ATTENTION AND TRAUMATIC STRESS IN CHILDREN

by

KATHRYN ANNE BECKER

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Jennifer Freyd

Dr. Jennifer Freyd, Chair of the Examining Committee

4 June 2002

Date

Committee in Charge: Dr. Jennifer Freyd, Chair
Dr. Kirby Deater-Deckard
Dr. Jeffrey Measelle
Dr. Daniel Close

Accepted by:

Dean of the Graduate School

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Approved: _____
Dr. Jennifer Freyd

Reports of increasing rates of Attention Deficit Hyperactivity Disorder (ADHD) diagnosis and stimulant treatment have alarmed clinicians, researchers and parents. Clinicians who treat abused children have been particularly concerned about misdiagnosis of ADHD. Dissociation is one response to trauma. Dissociative children have difficulty integrating aspects of their experience and may become distracted by internal thoughts, feelings or memories. Children with post-traumatic stress reactions may have similar experiences and may also experience hypervigilance, making it difficult for them to sit still and concentrate.

Study 1 investigates relations between trauma reactions and attention/hyperactivity problems in a community sample of 80 preschool children who varied in their experiences with stressful life events. Trauma symptoms were related to ADHD symptoms. Study 1 also investigates differences in memory for threat-related and neutral stimuli presented to children under selective and divided attention. Similar to previous results for dissociative adults (A. DePrince and J. Freyd, 1999), traumatized preschoolers did not differ from non-traumatized

preschoolers in memory under selective attention, but had poorer memory for threat-related stimuli under divided attention when compared to non-traumatized children in the same condition.

Study 2 investigates relations between trauma reactions and attention/hyperactivity problems in a community sample of 29 8- to 11-year-olds whose parents reported ADHD symptoms and who varied in their experiences with stressful life events. In contrast to studies that have not included abused children, there were no sex differences in symptoms of inattention and hyperactivity. Parents reported non-abused boys' ADHD symptoms began much younger than non-abused girls' symptoms (10.3 months vs. 6.0 yrs.). Trauma symptoms were related to ADHD symptoms. More parents reported that their children's ADHD symptoms were due to chronic stress, as compared to beginning or worsening after a particular stressful event. Abused children were more likely than non-abused children to have a relative with ADHD symptoms. Abuse predicted ADHD symptoms. Abuse and ADHD symptoms independently predicted school performance.

Results suggest that trauma plays a significant role in children's inattention and hyperactivity. Understanding how trauma affects children's attention, activity level and school functioning will improve the treatment and education of traumatized children.

CURRICULUM VITA

NAME OF AUTHOR: Kathryn A. Becker

PLACE OF BIRTH: McPherson, Kansas

DATE OF BIRTH: January 15, 1976

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon
Lane Community College
Seattle University

DEGREES AWARDED:

Doctor of Philosophy in Psychology, 2002, University of Oregon
Master of Science. in Psychology, 1999, University of Oregon
Bachelor of Science in Psychology, 1998, University of Oregon

AREAS OF SPECIAL INTEREST:

Developmental Traumatology
Developmental Victimology

PROFESSIONAL EXPERIENCE:

Post-doctoral Fellow, Center for Crimes Against Children, University of New Hampshire, May 2002-May 2004
Research Assistant, Oregon Social Learning Center, May 2001 – February 2002
Graduate Teaching Fellow, September 1998 – July 1999

AWARDS AND HONORS:

Pre-doctoral Fellow, NIMH Development and Psychopathology Training Grant

GRANTS:

Travel Award, Psychology Department, University of Oregon, 2001
Graduate Student Travel Award, Center for the Study of Women in Society, University of Oregon, 2001
Graduate Student Research Award, Center for the Study of Women in Society, University of Oregon, 2001
Travel Award, Psychology Department, University of Oregon, 2000

Graduate Student Research Award, University of Oregon, 1999
Sheldon Zack Undergraduate Research Award, Psychology Department, University of Oregon, 1998

PUBLICATIONS:

Becker, K. A. & Freyd, J. J. (2001). Legal Remedies for Sexual Abuse Survivors [Review of the book Sexual Abuse Litigation: A Practical Resource for Attorneys, Clinicians, and Advocates]. Psychology of Women Quarterly, 25,258-259.

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Becker, K. A. & Freyd, J. J. (2000). [Review of the book Momentous Events, Vivid Memories.] Biography, 23, 2, 372-374.

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CHAPTER I

INTRODUCTION

Overview

Attention deficit hyperactivity disorder (ADHD[1]) is one of the most frequently diagnosed childhood disorders (Cantwell, 1996). Both professionals and the public have been concerned as increasing numbers of children are diagnosed with ADHD and treated with stimulant medications. (Breggin, 1999; Safer, Zito, & Fine, 1996; Zito et al., 2000). The ADHD literature has emphasized biological and genetic causes for the disorder (Barkley, 1997; Bradley & Golden, 2001).

ADHD symptoms include hyperactivity, impulsivity and inattention. The DSM-IV (American Psychiatric Association, 1994) differs from previous versions of the DSM in that it allows for 3 types of ADHD: a primarily inattentive type, a primarily hyperactive/impulsive type, and a combined type. Separate hyperactive/impulsive and inattentive types are consistent with research showing that children's symptoms tend to cluster into these two groups

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1. What is now labeled ADHD has gone by different names through various versions of the Diagnostic and Statistical Manual. Unless otherwise noted, here the term "ADHD" means symptoms of hyperactivity, impulsivity and/or inattention that are inconsistent with developmental level. This includes the hyperactive/impulsive, inattentive and combined types of ADHD in the DSM-IV.

(Lahey et al., 1988; Lahey et al., 1998). Many ADHD symptoms overlap with symptoms of other disorders, making diagnosis difficult. Attention problems are associated with depression, post-traumatic stress disorder (PTSD), mania, schizophrenia and dissociative disorders (Nemzer, 1998). Abused children with PTSD have been shown to be as active as non-abused children with ADHD (Glod & Teicher, 1996).

Clinicians who treat abused and neglected children have been particularly concerned by high rates of ADHD diagnoses among abused and neglected children (e.g. Peterson, 1998; Putnam, 1997). Clinicians and researchers question whether these children have "true" ADHD, a qualitatively different form of ADHD from that experienced by non-traumatized children, or have post-traumatic stress or dissociative symptoms that have been misdiagnosed (e.g. Glod & Teicher, 1996; Hunter, 2001).

Very little research has addressed hyperactivity, impulsivity and inattention in abused and neglected children. Most studies of ADHD do not measure abuse, neglect or trauma history. The National Institute of Mental Health Multimodal Treatment Study of Children with ADHD (MTA) explicitly excluded abused and neglected children (Hinshaw et al., 1997).

