive skills. The likelihood of these problems developing is increased by poor cognitive functioning, behavioral problems, and social skill deficits (Besag, 2003; Cornaggia & Gobbi, 2001; El Sabbagh et al., 2006; Nassau & Drotar, 1997; Piazzini, & Canger, 2001; Tidman, Saravanan, & Gibbs, 2003; Sillanpaa, 1992).

### **Purpose of this Study**

The purpose of this current study was to explore the relationship between the level of somatic complaints (as measured by the somatization subscale of the Behavior Assessment System for Children- Second Edition (BASC-2; Reynolds & Kamphus, 2004) and adaptive skills, as measured by the BASC-2, for a retrospective sample of children with epilepsy.

### **Significance of the Study**

Children diagnosed with epilepsy in childhood are at risk for a multitude of problems; among these is poorer performance in areas of psychological functioning, peer

relations, and academic achievement. It is important to understand the somatic complaints and the differences in adaptive skills in a sample of children with epilepsy because adaptive skills may be indicative of later developing psychological problems. Identifying problems in each of the adaptive skill areas as early as possible provides the opportunity for each of the children to receive interventions. Early interventions designed to address these deficits may contribute to better adaptive skills outcomes in adulthood.

## **Method**

### **Research Design**

This study was a quantitative, retrospective research project using an existing data base with parent/guardian completed rating scales related to child behaviors and medical history information. The purpose of this study was to conduct an analysis of the relationship between somatic complaints and adaptive skills as measured by the BASC-2 for children with epilepsy. Additionally, the potential impacts of gender, age, race/ethnicity, socioeconomic status, seizure type, cognitive ability, duration of illness, and age of onset were explored. The participants of this study did not participate in any randomized or experimental conditions; as a result no adverse events were expected. Approval for the study was obtained from the Texas A&M Institutional Review Board (IRB).

### **Participants**

This study used archival information gathered from a de-identified data set obtained from a tertiary care center for epilepsy in the south. Participants included those individuals with epilepsy who meet criteria for inclusion. For this study, a review of an

existing database was conducted to identify participants between the ages of 4 and 18 who had been administered the BASC-2 Parent Report and had a diagnosis of epilepsy for at least a year. The following exclusionary criteria were used: (a) children with a diagnosis of epilepsy for less than a year, (b) omission of the BASC-2 parent report or (c) a cognitive ability below 70. Data was collected on each child, including epilepsy type [Generalized Tonic-Clonic, Absence, Myoclonic, Akinetic, Partial, Complex/Partial (CP), Complex/Partial secondary generalized tonic-clonic (SGTC) and Febrile]. For the purposes of this study only those children with CP and SGTC were utilized to comprise the data set those individuals with the least frequently occurring epilepsy types were excluded from the study. The dependent variables that were examined in this study were the adaptive skills and level of somatic complaints of each of the participants as reported by parents on the BASC-2. Exploratory analyses were conducted utilizing the BASC-2 Teacher Report. Additional information collected included etiology, severity of head injury (if present), hemisphere, lobe, duration of seizure, medications, and learning disability type.

### **Procedures**

Approval for this research study was obtained from the Texas A & M University IRB following the completion of the proposal and prior to the analysis of the data. Because the data for this study is archival, collection and coding systems were already established. Data from the sample was collected from comprehensive neuropsychological reports. Prior to the time of assessment, parental consent and child assent were obtained. Neuropsychological assessment reports included a measure of



cognitive functioning (as measured by the Wechsler Intelligence Scale for Children- 3<sup>rd</sup> and 4<sup>th</sup> Edition, WISC-III and IV), two measures of psychological and behavioral functioning (BASC-2), as well as additional data measuring global neuropsychological functioning. Demographic information including, age, race/ethnicity, gender, income, and type of epilepsy were provided in the database. See Tables 7 and 8 for a summary of the demographic data for this sample.

Table 7  
*Individual Demographic Characteristics of the Sample*

Characteristic	<i>n</i> (%)
<b>Seizure Type</b>	
Complex Partial	68 (72.3)
Complex Partial-SGTC	26 (27.7)
<b>Sex</b>	
Male	58 (61.7)
Female	36 (38.3)
<b>Annual Income</b>	
>\$10,000	10 (10.6)
\$10-20,000	14 (14.9)
\$20-30,000	18 (19.1)
\$30-40,000	11 (11.7)
\$40-50,000	9 (9.6)
>\$50,000	32 (34.0)
<b>Ethnicity</b>	
Caucasian	70 (74.5)
African American	19 (20.2)
Hispanic/Other	5 (5.3)

*Note.* Complex partial-SGTC = secondary generalized tonic-clonic.

Table 8  
*Epilepsy and Cognitive Characteristics of the Sample*

Characteristic	<i>M</i> ( <i>n</i> = 94)	<i>SD</i>
Age (years)	10.96	2.99
Cognitive Functioning		
FSIQ	85.87	10.91
Epilepsy		
Onset (years)	5.55	3.57
Duration (years)	5.30	3.93
SGTC	5.25	3.02
CP	5.32	4.24
Number of Medications	<i>n</i> (%)	
No Medications	5 (5.3)	
SGTC	0 (0)	
CP	5 (5.3)	
One Medication	33 (35.1)	
SGTC	9 (25.5)	
CP	24 (9.6)	
Two Medications	38 (40.4)	
SGTC	13 (13.8)	
CP	25 (26.6)	
Three Medications	17 (18.1)	
SGTC	13 (13.8)	
CP	4 (4.3)	

*Note.* FSIQ = full scale intelligence quotient. One case was missing information on medications.

In total, 94 children and adolescents with epilepsy were included in this study. The sample was composed of 58 males and 36 females, ranging in age from 4 to 18, with a mean age of 10.96 (SD = 2.99). Of these participants, 68 (72.3%) had a diagnosis of complex partial seizures and 26 (27.7%) had a diagnosis of SGTC. The sample had been living with a seizure disorder for an average of 5.30 years (SD = 3.93) and came from various ethnic backgrounds, with 74.5% Caucasian, 20.2% African American, and 5.3%

Hispanic. The sample had IQ's ranging from 70 to 115, with a mean IQ of 85.87 (SD = 10.91).

## **Measures**

**Behavior Assessment System for Children, Second Edition (BASC-2).** The BASC-2 system is used to evaluate the behavior and self-perceptions of children and adults aged 2 through 25 years of age (Reynolds & Kamphaus, 2004). The BASC-2 has been well recognized as an appropriate instrument for the evaluation of behavior in children and adolescents (Merydith, 2001; Stein, 2007; Bergeron, Floyd, McCormack & Farmer, 2008). The administration of the BASC-2 is based on age, with separate forms for both. The interpretation of the BASC-2 scales and subscales is based on T-scores. T-scores from 60 through 69 on the clinical scales and 31 through 40 on the adaptive scales are considered at-risk. T-scores of 70 and above on clinical scales and 30 and below on adaptive scales are considered clinically significant.

The BASC-2 includes two validity scales that were designed from standardization data: F ("faking bad") and L ("faking good"). The V (validity) index was developed before standardization so that records likely to be invalid for reasons such as carelessness, inattentiveness, or cognitive limitations could be eliminated. Additionally, the BASC-2 demonstrates convergent validity with other test instruments that include the Social Skills Rating Scale (SSRS), the Child Behavior Checklist (CBCL), and the Achenbach System of Empirically Based Assessment (ASEBA) (Achenbach & Rescorla, 2001; Gresham & Elliot, 1990, Merydith, 2001; Reynolds & Kamphaus, 2004).

For the purposes of this study, the variables of interest from Parent Rating Scale included the adaptive skills composite and subscale scores, as well as the somatization subscale. The adaptive skills composite includes the following subscales: adaptability, social skills, functional communication, leadership, and activities of daily living. The reliability range, using the coefficient alpha, for each of the each of the subscales for ages 6 -18 is as follows: adaptability (.81 - .84), leadership (.82 - .86), activities of daily living (.72 - .76), functional communication (.84 - .88), and social skills (.84 - .88). It is important to note that two adaptive subscales (activities of daily living and social skills) occur exclusively in either the parent or teacher report.

The somatization subscale represents only one part of the internalizing scale. This scale assesses the tendency of the child or adolescent to be overly sensitive about relatively minor physical problems and over report the frequency of these complaints. It is composed of items that cover topics including doctors' visits and physical ailments (e.g., visits school nurse, gets sick, has headaches, is afraid of getting sick, makes frequent visits to the doctor, etc.). The reliability for the somatization subscale for children ages 6 to 18 ranges from .79 to .84, Convergent validity for this subscale was evidenced when comparisons of the BASC-2 PRS and the CBCL were made. The results indicated significant correlations on the subscale measuring somatization (BASC-2) and somatic complaints (CBCL)  $r = .63$  (Reynolds & Kamphaus, 2004).

Exploratory analysis was also conducted from the database utilizing the adaptive skills subscales of the BASC-2 teacher reports (adaptability, functional communication, social skills, and leadership). The purpose of the exploratory analysis was to better

understand the trends in reporting patterns between the two groups of respondents. Understanding these patterns could provide insight into the adaptive skills profiles for each of the two epilepsy groups.

**Wechsler Intelligence Scale for Children (WISC).** The Wechsler scales are commonly used measures of ability for children and adults. Because of the retrospective nature of the study, children had different editions of the Wechsler scales. Each of the participants in this study was given the WISC-III or IV, as a measure of cognitive ability (Wechsler, 1991, 2003). The WISC-IV (Wechsler, 2003) is an individually administered intelligence test for ages 6-16 years. The instrument was standardized on 2,200 children aged 6 years 0 months to 16 years 11 months, who closely matched the U.S. sample on the basis of gender, race, parental education, and geographic region. The WISC-IV is composed of four index scores: (Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed) and a Full Scale IQ. For the purposes of this study, the results of the WISC III and IV are included for descriptive purposes with consideration of FSIQ only. The correlation of the WISC-IV with the previous version of the WISC (the WISC-III) is high ( $r = .89$ ).

### **Data Analysis**

All of the data used were entered into SPSS statistical software for analysis by the primary researcher. Cases with missing data were excluded. Of the 164 cases, 70 were excluded. Initially 38 cases in the data sample were excluded that did not have an IQ greater than 70. Next 20 additional cases were excluded due to missing BASC data. Finally, 12 cases were eliminated from analysis due to the type of epilepsy and the

limited number of cases available. Descriptive statistics were generated for demographic information. Demographic statistics, including frequency counts, means, and SD values were collected on the participants completing the BASC-PRS and the TRS. Participants were divided into two groups based on their medical diagnosis (CP, and SGTC).

Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. Initially descriptive statistics were run on the continuous variable of age and onset to ascertain kurtosis (age = -.83; onset = .03) and skewness (age = -.02; onset = .55). The results for the variables age and onset, using the Kolmogorov-Smirnov statistic, were within normal limits: age ( $p = .08$ ) and onset ( $p = .20$ ) showing no violation of the assumptions of normality. The results of the normality tests for the remaining variables: sex, race, and SES (as measured by income) were significant. Specifically, Chi-square tests indicated an unequal distribution of the categorical variables: sex  $\chi^2(1, n = 94) = 5.15, p = .02$ ; SES  $\chi^2(2, n = 94) = 74.70, p < .01$ ; race  $\chi^2(5, n = 94) = 23.83, p < .01$ . As a result, nonparametric techniques will be utilized for further analyses of the data.

## **Results**

### **Research Question 1**

What do the adaptive skills, as measured by the BASC-2 Parent Report, look like for children with different types of epilepsy? It was hypothesized that the children and adolescents in the CP group would have at-risk or clinically significant scores in all of the areas of functioning, whereas, the children and adolescents in the SGTC group as

reported by their parents, would have levels of adaptive skill functioning and somatization scores that fall within typical ranges.

**Descriptive Summary of BASC-2 Scores.** Table 3 shows the means and standard deviations for each of the somatization and adaptive skill subscales as measured by the BASC-2 PRS and each of the seizure types. Children and adolescents diagnosed as having CP seizures were reported by their parents as being in the at-risk range in the area of somatization, with no concerns in any of the adaptive skill areas with BASC T-scores falling within typical ranges when compared to healthy peers (See Table 9). In contrast parent reports of the SGTC seizure group indicated at-risk levels of concern in the areas of functional communication and activities of daily living subscales. No deficits were reported by the parents for either group in the areas of adaptability or leadership. Specifically, the range of means for each of the seizure groups in the adaptive skill subscales is as follows: adaptability (T-scores 43.14 - 45.49), leadership (T-scores 40.24 - 43.36), activities of daily living (T-scores 38.23 - 42.80), and functional communication (T-scores 37.85 - 41.76). Additional exploratory analysis was conducted using the BASC-2 Teacher reports. Table 9 shows the means and standard deviations for each of the somatization and adaptive skill subscales as measured by the BASC-2 TRS and each of the seizure types. The results these analyses indicate that children and adolescents from the CP seizure group were reported by their teachers as being at risk in the areas of somatization and adaptability. Participants in the SGTC seizure group were reported by their teachers to be within normal ranges in all areas except somatization.

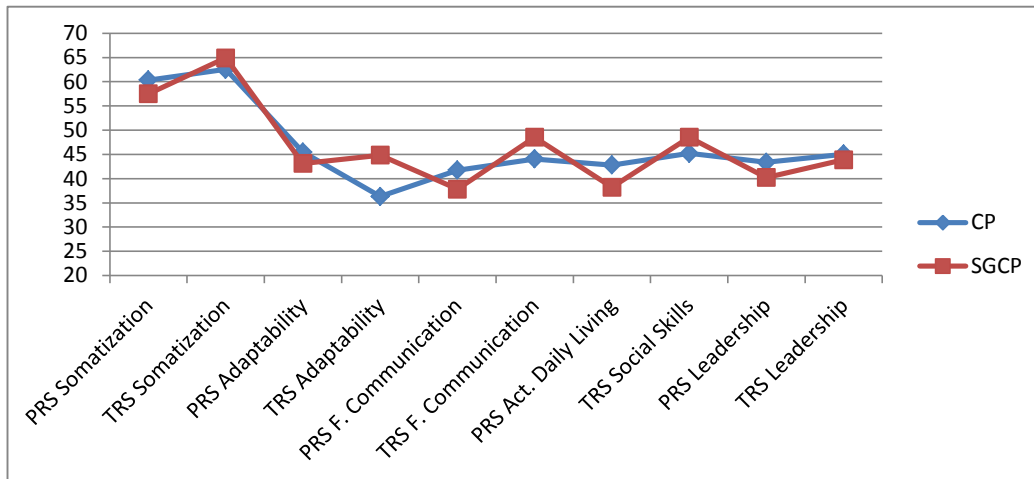
**Group Comparison.** The Mann-Whitney U Test was used to evaluate the differences between epilepsy groups for both the BASC Teacher and Parent Reports. The Mann-Whitney U Test was chosen because the categorical variable only contained two groups and, as previously mentioned, nonparametric techniques were utilized for analyses of the variables due to violations of normality. The dependent variables were the adaptive subscales as measured by the BASC-2 Parent Report (adaptive skills subscales: activities of daily living, leadership, functional communication, adaptability, and somatization from the internalizing index). For exploratory analysis, BASC-2 Teacher Report (adaptability, functional communication, social skills, leadership and somatization from the internalizing index) were the dependent variables. Results of the Mann-Whitney U Test indicated no differences on any variables of interest ( $p > .05$ ; see Table 9 and Figure 3). An additional exploratory Mann-Whitney U Test was conducted utilizing teacher reports. The results of the analyses for the BASC-2 parent report revealed no significant difference in the adaptive subscale levels of the two different epilepsy groups and teacher reports for both groups indicated that there were no statistically significant differences ( $p > .05$ ) in the adaptive skill subscales between the two epilepsy groups.