The studies presented in this dissertation investigate attention abilities in community samples of abused and non-abused children. These studies present preliminary data on the relations between child abuse, trauma symptoms and attention problems in preschool and school-age children. Implications for future research, clinical practice, and education are discussed.

Review of Attention Deficit Hyperactivity Disorder Literature

Hyperactivity, Impulsivity, and Inattention

Biological, Genetic and Environmental Bases for ADHD

Since at least the 1920s, researchers and clinicians have recognized a set of symptoms now defined by the DSM-IV as ADHD (Rafalovich, 2001). At the end of World War I, there was an outbreak of *encephalitis lethargica*, an illness characterized by sluggishness, hallucinations and fever. Often the illness was fatal, but in the cases that went into remission, a variety of physical and mental impairments were observed. Among them were "emotional instability, lying, thieving, impaired memory and attention, and hyperactivity" (Kessler, 1980, p. 18). Over time, research revealed a group of children who had these symptoms, but never had *encephalitis lethargica.* Over time, children presenting with symptoms of hyperactivity, impulsivity and inattention were thought to have "minimal brain damage" (Barkley, 1990).

While researchers no longer use the term "minimal brain damage" to describe the proposed biological basis of ADHD, several have demonstrated brain abnormalities between ADHD, ADHD with co-morbid disorders, and control children. Differences between groups have been found in areas including the prefrontal lobe, striatum, basal ganglia, corpus collosum, temporal lobes, and right parietal lobe (Bradley & Golden, 2001). Some researchers conclude from this evidence that "biological deficits are presumed to be the primary cause" of ADHD (Bradley & Golden, 2001, pg. 908) and that "psychosocial factors are not thought to

play a primary etiological role" (Cantwell, 1996, pg. 979). Others are concerned by the non-specificity of results from imaging studies (Conners, 1998). In response, some argue that there are several kinds of ADHD, each associated with its own brain abnormality. If so, brain imaging could be useful in disentangling these types (Bradley & Golden, 2001).

The emphasis on ADHD as a biological and genetically determined disorder may be exaggerated (Joseph, 2000). There is often a presumption that biological factors are not socially determined. For example, Barkley (1997, p. 37) writes:

> *Where differences in brain structures are found, they are likely the result of abnormalities in brain development within these particular regions, the causes of which are unknown but are probably under genetic control. After all, genes control in large part the developmental construction of the brain.*

In fact, in the same chapter Barkley (1997) reviews evidence of the increased risk of ADHD afforded by prenatal exposure to alcohol, cigarette smoke, and postnatal exposure lead. These, along with any number of social factors, may influence brain structure and function. Barkley (1997, p. 30) states, alternatively, that these factors are involved in exacerbating a pre-existing genetic propensity for brain abnormalities associated with ADHD: "Environmental factors may well shape and mold the nature and severity of an initial biologically created vulnerability toward poor inhibition such that it arises to the level of clinical ADHD." Without studies in which both genes and environments are studied, researchers cannot know to what extent genes and environment are causing brain abnormalities.

Several reviews cite family studies (that do not take advantage of differences in genes and environments as twin, adoptive and step-family designs do) to support the genetic (but not environmental) basis for ADHD (e.g. Barkley, 1997; Bradley & Golden, 2001; Cantwell, 1996). Simply studying concordance between parents and children does not shed any light on which environmental or genetic factors may be at play. Yet, Barkley (1997, p. 37) writes, "ADHD clusters among biological relatives of children or adults with the disorder, strongly implying a hereditary basis to this condition." As an analogy, there is evidence indicating that child physical abuse clusters among biological relatives (e.g. Pears & Capaldi, 2001) yet most researchers would not conclude that there is a primary genetic cause to physical abuse.

Reviews that do consider behavior genetic studies (i.e. twin, adoption, and step-family designs) have misinterpreted the meaning of genetic, shared environment and non-shared environmental influences. In reviews of the behavior genetic literature, researchers (e.g. Barkley, 1997; Bradley & Golden, 2001; Cantwell, 1996) fail to address gene-environment correlations and interactions. Gene-environment correlations occur when genes co-occur with environments. For example, in an evocative gene-environment interaction, children with a particular gene or set of genes evoke certain kinds of behaviors from others. Those behaviors then guide the child's development. If the same child had been raised by a parent who responded differently, the child's behavior would be different. When genes and environments are correlated, estimating heritability using additive models (e.g. ACE models) does not yield a "pure" measure of heritability, but a mix of genes and environment.

Another serious misunderstanding involves the meaning of "shared" and "nonshared" environmental variance. As is the case with many traits, ADHD has been shown to have a

substantial hereditary component (perhaps as high as 80%), a moderate non-shared environmental component (about 15-20%) and a negligible shared environmental component (Kuntsi & Stevenson, 2000; Nadder, Silberg, Eaves, Maes, & Meyer, 1998). While this information is useful for investigating those aspects of the environment that are important, some researchers have attempted to define "shared" environment without the benefit of empirical investigation. On the basis of the finding of small shared environment effects, Barkley (1997, p. 43) writes,

> *Family diet, common environmental toxins, family dysfunction, flawed child-rearing characteristics of the parents, social class and disadvantage, marital discord, separation, and divorce, and any of a whole host of other common environmental factors must now be ruled out as providing any credible explanation for the development of ADHD, either alone or as a major contributor in concert with other possible causes.*

To make this statement assumes that researchers can know that these factors do not affect children differentially. Many alternative examples are plausible. A family can be dysfunctional by subjecting one child to physical abuse and another to neglect or to no abuse at all. A parent can sexually abuse a daughter, but not a son. During divorce, a parent can treat one child as a confidant and isolate another child. Even children who experience seemingly identical events may interpret those events differently. One poor child may feel self-conscious for not having nice clothes while another may not be as concerned. In addition, these factors may be important in understanding gene-environment correlations and interactions. It may be that children with a gene or genes for inattention or hyperactivity only develop ADHD in the presence of particular family environments (shared or non-shared).

Even if behavior genetic studies investigated gene-environment interactions and correlations and found evidence of a "pure" genetic basis for ADHD, researchers still would not want to rule out the study of whole classes of variables. This is because the genetic and environmental contributions for ADHD may differ depending on the sample of participants. Adoption, twin and step-family studies are, by definition, not based on a representative sample of all families. Parents are screened before being allowed to adopt, and many twin studies rely on volunteer samples that may be biased toward families with less serious difficulties. Step-families also differ from other families in several ways.

In addition, no study can include a sample representative of all environments throughout the world and throughout time. In fact, most studies include people of a single culture. Any effect that culture has on the expression of genes is obscured in these studies that include very little variation in the participants' cultural background (Gottlieb, 1995).

Culture may be an important component for ADHD and most other mental disorders, which require symptoms to interfere with people's functioning and/or to exceed behavior normally expected for a person of the same age. What is a problem for a child of a particular age in one culture may not be a problem in another culture. Culture varies not only from place to place, but also through time. The relative influence of genes and environment may vary considerably between today and an earlier point in history. One aspect of culture of relevance to mental health is cultural norms about parenting. Some types of domestic violence, physical abuse, sexual abuse and neglect that are widely considered detrimental to children's well-being in many cultures today were not considered as harmful a short time ago, nor are they considered as problematic in other societies throughout the world today.

These issues are in addition to bias that affects virtually all studies of families and children. It stands to reason that families who do not have a telephone, who do not have reliable transportation, who are abusing their children and do not want to be caught, or who are unable to keep appointments because of drug use or mental or physical illness are less likely to participate in research. There are likely many other more subtle differences between families who are recruited and participate in research and those who do not. These might include what kind and how much compensation participants are offered, if participants are recruited using a list of parents derived from public records and what kind of records are used, what kind of confidentiality or anonymity is offered, the time, literacy, and other demands of the research, and so on. Most method sections of journal articles do not go into enough detail for other researchers to know how these factors affected participation. Because it is difficult at best to investigate meaningful characteristics of people who are not recruited and who do not participate, there is little evidence to inform researchers on the ways our studies are biased. If studies of ADHD, including family and genetic studies, are biased toward families that don't have these problems, then these problems will appear less influential in the development of ADHD even if they are, in fact, critical for certain groups of children.

The MTA study (Hinshaw et al., 1997) is an example of a major study on ADHD diagnosis and treatment that systematically excluded abused and neglected children. This multi-site study was undertaken to determine the best treatment for children with ADHD. A major aim of the study was to gather data on a large and diverse set of children in order to produce reliable results that were generalizable to most children with ADHD.

In an effort to run the study rigorously, researchers had numerous requirements for

participation that may have excluded important groups of ADHD children from the study. Some of the requirements to participate included having a telephone, having no parents who had abused stimulant drugs, and not having experienced recent or current abuse or neglect. The reasons for these choices were that the study protocol involved the need to speak with parents on the phone, parents of the children in the stimulant medication group were at risk for stealing stimulant medications, and children who had experienced abuse were at risk for removal from their homes, risking the ability of the study to follow them longitudinally. As a result, the MTA findings for the best treatment of ADHD cannot be generalized to abused and neglected children. It is likely that children at risk for certain kinds of abuse and neglect (by not having a telephone or by having a parent who abused stimulant drugs) have also been systematically excluded from the study sample.

Arguably, it is these stressed families who are of the most interest to those interested in improving treatment because it is these families who are least able to manage their children's ADHD symptoms without treatment. This is not to say that children in well-functioning families who have ADHD do not require research and treatment. However, to totally exclude family environment in future research on the basis of a relatively small number of studies using a particular methodology (i.e. behavior genetics) is to severely limit our understanding of the causes of the disorder and best treatments in heretofore understudied groups of children.

ADHD as an Executive Functioning Deficit

Clinicians and researchers have proposed several theories to explain hyperactivity,

impulsivity and inattention. One of the most prominent theories of brain dysfunction underlying ADHD is an executive functioning deficit, usually presumed to be related to a frontal lobe abnormality (Barkley, 1997; Nigg, 2001; Reader, Harris, Schuerholz, & Denckla, 1994). Barkley (1997, p. 56) defines executive function as "those self-directed actions of the individual that are being used to self-regulate", although other definitions are used (Nigg, 2001).

One piece of evidence supporting this view is the finding that children with ADHD have difficulty with tasks designed to test inhibition and persistence. One such task is the Stroop task (Golden, 1978). Several studies have demonstrated that children with an ADHD diagnosis perform worse (i.e. have more interference) on Stroop tasks than do children without an ADHD diagnosis (see Barkley, Grodzinsky, & DuPaul, 1992 for review). Stroop tasks require sustained attention as well as inhibitory control. The examinee must inhibit the prepotent response (to read the word) in order to respond correctly (by saying the ink color).

Another inhibitory control, sustained attention task is the directed forgetting task (Nigg, 2001). In this task, people are shown lists of words or pictures and asked to remember some of them and forget others. Memory for each type of word (to-be-remembered and to-be-forgotten) is examined, and memory for the to-be-forgotten words is taken as a failure of inhibitory control.

Although these tasks, and many others, have been used with ADHD samples, the most common inhibitory, sustained attention task is the continuous performance test (CPT) Several versions have been developed. In general, these tasks require the examinee to watch or

listen to stimuli and only respond when a target stimulus is presented (and inhibit responding when non-target stimuli are presented). Continuous performance tests are described in more detail in the Symptom Measurement section below.

Diagnosis

DSM-IV Criteria

In the DSM-IV, ADHD is defined by symptoms of inattention, impulsivity and hyperactivity (see Table 1). To meet criteria for ADHD-Inattentive type, a person must have six or more of the inattention symptoms and five or fewer of the combined hyperactive/impulsive symptoms. To meet criteria for ADHD-Impulsive/hyperactive type, a person must have six or more hyperactive or impulsive symptoms and five or fewer inattention symptoms. People who have six or more symptoms from both the inattention and hyperactive/impulsive categories are diagnosed with ADHD-Combined type. Symptoms must have begun before the child turned seven years old, must persist for at least six months, must be present in two or more settings, must be more frequent or severe than children of similar developmental level, and must represent significant functional impairment. Importantly, an ADHD diagnosis should not be made if the symptoms occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or another psychotic disorder, nor if symptoms are better accounted for by another mental disorder (such as a mood, anxiety, dissociative or personality disorder). Thus, according to the DSM-IV, children whose symptoms are best accounted for by post-traumatic stress disorder (an anxiety disorder) or a

dissociative disorder should not be diagnosed or treated for ADHD, at least until the PTSD or dissociative disorder has been treated. In practice, however, it can be difficult to know which disorder is primary. Clinicians often give dual diagnoses (Cohen, 1998).

Table 1. DSM-IV Symptoms of ADHD

Inattention	Hyperactivity	Impulsivity
Fails to attend to details	Fidgets	Blurts out answers
Difficulty sustaining attention	Leaves seat inappropriately	Difficulty awaiting turn
Does not listen	Runs about or climbs	Interrupts
Does not follow instructions	Difficulty playing quietly	
Difficulty organizing tasks	On the go	
Avoids tasks requiring sustained mental effort	Talks incessantly	
Often loses things		
Distracted by external stimuli		
Forgetful		

Diagnosis Guidelines

The American Academy of Child and Adolescent Psychiatry (AACAP) has published practice parameters for the assessment and treatment of children, adolescents and adults with ADHD (Dulcan & Benson, 1997). According to the AACAP parameters, parent interviews are important in assessment since children may not present with symptoms during an office visit and children may underreport their symptoms. However, the AACAP parameters emphasize the importance of child interviews in assessing alternative or co-morbid diagnoses. Asking parents and children about "psychosocial adversity" including "poverty, parental psychopathology or absence, family conflict" is considered especially crucial due to "their relationship to prognosis." Educational assessment, including information on learning disabilities, intellectual ability, the child's behavior at school, and the classroom management

style, are also indicated.