Table 9  
*Descriptive Statistics by Group for Parent and Teacher BASC-2 (Means and SD)*

Variable	Complex Partial		Sec.Gen. C/P		<i>p</i>
	<i>n</i>	Mean (SD)	<i>N</i>	Mean (SD)	
<b>BASC-2 PRS</b>					
<b>Somatization</b>	68	60.35 (15.93)*	26	57.50 (15.19)	.43
<b>Adaptability</b>	53	45.49 (11.85)	22	43.14 (10.87)	.45
<b>Func. Comm.</b>	21	41.76 (9.73)	13	37.85 (21.16)*	.87
<b>ADL</b>	20	42.80 (9.45)	13	38.23 (13.63)*	.20
<b>Leadership</b>	64	43.36 (9.77)	25	40.24 (9.45)	.19
<b>BASC -2 TRS</b>					
<b>Somatization</b>	59	62.56 (15.07)*	22	64.91 (13.82)*	.42
<b>Adaptability</b>	58	36.33 (20.99)*	22	44.86 (15.76)	.18
<b>Func. Comm.</b>	21	44.05 (13.08)	8	48.88 (11.92)	.41
<b>Social Skills</b>	59	45.22 (12.43)	22	48.55 (9.27)	.32
<b>Leadership</b>	54	45.06 (10.71)	21	43.90 (7.84)	.75

*Note.* Scores with \* Indicate At-Risk ranges as reported by the parent and teacher. PRS = Parent Rating Scale; TRS = Teacher Rating Scale. Func. Comm. = Functional Communication; ADL = Activities of Daily Living



**Figure 3. Comparison of Results by Type of Seizure (Means)**

PRS= Parent Report Scale; TRS= Teacher Report Scale; F.Communication = Functional Communication; CP= Complex Partial; SGCT = Secondary Generalized Tonic Clonic

## Research Question 2

What is the relationship between the Adaptive Skills Subscales in the BASC-2 Parent report and various demographic variables (e.g., age of onset of seizures, duration, and type of seizure)? It was hypothesized, for both the parent and teacher reports, that the younger age at the onset of seizure and the longer the duration living with the illness would be positively correlated with adaptive skills.

**Correlational Analyses.** Spearman's *rho* correlation was conducted to determine the relationship that age of onset and duration (i.e., length of illness) has with each of the adaptive skills subscales (adaptability, social skills, leadership, functional communication, and length of illness) for the entire sample (see Table 10). Two-tailed correlations were used because there was no strong prior theory to suggest whether the

relationship between the variables would be positive or negative. The results of the correlational analysis are presented in Table 10.

For the BASC-2 parent report indicated that there was a significant negative correlation between duration and leadership,  $r_{ho} = -.24, n = 89, p < .05$ , with high levels of leadership associated with shorter time periods living with epilepsy. There was also a significant negative correlation found between duration and activities of daily living,  $r_{ho} = -.39, n = 33, p < .05$ . In effect, the longer duration of the illness was associated with lower reported leadership behaviors. Similarly, for this sample the longer the duration of the illness the poorer the individual's performance on activities of daily living. The results of the BASC-2 Teacher report indicated a positive correlation in the area of functional communication ( $r = .49, n = 29, p < .01$ ), and onset. The age at onset of the seizure disorder was associated with lower levels of reported functional communication. In contrast, no significant relationships were found between the adaptability subscales and the duration or onset of the seizure for either the parent or teacher report.

### **Research Question 3**

How does the severity of the somatic complaints in children with epilepsy influence or predict the child's adaptive functioning? It was hypothesized that somatization scores would be inversely related to adaptive functioning for both the parent and teacher report.

Table 10  
 Summary of Correlations ( $\rho$ ) for Duration and Onset and the BASC-2 Parent and Teacher Report Adaptive Subscales

	Adaptability	Leadership	Activities of Daily Living (PRS)/ Social Skills (TRS)	Functional Communication
<b>BASC-2 PRS</b>				
<b>Duration</b>	-.15	-.24*	-.39*	-.25
<b>Onset</b>	.02	-.03	.23	-.04
<b>BASC-2 TRS</b>				
<b>Duration</b>	-.08	.03	<.01	-.34
<b>Onset</b>	.18	.11	.18	.49**

Note. PRS = Parent Rating Scale; TRS = Teacher Rating Scale

\*  $p < 0.05$  level (2-tailed). \*\*  $p < 0.01$  level (2-tailed).

An additional Spearman's  $\rho$  correlation analysis was conducted to ascertain whether a relationship existed between level of somatic complaints and the adaptive skills subscales as measured by the BASC-2 PRS. The results (see Table 11) indicated that there was no significant relationship between these variables on the BASC-2 Parent report. In contrast, exploratory analysis on the BASC-2 Teacher report suggested a significant relationship existed between the level of somatization and the functional communication index ( $r = -.49, n = 29, p < .01$ ). Specifically, the more significant the somatization symptoms the poorer the child's skill set in the areas measuring functional communication.

Table 11  
*Summary of Correlations (rho) for BASC-2 Parent and Teacher Report Adaptive Subscales*

	<b>Adaptability</b>	<b>Leadership</b>	<b>Activities of Daily Living (PRS)/ Social Skills (TRS)</b>	<b>Functional Communication</b>
<b>BASC-2PRS</b>				
<b>Somatization BASC-2TRS</b>	-0.14	.04	-0.03	-0.09
<b>Somatization</b>	-0.03	-0.01	-0.17	-.49**

*Note.* PRS = Parent Rating Scale; TRS = Teacher Rating Scale  
 Scores with \* indicate  $p < 0.05$  level (2-tailed). Scores with \*\* indicate  $p < 0.01$  level (2-tailed).

## Discussion

Epilepsy is by far one of the most studied and explored chronic illnesses. However, research has failed to examine the relationships between somatic complaints, social skills, and psychological functioning. The aim of this study was to investigate the adaptive skills subscales of children with epilepsy by examining BASC-2 parent reports and their relation with somatic complaints, as well as other demographic variables. The influence of epilepsy-specific variables was examined by considering factors such as age of seizure onset, duration of illness, and epilepsy type. This study included data on participants with CP seizure disorder and SGTC seizure disorder and was retrospective in nature.

When exploring the differences in adaptive scales between the two types of epilepsy, it was expected that individuals with both CP and SGTC would demonstrate impaired or at-risk levels of adaptive behavior. At the same time, it was expected that the children with CP seizures would have significantly more severe scores than the SGTC group on the BASC-2 Parent report. The results of the analysis did not support the hypotheses. For the SGTC children and adolescents diagnosed with CP seizures, parent reports indicated adaptive skills to be within the at-risk range in the areas of functional communication and activities of daily living. In contrast, while not significant, children diagnosed with CP seizures were reported by their parents as having no deficits in any of the adaptive skill areas, but at-risk scores in somatization.

Exploratory analysis of the BASC-2 Teacher reports yielded different results for the two types of disorders. While both had at-risk levels of somatization, only the CP seizure group had significant impairment in the area of Adaptability, supporting previous findings (Titus et al., 2008). Additionally, teacher reports for both groups indicated that neither group evidenced impaired social skills. The SGTC participants had typical levels of performance in all of the adaptive skill areas. The differences between parent and teacher reports are not unusual. Multiple studies examining the agreement between parent and teacher reports indicate that parents are more likely to over report symptoms or deficits, while teachers are less likely to reports difficulties. This is seen when reporting on internalizing and externalizing disorders as well as behavior problems (Huberty, Austin, Harezlak, Dunn, & Ambrosius, 2000; Sillanpaa, Jalava, Kaleva, & Shinnar, 1998; Youngstrom, Loeber, & Stouthamer-Loeber, 2000). For this study, the

differences may be due to which factors are more readily observable in different settings (e.g., classroom or home), and therefore more easily quantifiable.

The evaluation of specific epilepsy variables was also considered. When examining the relationship between the duration, age at onset, and the level of somatic complaints; the parent reports yielded a negative relationship between the duration of the illness and the adaptive subscales: leadership and activities of daily living. This suggests that the duration of time spent living with a chronic illness negatively impacts a child's ability to initiate and take a leadership role in activities involving peers. Similarly, parent reports also suggest that the longer the child lives with an illness also impacts their ability to interact effectively in their community and other outside environments. These results suggest a general decrease in feelings of competence in environments outside of the home.

In contrast, exploratory analysis conducted on the teacher reports suggested significance in the relation between age of onset and functional communication. This may be explained in terms of the educational environment. A classroom setting places increasing demands on children to convey information in both an academic and interpersonal context. The unique demands placed on a child in an academic setting, when presented with a novel subject, to verbalize understanding or a need for clarification are negatively impacted when they are diagnosed with a seizure disorder early in life. Unlike the parent reports, teachers reported no relationship between epilepsy variables and leadership or social skills (alternate subscale to daily living on teacher report).

When exploring the relation between somatic complaints and adaptive skills, parent reports did not indicate a clinically significant relationship. In contrast, exploratory analysis conducted on teacher reports indicated a negative relationship between the somatization subscale and functional communication. Because the somatization subscale emphasizes physical aches and pains, medications, and medical treatments (doctor's visits), this finding suggests that the higher the degree of symptomology the child is experiencing due to their illness, the less likely they are to actively communicate and participate in the classroom.

### **Limitations**

This study has several limitations. First, the study is based on retrospective data and the participants are a sample of convenience. Tied to the use of extant data from a clinical setting, there was not a clinical control group of children and adolescents with other disorders. As a result, it is unclear if the findings are specific to seizure disorders or true for children with a general chronic illness. Second, all of the participants came from a tertiary care center with more severe symptomology related to their seizure disorder. Next, the sample consisted only of children and adolescents diagnosed as having CP seizures and excluded all other forms of epilepsy due to the smallness of the respective samples of other children with other forms of epilepsy. This may impact the generalizability of the results to other individuals diagnosed with other types of epilepsy. Fourth, the number of completed teacher reports was significantly lower than completed parent reports. The small number of completed reports may have played a role in the significance of the results and the agreement between both parents and teachers as raters.



Additionally, the findings reported by the teachers come from one setting and specific subject area. Multiple teacher reports from different settings (e.g., structured and unstructured) for each child may better inform the clinician regarding the child's overall adaptive functioning.

Finally, scales may sometimes be elevated for children with epilepsy because of factors related to the seizures themselves rather than because of psychopathology (e.g., somatization subscale). It is important to consider behavioral ratings in the context of how seizures are impacting the functioning of each individual child that is evaluated. Further, the majority of the participants were Caucasian; it is unclear, whether these findings will generalize to other ethnicities. As a result, it is important that these findings be replicated with different and a more ethnically diverse sample. Another limitation is the almost exclusive examination of parent ratings and teacher ratings with no self-report ratings. The differences in the reporting styles of both parents and teachers was evident during the exploratory analysis examining demographic and seizure variables and correlations that accounted for variation in adaptive skill sets. The lack of agreement between parent and teacher reports may have been better explained had there been a self-report measure, or a combination of the three.

There were several limitations to the analyses conducted as well. First, the assumptions of normality were not met and as a result nonparametric statistics were utilized when analyzing the data. Secondly, although highly correlated (.89 - .98) the sample included parent reports of both the BASC and BASC-2 as a result, only completed BASC-2 forms would have yielded results in both the activities of daily living

and functional communication scales, explaining the reason for the low number of respondents within each of these areas. Third, the sample included children ages 6 through 18 which required that multiple forms of the BASC-2 be utilized (e.g., child and adolescent parent report forms). The variation in the forms also resulted in differences in scale items by rater and by age. Additionally, several of the research questions were correlational in nature and as such no inferences regarding causality may be made. The current study is an exploration of the cross-sectional findings of the adaptive skills subscales in a sample of children and adolescents with epilepsy; however it only provides the first indication of adaptive skills functioning at one point in time.

### **Implications of the Study**

The findings of this study suggest that living with epilepsy (e.g., duration) may impact multiple areas of adaptive functioning. Based on the descriptive data, it appears that the most impacted area of adaptive skills functioning for both groups includes: adaptability, functional communication and activities of daily living. As a result, these areas should be the focus areas of intervention when working with this sample. Additionally, upon diagnosis of epilepsy, children should be immediately targeted for intervention as this current study suggests that duration of the illness significantly impacts adaptive skill areas.

Next, teacher reports may be a valuable tool in assessing a child's psychological functioning if multiple reports are gathered in multiple settings rather than solely structured environments. Lastly, elevated somatization scores were reported across groups by both the parent and the teacher. Elevated scores for this sample may more

accurately reflect their real health issues as opposed to predicting impaired adaptive behavior or avoidant issues.

### **Directions for Future Research**

To truly investigate the long term effects of seizure disorders on adaptive skills future research should include measurements at, at least three time points in the child's growth and development. Ideally following, children diagnosed in elementary school, with time points in elementary, middle school, and high school to more accurately follow Erickson's developmental milestones. Further exploration is needed to better understand the differences in reports between both parent and teacher. Specifically, teacher reports obtained from both academic classes, as well as elective classes, may provide a more comprehensive picture of the child's functioning across school settings. Additionally, self-report measures may provide insight as to the child's own feelings of self-efficacy in the adaptive skill areas.

Future research is needed to more directly examine the role of parents in children and adolescents living with a seizure disorder. Adding to this, further exploration in parental involvement is also necessary for this sample. For example, future research could evaluate specific mechanisms (e.g., parental attitudes regarding their child's interaction patterns in different settings such as school and community, parental modeling of coping skills and informal modeling of social skills in varied environments-structured and unstructured) linking parental involvement and adaptive skills scores. Specifically, analysis could be conducted of the different seizure groups in order to explore the differences in parental perception of adaptive skills. Also, further exploring

other demographic variables that may contribute to academic outcome (e.g., GPA and school attendance) may add to the literature in better understanding this sample.

Additionally, an exploration of seizure disorders with varying severity may further add to the understanding of the adaptive skill profiles of this sample.

### **Conclusion**

The findings of this study indicate that there are no differences in adaptive skills or somatization between epilepsy groups. For both of the groups, depending on the rater, at-risk levels of concern in at least one area of adaptive skill functioning. For those with SGTC epilepsy, concerns were evident in activities of daily living, and leadership. Those diagnosed with CP, were more likely to have difficulty in somatization. Additionally, there were marked differences between the parent and teacher reports for each of the groups, consistent with differences in demands of the environment.

Also of note is the impact duration and age of onset of the illness has on adaptive skills. This has also been seen in studies examining overall adaptive skills composites (Titus et al., 2008); however, the results of this study suggest that specific epilepsy-related factors are associated with specific adaptive skills and somatic complaints. In particular, onset and duration of the illness appear to be linked to deficits in adaptive skills (e.g., adaptability, functional communication and activities of daily living) while the somatization scale is associated with functional communication skills. This pattern of at-risk scores on the adaptive skills subscales and their impact on children's functioning may represent an opportunity for tailored prevention and intervention programming for

this sample. Additional research may better explain the underlying mechanisms related to adaptive skill level deficits within this sample of children with chronic illness.

## CONCLUSION: A COMPARISON OF TWO SAMPLES

### **Introduction**

Children diagnosed with epilepsy and children experiencing psychological distress are at risk for many of the same outcomes. These outcomes lead to well documented deficits in social competency. However, the literature has failed to explore the other adaptive skill domains in detail. Complicating the issue is the presence of somatic complaints within each sample. Children with epilepsy experience the stress of repeated medical interventions which take away from their participation in environments (e.g., school and community). Added to this is their risk for the later development of a psychological disorder. Children experiencing psychological distress may experience somatic complaints prior to, following, or in combination with their psychological symptoms. When this occurs they are often prevented from participation in daily activities, and their interactions with parents teachers and friends may be altered. For both samples of children, a better understanding of the relationship between somatic complaints and adaptive skills is necessary.

Each of these samples brings with it its own set of unique characteristics and adaptive skill profiles. These differences are especially evident when comparing the two groups using age, gender, race, and the relationship somatic complaints has to adaptive skills and internalizing and externalizing disorders. The archival database containing the BASC-2 subscales and indexes did not include an adaptive skills index, but four subscales (adaptability, leadership, activities of daily living, and functional

communication) as reported by the parent. The social skills subscale for the epilepsy group was only included as part of the BASC-2 teacher report measure.

### **Age, Ethnicity, and Adaptive Skills**

With regards to age, parents of the epilepsy group reported no statistically significant differences between children and adolescents [children ( $M = 44.16$ ,  $n = 63$ ) and adolescents ( $M = 48.17$ ,  $n = 12$ ),  $U = 287.5$ ,  $z = -1.31$ ,  $p = .19$ ]; leadership subscale [children ( $M = 43.39$ ,  $n = 62$ ) and adolescents ( $M = 40.41$ ,  $n = 27$ ),  $U = 701.5$ ,  $z = -1.20$ ,  $p = .23$ ]; functional communication subscale [children ( $M = 44.05$ ,  $n = 22$ ) and adolescents ( $M = 33.33$ ,  $n = 12$ ),  $U = 166.0$ ,  $z = -1.56$ ,  $p = .12$ ]; and activities of daily living subscale [children ( $M = 41.50$ ,  $n = 22$ ) and adolescents ( $M = 40.00$ ,  $n = 22$ ),  $U = 109.0$ ,  $z = -.46$ ,  $p = .67$ ]; however, the psychological distress group reported clinically significant differences between children and adolescents in the adaptive skill area of leadership. In contrast, children in both groups were reported by their parents as having higher general adaptive skill levels than adolescents ( $M = 40.50$ ,  $n = 80$ ),  $U = 1534.50$ ,  $z = -1.89$ ,  $p = .05$ ).