The authors of the AACAP parameters warn that "a variety of disorders can be mistaken for ADHD or can co-occur." Among the disorders and circumstances that can mimic or co-occur with ADHD symptoms are: impaired vision or hearing, seizures, sequelae of head trauma, acute or chronic medical illness, poor nutrition, insufficient sleep, mental retardation, borderline intellectual functioning, learning disorders, bipolar disorders, anxiety disorders, realistic fear, depression, and the sequelae of abuse and neglect.

The American Academy of Pediatrics (AAP) have also published a clinical practice guideline for the diagnosis and treatment of ADHD (American Academy of Pediatrics, 2000). The guideline states that the AAP recommendations are "not intended for children with mental retardation, pervasive developmental disorder, moderate to severe sensory deficits such as visual and hearing impairment, chronic disorders associated with medications that may affect behavior, and those who have experienced child abuse and sexual abuse" (American Academy of Pediatrics, 2000, p. 1159).

The AAP guideline recommends that 6- to 12-year-old children who present with symptoms of inattention, impulsivity, hyperactivity, academic underachievement or behavior problems be assessed for ADHD. The guideline suggests some general questions about school (e.g. "How is your child doing in school?") as an initial screening for all school-aged children. In making an ADHD diagnosis, the guideline recommends following the DSM-IV guidelines. In addition, the guideline refers to the Diagnostic and Statistical Manual for Primary Care (DSM-PC, as cited in American Academy of Pediatrics, 2000). This manual uses a

developmental perspective and includes information about environmental influences on children's behavior. For example, the DSM-PC (as cited in American Academy of Pediatrics, 2000) notes that depressed mothers may over-estimate their children's hyperactivity and that children's activity levels normally increase when they are tired or hungry.

Symptom Measurement

There is no one test or set of tests to diagnose ADHD (American Academy of Pediatrics, 2000). The AAP guideline recommends one or more of the following methods to assess symptom presence and severity: open-ended questions (e.g. "What are you concerns about your child's behavior in school?"), semi-structured interviews, questionnaires and rating scales.

Since open-ended interviews can be time consuming and can miss information considered unimportant by the responder, many clinicians use structured instruments (Pliszka, Carlson, & Swanon, 1999). The Diagnostic Interview Schedule for Children (DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000), the Diagnostic Interview for Children and Adolescents (DICA; Reich, 2000) and the Schedule for Affective Disorders and Schizophrenia for School Age Children (Ambrosini, 2000) are some examples. These interviews have the advantage of including questions about possible co-morbid disorders, unlike most questionnaires and rating scales.

There are numerous questionnaires and ratings scales available to assess ADHD symptoms in children. The Conners Parent and Teacher Rating Scales have been widely used,

and include other externalizing and internalizing problems besides ADHD (Goyette, Conners, & Ulrich, 1978). The ADHD-Rating Scales-IV (DuPaul, Power, Anastopoulos, & Reid, 1998) has both parent and teacher versions and is keyed to DSM-IV criteria. The Attention Deficit Hyperactivity Disorder Test (ADHDT; Gilliam, 1995) is also keyed to DSM-IV symptoms. The ADHDT has an advantage in that it is brief and easy for parents and teachers to fill out. However, the response scale ("not a problem, mild problem or severe problem") requires responders to interpret how much of a "problem" each symptom represents. The SNAP-IV (Swanson, 2002) also has parent and teacher versions and is keyed to DSM-IV criteria. In addition, the SNAP-IV includes items designed to screen for numerous other disorders including conduct disorder, generalized anxiety disorder, major depressive episode, dysthymic disorder, post-traumatic stress disorder and adjustment disorder. While the SNAP-IV includes the advantage of screening for many potential disorders in addition to complete DSM-IV criteria for ADHD, many of the items require a high level of literacy that may be prohibitive to some parents (e.g. "Sometimes for at least a week has elevated, expansive or euphoric mood").

Continuous performance tests (CPTs) have been used in research and clinical settings to measures sustained attention and vigilance (McGee, Clark, & Symons, 2000). Most CPTs require participants to continuously attend during a relatively long (10-30 minute), boring task. In the visual version, participants usually see either a series of letters (Conners, 1995) or shapes (Leark, Dupuy, Greenberg, Corman, & Kindschi, 1996) and are asked to push a button when target stimuli are displayed and not to push when non-target stimuli are displayed. In an auditory version of the CPT, participants listen and respond to words (Keith, 1994) or tones (Leark et al., 1996). Errors of omission are interpreted as inattention while errors of

commission are interpreted as impulsivity. CPTs were designed to be less subjective than teacher or parent-report questionnaires and to tap the core attentional abilities thought to underlie ADHD.

To date, research on the ability of CPTs to differentiate between ADHD and non-ADHD children has been mixed (Barkley, 1991; Corkum & Siegel, 1993). As a result, the NIH Consensus Statement (National Institutes of Health Consensus Committee, 1998), the AAP Clinical Practice Guideline (American Academy of Pediatrics, 2000) and the AACAP Practice Parameters (Dulcan & Benson, 1997) all conclude that CPTs are not reliable measures of ADHD and should not be used routinely to diagnose ADHD. CPTs may provide useful information to measure symptoms during treatment and to provide information on basic attention processes (Leark et al., 1996).

Co-Morbidity

Comorbidity has been defined as "the condition whenever two different disease processes are present in an individual patient" (Pliszka et al., 1999). Because of symptom overlap in the DSM, meeting criteria for one disorder sometimes means that a person will also meet partial criteria for a second disorder. For example, a child who is distractible and restless may also have enough ADHD symptoms to be diagnosed with ADHD, but would also meet partial criteria for mania. Following Pliszka and colleagues (1999), unless otherwise stated, co-morbidity here refers only to the case when a person meets full DSM-IV criteria for two disorders.

The presence of co-morbid disorders with ADHD is common in the research literature in both clinical and community samples. Epidemiological studies find that at least half of participants who meet criteria for ADHD also meet criteria for a second disorder (Campbell, 2000). Rates are as high as 66% in clinical samples of school-age children (Cantwell, 1996). The higher rates in clinical samples are due, at least in part, to a referral bias. Children with more symptoms (of ADHD and other disorders) are more likely to be referred for treatment, thus increasing the numbers of children meeting criteria for more than one disorder in clinical settings (Pliszka et al., 1999).

Children, particularly boys, who have been diagnosed with ADHD often also have conduct or oppositional defiant disorder (CD and ODD; Campbell, 2000). Children who have been diagnosed with both CD/ODD and ADHD are more likely to hyperactive symptoms or combined hyperactive and inattentive symptoms than solely inattentive symptoms (Jensen et al., 2001). Children with primarily hyperactive symptoms have been shown to have more conduct problems, to be more impulsive, to be more unpopular with peers and less socially competent (see Morgan, Hynd, Riccio, & Hall, 1996 for a review). Some have argued that co-morbid ADHD/CO or ODD is a disorder with its own etiology and outcomes, and that it may even be best thought of as a distinct disorder (Jensen, Martin, & Cantwell, 1997).

Children who have been diagnosed with ADHD also often meet criteria for anxiety and depression (Campbell, 2000). Children who have been diagnosed with either anxiety or depression and ADHD are more likely to have inattention symptoms than hyperactive symptoms (Jensen et al., 2001). Children who meet the inattention criteria for ADHD are more likely to be girls, and are more likely to also have a learning disorder (Campbell, 2000).

Children with primarily inattention symptoms have been shown to be more anxious, more shy and more socially withdrawn (see Morgan et al., 1996 for a review).

Review of Childhood Traumatic Stress Literature

Re-experiencing, Avoidance, and Hyperarousal

Post-traumatic stress disorder includes a wide variety of symptoms categorized as re-experiencing (intrusion), avoidance and hyperarousal. Many of these symptoms were first recognized in combat veterans after the First World War (Herman, 1992). Combat veterans, as well as survivors of other terrifying events, such as some car accidents, child abuse, domestic violence, and rape, often relive the experience through flashbacks and dreams. Children relive terrifying events in their play. Terr (1990, 1994) describes traumatic play as being grim and not as spontaneous or lighthearted as non-traumatic play. Often, children who cannot verbalize their experience do reenact the event with surprising accuracy.

At the same time as re-experiencing trauma, survivors often also avoid reminders of the event(s). Survivors not only physically avoid traumatic reminders (such as avoiding a house in which a person was physically abused), but also avoid thinking about or remembering events (such as suddenly daydreaming when encountering a man who resembles a rapist). These cognitive strategies overlap considerably with dissociation. While many believe that dissociative disorders begin in childhood when people are more adept at dissociation (Putnam, 1997), measuring dissociation in young children who cannot verbalize their internal thoughts and

feelings is difficult. As a result, parent-report measures of avoidance for young children often rely on behavioral measures (e.g. "child doesn't like to talk about a traumatic experience") that are only indirect measures of cognitive avoidance.

Survivors of terrifying events also frequently experience hyperarousal, including exaggerated startle and a sense of always being vigilant for signs of danger. This vigilance can include an inability to ignore extraneous stimuli, as the survivor is constantly monitoring the surrounding environment for signs of danger. These symptoms have been attributed to the chronic arousal of the autonomic system (Herman, 1992). Since there are few observable signs of hyperarousal besides exaggerated startle, measuring hyperarousal in young children is difficult.

Diagnosis of PTSD

DSM-IV Criteria

According to the DSM-IV, for a diagnosis of PTSD, a person must have been exposed to a traumatic event in which both of the following were present:

(1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or other;

(2) the person's response involved intense fear, helplessness, or horror. In children,

this may be expressed instead by disorganized or agitated behavior.

In addition, the person must have any one (or more) of the five re-experiencing symptoms, any three (or more) of the seven avoidance symptoms, and any two (or more) of the five arousal symptoms (see Table 2). The symptoms must represent a significant functional impairment and last at least one month. Acute PTSD lasts between one and three months; chronic PTSD lasts three months or longer.

Diagnosis Guidelines

The AACAP has published practice parameters for the assessment and treatment of PTSD in children and adolescents (Cohen, 1998). The practice parameters note that children with significant impairment do not always meet full DSM-IV criteria for PTSD. More research is needed to know if children should be required to show the same number and types of symptoms as do adults. In addition, children who are adept at avoidance and numbing may appear unaffected by trauma. While this is also true of adults, children are less able to report on internal states, making it more likely that PTSD symptoms will go unnoticed. In addition, the parameters call for developmental criteria for children of different ages to aid clinicians in determining which symptoms represent unusual behavior for children at various developmental stages. Given all of these factors, the parameters conclude that treatment should be offered to children who have significant symptoms regardless of whether or not they meet full DSM-IV criteria.

Table 2. DSM-IV Symptoms of PTSD

Re-experiencing	Avoidance	Hyperarousal
Recurrent and intrusive distressing recollections of the event. In children, repetitive play may occur in which themes or aspects of the trauma are expressed.	Efforts to avoid thoughts, feelings, or conversations associated with the trauma	Difficulty falling to sleep or staying asleep
Recurrent distressing dreams of the event. In children, there may be frightening dreams without recognizable content.	Efforts to avoid activities, places, people that arouse recollections of the trauma	Irritability or outbursts of anger
Acting or feeling as if the traumatic event were recurring. In young children, trauma-specific reenactments may occur.	Inability to recall an important aspect of the trauma	Difficulty concentrating
Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.	Markedly diminished interest or participation in significant activities	Hypervigilance
Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.	Feeling of detachment or estrangement from others	Exaggerated startle response
	Restricted range of affect (e.g. unable to have loving feelings)	
	Sense of a foreshortened future (e.g. does not expect to have a career, marriage, children, or a normal life span)	

The authors of the parameters recommend interviews with children and non-offending caretakers when possible. There is no one measure for children that is accepted as the gold standard in making PTSD diagnoses in children. As a result, there is risk of both under- and over-diagnosis.

Concerning differential diagnosis, the parameters recommend, "If the symptom pattern in response to this stressor meets criteria for PTSD and for another mental disorder, such as major depressive disorder, ADHD, or mixed substance abuse, these diagnoses should be given in addition to PTSD" (Cohen, 1998). This recommendation appears to contradict the DSM-IV requirement that ADHD not be diagnosed when the symptoms are better accounted for by an anxiety disorder (which includes PTSD). However, it is possible that children with PTSD will have a separate response to the trauma that meets ADHD criteria. A less clear issue is the DSM-IV requirement that ADHD have an onset before 7 years of age. If an 8-year-old child experiences ADHD symptoms after (but not before) a traumatic event, it's less clear how the clinician should diagnose or treat the ADHD symptoms.

Finally, the parameters also indicate that "chronic PTSD may present with a preponderance of symptoms such as dissociation, self-injurious behaviors, substance abuse, and/or conduct problems, which may obscure the posttraumatic origin of the disorder." This has implications for the accurate diagnosis of PTSD as well as dissociative disorders. In particular, this point highlights the need for clinicians to ask about trauma exposure for children presenting with a wide variety of problems, not just those children who have classic PTSD symptoms.