The results from the psychological distress group indicate that parents reported higher competency levels in the area of leadership for children than adolescents. Additionally, children and adolescents experiencing psychological distress had poorer overall adaptive skills than children with epilepsy; having at-risk scores in adaptability, activities of daily living, and functional communication. The epilepsy group was reported by their parents as having typical levels of adaptive functioning in all areas but functional communication; the only exception to the age difference was in the

adaptability subscale, where adolescents were reported by their parents as having higher overall levels ( $M = 48.17$ ) when compared to children ( $M = 44.16$ ). It should be noted that these differences are not significant (see Table 12 and Figure 4).

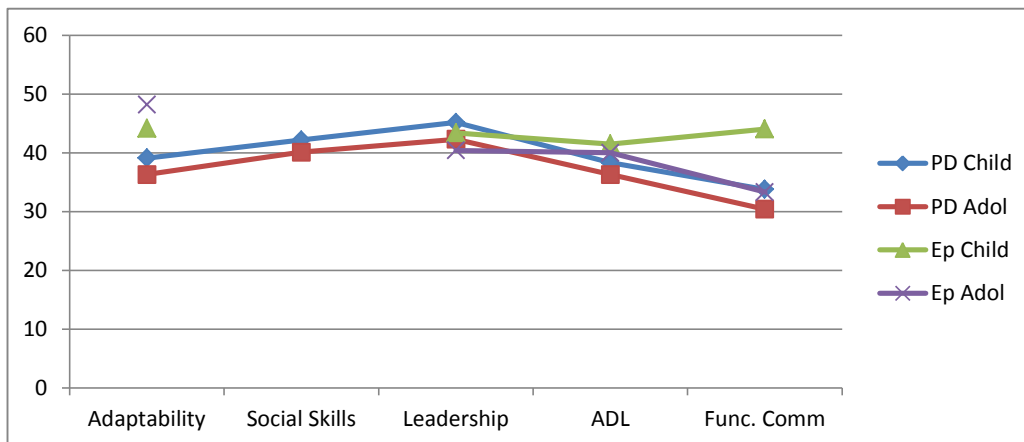
Table 12

*Descriptive Statistics by Age for Parent BASC-2 for Children and Adolescents with Epilepsy and Children and Adolescents in Psychological Distress (Means and SD)*

Variable	Child		Adol.		Ep.Child.		Ep.Adol	
	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)
<b>BASC-2 PRS</b>								
<b>Adaptive Index</b>	80	40.50 (11.55)	48	38.69** (11.61)	-	-	-	-
<b>Adaptability</b>	79	39.10** (10.51)	31	36.32** (10.31)	63	44.16 (11.68)	12	48.17 (10.65)
<b>Social Skills</b>	80	42.17 (11.55)	48	40.10 (9.99)	-	-	-	-
<b>Leadership</b>	80	45.15 (10.47)	48	42.31 (11.19)	62	43.39 (10.14)	27	40.41 (8.52)
<b>ADL</b>	51	38.31** (12.39)	31	36.29** (12.11)	22	41.50 (11.67)	11	40.00 (11.02)
<b>Func. Comm.</b>	62	33.77** (19.28)	40	30.40** (18.46)	22	44.05 (12.27)	12	33.33** (17.41)

*Note.* Ep. Child = Epilepsy Children; Ep. Adol. = Epilepsy Adolescents; Scores with \*\* indicate At-Risk ranges as reported by the parent. Func. Comm. = Functional Communication; ADL = Activities of Daily Living





**Figure 4. Comparison of BASC-2 Results (Means) by Age Group for Epilepsy and Psychological Distress** PD = Psychological Distress; Ep = Epilepsy

Ethnicity was found to have no impact on the level of adaptive skills performance for either the epilepsy [(Gp1,  $n = 58$ : Caucasian, Gp2,  $n = 17$ : African American, Gp3,  $n = 5$ : Other),  $\chi^2 (2, n = 80) = .74, p = .69$ ] or psychological distress group [(Gp1,  $n = 72$ : Caucasian, Gp2,  $n = 28$ : African American, Gp3,  $n = 6$ : Hispanic, Gp4,  $n = 22$ , Other),  $\chi^2 (3, n = 128) = 3.72, p = .29$ ] as measured by the adaptability subscale and the adaptive skills index.

### Sex and Adaptive Skills

With regards to gender differences, no statistically significant results were found when comparing males and females in the epilepsy group; however, statistical significance was found in the area of adaptability for the psychological distress group [males ( $M = 35.04, n = 49$ ) and females ( $M = 41.27, n = 33$ ),  $U = 603.50, z = -1.94, p = .05$ ], and the functional communication subscale: males ( $M = 29.65, n = 62$ ) and females ( $M = 36.80, n = 40$ ),  $U = 916, z = -2.23, p = .02$ . The results revealed that parents of

males reported more severe deficits in these areas than parents of females. When looking at the mean scores for each sample, males from the psychological distress group had more deficits than females, with both genders sharing common weaknesses in the areas of adaptability and functional communication (see Table 13). Likewise, males from the epilepsy group had lower overall levels of adaptive skills than females, with at-risk scores in functional communication ( $M = 39.95$ ).

Table 13  
*Descriptive Statistics for Psychological Distress and Epilepsy Groups by Sex for Parent BASC-2 (Means and SD)*

Variable	Males		Females		Males Epilepsy		Females Epilepsy	
	<i>n</i>	<i>Mean (SD)</i>	<i>n</i>	<i>Mean (SD)</i>	<i>n</i>	<i>Mean (SD)</i>	<i>n</i>	<i>Mean (SD)</i>
<b>BASC-2 PRS</b>								
<b>Adaptive Skills Index</b>	74	38.00** (11.53)	54	42.31 (11.23)	-	-	-	-
<b>Adaptability</b>	64	37.70** (11.43)	46	39.17** (9.06)	45	43.82 (11.60)	30	46.27 (11.50)
<b>Social Skills</b>	74	40.15 (10.59)	54	43.11 (11.41)	-	-	-	-
<b>Leadership</b>	74	42.91 (10.46)	54	45.70 (11.13)	57	42.14 (9.72)	32	43.09 (9.86)
<b>ADL</b>	49	35.04** (12.13)	33	41.27 (11.61)	19	40.05 (11.41)	14	42.29 (11.45)
<b>Func. Comm.</b>	62	29.65*** (18.69)	40	36.80** (18.74)	20	39.55** (13.88)	14	41.29 (16.88)

Note. PRS = Parent Rating Scale. Scores with \*\* indicate At-Risk ranges as reported by the parent. Scores with \*\*\* indicate Clinically significant ranges as reported by the parent. Func. Comm. = Functional Communication; ADL = Activities of Daily Living

### **Somatic Complaints, Behavioral Ratings, and Adaptive Skills**

The relationship between somatic complaints and adaptive skills, and somatic complaints and internalizing and externalizing disorders was examined for both the psychological distress and epilepsy groups. With regard to the relationship between somatic complaints and adaptive skills for the psychological distress group, the BASC-2 parent report indicated a positive correlation in the areas of adaptability ( $r_{ho} = -.27, n = 110, p < .01$ ), and leadership ( $r_{ho} = -.20, n = 110, p < .05$ ). Higher levels of reported somatic complaints were associated with lower levels of reported leadership and adaptability. In contrast, no statistically significant relationship was found between somatic complaints and any of the remaining adaptive skill subscales for the epilepsy group.

Also examined, was the relationship between somatic complaints and internalizing and externalizing disorders for both groups. Positive correlations were found for the psychological distress group in the aggression ( $r_{ho} = .22, n = 128, p < .05$ ), and hyperactivity ( $r_{ho} = .24, n = 128, p < .01$ ) subscales of the externalizing index, and the anxiety ( $r_{ho} = .51, n = 128, p < .01$ ) and depression ( $r_{ho} = .45, n = 128, p < .01$ ) subscales of the internalizing index. Likewise, positive correlates were found in the anxiety ( $r_{ho} = .48, n = 94, p < .01$ ) and depression ( $r_{ho} = .33, n = 94, p < .01$ ) subscales of the internalizing index and hyperactivity ( $r_{ho} = .22, n = 94, p < .01$ ) subscale of the externalizing index for the epilepsy group (see Table 14).

Table 14  
*Summary of Correlations (rho) for BASC-2 Parent Internalizing and Externalizing Subscales*

	<b>Internalizing Index</b>	<b>Anxiety</b>	<b>Depression</b>	
<b>BASC-2</b>				
<b>Psychological Distress</b>				
<b>Somatization</b>	.73**	.51**	.45**	
<b>BASC-2</b>				
<b>Epilepsy Somatization</b>				
	--	.48**	.33**	
	<b>Externalizing Index</b>	<b>Aggression</b>	<b>Conduct Problems</b>	<b>Hyperactivity</b>
<b>BASC-2</b>				
<b>Psychological Distress</b>				
<b>Somatization</b>	.20*	.22*	.14	.24**
<b>BASC-2</b>				
<b>Epilepsy Somatization</b>				
	--	.13	.10	.22*

Note. Scores with \* indicate  $p < 0.05$  level (2-tailed). Scores with \*\* indicate Correlation significant at the 0.01 level (2-tailed)

Both groups share some commonalities. Males in both groups have lower adaptive skills than females. Additionally, adolescents have generally lower overall adaptive scores than children. This is especially evident in the area of adaptability; a reported deficit for both samples. Also of note, both samples reported strong positive relationships between somatic complaints and the anxiety, depression, and hyperactivity subscale.

Unique to the epilepsy group was the absence of a relationship between somatic complaints and adaptive skills. This suggests that parental reports regarding functional aches and pains may be directly linked to their medical interventions and chronic illness diagnosis rather than a physical manifestation of psychological distress. In contrast, children experiencing psychological distress may be more likely to manifest their feelings in a physical way, or in combination with psychological symptoms.

### **Implications**

The findings for both of these groups suggest that age and gender do influence which specific adaptive skill domains are impacted for both groups. Based on the descriptive data it appears that children generally fare better than their adolescent counterparts in overall adaptive skill functioning with higher scores in all areas except adaptability (epilepsy group). As a result, age and gender should be considered when targeting areas for adaptive skill interventions. Also of note for both groups are the commonalities shared when examining the relationship between somatic complaints and internalizing and externalizing behaviors. Both groups were positively correlated with anxiety, depression, and hyperactivity. This overlap supports previous research regarding the psychological risk factors associated with chronic illness (Martinez, Smith-Carter, & Legato, 2011; Piquart & Shen, 2011).

Based on the observed differences in adaptive skill profiles for both groups, children and adolescents from the epilepsy group would benefit from a multidisciplinary team approach where both medical and psychology professionals may establish a collaborative treatment approach.

Children experiencing psychological distress appear to have more global deficits in all areas, specifically as they enter into adolescents. Screenings targeting both samples, where a large part of their time is spent (the school setting) may assist in early identification and implementation of interventions. Additionally, interventions that include multiple components such as problem solving, social skills training, modeling, and social perception training may be effective ways for improving adaptive skills in both groups of children and adolescents. Given that academic difficulties have been shown in the literature to be a contributor of poorer adaptive skills (Aldenkamp, Weber, Overweg-Plandsoen, Reijs, & van Mil, 2005; Katzenstein, Fastenau, Dunn, & Austin, 2007; McNelis, Johnson, Huberty, & Austin, 2005; Thornton, et al. 2008), and that academic difficulties is an indicator of a child's psychological distress, it is important that interventions are multi-systemic in nature and include settings where both groups spend a large part of their time, school. It is not uncommon for children and adolescents with epilepsy to experience regular disruptions in their school functioning. As a result, it is important that future research target and assess academic performance, which is not limited to grades, and the ability to participate in and attend to academic activities regardless of graded outcome. Data on levels of perceived competence (by both parents and teachers) in schools and in social and athletic spheres would add to a better understanding of specific environments and settings. Additionally, examinations of individual patterns and seasonal trends in both attendance and academic performance are needed, studying these patterns across periods of time may allow for identification of triggers to psychological distress and adaptive skills deficits. It may also provide

researchers with information regarding resiliency thresholds (i.e., how much catching up prevents keeping up). Identifying these thresholds may ultimately prevent a child's adaptive skills and achievement from being undermined.

### **Conclusion**

Children with epilepsy and children experiencing psychological distress exhibit many of the same adaptive skill deficits (e.g., activities of daily living and functional communication). Age also plays a contributing role in the severity of the adaptive skills deficit. As a result, it is important that preventative measures be taken to ensure that children are taught compensatory strategies earlier rather than later in their development. Actively targeting these two adaptive skill areas as a focus for intervention is important for future development into adolescents and adulthood.

## REFERENCES

- Achenbach, T. M. (1991). *Manual for the child behavior checklist*. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T.M. & Rescorla, L. A. (2001). *Manual for the ASEBA school-aged forms and profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- Adler, A. (1917). *The neurotic constitution: Outlines of a comparative individualistic psychology and psychotherapy*. New York: Cornell University.
- Aldenkamp, A. P., Weber, B., Overweg-Plandsoen, W. C., Reijs, R. & van Mil, S. (2005). Educational underachievement in children with epilepsy: A model to predict the effects of epilepsy on educational achievement. *Journal of Child Neurology*, 20, 175–180. doi: 10.1177/08830738050200030101
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed., Text Revision). Washington, DC: Author.
- Antipova, N. (2000). Review of the somatic response: Formation in the child development. *American Imago*, 57, 35-41. doi: 10.1353/aim.2002.0011
- Apley, J., & Nash N. (1958). Recurrent abdominal pains: A field survey of 1,000 school children. *Archives of Disorders of Childhood*, 33, 165-70.
- Apter, A., Aviv, K., Kaminer, Y., Weizman, A., Lerman, P., & Tyano, S. (1991). Behavioral profile and social competence in temporal lobe epilepsy of adolescence. *Journal of the American Academy of Child and Adolescent*



- Psychiatry*, 30, 887-892. doi: 10.1097/00004583-199111000-00004
- Atkin, G. Q. (2000). Concurrent-criterion validity of the Youth Outcome Questionnaire. (Doctoral dissertation, Brigham Young University, 2000). *Dissertation Abstracts International*, 61, 582. doi: 10.2519/jospt.2009.2996
- Austin, J. K. (2005). Comparison of child adaptation to epilepsy and asthma. *Epilepsy & Behavior*, 6, 488-503. doi:10.1016/j.yebeh.2005.03.006
- Austin, J. K., & Dunn, D. W. (2002). Progressive behavioral changes in children with epilepsy. *Progress in Brain Research*, 135, 419-427. doi: 10.1016/S0079-6123(02)35039-8
- Austin, J. K. & Dunn, D. W. (2006). Progressive behavioral changes in children with epilepsy. *Developmental Medicine & Child Neurology*, 48, 213-219. doi:10.1017/S0012162206000454
- Austin, J. K., Dunn, D. W., Johnson, C. S., & Perkins, S. M. (2004). Behavioral issues involving children and adolescents with epilepsy and the impact of their families: Recent research data. *Epilepsy and Behavior*, 5, 33-41. doi:10.1016/j.yebeh.2004.06.014
- Austin, J. K., Harezlak, J., Dunn, D. W., Huster, G. A., Rose, D. F., & Ambrosius, W. T. (2001). Behavior problems in children before first recognized seizures. *Pediatrics*, 107, 115-122. doi: 10.1542/peds.107.1.115
- Austin, J. K., Huster, G. A., Dunn, D. W., & Risinger, M. W. (1996). Adolescents with active or inactive epilepsy or asthma: A comparison of quality of life. *Epilepsia*, 12, 1228-1238. doi: 10.1111/j.1528-1157.1996.tb00558.x