Measurement of PTSD Symptoms in Children

Absorption, Derealization/Depersonalization, and Amnesia

Research into dissociation in adults reveals that it is a complex phenomena. Clinical and empirical work (i.e. factor analyses of measures of dissociation) suggest that there are three main factors of dissociation in adult: absorption, derealization/depersonalization and amnesia (Putnam, 1997). Evidence is not conclusive, but suggests that some aspects of dissociation (e.g. absorption) may exist along a continuum whereas significant derealization/depersonalization and amnesia are present only for those who have a clinically significant form of dissociation.

The components of dissociation are less clear for children. In part, this may be because many aspects of dissociation are internal, and difficult for young children as well as observers to report. There are clinical accounts of very young children having symptoms of depersonalization and amnesia that are consistent with dissociative identity disorder (e.g. Silberg, 1998). However, many children with dissociative disorders are diagnosed with dissociative disorders not otherwise specified (DDNOS), representing fluctuations in how children relate to others or in their skills (Silberg, 1998). For example, a child with DDNOS may not have separate personalities who interact with others, but may be very aggressive and angry some of the time and very shy and quiet at other times. While behaving in one way, the child may deny remembering what happened while she or he was behaving in another state. For a DDNOS diagnosis, these states, in the clinician's view, must go beyond normative variations young children have with regulating emotions to distinctly different patterns of

relating to people.

Other dissociative children do not have changes in personality, but are very spacy and forgetful. These children may frequently daydream or stare into space. These children may have amnesia, too, for the period of time that they are not paying attention to the external world. Some have suggested that highly hypnotizable people are at risk for developing dissociative disorders, particularly if they have experienced ongoing traumatic events (Putnam, 1997). If so, these children who appear spacy may be hypnotizing themselves into a trance-like state.

Trauma is thought to play a role in the etiology of clinically significant dissociation. Adults (Coons, Bowman, & Milstein, 1988; Putnam, Gurof, Silberman, Barbar & Post, 1986), adolescents (Dell & Eisenhower, 1990; Bowman, Blix & Coons, 1985, Hornstein & Putnam, 1992) and children (Coons, 1994; Fagan & McMahon, 1984) with dissociative disorders report high rates of childhood trauma and neglect. Childhood sexual and physical trauma and neglect are positively related to scores on measures of dissociative tendency in adults (DiTomasso & Routh, 1993; Draijer & Langeland, 1999; Irwin, 1996) and children (Ogawa, Sroufe, Weinsfeld, Carlson, & Egeland, 1997; Sanders & Giolas, 1991). Adults who were physically or sexually abused as children have higher scores on measures of dissociation than do non-abused adults (Chu & Dill, 1990). Similarly, abused children score higher on dissociation measures than non-abused children (Atlas & Hiott, 1994; Malinosky-Rummell & Hoier, 1991; Putnam, Helmers, & Trickett, 1993).

Particular kinds of trauma may be more likely to lead to dissociative phenomena.

These include experiences in which children are trapped during prolonged or ongoing abuse (Putnam, 1997). During these conditions, children may dissociate to remain unaware or to compartmentalize the horror and/or betrayal involved in the experience. The conditions of most intrafamilial sexual abuse are consistent with the development of dissociation. In these cases, children are unable to physically escape the situation, making cognitive strategies of escape more likely. In addition, children abused by caregivers are motivated to remain attached to the caregiver in order to have their physical and emotional needs met (Freyd, 1996).

Diagnosis of Dissociative Disorders

DSM-IV Criteria

The DSM-IV includes four distinct dissociative disorders: dissociative amnesia, depersonalization disorder, dissociative fugue, and dissociative identity disorder (DID). The DSM-IV also includes a DDNOS category. For children, the most widely discussed dissociative disorders are DID and DDNOS (Hornstein, 1998). According to the DSM-IV, for a diagnosis of DID, a person must have two or more distinct identities or personality states (each with its own relatively enduring pattern of perceiving, relating to, and thinking about the environment and self). At least two of these identities recurrently must take control of the person's behavior. The person must have the inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness. The disturbance must not be due to the substance use, general medical condition, or, in children, attributable to imaginary playmates or other fantasy play. Frequently, dissociative children do not present with two

completely separate and well-defined personalities, and often their dissociative behavior involves imaginary playmates and fantasy play. In these cases, children are diagnosed with DDNOS (Silberg, 1998).

Measurement of Dissociative Symptoms in Children

There are few measures of dissociation in children. The most widely used is the Child Dissociative Checklist (Putnam, Helmers, & Trickett, 1993). This 20-item measure asks parents of children aged 5 to 12 years to report on symptoms of dissociative disorders, though the measure does not assess DSM-IV criteria. The measure is able to distinguish between children with DID versus DDNOS diagnoses (Putnam & Peterson, 1994). Briere has developed both self-report and parent-report measures of dissociation as part of comprehensive trauma symptom measures. The Trauma Symptom Checklist for Children (TSCC, Briere, 1996) is a self-report measure for children ages 8 to 16. It includes both overt and fantasy dissociation scales. The Trauma Symptom Checklist for Young Children (TSCYC, Briere et al., 2001) is a parent report measure of trauma symptoms, including dissociation, for children aged 3 to 12. The Children's Perceptual Alteration Scale (Evers-Szostak & Sanders, 1992) is another measures of childhood dissociation that has been received less empirical investigation. The Dissociative Features Profile (Silberg, 1999) is an observation-based measure. It can be used in conjunction with a standard psychological testing battery including intelligence and projective tests.

Overlap between ADHD, PTSD and Dissociation Symptoms

Clinicians who treat children with dissociative and post-traumatic stress disorder have frequently commented on comorbidity with ADHD (e.g. Graham, 1998; Hunter, 2001; Putnam, 1997). Cuffe, McCullough and Pumariega (1994) have reported on the case histories and symptom profiles of four traumatized children who meet DSM-III-R criteria for both ADHD and PTSD. All four children met PTSD criteria: recurrent distressing dreams, avoiding associated thoughts/feelings, diminished interest/developmental regression, detachment/estrangement, irritability/angry outbursts, and difficulty concentrating. They also all met ADHD criteria: fidgeting/squirming, difficulty remaining seated, easily distractible, difficulty following instructions, difficulty sustaining attention, shifts activities, and not listening. Others have worked to include dissociative disorders as a rule-out criteria for ADHD in the DSM-IV (Peterson, 1998). Several studies have documented higher rates of ADHD in physically and sexually abused children than are found in community and clinical samples (Famularo, Kinscherff, & Fenton, 1992; McLeer, Callaghan, Henry, & Wallen, 1994; McLeer, Deblinger, Henry, & Orvaschel, 1992; Merry & Andrews, 1994).

Weinstein, Staffelbach and Biaggio (2000) present a comparison of ADHD and PTSD symptoms that may resemble each other. Some of these comparisons are shown in Table 3. Because some PTSD symptoms include dissociation (e.g. re-experiencing and derealization/depersonalization), some of the symptoms labeled "PSTD Manifestation" would also fit for dissociative disorders.

Table 3. Comparison of DSM-IV ADHD and PTSD Symptoms

ADHD Category	PTSD Manifestation
Inattention	Re-experiencing trauma Problems Concentrating
Hyperactivity/Impulsivity	Inability to inhibit inappropriate response due to hypervigilance Acting or feeling as if the traumatic event were recurring
Externalizing Behaviors	Irritability/angry outbursts Feeling detached/estranged (e.g. if uncooperative/non-participating)

Explanations for High Rates of ADHD Among Children with Trauma Symptoms

There are several possible explanations for high rates of ADHD among children with PTSD and/or dissociative disorders. First, there could be true comorbidity. That is, there could be a high percentage of children who meet criteria for both ADHD and PTSD. There are several scenarios that would lead to this observation:

1. Children who have ADHD elicit abuse from adults, which in turn puts them at risk for PTSD or dissociative disorders. (e.g. A sex offender targets a vulnerable child, perhaps one that is socially isolated, shy or withdrawn as is sometimes associated with ADD-inattentive type. Or, hyperactive, impulsive children put more stress on their parents who may physically abuse them. ADHD children whose parents also have ADHD could be at even higher risk for physical abuse. (Cuffe et al., 1994; McLeer et al., 1994).)

2. Children with a genetic predisposition for ADHD develop ADHD after

experiencing a stressor (a diathesis-stress model). The stressor also puts them at risk for PTSD and dissociative disorders. (e.g. Two identical twins both have the genotype for ADHD, but only the twin who experiences abuse displays the ADHD phenotype and also develops PTSD and/or a dissociative disorder (Cuffe et al., 1994).)

3. Environmental conditions sometimes associated with abuse (particularly in samples of children referred to Children's Protective Services) cause ADHD. (e.g. a child is exposed to drugs prenatally or to an early chaotic home environment that causes ADHD. The child is also abused, leading to PTSD or a dissociative disorder.)

4. ADHD may be a risk factor for the development of PTSD or a dissociative disorder. (e.g. the child may have a brain abnormality--whether caused primarily by genetics or a by environmental factors--that makes it more likely that the child will develop PTSD or a dissociative disorder in the face of trauma (McLeer et al., 1994).)

5. Children who have both ADHD combined with PTSD or a dissociative disorder (or all three) have more behavioral problems than do children with only one disorder, increasing the referral and diagnosis rate for co-morbid children. (e.g. A child who would meet criteria for ADHD is managed by a skilled teacher and is not referred for diagnosis. Another child who has more challenging behaviors, resulting from co-morbid PTSD or dissociative disorder, cannot be managed at

school and is referred for diagnosis. As a result, the rate of ADHD is higher among children with PTSD or dissociative disorders than in the community (McLeer et al., 1994).)

It is also possible that the high rates of comorbidity between PTSD and dissociation with ADHD are due to symptom overlap, misdiagnosis and/or sample bias. Among the possibilities are:

1. The symptoms of PTSD and dissociative disorders mimic ADHD symptoms, but are qualitatively and etiologically different. That is, PTSD or dissociative disorders better account for these symptoms, but children are also being diagnosed with ADHD. (e.g. Children with PTSD are hyperactive due to hypervigilance. Dissociative children are inattentive due to a diffuse attentional style that helps keep traumatic triggers out of awareness.)

2. There is a trauma reaction that has features of ADHD, PTSD and dissociative disorders that would best be classified as a separate entity. (e.g. a child is sexually abused and experiences nightmares, flashbacks, and difficulty concentrating that represent aspects of all three disorders, but are currently being diagnosed as some combination of ADHD with PTSD or a dissociative disorder, though the child's ADHD symptoms are qualitatively different from the symptoms of children who have not been traumatized).

Assumptions regarding the etiology of each disorder complicate the evaluation of the above possibilities. For example, Merry and Andrews (1994) examined DSM-III-R diagnoses

in a group of children who had been identified to authorities as having experienced sexual abuse. Rates of oppositional defiant disorder, separation anxiety disorder, attention deficit hyperactivity disorder, depressive disorders, overanxious disorder, and simple phobia were higher than had previously been reported for community samples. In discussing whether these disorders preceded abuse or represent the effects of abuse, the authors write:

> *It is possible that psychological dysfunction in the parent and/or the child may have preceded and predisposed to sexual abuse. Support for this theory is given by the high rate of attention-deficit hyperactivity disorder, which is largely congenital. In addition, we know that abusers preselect vulnerable children (Conte and Schuerman, 1987). However, not all the psychological difficulties could have preceded abuse because of the high rate of PTSD, which is clearly a consequence (p. 943).*

Here, the authors apparently assume that it is common knowledge that ADHD is a genetically determined disorder and do not cite a source for the claim that ADHD is "largely congenital." For the reasons discussed in the Hyperactivity, Impulsivity and Inattention section, it is not at all clear that ADHD is primarily genetically determined in samples of sexually abused children, or that these genetic effects do not involve gene-environment correlations and interactions.

Further, perhaps a result of the authors' belief that ADHD could not be primarily caused by sexual abuse, they suggest that sex offenders target ADHD children. While there is evidence that sex offenders target vulnerable children, usually these children are socially isolated, withdrawn, unhappy children, not hyperactive, impulsive or inattentive children. This

theory is conceivable, especially since some ADHD children are socially isolated, withdrawn or unhappy. However, it is also at least as possible that sex offenders target oppositional, depressed, or anxious children, yet the authors do not includes these groups of children in the discussion of victim targeting, perhaps because they believe these disorders to be caused by environmental factors.

Finally, the authors focus on the "clear" factor of sexual abuse in the development of PTSD. In fact, many researchers question whether there is a genetic propensity to develop PTSD in the face of trauma, since not all traumatized people develop PTSD (e.g. King, Abend, & Edwards, 2001; McLeod et al., 2001). Indeed, if only children who had a genetic propensity for PTSD and had experienced a stressor developed PTSD (and all children with the propensity developed PTSD in response to a stressor), this would be a classic gene-environment interaction. If an additive behavior genetic study were done with these children, PTSD would appear to be largely heritable, as the heritability estimate would capture this gene-environment interaction effect. This is precisely the same evidence that the authors apparently rely on to conclude that ADHD is "largely congenital."

As a result of emphasizing genetic factors in the etiology of ADHD and environmental factors in the etiology of PTSD, the authors move toward explanations of phenomena to the exclusion of alternative possibilities. If such discussions influence the variables that are investigated in future studies, important information about the role of the environment in the etiology of ADHD and the role of genetics in the etiology of PTSD would be missed (and assumed to be not supported by research).