- Austin, J. K., Smith, M. S., Risinger, M. W., & McNelis, A. M. (1994). Childhood epilepsy and asthma: Comparison of quality of life. *Epilepsia*, *3*, 608-615. doi: 10.1111/j.1528-1157.1994.tb02481.x
- Banerjee, P. N., Filippi, D., & Hauser, W. A. (2009). The descriptive epidemiology of Epilepsy: A review. *Epilepsy Research*, *85*, 31-45. doi: 10.1016/j.eplepsyres.2009.03.003
- Barry, J. J., Ettinger, A. B., Friel, P., Gilliam, F., Harden, C. L., Hermann, B., et al. (2008). Consensus statement: The evaluation and treatment of people with epilepsy and affective disorders. *Epilepsy and Behavior*, *13*, 1-29. doi:10.1016/j.yebeh.2008.04.005
- Barry, J. J., Lembke, A., Gisbert, P. A., & Gilliam, F. (2007). Affective disorders in epilepsy. In B. Ettinger & A. M. Kanner (Eds.), *Psychiatric issues in epilepsy* (2nd ed., pp. 203-247). Philadelphia: Lippincott Williams & Wilkins.
- Belmaker, E., Espinoza, R., & Pogrund, R. (1985). Use of medical services by adolescents with non-specific somatic symptoms. *International Journal of Adolescent Medicine and Health*, *1*, 149-156.
- Bennett-Osborne, R., Hatcher, J. W., & Richtsmeier, A. J. (1989). The role of social modeling in unexplained pediatric pain. *Journal of Pediatric Psychology*, *14*, 43-61. doi: 10.1093/jpepsy/14.1.43
- Berg, A. T., Smith, S. N., Frobish, D., Beckerman, B., Levy, S. R., Testa, F. M., & Shinnar, S. (2004). Longitudinal assessment of adaptive behavior in infants and young children with newly diagnosed epilepsy: Influence of etiology, syndrome,

- and seizure control. *Pediatrics*, *114*, 645-650. doi: 10.1542/peds.2003-1151-L
- Bergeron, R., Floyd, R. G., McCormack, W. L., & Farmer, W. L. (2008). The generalizability of externalizing behavior composites and subscales across time, rater, and instrument. *School Psychology Review*, *37*, 91-108.
- Besag, F. (1995). Epilepsy, learning and behavior in childhood. *Epilepsy and Behavior*, *5*, 3-13. doi: 10.1111/j.1528-1157.1995.tb01654.x
- Buelow, J. M., Austin, J. K., Perkins, S. M., Shen, J., Dunn, D. W., & Fastenau, P. S. (2003). Behavior and mental health problems in children with epilepsy and low IQ. *Developmental Medicine & Child Neurology*, *45*, 683-692. doi: 10.1111/j.1469-8749.2003.tb00871.x
- Burack, G. D. (1997). The effect of seizure type and medication on cognitive and behavioral functioning in children with idiopathic epilepsy. *Developmental Medicine & Child Neurology*, *39*, 731-735. doi:10.1111/j.1469-8749.1997.tb07374.x
- Burlingame, G. M., Mosier, J. I., Wells, M. G., Atkin, Q. G., Lambert, M. J., Whoolery, M. et al. (2001). Tracking the influence of mental health treatment: The development of the Youth Outcome Questionnaire. *Clinical Psychology & Psychotherapy*, *5*, 361-379. doi: 10.1002/cpp.315.
- Burlingame, G. M., Wells, M. G., Hoag, M. J. Hope, C. A., Nebeker, R. S., Konkel, K., et al. (1996a). *Administration and scoring manual for the Youth Outcome Questionnaire 2.0*. Stevenson, MD: American Professional Credentialing Services.

- Burlingame, G. M., Wells, M. G., & Lambert, M. J. (1996b). *Youth Outcome Questionnaire*. Stevenson, MD: American Professional Credentialing Services.
- Burlingame, G. M., Wells, M. G., Lambert, M. J., & Cox, J. C. (2004) Youth Outcome Questionnaire (YOQ). In M. E. Marush (Ed.). *The use of psychological testing for treatment planning and outcome assessment* (3<sup>rd</sup> ed., Vol. 2). Mahwah, NJ: Lawrence Erlbaum Associates.
- Camfield, C., Camfield, P., Smith, B., Gordon, K. & Dooley, J. (1993). Biological factors as predictors of social outcome of epilepsy in intellectually normal children: A sample-based study. *Journal of Pediatrics*, *122*, 869-873. doi: 2048/10.1016/j.bbr.2011.03.031
- Campo, J. (2012). Annual research review: Functional somatic symptoms and associated anxiety and depression - developmental psychopathology in pediatric practice. *Journal of Child Psychology and Psychiatry*, *53*, 575-592. doi: 10.1111/j.1469-7610.2012.02535.x
- Campo, J. V. & Fritsch, S. L. (1994). Somatization in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *33*, 1223-1235. doi: 10.1097/00004583-199411000-00003
- Campo, J. V., Jansen-McWilliams, L., Comer, D. M., & Kelleher, K. J. (1999). Somatization in pediatric primary care: Association with psychopathology, functional impairment, and use of services. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*, 1093-1101. doi: 10.1097/00004583-199909000-00012

- Caplan, R., Sagun, J., Siddarth, P., Gurbani, S., Koh, S., Gowrinathan, R., & Sankar, R. (2005a). Social competence in pediatric epilepsy: Insights into underlying mechanisms. *Epilepsy and Behavior*, *6*, 218-228.  
doi:10.1016/j.yebeh.2004.11.020
- Caplan, R., Siddarth, P., Gurbani, S., Hanson, R., Sankar, R., & Shields, W. D. (2005b). Depression and anxiety disorders in pediatric epilepsy. *Epilepsia*, *46*, 720-730.  
doi: 10.1016/j.yebeh.2004.11.020
- Centers for Disease Control and Prevention. (2006, May). *Chronic fatigue syndrome basic facts*. Retrieved August 25, 2010 from  
<http://www.cdc.gov/cfs/cfsbasicfacts.htm>.
- Conners, C. K. (1990). *Conners' rating scales manual*. North Towands, NY: Multi-Health Systems.
- Cornaggia, C. M., & Gobbi, G. (2001). Learning disability in epilepsy: Definitions and classification. *Epilepsia*, *42*, 2-5. doi:  
10.1046/j.1528-1157.2001.042004575.x
- Cornaggia, C. M., Beghi, M., Provenzi, M., & Beghi, E. (2006). Correlation between cognition and behavior in epilepsy. *Epilepsia*, *47*, 34-39. doi:  
10.1111/j.1528-1167.2006.00685.x
- Craig, T. K., Boardman, A. P., Mills, K., Daly-Jones, O., & Drake, H. (1993). The south London study I: Longitudinal course and the influence of early life experiences. *British Journal of Psychiatry*, *163*, 579-588. doi:  
10.1192/bjp.163.5.579

- Craig, T. K., Drake, H., Mills, K., & Boardman, A. P. (1994). The south London study II: Longitudinal course and the influence of early life experiences. *British Journal of Psychiatry, 165*, 248-258. doi: 10.1192/bjp.165.2.248
- Crossley, R. B. (1982). Hospital admissions for abdominal pain in childhood. *Journal of the Royal Society of Medicine, 75*, 772-776.
- Cunningham, S. J., McGrath, P. J., Ferguson, H. B., Humphreys, P., D'Astous, J., Latter, J., et al. (1987). Personality and behavioral characteristics in pediatric migraine. *Headache, 27*, 16-20. doi: 10.1111/j.1526-4610.1987.hed2701016.x
- Davies, S., Heyman, I., & Goodman, R. (2007). A population survey of mental health problems in children with epilepsy. *Developmental Medicine & Child Neurology, 5*, 292-295. doi: 10.1111/j.1469-8749.2003.tb00398.x
- Davison, I. S., Faull, C., & Nicol, A. R. (1986). Research note. Temperament and behavior in six-year-olds with recurrent abdominal pain: A follow up. *Journal of Child Psychology and Psychiatry, 27*, 539-544.
- Deater-Deckard, K. (2001). Recent research examining the role of peer relationships in the development of psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 42*, 565-579. doi: 10.1111/1469-7610.00753
- Dellatolas, G. (2006). Impact of epilepsy characteristics and behavioral problems on school placement in children. *Epilepsy and Behavior, 9*, 573-578.  
doi:10.1016/j.yebeh.2006.08.004
- Devinsky, O., Westbrook, L., Cramer, J., Glassman, M., Perrine, K., & Camfield, K. (2005). Risk factors for poor health-related quality of life in adolescents with

- epilepsy. *Epilepsia*, *40*, 1715-1720. doi: 10.1111/j.1528-1157.1999.tb01588.x
- Dodson, W. E. (2001). Epilepsy, cerebral palsy, and IQ. In Pellock, J. M., Dodson, W. E., & Bourgeois, B. F. (Eds.), *Pediatric epilepsy: Diagnosis and therapy* (2<sup>nd</sup> ed., pp. 613–627). New York, NY: Demos.
- Dorenbaum, D., Cappelli, M., Keene, D., & McGrath, P. J. (1985). Use of a child behavior checklist in the psychological assessment of children with epilepsy. *Clinical Pediatrics*, *11*, 634-637. doi: 10.1177/000992288502401106
- Dreisbach, M., Ballard, M., Russo, D. C., & Schain, L. (1982). Educational intervention for children with epilepsy: A challenge for collaborative service delivery. *Journal of Special Education*, *16*, 111-121. doi: 10.1177/002246698201600111
- Drewel, E. H., Bell, D. J., & Austin, J. K. (2009). Peer difficulties in children with epilepsy: Association with seizure, neuropsychological, academic, and behavioral variables. *Child Neuropsychology*, *4*, 305-320. doi: 10.1080/09297040802537646
- Dunn, D. W. & Austin, J. K. (1999). Behavioral issues in pediatric epilepsy. *Neurology*, *53*, 96-100. doi: 10.1159/000023323
- Dunn, D. W., Austin, J. K., Caffrey, H. M., & Perkins, S. M. (2003). A prospective study of teachers' ratings of behavior problems in children with new-onset seizures. *Epilepsy & Behavior*, *4*, 26-35. doi: 10.1016/S1525-5050(02)00642-
- Dunn, D.W., Austin, J.K., Harezlak, J., & Ambrosius, W.T. (2003). ADHD and epilepsy in childhood. *Developmental Medicine and Child Neurology*, *45*, 50-54. doi:10.1017/S0012162203000094

- Dunn, D. W., Austin, J. K., & Huster, G. A. (1999). Symptoms of depression in adolescents with epilepsy. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 1132-1138. doi: 10.1097/00004583-199909999-00017
- Durlak, J. A., Wells, A. M., Cotton, J. K., & Johnson, S. (1995). Analysis of selected methodological issues in child psychotherapy research. *Journal of Clinical Child Psychology, 24*, 141-148.
- Elger, C. E. (2000). Behavioral disorders in children with epilepsy: Early improvement after surgery. *Neurology Neurosurgery and Psychiatry, 69*, 739-744.  
doi:10.1136/jnnp.69.6.739
- Ellis, N., Upton, D., & Thompson, P. (2000). Epilepsy and the family: A review of current literature. *Seizure, 9*, 22-30. doi: 2048/10.1053/seiz.1999.0353
- El Sabbagh, S., Soria, C., Escolano, S., Bulteau, C., & Dellatolas, G. (2006). Impact of epilepsy characteristics and behavioral problems on school placement in children. *Epilepsy and Behavior, 9*, 573-578. doi:10.1016/j.yebeh.2006.08.004
- Eminson, M., Benjamin, S., Shortall, A., Woods, T., & Faragher, B. (1996). Physical symptoms and illness attitudes in adolescents: An epidemiological study. *Journal of Child Psychology and Psychiatry, 5*, 519-528. doi: 10.1111/j.1496-7610.1996.tb01438.x
- Fava, G. A. (1992). The concept of psychosomatic disorder. *Psychotherapy and Psychosomatics, 58*, 1-12.
- Ferrari, M., Matthews, W., & Barabas, G. (1983). The family and the child with



epilepsy. *Family Process*, 22, 53-59.

Freilinger, M., Reisel, B., Reiter, E., Zelenko, M., Hauser, E., & Seidl, R. (2006).

Behavioral and emotional problems in children with epilepsy. *Journal of Child Neurology*, 21, 939-945. doi:10.2301/7010.2006.00205

Fritz, G. K., Fritsch, S., & Hagino, O. (1997). Somatoform disorders in children and adolescents: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1329-1338. doi: 10.1097/0004583-199710000-00014

Garber, J., Walker, L. S., & Zeman, J. (1991). Somatization symptoms in a community sample of children and adolescents: Further validation of the Children's Somatization Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 4, 588-595. doi: 10.1037/1040-3590.3.4.588

Garralda, M. E. (1992). Severe chronic fatigue syndrome: A discussion of psychopathological mechanisms. *European Child and Adolescent Psychiatry*, 1, 111-118. doi: 10.1007/BF02091794

Garralda, M. E. (1996). Somatization in children. *Journal of Child Psychology and Psychiatry*, 37, 13-33. doi: 10.1111/j.1469-7610.1996.tb01378.x

Garralda, M. E. (1999). Practitioner review: Assessment and management of somatization in childhood and adolescence: A practical perspective. *Journal of Child Psychology and Psychiatry*, 40, 1159-1167. doi: 10.1111/1469-7610.00533

Garralda, M. E. (2010). Unexplained physical complaints. *Child and Adolescent*

*Psychiatric Clinic in North America*, 19, 199-209.

doi:10.1016/j.chc.2010.01.002

Garralda, E., Rangel, L., Levin, M., Roberts, H., & Ukoumunne, O. (1999). Psychiatric adjustment in adolescents with a history of chronic fatigue syndrome. *Journal of the American Academy of Child and Adolescent Psychiatry*, 12, 1515-1521. doi: 10.1097/00004583-199912000-00012

Gilleland, J., Suveg, C., Jacob, M. L., & Thomassin, K. (2009). Understanding the medically unexplained: Emotional and familial influences on children's somatic functioning. *Child: Care, health and development*, 35, 383-390. doi:10.1111/j.1365-2214.2009.00950.x

Gledhill, J., & Garralda, M. E. (2006). Functional symptoms and somatoform disorders in children and adolescents: The role of standardized measures in assessment. *Children and Adolescent Mental Health*, 11, 208-214. doi: 10.1111/j.1475-3588.2006.00392.x

Goodman, J. E., & McGrath, P. J. (1991). The epidemiology of pain in children and adolescents: A review. *Pain*, 46, 247-264. doi: 10.1016/0304-3959(91)90108-A

Gresham, E.M. & Elliot, S. N. (1990). *Social skills rating system*. Circle Pines, MN: AGS.

Hanssen-Bauer, K., Heyerdahl, S., & Eriksson, A. S. (2007). Mental health problems in children and adolescents referred to a national epilepsy center. *Epilepsy Behavior*, 10, 255-262. doi: 10.1016/j.yebeh.2006.11.011

Hermann, B. P., Whitman, S., Hughes, J., Melyn, M. M., & Dell, J. (1988).

- Multietiological determinants of psychopathology and social competence in children with epilepsy. *Epilepsy Research*, *1*, 51-60. doi: 10.1016/0920-1211(88)90010-1
- Hilker, K. A., Murphy, M. A., & Kelly, M. L. (2005). Violence exposure, somatic complaints, and health care utilization in a pediatric sample. *Children's Health Care*, *34*, 35-46. doi: 10.1207/s15326888chc3401\_3
- Hirtz, D., Thurman, D. J., Gwinn-Hardy, K., Mohamed, M., Chauduri, A. R. & Zalutsky, R. (2007). How common are the “common” neurologic disorders? *Neurology*, *68*, 326 – 337. doi: 10.1212/01.wnl.0000252807.38124.a3
- Hoare, P. (1993). The quality of life of children with chronic epilepsy and their families. *Seizure*, *2*, 269-275. doi: 10.1016/S1059-1311(05)80139-6
- Høie, B., Sommerfelt, K., Waaler, P. E., Alsaker, F. D., Skeidsvoll, H., & Mykletun, (1989). Psychosocial problems and seizure-related factors in children with epilepsy. *Child and Adolescent Psychiatric Mental Health Nursing*, *2*, 139-144. doi: 10.1017/S0012162206000454
- Hooper, S. R., Murphy, J., Devaney, A., & Hultman, T. (2000). Ecological outcomes of adolescents in a psychoeducational residential treatment facility. *American Journal of Orthopsychiatry*, *70*, 491-500. doi: 10.1037/h0087807
- Huberty, T., Austin, J., Harezlak, J., Dunn, D., & Ambrosius, W. (2000). Informant agreement on behavior ratings for children with epilepsy. *Epilepsy Behavior*, *1*, 427-435. doi: 10.1006/ebeh.2000.0119
- Jalava, M., Sillanpaa, M., Camfield, C., & Camfield, P. (2005). Social adjustment and

- competence 35 years after onset of childhood epilepsy: A prospective controlled study. *Epilepsia*, *6*, 708-715. doi: 10.1111/j.1528-1157.1997.tb01241.x
- Jellesma, F. C., Rieffe, C., & Terwogt, M. M. (2008). My peers, my friend, and I: Peer interactions and somatic complaints in boys and girls. *Social Science and Medicine*, *66*, 2195-2205. doi:10.1016/j.socscimed.2008.01.0129
- Katzenstein, J. M., Fastenau, P. S., Dunn, D. W., & Austin, J. K. (2007). Teachers' ratings of the academic performance of children with epilepsy. *Epilepsy & Behavior*, *10*, 426 – 431. doi: 10.1016/j.yebeh.2007.01.006
- Keene, D. L., Manion, I., Whiting, S., Belanger, E., Brennan, R., Jacob, P., & Humphreys, P. (2005). A survey of behavior problems in children with epilepsy. *Epilepsy & Behavior*, *6*, 581-586. doi:10.1016/j.yebeh.2005.03.004
- Kingery, J. N., Ginsburg, G. S., & Alfano, C. A. (2007). Somatic symptoms and anxiety among African American adolescents. *Journal of Black Psychology*, *33*, 363-378. doi: 10.1177/0095798407307041
- Kokkonen, J., Kokkonen, E. R., Saukkonen, A. L., & Pennanen, P. (1997). Psychosocial outcome of young adults with epilepsy in childhood. *Journal of Neurology, Neurosurgery, & Psychiatry*, *62*, 265-268. doi: 0.1136/jnnp.62.3.265
- Kriechman, A. M. (1987). Siblings with somatoform disorders in childhood and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, *26*, 226-231. doi: 10.1097/00004583-198703000-00019
- Lamberg, L. (2005). New mind/body tactics target medically unexplained physical symptoms and fears. *The Journal of the American Medical Association*, *20*,

2187-2283. doi: 10.1001/jama.294.17.2152

Lambert, M. J., Hansen, N. B., Umpress, V., Lunnen, K., Okiishi, J., & Burlingame, G.

M. (1996). *Administration and scoring manual for the OQ-45*. East Setauket, NY: American Professional Credentialing Services LLC.

Lask, B. (1986). Research article: The high-achieving child. *Postgraduate Medical*

*Journal*, 62, 143-145 doi:10.1136/pgmj.62.724.143

Lewis, J. N., Tonge, B. J., Mowat, D. B., Einfeld, S. L., Siddons, H. M., & Rees, V. W.

(2000). Epilepsy and associated psychopathology in young people with intellectual disability. *Journal of Pediatric Child Health*, 36, 172-175. doi: 10.1046/j.1440-1754.2000.00487.x

Libow, J. A. (2000). Child and Adolescent illness falsification. *Pediatrics*, 105, 336-341.

doi: 10.1542/peds.105.2.336

Lipowski, Z. J. (1988). Somatization: The concept and its clinical application. *The*

*American Journal of Psychiatry*, 145, 1358-1368

Lloyd, G. G. (1986). Psychiatric syndromes with a somatic presentation. *Journal of*

*Psychosomatic Research*, 30, 113-120. doi: 10.1016/0022-3999(86)90030-5

Mandelbaum, D. E., & Burack, G. (1997). The effect of seizure type and medication on cognitive and behavioral functioning in children with idiopathic epilepsy.

*Developmental Medicine & Child Neurology*, 39, 731-735. doi: 10.1111/j.1469-8749.1997.tb07374.x

- Martinez, W., Smith-Carter, J., & Legato, L. (2011). Social competence in children with chronic illness: A meta-analytic review. *Journal of Pediatric Psychology, 36*, 878-887. doi: 10.1093/jpepsy/jsr035
- Mash, E.J. & Barkley, R.J. (2003). *Child psychopathology*. New York, NY: The Guilford Press.
- Masi, G., Favilla, L., Millepiedi, S., & Mucci, M. (2000). Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. *Psychiatry, 63*, 140-149.
- McCusker, C. G., Kennedy, P. J., Anderson, J., Hicks, E. M., & Hanrahan, D. (2007). Adjustment in children with intractable epilepsy: Importance of seizure duration and family factors. *Developmental Medicine & Child Neurology, 44*, 681–687. doi:10.1111/j.1469-8749.2005.tb01073.x
- McGrath, P. J. (1994). Annotation: Aspects of pain in children and adolescents. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 36*, 717-730. doi: 10.1111/j.1469-7610.1995.tb01325.x
- McNelis, A. M., Johnson, C. S., Huberty, T. J., & Austin, J. K. (2005). Factors associated with academic achievement in children with recent-onset seizures. *Seizure, 14*, 331–339. doi: 10.1016/j.seizure.2005.04.005
- Meador, K. J. (1994). Cognitive side effects of antiepileptic drugs. *Canadian Journal of Neurological Sciences, 21*, 512-516. doi: 10.1016/j.yebeh.2003.11.008
- Melman, S., Little, S. G., & Akin-Little, K. A. (2007). Adolescent overscheduling: The relationship between levels of participation in scheduled activities and self-

reported clinical symptomology. *The High School Journal*, 90, 18-30.

doi:10.1353/hsj.2007.0011

Merydith, S. P. (2001). Temporal stability and convergent validity of the Behavior Assessment System for Children. *Journal of School Psychology*, 3, 253-265. doi: 10.1016/S0022-4405(01)00064-4.

Miers, A. C., Rieffe, C., Terwogt, M. M., Cowan, R., & Linden, W. (2007). The relation between anger coping strategies, anger mood and somatic complaints between children and adolescents. *Journal of Abnormal Child Psychology*, 35, 653-664. doi: 10.1007/s10802.007.9120.9

Mitchell, W.G., Scheier, L.M., & Baker, A.S. (1994). Psychosocial, behavioral, and medical outcomes in children with epilepsy: A developmental risk factor model using longitudinal data. *Pediatrics*, 94, 471-477.

Montenegro, M. A., Guerreiro, M. M., Lopes-Cendes, I., Guerreiro, C. A. M., & Cendes, F. (2002). Interrelationship of genetics and prenatal injury in the genesis of malformations of cortical development. *Archives of Neurology*, 59, 1147-1153.

Murberg, T. A., & Bru, E. (2007). The role of neuroticism and perceived school-related stress in somatic symptoms among students in Norwegian junior high schools. *Journal of Adolescence*, 30, 203-212. doi: 10.1016/j.adolescence.2006.02.001.

Nassau, J. H., & Drotar, D. (1997). Social competence among children with central nervous system-related chronic health conditions: A review. *Journal of Pediatric Psychology*, 6, 771-793. doi: 10.1093/jpepsy/22.6.771

Noeker, M., Haverkamp-Krois, A., & Haverkamp, F. (2005). Development of mental

- health dysfunction in childhood epilepsy. *Brain Development*, 27, 5-16. doi: 10.1016/j.braindev.2004.02.008
- Offord, D. R., Hofmann, H. G., Catlin, G. P., Byles, J. A., Cadman, D. T., Crawford, J., et al. (1987). Ontario child health study: Prevalence of attention deficit disorder with hyperactivity. *Archives of General Psychiatry*, 44, 826-831. doi: 10.1111/j.1469-7610.1989.tb00236.x
- Oostrom, K. J., Schouten, A., Kruitwagen, L. J. J., Peters, A. C. B., & Jennekens-Schinkel, A. (2003). Behavioral problems in children with newly diagnosed idiopathic or cryptogenic epilepsy attending normal schools are in majority not persistent. *Epilepsia*, 44, 97–106. doi: 10.1046/j.1528-1157.2003.18202.x
- Pellock, J. M. (2004). Defining the problem: Psychiatric and behavioral comorbidity in children and adolescents with epilepsy. *Epilepsy and Behavior*, 5, 3-9. doi:10.1016/j.yebeh.2004.06.010
- Piazzini, A., & Canger, R. (2001). Depression and anxiety in patients with epilepsy. *Epilepsia*, 42, 29–31. doi: 10.1006/ebch.2001.0247
- Pinquart, M., & Shen, Y. (2011). Behavior problems in children and adolescents with chronic physical illness: A meta-analysis. *Journal of Pediatric Psychology*, 36, 1003-1015. doi:10.1093/jpepsy/jsr042
- Pless, I. B., & Pinkerton, P. (1975). *Chronic childhood disorder: Promoting patterns of adjustment*. London: Kimpton.
- Rantanen, K., Timonen, S., Hagstrom, K., Hamalainen, P., Eriksson, K. & Nieminen, P. (2009). Social competence of preschool children with epilepsy. *Epilepsy and*



*Behavior*, 14, 338-343. doi:10.1016/j.yebeh.2008.10.022

- Raymer, D., Weininger, O. & Hamilton, J. R. (1984). Psychological problems in children with abdominal pain. *Lancet*, 1, 439-440. doi: 10.1016/S0140-6736(84)91763-X
- Reif, W., Hennings, A., Riemer, S. & Euteneuer, F. (2010). Psychobiological differences between depression and somatization. *Journal of Psychosomatic Research*, 68, 495-502. doi:10.1016/j.psychores.2010.02.001
- Reisinger, C. W. & Burlingame, G. M. (1997). How to evaluate a mental health outcome measure. In K.M. Coughlin (Ed.), *Behavioral outcomes guidelines sourcebook* (pp. 370-374). New York, NY: John Wiley.
- Reynolds, C. R., & Kamphaus, R. W. (1992). *Behavioral assessment system for children manual*. Circle Pines, MN: AGS.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *BASC-2: Behavioral assessment system for children manual* (2nd ed.). Circle Pines, MN: AGS.
- Rodenburg, R., Meijer, A. M., Deković, M., & Aldenkamp, A. P. (2006). Family predictors of psychopathology in children with epilepsy. *Epilepsia*, 47, 601–614. doi: 10.1111/j.1528-1167.2006.00475.x
- Routh, D. K., & Ernst, A. R. (1984). Somatization disorder in relatives of children and adolescents with functional abdominal pain. *Journal of Pediatric Psychology*, 9, 427-437. doi: 10.1093/jpepsy/9.4.427
- Rutter, M. (1989). Isle of Wight revisited: Twenty-five years of child psychiatric epidemiology. *Journal of the American Academy of Child and Adolescent*

*Psychiatry*, 5, 633-653. doi: 10.1097/00004583-198909000-00001

Rutter, M., Tizard, J., Yule, W., Graham, P., & Whitmore, K. (1970). Isle of Wight studies. *Psychological Medicine*, 2, 313-332. doi: 10.1017/S003329170001388X

Sabaz, M., Cairns, D. R., Lawson, J. A., Bleasel, A. F., & Bye, A. M. E. (2001). Health related quality of life of children with refractory epilepsy: A comparison of those with and without intellectual disability. *Epilepsia*, 5, 621-628. doi: 10.1046/j.1528-1157.2001.25200.x

Santalampi, P., Aromaa, M., Sourander, A., Helenius, H., & Piha, J. (2005). Have there been changes in children's psychosomatic symptoms? A 10-year comparison from Finland. *Journal of the American Academy of Pediatrics*, 4, 44-442. doi: 10.1542/peds.2004-1261

Schilte, A. F., Portejijns, P. J. M., Blankenstein, A. H., Latour, M. B. B., & van Eijk, J. T. (2001). Indicators of childhood adversity in somatisation in general practice. *Scandinavian Journal of Primary Health Care*, 19, 232-236. doi: 10.1080/02813430152706747

Schmitz, B. (1999). Psychiatric syndromes related to anti-epileptic drugs. *Epilepsia*, 40, 65-70. doi: 10.1111/j.1528-1157.1999.tb00887.x

Schoenfeld, J., Seidenberg, M., Woodard, A., Hecox, K., Inglese, C., Mack, K., et al. (1999). Neuropsychological and behavioral status of children with complex partial seizures. *Developmental Medicine & Child Neurology*, 41, 724-731. doi:10.1111/j.14698749.1999.tb00532.x

Schor, E. R. (1986). Use of health care services by children and diagnoses received

- during presumably stressful life transitions. *American Academy of Pediatrics*, 77, 834-841.
- Siegel, L. J. (1990). Somatic disorders of childhood and adolescence. *School Psychology Review*, 19, 174-185.
- Sillanpaa, M. (1992). Epilepsy in children: Prevalence, disability, and handicap. *Epilepsia*, 44, 97-106. doi:10.1111/j.1528-1157.1992.tb01689.x
- Sillanpaa, M., Jalava, M., Kaleva, O., & Shinnar, S. (1998). Long term prognosis of seizures with onset in childhood. *New England Journal of Medicine*, 338, 1715-1722. doi:10.1016/j.eurpsy.2008.07.008
- Stein, S. (2007). Review of the Behavior Assessment System for Children – Second Edition. In R. A. Spies, K. F. Geisinger, & B. S. Plake (Eds.), *The seventeenth mental measurements yearbook* (pp.361-389). Lincoln, NE: Buros Institute of Mental Measurements.
- Steffenburg, S., Gillberg, C., & Steffenburg, U. (1996). Psychiatric disorders in children and adolescents with mental retardation and active epilepsy. *Archives of Neurology*, 53, 904-912.
- Thornton, N., Hamiwka, L., Sherman, E., Tse, E., Blackman, M., & Wirrell, E. (2008). Family function in cognitively normal children with epilepsy: Impact on competence and problem behaviors. *Epilepsy and Behavior*, 12, 90-95. doi:10.1016/j.yebeh.2007.07.008
- Tidman, L., Saravanan, K., & Gibbs, J. (2003). Epilepsy in mainstream and special educational primary school settings. *Seizure*, 12, 47-51. doi:

10.1016/S1059131102001711

Titus, J. B., Kanive, R., Sanders, S. J., & Blackburn, L. B. (2008). Behavioral profiles of children with epilepsy: Parent and teacher reports of emotional, behavioral, and educational concerns on the BASC-2. *Psychology in the Schools, 45*, 893-906.

doi: 10.1002/pits.20333

Torsheim, T., & Wold, B. (2001). School-related stress, school support, and somatic complaints: A general sample study. *Journal of Adolescent Research, 16*, 293-303. doi: 10.1006/jado.2001.0440

Tsao, J. C. I., Allen, L. B., Lu, Q., Myers, C. D., & Zeltzer, L. K. (2009). Anxiety sensitivity and catastrophizing associations with pain and somatization in non-clinical children. *Journal of Health Psychology, 14*, 1085-1094.

doi:10.1177/1359105309342306

Tse, E., Hamiwka, L., Sherman, E., & Wirrell, E. (2007). Social skills problems in children with epilepsy: Prevalence, nature and predictors. *Epilepsy and Behavior, 11*, 499-505. doi: 10.1016/j.yebeh.2007.08.008

Vermillion, J. M., & Pfeiffer, S. I. (1993). Treatment outcomes and continuous quality improvement: Two aspects of program evaluation. *Psychiatric Hospital, 24*, 9-14.

Waalder, P. E., Blom, B. H., Skeidsvoll, H., & Mykletum, A. (2005). Prevalence, classification, and severity of epilepsy in children in western Norway. *Epilepsia, 41*, 802-810. doi: 10.1016/j.seizure.2004.10.006

Walker, L. S., Garber, J., & Greene, J. W. (1989). Children with recurrent abdominal

pain and their parents: More somatic complaints, anxiety, and depression than other patient families? *Journal of Pediatric Psychology*, *14*, 231-243. doi: 10.1093/jpepsy/14.2.231

Walker, L. S., Garber, J., & Greene, J. W. (1993). Psychosocial correlates of recurrent childhood pain: A comparison of pediatric patients with recurrent abdominal pain, organic illness and psychiatric disorders. *Journal of Abdominal Psychology*, *102*, 248-258. doi: 10.1037/0021-843X.102.2.248

Walker, L. S., Garber, J., & Greene, J. W. (1994). Somatic complaints in pediatric patients: A prospective study of the role of negative life events, child social and academic competence and parental somatic symptoms. *Journal of Consulting and Clinical Psychology*, *62*, 1213-1221. doi: 10.1037/0022-006X.62.6.1213

Wasserman, A. L., Whittington, P. F., & Rivera, F. (1988). Psychogenic basis for abdominal pain in children and adolescents. *Journal of American Academy Child and Adolescent Psychiatry*, *27*, 179-184. doi: 10.1097/00004583-198803000-00008

Wechsler, D. (1991). *Manual for the Wechsler intelligence scale* (3<sup>rd</sup> ed.). San Antonio, TX: The Psychological Corporation.

Wechsler, D. (2003). *Manual for the Wechsler intelligence scale* (4<sup>th</sup> ed.). San Antonio, TX: The Psychological Corporation.

Wells, M. G., Burlingame, G. M., Lambert, M. J., Hoag, M. J., & Hope, C. A. (1996). Conceptualization and measurement of patient change during psychotherapy: Development of the Outcome Questionnaire and Youth Outcome Questionnaire.

*Psychotherapy*, 33, 275-283. doi: 10.1037/0033-3204.33.2.275

Williams, J. (2003). Learning and behavior in children with epilepsy. *Epilepsy and Behavior*, 4, 107-111. doi: 10.1016/S1525-5050(03)00024-6

Williams, J., Sharp, G., Lange, B., Bates, S., Griebel, M., Spence, G. T., & Thomas, P. (1996). The effect of seizure type, level of seizure control, and antiepileptic drugs on memory and attention skills in children with epilepsy. *Developmental Neuropsychology*, 12, 241-253. doi: 10.1080/87565649609540649

Wirrell, E., Camfield, C., Camfield, P., Dooley, J., Gordon, K., & Smith, B. (1997). Long term psychosocial outcomes in typical absence epilepsy: Sometimes a wolf in sheep's clothing. *Archives of Pediatrics & Adolescent Medicine*, 151, 152-158.

World Health Organization (1992). *International classification of diseases* (10<sup>th</sup> ed.). Geneva: World Health Organization.

Youngstrom, E., Loeber, R., & Stouthamer-Loeber, M. (2000). Patterns and correlates of agreement between parent, teacher, and male adolescent ratings of internalizing problems. *Journal of Consultation in Clinical Psychology*, 68, 1038-1050. doi: 10.1037/0022-006X.68.6.1038

Zuckerman, B., Stevenson, J., & Bailey, V. (1987). Stomachaches and headaches in a community sample of preschool children. *American Academy of Pediatrics*, 79, 677-682.

## APPENDIX A

### **Introduction**

The context of a child's life and their physical health greatly impact later development. The following literature review explores two samples of children and adolescents; those diagnosed with a chronic illness (epilepsy) and a group of otherwise healthy children experiencing psychological distress. In each case, both groups are at risks for the later development of a psychological disorder as well as the co-occurrence of somatic complaints. The purpose of the following literature review is to operationally define somatic complaints and epilepsy and discuss risk factors for each sample that contribute to the later development of poor social skills and psychological disorders. These risk factors include: familial involvement, cognitive ability, medication, socioeconomic status, age, and personality characteristics. Included in the discussion of risk factors are recent articles whose findings illustrate the continued poor outcomes when presented with these two samples. Additionally, the role of adaptive skills (social skills, functional, communication, leadership, adaptability, and activities of daily living) in better understanding both samples is reviewed. Lastly, a discussion of the gaps in the literature will be outlined with suggestions for future directions.

### **Literature Review**

#### **Somatization in Children**

Somatization is a term used to denote psychological difficulty or distress that is manifested through somatic symptoms (Lamberg, 2005). This is seen as a tendency to

experience and communicate somatic distress, where symptoms are unaccounted for by pathological findings, and the symptoms are too weak to attribute to physical illness or seek medical help. Recent research suggests that more children and adolescents are experiencing complaints at present than in the past (Antipova, 2000). Parent reports taken from the general sample often indicate recurrent and distressing somatic symptoms in their children (Antipova, 2000).

For example, Offord et al. (1987) found this to be the case in 11% of girls and 4% of boys within the age ranges of 12-16 years; similarly, Goodman and McGrath (1991) found that between 2 to 10% of children have “functional” aches and pains for which there is no cause (p. 826). Around 10% of these school-aged children had at least three instances of somatic complaints severe enough to impact their activities over a period of three months. Comparable levels of somatic complaints have been found across studies (Apley & Nash, 1958; Zuckerman, Stevenson, & Bailey, 1987). The results of these studies suggest that the prevalence and severity of children experiencing somatic complaints is a problematic one, impacting more females than males with symptoms significant enough to impact all areas of function (e.g., academic and social)

Somatoform disorders include the following: conversion disorder, somatization disorder, body dysmorphic disorder, and hypochondriasis. In conversion disorder, the symptoms resemble those of a neurologic disorder. Children may seem to have a paralyzed arm or leg, become deaf or blind, or have shaking that may resemble seizures. These symptoms begin suddenly, usually after a distressing event, and may or may not resolve abruptly. In somatization disorder children develop numerous vague symptoms:



headaches, abdominal pain, and nausea (American Psychiatric Association [APA], 2000).

Somatization disorder is the most common type seen in children and adolescents with somatoform disorders; it includes persistent somatoform pain disorder, dissociative/conversion disorder, and chronic fatigue syndrome (Antipova, 2000; Campo & Fritsch, 1994; Campo et al., 1999; Lipowski, 1988). Additional symptoms such as leg pain, aching muscles, fatigue, and neurological symptoms are often observed as a child grows older (Libow, 2000). The diagnosis of a somatoform disorder represents the extreme end of a continuum where unexplained functional aches and pains fall in the middle, and temporary, everyday aches and pains fall at the nonclinical or within average ranges when compared against the general sample. (Antipova, 2000; Fritz, Fritsch & Hagino, 1997; Lamberg, 2005). Commonly occurring physical complaints among children and adolescents include: recurrent abdominal pain, headaches, conversion disorder, and chronic fatigue syndrome.

Recurrent abdominal pain (RAP) followed by headaches appears to be the most frequently reported physical complaint in children, occurring in 10-30% of children and adolescents who report symptoms as occurring as often as weekly (Belmaker, Espinoza & Pogrund, 1985; Campo & Fritsch, 1994; Garber, Walker & Zeman, 1991). The physical symptoms associated with RAP include vomiting, headache, fever, pallor, sleepiness, and fatigue. Across studies, approximately 10 to 15% of school aged children experience episodes of abdominal pain severe enough to impact their activities over a

period of three months (Eminson, Benjamin, Shortall, Woods, & Faragher, 1996; Zuckerman et al., 1987).

In addition to abdominal pains, headaches are the next most common somatic complaint of children (Fava, 1992). The most common types of headaches are tension and migraine headaches. Tension headaches are characterized as being frequent, bilateral, and like a band or fullness or heavy weight, that is then associated with dizziness (Fava, 1992). Migraine headaches are periodic, severe, and are usually accompanied by a visual aura, vomiting, nausea and are unilateral in location (Fava, 1992; Lamberg, 2005). Although headache is rare before the age of 4, its prevalence increases throughout childhood reaching a peak at about 13 years of age in both sexes. However, estimates of prevalence vary according to age, definition of headache, and method of data collection, but in children of school age as many as 75% may experience headaches infrequently and about 10% have recurring headaches.

The two remaining somatoform disorders are less common, but are still present among samples of children and adolescents (Hopkins, 1992; Lamberg, 2005). In dissociative (conversion) disorder the child's symptoms are typically triggered by a traumatic event, and resolve themselves within a few weeks or months. This disorder may occur in young children, but more often than not it occurs during early adolescents and later. The symptoms usually have an acute onset, but sometimes worsen gradually. The most frequent forms of conversion disorder in Western countries include pseudoparalysis (the patient loses the use of half of his/her body or of a single limb, and is often inconsistent upon repeat examination.), pseudosensory syndromes (numbness or

lack of sensation in various parts of their bodies), pseudoseizures (the most difficult symptoms of conversion disorder to distinguish from their organic equivalents (APA, 2000; Hopkins, 1992; Lamberg, 2005). Between 5% and 35% of patients with pseudoseizures also have epilepsy.

Additional conversion disorder types include pseudoblindness (inability to see although there is no presence of vision problems), pseudodiplopia (seeing double), pseudoptosis (drooping of the upper eyelid, and a lowering of the eyebrow) and hysterical aphonia (loss of the ability to produce sounds) (Hopkins, 1992; Lamberg, 2005). Among children, the prevalence rates of conversion disorder range from 1 to 3%.(Hopkins, 1992; Lamberg, 2005). Less educated people and those of lower socioeconomic status are more likely to develop conversion disorder; race/ethnicity by itself does not appear to be a factor. There is, however, a major difference between the samples of developing and developed countries; in developing countries, the prevalence of conversion disorder may run as high as 31% (Hopkins, 1992; Lamberg, 2005).

The last of the somatoform disorders, chronic fatigue syndrome (CFS) is characterized by increased fatigue after mental effort (APA, 2000). Additional symptoms include lack of concentration, dizziness, tiredness, weakness, and extreme exhaustion after extending minimal physical effort. The prevalence rate for CFS ranges from 1 to 3% (Centers for Disease Control and Prevention [CDC], 2006). Regardless of the type of somatic complaint, gender differences have been found. Across studies, girls tend to report more somatic symptoms than boys (Garber, Walker & Zeman, 1991;

Eminson, Benjamin, Shortall, Woods, & Faragher, 1996). Gender differences appear to be more evident with increasing age (Libow, 2000).

### **Diagnosis**

Diagnosis of a child with any type of somatization disorder is a complex process, especially when considering the criteria for diagnosis outlined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; APA, 2000). Campo and Fritsch (1994) and Garralda (1992, 1996, 1999, 2010) found that these criteria are more appropriately applied to adult samples rather than children and adolescents. Specifically, the DSM-IV-TR requires 13 physical symptoms from a list of 35, eight of which are appropriate only for sexually active patients. Children do not typically engage in sexual relationships with their peers; as a result the criteria related to sexual function used to evaluate the presence of this disorder are not generally applicable to this aged sample (Campo & Fritsch, 1994; Fritz, Fritsch & Hagino, 1997).

In contrast, the *International Statistical Classification of Diseases and Related Health Problems 10th Revision* (ICD-10; World Health Organization [WHO], 1992) criteria for somatoform disorder is markedly different in that it does not limit itself to specific criteria. To meet ICD-10 criteria, the pain must be persistent, distressing, and severe. Additionally, if the complaint occurs in association with emotional conflict or psychosocial problems that are significant enough to allow the conclusion that they may have an etiological influence then the individual meets ICD-10 criteria. This allows for

increased clinical judgment in the diagnosis of somatization disorders based on the symptoms and their impact on functioning (WHO, 1992).

Somatization disorders of childhood as outlined in the ICD-10 and DSM-IV-TR list a number of conditions where physical symptoms are a key feature. Although these conditions are spread under a variety of headings, they can be grouped into three main categories. The first category includes mental factors that are assumed to have a major etiological significance for the physical symptoms (i.e., somatoform pain disorder; chronic fatigue syndrome; conversion disorder). The second category is characterized by physical symptoms that are the main presenting feature of well recognized, psychiatric or developmental conditions (i.e., eating or sleeping disorder, bed wetting and abnormal movement disorder). This includes a number of disorders including cataplexy (dropping to the ground when experiencing a strong emotions such as laughter), sleep paralysis, hypnagogic hallucinations (seeing thing that are not there during the first stages of sleep), or parasomnias (e.g., nightmares, night terrors, sleep walking). The third and final group consists of mental factors that influence the development of a physical condition with noticeable physical pathology or physiological processes (i.e., asthma or ulcerative colitis). Regardless of category, somatic complaints in children play a significant role in general psychological functioning. Children with chronic illness may also present with somatic complaints that are directly related to the physiological basis of the disorder or the treatment for same (e.g., asthma, diabetes, cerebral palsy, sickle cell anemia, cystic fibrosis, cancer, AIDS, epilepsy, spina bifida, congenital heart problems). The somatic

issues associated with a chronic illness may have the same effect on children's psychological functioning.

### **Chronic Illness in Children**

Somatic complaints are not exclusively limited to physically healthy children; instead, children with a history of illness or an illness that is ongoing or chronic, are just as likely (and in some instances more so) to develop somatic complaints. Chronic illness is an "umbrella" term. Children with chronic illnesses may be ill or well at any given time, but they are always living with their condition (Austin et al., 2001; Austin & Dunn, 2006; Austin, Dunn & Huster, 2005; Austin, Dunn, Johnson, & Perkins, 2004; Barry, Lembke, Gisbert, & Gilliam, 2007; Burack, 1997; Pless & Pinkerton, 1975). Some examples of chronic conditions include, but are not limited to asthma, diabetes, cerebral palsy, sickle cell anemia, cystic fibrosis, cancer, AIDS, epilepsy, spina bifida, congenital heart problems (Austin et al., 2001; Austin & Dunn, 2006; Austin, 2005; Austin, Dunn, Johnson, & Perkins, 2004; Barry et al. 2007; Burack, 1997; Pless & Pinkerton, 1975). These illnesses affect children in a variety of ways. For example, they may prevent participation in daily activities or alter the behavior of parents, teachers, or friends toward the child. A minimum period of three months is generally accepted as the operational definition of conditions that are most likely to be chronic (Tidman, Saravanan, & Gibbs, 2003).

Approximately 10 percent of all children experience one or more illnesses or medical condition for a prolonged period of time (i.e., three months) before the age of 16 (Garralda 1992, 1996, 1999, 2010). Despite the diverse symptomology of these

conditions, it is widely assumed that all chronic illnesses have the potential for causing significant and permanent interference with physical and emotional growth and development (Austin et al., 2001; Austin & Dunn, 2006; Austin, 2005; Austin et al., 2004; Barry et al. 2007; Burack, 1997; Pless & Pinkerton, 1975). Of the chronic illnesses, epilepsy is by far one of the most studied and explored in terms of the impact that the illness has on multiple settings, families, and social/emotional functioning. Research, however, has not examined the relation between somatization, adaptive skills and psychological functioning in this group.

### **Epilepsy**

Epilepsy is a broad term used to describe a numerous features with variation in etiology and clinical characteristics. In general, epilepsy is diagnosed in children who experience two or more unprovoked seizures. Seizures are defined as the behavioral manifestation of a sudden change in electrical activity in the brain. As a result, children who experience one seizure or have seizures associated with high fevers or other changes in physiology are not usually treated or diagnosed with epilepsy. The presence of seizures in children varies significantly depending on the type of epilepsy. In children, the incidence of epilepsy is greatest in the youngest age groups, then falls exponentially after the first stage of life, remains stable throughout the first decade of life, and then changes again during adolescence (Banerjee, Filippi & Hauser, 2009; Hirtz et al., 2007). The incidence of epilepsy in children varies among developing countries; it is the highest in Scandinavia and Italy and lowest in the United Kingdom and Canada (Banerjee, Filippi & Hauser, 2009). In contrast to somatoform disorders, epilepsy is more common

in males, though not to a significant degree (Banerjee, Filippi & Hauser, 2009; Hirtz et al., 2007; Sillanpaa, 1992).

Seizures are broadly divided into two types: partial and generalized (Hauser, 2001; Hirtz et al., 2007). Partial seizures begin in one area of the brain and include a variety of manifestations depending on where the seizures are located and whether they spread to the rest of the brain. If partial seizures remain localized to one area of the brain, children typically do not exhibit an alteration of awareness (i.e., simple partial seizures); however, if the seizures spread throughout the brain, an alteration of awareness often occurs (i.e., complex partial seizures).

The most commonly occurring seizure during the first year of life is generalized convulsive seizures, followed by partial seizures (Hirtz et al. 2007; Montenegro, Guerreiro & Lopes-Cendes, 2002; Sillanpaa, 1992). In otherwise neurologically normal children, localized seizures account for approximately 59% of cases; generalized seizures account for about 29% of the cases; and the remaining 12% are of undetermined type and more common in younger children (Montenegro, Guerreiro & Lopes-Cendes, 2002). Generalized seizures are characterized by the involvement of the whole brain and include tonic-clonic seizures (formerly grand mal) (Hauser, 2001; Hirtz et al., 2007; Sillanpaa, 1992). Generalized seizures may also be absence seizures (formerly petit mal), which may involve only momentary loss of awareness and no apparent movements. Absence seizures are characterized by blank staring that may only last a few seconds (Hirtz et al, 2007). In spite of their short duration, the impact that this type of



seizure has on learning is significant, especially if they occur with relative frequency (Hirtz et al. 2007; Sillanpaa, 1992).

Each year, 120 out of 100,000 persons in the United States seek medical attention for a newly recognized seizure disorder (Banerjee, Filippi & Hauser, 2009). Of this group, epilepsy impacts 0.5 to 1% of children (Camfield, Camfield, Gordon, Wirrell & Dooley, 1993; Waaler, Blom, Skeidsvoll, & Mykletun, 2005); in pediatric neurology practices, the prevalence of epilepsy ranges as high as 70%. There are between 20,000 and 45,000 children who are diagnosed annually with epilepsy.

In terms of etiology, 60-80% of new seizures in children have no apparent cause (Banerjee, Filippi & Hauser, 2009). A family history of epilepsy increases the risk of developing epilepsy. About 20% of childhood epilepsy cases are associated with a neurological deficit present at birth, most commonly mental retardation or cerebral palsy (Banerjee, Filippi & Hauser, 2009). Childhood epilepsy occurs in association with cerebrovascular disease in approximately 12% of cases (Banerjee, Filippi & Hauser, 2009). Only a small number of cases are linked to trauma or infection. Additional contributing factors to the onset of a seizure include emotional stress, sleep deprivation, and tiredness. Individuals diagnosed with generalized seizures seemed to be more sensitive to light and sleep deprivation than those with partial seizures (Nakken, Solas, Kjeidsen, et al., 2005) With the diagnosis of epilepsy, there are risk factors for a multitude of problems including psychological disorders, cognitive and academic deficits, familial problems, and somatic complaints that may contribute to overall functioning of the child with the diagnosis. Thus, it is important to consider the relation

between somatic complaints and psychopathology in both physically healthy children and children with epilepsy.

Psychopathology/Psychological Disorders in Somatization and Epilepsy

### **Psychological Problems and Somatization**

The risk factors for developing a somatization disorder are the same for mild, moderate, and severe cases (Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Garralda, 1992, 1996, 2010; Siegel, 1990). Most children with somatic complaints do not have associated psychiatric disorders; however, approximately a third to a half have emotional problems. The most commonly diagnosed problems are anxiety and depression (Campo & Fritsch, 1994; Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Siegel, 1990; Tsao, Allen, Lu, Myers, & Zeltzer, 2009; Walker, Garber, Greene, 1994). In some instances, the psychological disorder precedes the development of somatic symptoms, but more commonly than not the psychological disorder will begin to develop as the individual experiences somatic complaints. It is also common for functional physical symptoms to be brought about by previous physical problems and medical treatment (Campo & Fritsch, 1994; Campo et al., 1999). Specific risk factors (e.g., family factors, communication skills, personality, and behavioral correlates) have been explored in relation to somatization and psychopathology.

**Communication Skills.** Research suggests that there is a relation between the level of communication skills and the experience of somatic complaints (Garralda 1992, 1996; Libow, 2000; Siegel, 1990; Tsao et al., 2009). Specifically, children with somatic complaints typically have an impaired ability to verbalize distress, and as a result

communicate this distress through somatic symptoms (Lloyd, 1986; Tsao et al., 2009). Since children in general have less developed expressive vocabulary skills than adults and their vocabulary for emotional expression is limited, somatization is particularly common in childhood (Garralda 1992, 1996; Libow, 2000; Siegel, 1990; Tsao et al., 2009). The increased incidence in adolescents and adulthood is hypothesized to occur for several reasons. The first is the increased stressors coupled with the individuals continued inability to cope with emotions. Additionally reinforcement from the family serves to maintain the behaviors as the child continues to grow and develop. Finally, exposure to ongoing negative events (abuse and trauma) exacerbates developing somatic complaints rather than resolving them. Research suggests that being able to communicate emotions is associated with fewer somatic complaints, particularly for girls (Deater-Deckard, 2001). For boys, emotional communication skills were associated with fewer somatic complaints, but the same was not true for disclosure.

**Personality Correlates.** With regards to personality, research suggests that specific personality characteristics may be precursors to the development of somatic complaints. Clinicians have consistently found that children identified with somatic complaints are typically conscientious, sensitive, insecure, and anxious (Kingery, Ginsburg & Alfanso, 2007; Miers, Rieffe, Terwogt, Cowan, & Linden, 2007; Riangel, Garralda, Levin, & Roberts, 1999). These children are also described by others as “good” and focused on high academic performance (Kingery et al. 2007; Miers et al. 2007). They set high standards for themselves in terms of behavior and educational achievement, which then may result in their subsequent anxiety. In this instance, time

lost due to somatic complaints results in difficulty in catching up, which causes the child to become discouraged (Lask, 1986). Children who demonstrate somatic complaints may also exhibit temperamental difficulties and a predisposition to withdraw in new situations. For example, Davidson, Faull and Nicol (1986) found that children with RAP, as compared to healthy controls, have a fairly consistent personality makeup [e.g., extraversion (versus introversion), agreeableness (versus antagonism), neuroticism (versus emotional stability), conscientiousness (versus negligence) and openness (versus closeness) to experiences], suggesting that a child's personality is an underlying risk factor to the development of somatic complaints.

**Behavioral Correlates.** Behaviorally, research suggests that children with somatic complaints are at increased risk for problems in peer relationships and may present with obsessive characteristics (Cunningham, McGrath, Ferguson et al., 1987). Walker, Garber and Greene (1994) examined potential moderator variables (e.g., child social and academic competence, parental somatic symptoms, and child sex) of somatization for 197 children with abdominal pain. They found that high levels of negative events (e.g., repeated failures, family discord, trauma, and death) at follow up were indicative of more somatic symptoms, but only in children lacking competence in social skills, and in families with high levels of negative life events. Boys with mothers who demonstrated high levels of somatic complaints also had high levels of somatic symptoms at follow-up. Levels of somatic symptoms for fathers were predictive of high levels of somatic symptoms in the child at follow up, regardless of the presence or absence of additional life stressors (Walker et al., 1994).

In addition to childhood traumatic experiences, and the influences parents have on the maintenance of somatic symptoms, the longevity and severity of the diagnosis often persists into adulthood if left untreated. Adults experiencing somatic complaints also reported significant histories of these same physical symptoms in childhood. Schilte et al. (2001) found that four of five adults who were frequent visitors to physicians' offices with unexplained symptoms reported at least one major somatic episode in their childhood. Additionally, adult women with somatic complaints reported difficult childhoods, bearing a high degree of responsibility within the family unit, or abuse. Likewise, Campo, Jansen-McWilliams, Comer and Kelleher (1999) also supported the notion of psychological problems being related to family dysfunction. Specifically, it was found that adolescents were more often classified as somatizers than children, while females, non-white groups, non-intact families, and families with lower parental education were more highly associated with identified psychopathology, family dysfunction, poor school performance and attendance, perceived health impairment, and more frequent use of physical health and mental health services.

To elaborate, school performance and somatic complaints frequently come hand in hand. Physical complaints begin to appear more frequently with the start of secondary school, this may be due in large part to increased concerns regarding academic performance which results in increased pressure to complete academic tasks. Additionally, there may be a significant history in the area of social relationships (e.g., bullying). Also of importance, educational stresses (high educational demands, poor school progress, and difficulties settling in school) are linked to the somatic complaints

of children with functional problems (Masi et al., 2000; Murberg, & Bru, 2007; Wynick et al., 1995). Academic problems, if present, are secondary to emotional and social problems and self-esteem has not been found to buffer the effects of life stressors in children with somatization (Gledhill, & Garralda, 2006; Walker, Garber & Green, 1993; 1994). Whatever the origin of a child's somatic complaints, it is likely that for a large number of children, educational and school stresses act as a trigger or maintenance for ongoing somatic symptoms (Faull & Nicol, 1986; Davidson, Faull & Nicol, 1986; Schor, 1986).

Torsheim and Wold (2001) examined the relationship between school related stress, social support from teachers and classmates, and somatic complaints in the general sample of Norwegian adolescents. The results demonstrated that school-related stress and social support show consistent associations with different somatic complaints. Low social support of class peers and teachers was suggestive of increased somatic complaints. Additionally, regardless of the level of support from others, if the student perceived themselves to be under significant amount of stress they were more likely to demonstrate somatic complaints. Melman, Little, and Akin-Little (2007) attempted to determine whether a relationship existed between levels of participation in physical activities and self-reported physical complaints. The results of the study indicated varying levels of somatic complaints, with females reporting more anxious and somatic features than males based on the number of extracurricular activities.

In terms of social competence and peer interactions, Jellesma, Rieffe and Terwogt (2008) examined the reciprocity of friendship, disclosure, emotional

communication and somatic complaints. They concluded that self-reported social anxiety is associated with more somatic complaints in children; however, it was found that factors of popularity in the classroom, rejection, and a controversial or neglected status were not related to somatic complaints. Numerous behavioral, temperamental, and psychological problems occur in otherwise healthy children with somatic complaints. These problems include difficulty engaging in social relationships, withdrawal and anxiety, and dysfunction within the family unit. The addition of a chronic illness, such as epilepsy, to a child with a temperamental predisposition to develop somatic complaints and psychological disorders, results in an increased number of psychological diagnoses.

Rodenburg, Meijer, Dekovic, and Aldenkamp (2006) found that the parent-child relationship was the most important contributing factor to child psychopathology even when other factors were controlled for. Specifically, parental depression and marital satisfaction influence externalizing behavior problems and aggression through parent child relationship quality. Additionally, the effects of parental depression and marital satisfaction on delinquency are mediated by the positive parent-child relationship. Finally, parental depression and family adaptation were found to exert its influence on internalizing behavior problems (anxiety, depression, withdrawal, and thought and attention problems) through parental rejection. Gilleland, Suveg, Jacob and Thomassin (2009) examined the parental role in their child's somatic symptoms. The results supported earlier findings and indicate that children experiencing somatic symptoms have poor awareness of emotional experiences. In particular, the frequency of the negative affect predicted the child-reported somatic symptoms. Additionally, for parents

who also experienced somatic complaints, fathers were more likely than mothers to have symptoms occurring at the same time as their child (Gilleland et al., 2009). For parents who also experienced somatic complaints, fathers were more likely than mother to have symptoms occurring at the same time as their child (Gilleland et al. 2009).

It has been well documented that parental attitudes and behavior greatly influence children's adjustment, and the same can be said for somatization (Gilleland et al. 2009). Somatization in childhood is associated with somatic symptoms and illness in parents and families, with children frequently sharing a variety of symptoms in common with family members (Campo & Fritsch, 1994; Hilker, Murphy, & Kelley, 2005; McGrath, 1994; Siegel, 1990; Wasserman, Whittington & Rivara, 1988; Zuckerman, Stevenson & Bailey, 1987). In particular, children with somatization often have an abundance of relatives with comparable symptomology and with other additional psychiatric disorders (Siegel, 1990; Campo & Fritsch, 1994). Routh and Ernst (1984) studied the mothers of 20 children and adolescents with functional abdominal pain and compared them to another group of children who also suffered from abdominal pain as a result of organic causes. Half of the children with somatization, and only one child with organic pain had one or more relatives (primarily female) with somatization disorder. Additionally, significantly higher incidences of children with RAP had relatives with alcoholism, antisocial or conduct disorder, or attention deficit hyperactivity disorder. Kriechman (1987) found similar results when a study was conducted using 12 families, each having two children that had both been placed in a psychiatric hospital with a somatization disorder diagnosis.



Walker and Greene's (1989) study of 41 children with RAP and 41 controls, found that both RAP children and their mothers had heightened levels of anxiety and depression; however, in a follow up survey (Walker & Greene, 1989; Walker, Garber, & Greene, 1993), the authors found no evidence of psychopathology on the part of the parent. In both studies, it was noted that children with RAP had comparable levels of psychological distress as compared to 28 children with chronic organic abdominal pain (Campo & Fritsch, 1994; Crossley, 1982; Raymer, Weininger & Hamilton, 1984). It was also found that children with RAP had higher rates of family illness including abdominal problems and other serious health problems than well children, or children with emotional disorders (Campo & Fritsch, 1994; Crossley, 1982; Raymer, Weininger & Hamilton, 1984).

With regards to family modeling and reinforcement of the somatic complaint, Bennett-Osborne, Hatcher and Richtsmeier (1989) explored the extent to which familial clustering of unexplained physical symptoms serves as a learned model of behavior for children. In their study, 20 children with RAP were interviewed and compared to children with sickle cell disease with recurrent pain linked to their illness. Children with unexplained pain identified more family models and perceived the frequency and intensity of their pain as similar to their family models, while their parents did not report this relationship (Bennett-Osborne et al., 1989; McGrath, 1994). This suggests similar symptomology in families of children who demonstrate other somatic complaints.

Additionally, parental reinforcement of the symptoms and discouragement of coping is also likely to play a part in the maintenance and onset of the symptoms. In the

Walker et al. study (1993), children with RAP reported greater parental encouragement of illness-related behavior than children with emotional disorders and well children. Specifically, they reported that parents more frequently responded to symptom complaints with attention and special privileges

When addressing parental concern about illness and its increased child and family health focus and medical help seeking, the studies discussed above indicate an enhanced family health focus for many children who have somatic complaints, as well as high levels of anxiety and mood disorders. For young children, the specific anxieties regarding illness have more bearing on medical help seeking than maternal anxieties or mood changes (Bennett-Osborne et al., 1989; Campo & Fritsch, 1994; McGrath, 1994). Gilleland, Suveg, Jacob and Thomassin (2009) examined the parental role in their child's somatic symptoms. The results supported earlier findings and indicate that children experiencing somatic symptoms have poor awareness of emotional experiences. In particular, the frequency of negative affect predicted the child-reported somatic symptoms.

Also of note, children with somatic complaints were more likely than other groups of children with psychological disorders were more likely to report a childhood pattern of parental neglect (Campo & Fritsch, 1994; Craig, Boardman, Mills, Daly-Jones & Drake, 1993; Masi, Favilla, Millepiedi, & Mucci, 2000; Schilte et al., 2001; Siegel, 1990). Interestingly, although there is a lack of intimacy in terms of parent-child relationships within the family systems, there is a marked degree of closeness and togetherness in situations surrounding health issues (Campo & Fritsch, 1994; Fritz,

Fritsch & Hagino, 1997). Craig, Drake, Mills and Boardman (1994) found evidence to suggest that this combination of reduced parental care coupled with illness in childhood may have led to the development of inadequate coping strategies to minimize the effects of a perceived crisis, and then to somatization in adulthood.

A study conducted by Thornton et al. (2008) supported Rodenburg et al. (2006) findings, concluding that families with higher degrees of involvement, nurturance had more positive family units. Additionally, family functioning correlated moderately with competence and behavior problems in both children with epilepsy and their siblings. In parents that had positive supportive relationships with their children, no significant differences were found between the proportion of children with epilepsy and their siblings in scores of total competence, internalizing problems, and externalizing problems; as both groups reported positive outcomes. Interestingly, it appears that epilepsy was not a significant contributor regardless of the type of psychopathology, whereas each type of family factor significantly influenced almost each type of child psychopathology, the exception being somatic complaints. In families with overall low levels of functioning, no significant differences were seen between the children with epilepsy and their siblings in terms of behavior problems; however, in this group half of the children scored in the borderline or clinical range (Rodenburg et al., 2006).

Numerous studies have been done outlining the role of psychological disorders verses other chronic illnesses, seizure frequency, and familial support. Austin, Huster, Dunn, & Risinger (1996) reported a greater frequency of psychological, social and school problems and poorer psychosocial adaptive skills in children with epilepsy when

compared to children treated with asthma. Austin et al. (1996) also found that seizure frequency, gender, and family variables (e.g., amount of stress, support) were related to behavioral and emotional problems in children with epilepsy (Barry et al., 2008). Dunn and Austin (1999) found specific problems in adolescents with epilepsy: attention difficulties, depression, and anxiety. Devinsky et al (2005) found several variables as possible explanations for behavioral and emotional problems in children with seizures which included: low socioeconomic status on academic achievement in children with well controlled epilepsy found that attention as the only variable associated with achievement scores. SES and seizure variables, including type and duration were not associated with differences in academic performance.

### **Psychological Problems and Epilepsy**

Each year it has been shown that children with epilepsy are at an increased risk of developing behavioral and emotional problems (Austin et al., 2001, 2005; Barry, Lembke, Gisbert, & Gilliam, 2007; Burack, 1997; Pless & Pinkerton, 1975; Rutter et al., 1970). The relationship between physical wellbeing and psychological reactions was first suggested by Adler (1917), and although the type of chronic illness may vary, depending on the nature of the underlying condition, there are only limited ways in which children can cope with the stress of having a chronic illness. As a result, the effectiveness of a child's psychological functioning may be the direct result of their proficiency in the use of coping mechanisms. In the general childhood sample, the prevalence of behavioral and emotional problems is 6.6% (Freilinger Reisel, Reiter, Zelenko, Hauser, & Seidl, 2006). In children with uncomplicated seizures, the

prevalence of the problems is 28.6%, in children with central nervous system damage the incidence is 37.5%, and in children with both seizures and central nervous system damage, the prevalence of the problems is 58.3% (Freilinger et al., 2006). As with somatization, numerous contributing factors to psychological distress have been identified for those with epilepsy.

### **Familial Factors**

Research studies have suggested that families of children with epilepsy generally fare worse than control groups (Ellis et al., 2000; Hooper et al., 2000; Rodenburg, et al., 2006). Seizures that occur with relative frequency and severity have been shown to be significant predictors of behavioral dysfunction in the family unit, whereas the seizure type and syndrome are less consistent in predicting the problems (Berg, Smith, Frobish, Beckerman, Levy, Testa & Shinnar, 2004; Besag, 1995). Dunn, Austin, and Huster (1999) found that in adolescents diagnosed with epilepsy, their satisfactions with family relationships, as well as their attitude towards having seizures are significant predictors of depression. Added to issues such as temperament and family is the child's cognitive ability and the impact that the educational environment plays in exacerbating somatic complaints for children with and without chronic illness.

**Cognitive Ability and Academics.** The cognitive functioning of a child with or without a chronic illness significantly impacts all aspects of life. This is especially seen in children with epilepsy. Children with epilepsy and low IQ are more likely to experience poor quality of life and psychosocial problems (Austin et al, 1994, 1996; Lewis et al, 2000; Sabaz et al., 2001). Among children with epilepsy, 28 to 38% have

mental retardation (Steffenburg et al, 1996). Additionally, there are a large percentage of children with epilepsy who have low (IQ 70-80) cognitive abilities, while the remaining individuals with epilepsy have an IQ that is 10 points lower than their healthy peers (Dodson, 2001) whose severity varies from one epilepsy syndrome to another (Carnaggia, Beghi, Provenzi & Beghi, 2006). Studies of children with both mental retardation and epilepsy have found high rates of behavior problems in this sample ranging from 50 to 59% (Rutter, 1989; Steffenburg, Gillberg, Steffenburg, 1996). Specifically, Hoare (1993) indicated that epilepsy accompanied by additional disabilities such as mental retardation had an adverse effect on quality of life for both the child and the child's family. Lewis et al. (2000) studied children with low IQ to find whether those who also had epilepsy were doing worse. The results of the study did not reach statistical significance; however, children who had active epilepsy had the highest total behavior problems scores. Also, Sabaz et al., (2001) found that children with both low IQ and epilepsy scored in the clinically abnormal range compared with 41% of those with mental retardation alone. These results illustrate a high rate of behavioral disturbance in children with both epilepsy and low IQ.

Even with normal intelligence, studies conducted on children with idiopathic epilepsy studies report that cognitive functions (attention, reaction time, spatial and emotional memory, and reading, writing, and math) are more frequently impaired in people with epilepsy than in the general sample (Tidman, Saravanan, & Gibbs, 2003; Sillanpaa, 1992; Tidman, et al., 2003) including children with normal intelligence

(Besag, 2003; Cornaggia & Gobbi, 2001; El Sabbagh, Soria, Escolano, Bulteau, & Dellatolas, 2006; Williams, 2003).

More recently, Buelow et al. (2003) found that children with both a diagnosis of epilepsy and having a low IQ had the highest incidence of behavior and mental health problems. Additionally, females with epilepsy and a low IQ were found to be at the highest risk for poor self-concept. With regards to somatic complaints, Beulow et al. (2003) also found that for both males and females a pattern was found as it related to IQ. Specifically, somatic complaints were found to increase with lower cognitive abilities.

Camfield, Camfield, Smith Gordon and Dooley (1993) examined children with average IQ and a diagnosis of epilepsy and found that the presence of a learning disorder at the time of diagnosis was most indicative of a poor social outcome. Only two other biological factors directly related to epilepsy were independently predictive of outcome - greater than 20 seizures before treatment and the “simple partial” type of seizure. Additionally, Ostrom et al. (2003) attempted to understand the “early educational and behavioral predicament in childhood” epilepsy. The results indicated that despite similar educational histories and intelligence, 51% more children than control (27%) required special education services. Children obtained worse scores in cognition and behavioral components. Parents and teachers also perceived these children to have more behavioral problems (Dunn, Austin, Caffrey, & Perkins, 2003). Added to the issues of cognition, personality, and behavioral correlates in children with epilepsy is the impact that medication has on the child’s social, emotional, and psychological development.

**Medications.** The studies examining antiepileptic drugs and their association with cognitive and behavioral difficulties in children and adolescents are mixed.

Herrman, Whitman, Hughes, Melyn and Dell (1989) found that the use of multiple antiepileptic medications caused behavioral problems; however, these same results were not replicated in the study conducted by Austin et al. (1999). In a third study conducted by Mandelbaum and Burack (1997) examining the cognitive and behavioral profiles of 43 children with new onset idiopathic seizures examined the effects of antiepileptic medications on psychological functioning during a twelve month follow up. The subjects were included in the study only if their seizures were well controlled by a single drug treatment. The researchers found no significant change in the psychological functioning of the children that could be attributed to medical treatment. An additional study conducted (2004) examined the interactions between drugs, neuropsychiatric problems, and the treatments of pediatric patients with epilepsy and coexisting cognitive by Pellock impairment and psychological disturbance. This study found that the actual contribution of antiepileptic drugs to cognitive and behavioral problems was difficult to ascertain.

In studies exploring the effects of antiepileptic medications on adult patients, Meador (1994) concluded that antiepileptic drugs can have cognitive side effects that are increased when compounded by multiple antiepileptic medications, and suggested the same to be true for children and adolescents. Another adult study conducted by Schmitz (1999) reported that behavioral problems are the most common psychiatric adverse events caused by antiepileptic drugs followed by depressive disorders. The authors found that the risk of psychiatric symptoms is likely to be increased with the severity of



the epilepsy, use of multiple medications at the same time, followed by depressive disorders. With regards to the risk of psychiatric symptoms, Schmitz (1999) found that the likelihood of developing these symptoms increases with the severity of the type of epilepsy, use of multiple drug treatments at the same time, rapid titration, and high dosages of drugs.

**Behavioral Correlates.** The behavior problems in children with epilepsy include both internalizing (e.g., anxiety and depression) and externalizing problems (e.g., aggression, disruptive behavior) (Keene et al., 2005; Lendt, Helmstaedter, Kuczaty, Schramm, & Elger, 2000). The incidence of recurrent seizures, however, does predict behavior problems very early during the course of epilepsy (Austin et al., 2002; Austin, 2005). Additionally, intractability has been reported to account for a large portion of the variance in behavioral problems (Austin et al., 2001). These seizure variables do not necessarily predict a child's social competence (Caplan et al., 2005b; Keene et al., 2005). Hanssen-Bauer, Heyerdahl and Eriksson (2007) found that 77% of the children and adolescents with epilepsy had a possible psychiatric disorder. Additionally, it was found that children who have a diagnosis of both epilepsy and mental retardation are at greater risk of more significant psychopathology and social skills deficits (Austin, 2001; 2004; 2005; 2006; Caplan & Austin, 2000; Høie, Sommerfelt, Waaler, Alsaker, Skeidsvoll & Mykletun 1989).

The effects of epilepsy on general mental health may be more indirect in nature rather than direct (Davies, Heyman, & Goodman, 2007). One possible reason for this is that both behavior problems and seizures are caused by the same underlying

neurological disorder (Dunn et al, 2003; Noeker, Haverkamp-Krois & Haverkamp, 2005). Alternative explanations include that seizures disrupt behavior or that children have negative psychological reactions to seizure activity (Austin et al., 2002). Seizure frequency in the past year, but not age at seizure onset, has been found to predict behavioral problems (Schoenfeld, Seidenberg & Woodard, 1999).

**Social Competence.** In addition to coping with the challenges associated with having a chronic illness, children with epilepsy are confronted with social difficulties related to having a disorder involving the central nervous system (Nassau & Drotar, 1997; Piazzini, & Canger, 2001). As children with chronic illness, children with epilepsy have problems in the school setting (Austin, Smith, Risinger & McNelis, 1994; Dorenbaum, Cappelli, Keene & McGrath, 1985; McCusker, et al., 2007; Schoenfeld, Seidenberg & Woodard, 1999), social relationships (Austin et al., 1994; Apter, Aviv, Kaminer, Weizman, Lerman & Tyano, 1991; McCusker et al., 2007; Schoenfeld, Seidenberg & Woodard, 1999;), activities (McCusker et al., 2007), and overall social competence domains (Austin et al., 1994; McCusker et al., 2007; Hermann et al., 1988) that are much lower when compared with CBCL norms (Austin et al., 1994; Austin, 2001, 2004, 2005, 2006; Dunn, Austin, Harezlak, & Ambrosius, 2003; 1985; McCusker et al., 2007; Schoenfeld et al., 1999) and scores of typically developing children (Apter et al., 1982).

A relationship between social competence scores and chronic illness factors such as pain and physical handicap has been observed with seizure variables in some studies (Herrman, Whitman, Hughes, Melyn & Dell, 1988; McCusker et al., 2002; Schoenfeld et

al., 1999; Williams et al., 1996) but not in others (Apter et al, 1982; Austin et al., 1994; Dorenbaum et al., 1985). Specifically, Hermann et al., (1988) demonstrated that children diagnosed with moderate to severe partial to primary generalized epilepsy had low total social competence scores which were also associated with poor seizure control, treatment with valproic acid (i.e., Depakote) and longer duration of illness. Williams et al. (1996) found lower school and social scores in 84 children with complex partial seizures; however there was no reported difference in social competence scores by type of seizure disorder. Austin et al. (1994) found reduced activities index scores in the Child Behavior Checklist (CBCL) in children with epilepsy with high internalizing and externalizing CBCL scores. Tse, Hamiwka, Sherman & Wirrell (2007) more recently confirmed these findings; they concluded that although children with epilepsy had poorer social skills and were generally less assertive than their siblings, the number of individuals with clinically significant social skills deficits was low and did not differ between groups. Additionally, neurological factors were related to social skills deficits, but only if the child had a learning disability and difficult family functioning.

In contrast (McCusker et al., 2002) in a study of 48 children with intractable epilepsy and half with partial seizures found several associations between social competence and several seizure variables: decreased activities with partial rather than mixed generalized seizures, reduced seizure relations with poor seizure control, and low school domain scores with previous use of rectal diazepam. The difference in findings may be attributable to the variation of sample size, as well as the inclusion of children with significant cognitive deficits (mental retardation), demographic variables, and the

relationship between the seizure variables examined (e.g., age at onset, duration of illness, seizure frequency, and antiepileptic drugs).

Caplan, Sagun, Siddarth, Gurbani, Koh, Gowrinathan & Sankar (2005a) compared the CBCL social competence scores of 90 children with complex partial seizures (CPS) and 62 with absence epilepsy (CAE) of average intelligence with score of 91 healthy children. More importantly it examined the use of the CBCL as an instrument in measuring social competency factors. Caplan et al. (2005b) found that when controlling for cognitive, behavioral, and demographic variables when studying CBCL social competence measures in children with epilepsy that those with average intelligence are at risk for school difficulties if they have verbal IQ deficits and externalizing or externalizing behavioral disorders.

Rantanen et al. (2009) examined the social competence of a group of 26 children ages 3 to 6 with epilepsy using the CBCL. The results indicated that children with epilepsy, especially complicated epilepsy had fewer age appropriate skills and more behavior and attention problems than healthy children. With regards to somatization, no differences were found between groups diagnosed with complicated verses uncomplicated epilepsy. However, there were differences between the study groups and the control groups in the areas of social problems and psychosomatic subscales.

Dorenbaum, Cappelli, Keene, and McGrath (1985) used the CBCL to study 38 randomly selected children with epilepsy found that the recruitment sample did not differ from the normative group in terms of behavioral or social problems.

Similar results were found in the Rantanen et al. study (2009) which also concluded that children with epilepsy, especially complicated epilepsy, had fewer age appropriate skills and more behavior and attention problems than healthy children. With differences between the study groups and the control groups in the areas of social problems and psychosomatic subscales.

Only in a recent study has the Behavior Assessment System for Children-Second Edition (BASC-2; Reynolds & Kamphaus, 2004) been incorporated to examine the behavioral, emotional, and educational profiles of children with epilepsy utilizing parent and teacher reports. Unlike the CBCL that includes a social competence domain, the BASC-2 generates an Adaptive Skills composite that is comprised of multiple skill levels including: social competence, social communication (thoughts and feelings), resiliency to changes or setbacks, and the ability to accomplish goals in social, educational and community settings.

Titus, Kanive, Sanders, and Blackburn (2008), utilizing archival data from a pediatric medical center, identified 108 children and adolescents who ranged in age from 3-19 years. BASC-2 parent rating scales were found for all children; however only 37 teacher reports were identified for the sample. The results of the study indicated that there was general agreement between the parent and teacher reports on how both rated the behavior of the children identified in the sample. Additionally, more than 50% of the children in the total sample had scores in the at-risk for attention problems and 11% in the clinically significant range. Third, more than 25% of the parents and teachers reported clinically significant ranges of atypicality. Fourth, clinically significant results

were reported by parents in the areas of: withdrawal (23%), depression (13%), somatization (12%), and hyperactivity (11%). Teachers reported the following indices within clinically significant ranges as well: somatization (24%) and learning problems (17%). Finally, more than 50% of parents and 47% of teachers reported adaptive skills in the at-risk range; however, the percentages reported by parents and teachers in the areas of externalizing behavior problems were below what might be expected in typical normative data.

In terms of the adaptive skills composite as generated by the BASC-2, relationships were found between age of seizure onset, intelligence and reading level. Age at onset was related to withdrawal, atypicality, and aggression. Intelligence was linked to hyperactivity, atypicality, and withdrawal; while reading was linked to hyperactivity and attention problems. Also of note, the age of seizure onset was positively associated with overall intelligence and reading, and negatively correlated with the number of antiepileptic medications. With regards to seizure control, children with intractable epilepsy were found to have significantly higher scores on the BASC-2 parent report on the indices of depression, somatization, atypicality, and withdrawal. Similar results were found when examining the teacher reports (Katzenstein, Fastenau, Dunn, & Austin, 2007).

In spite of these results there were several notable limitations. First, the number of completed teacher reports was significantly smaller than the sample of children in the study. This difference was significant enough to call into question the generalizability of findings. The lack of completed teacher reports in relation to the number of participants

as well as previous literature documenting the disagreement between parent and teacher reports makes the results questionable. Also of concern was the age range (3-19), although the children were separated based on type of seizure, they were not divided based on age. The results may have been significantly more different in areas that measured internalizing behaviors, externalizing behaviors, and adaptive skills if the developmental level of the child was considered. Of note, it is also important to examine the roles that social relationships play in their feelings of self-efficacy. Next, the sample was composed of children referred to a tertiary care hospital, whose results may be a reflection of children whose epilepsy is more complicated, and as a result may make them more prone to heightened behavioral and psychological problems.

### **Conclusion**

The literature in the areas of somatic complaints and epilepsy has covered a breadth of data and examined multiple contributors to the later developing poor outcomes for both groups; however, little has been done to identify the differences or possible outcomes for both samples when examined within the context of adaptive skills. Much of the literature has focused on a component of adaptive skills (social skills), but much of the emphasis on each of the studies has been to establish the presence or absence of a psychological disorder, using the absence of the disorder as evidence of the former. As a result, a detailed examination of the strengths and weaknesses within these two samples as it relates to adaptive skill functioning is essential in identifying areas where intervention may be beneficial.

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