Besides true comorbidity, it is possible that overlap of ADHD and PTSD symptoms leads to the diagnosis (correct or not) of only one disorder. For example, to the extent that clinicians are unaware of a child's trauma history, children whose symptoms might better be conceptualized as PTSD may be diagnosed with ADHD. Even subclinical levels of PTSD symptoms could elevate ADHD scores on parent and teacher report measures enough for them to meet ADHD criteria. For example, an active child who is involved in sports may meet DSM criteria for hyperactivity, but it would not be diagnosed because it doesn't impair the child's functioning. However, after a trauma, a child may develop difficulty with impulsivity and/or inattention so that the child's functioning was impaired and full DSM criteria were then met.

At least one study has linked hyperactivity symptoms to PTSD symptoms. Glod and Teicher (1996) studied abused children with and without PTSD using an actigraph to objectively measure activity level. Results showed that abused children with PTSD had activity levels as high as non-abused children with ADHD. Abused children without PTSD had activity levels as low as non-abused depressed children.

These results suggest that an overlap between ADHD and PTSD is not only the result of ADHD children being at higher risk for abuse. It is not clear whether the children who had PTSD had premorbid ADHD or if the hyperactive symptoms appeared after the trauma (either as part of true ADHD or PTSD symptoms mimicking ADHD). Whatever the cause, this study has important implications for diagnosis of ADHD. If these children presented to a pediatrician or therapist with hyperactivity, and the clinician did not specifically assess PTSD symptoms, the child would likely be diagnosed and treated for ADHD only.

Similarly, methods for diagnosing ADHD may be insensitive to symptoms either mimicked by or co-morbid with dissociation. As described in the Hyperactivity, Impulsivity and Inattention section, tests of sustained, selective attention are sometimes used to aid in diagnosis of ADHD. There is evidence, however, that some dissociative people perform worse on the selective attention Stroop and directed forgetting tasks relative controls, but perform better than controls on a divided attention versions of the same task (DePrince & Freyd, 2001; DePrince & Freyd, 1999).

In the Stroop study, participants were presented neutral, incongruent color words and trauma words and asked to name the ink color when each word was presented on a computer screen. Results showed that highly dissociative people (who as a group experienced more trauma than the low dissociative group) remembered more neutral words and fewer trauma words in a recall test at the end of the Stroop task. The mean number of words remembered between the highly dissociative and low dissociative group did not differ.

DePrince & Freyd (1999) suggest that people who use dissociation to manage information about trauma are able to do this by using divided attention to remain unaware of trauma-related information. If dissociative people improve their divided attention abilities relative to non-dissociative people by spending a lot of time using divided attention, they would have a sustained, selective attention and inhibitory deficit when compared to controls. If dissociation was not investigated, a dissociative person would appear to have some of the classic symptoms of ADHD: impulsivity and inattention. For this reason, it is premature to indicate that having poor performance on a selective attention, inhibitory control task alone is indicative of only ADHD. At least, dissociation would also need to be considered.

In addition, children who do not meet criteria for any disorder may still be experiencing significant distress and functional impairment. As yet, there is not sufficient evidence to know which symptoms and what severity should be required before children meet criteria for PTSD or dissociative disorders. Some children will not be diagnosed with a disorder because of special arrangements some parents make to maximize their children's functioning. For example, some parents choose to homeschool where the one-on-one instruction and less distracting environment allow children who might otherwise meet ADHD criteria to function. For all of these reasons, it is important to study not only DSM categories and co-morbidity, but also continua of behaviors that may be implicated in the disorders of ADHD, PTSD and dissociative disorders.

Attention and Traumatic Stress in Children: Aims and Hypotheses

Research Questions for Study One: Preschool Children

The primary research questions were:

a) Do traumatized children have more parent-rated attention problems, dissociative symptoms, and post-traumatic stress symptoms as compared to non-traumatized children?

b) Are parent-rated post-traumatic stress and dissociative symptoms positively correlated with parent- and experimenter-rated attention problems?

c) Will highly dissociative children remember fewer emotionally charged pictures in a divided attention task than non-dissociative children will remember in the same task?

Research Questions for Study Two: School Age Children

The primary research questions were:

a) Are items on a parent-report ADHD measure designed to screen for PTSD positively correlated with a full-scale parent-report PTSD measure?

b) Does family history or age of onset of ADHD symptoms differ between

traumatized and non-traumatized children? Between abused and non-abused children?

c) Is trauma related to ADHD symptoms and school functioning?

d) Are trauma symptoms related to ADHD symptoms and school functioning?

Contributions of the Studies

The previous section presented many possible ways that symptoms of ADHD, PTSD and dissociative disorders could come to be present in abused children. This project cannot offer definitive evidence on the etiology of in this cluster of symptoms. However, these studies were designed to present evidence of the co-occurrence of symptoms of ADHD, PTSD and dissociative disorders in community samples of children. A few previous studies have used samples of children who had been referred for clinical services and/or to children's protection services. Most studies of ADHD have not been designed to include abused children. The studies also clarify similarities and differences in attention, impulsivity and hyperactivity between abused and non-abused children using a variety of objective, self-report and parent-report measures. With the exception of Glod and Teicher (1996), previous studies have not addressed associations between specific aspects of ADHD (e.g. inattention), PTSD (e.g. re-experiencing) and dissociative symptoms (e.g. derealization).

CHAPTER II

STUDY 1: ATTENTION, POST-TRAUMATIC STRESS AND DISSOCIATION IN PRESCHOOLERS

Chapter 2 presents the results of the first of two studies. Study 1 investigates attention and memory in a sample of preschool children who have experienced a range of traumatic events. One of the goals of Study 1 was to examine links between trauma symptoms and attention problems in very young children. Another goal was to extend previous work on memory for threat-related stimuli in adults to a preschool sample.

Method

Participants

The sample consisted of eighty parents and preschool children (*M* age = 4.4 yrs., *SD* = 0.33) who responded to fliers posted in preschools, community centers, social services offices, and similar public locations. The fliers invited parents to participate in a study of pretend play and life stress with their 4-5-year-old children. The fliers indicated that "children who have and have not experienced stressful life events" were needed, and did not define "stressful life events." Approximately ten percent of the children, recruited at the end of data collection, were accepted into the study after a parent-report dissociation measure

(TSCYC, Briere et al., 2001) revealed that the child's dissociation score was moderately high (12 or higher). This was to ensure adequate numbers of high dissociators.

None of the participating children had begun kindergarten. Data was not collected on if or where children attended preschool. Informally, it was apparent that many children attended Head Start. From what parents reported, it appeared that local Head Start administrators copied the few recruitment fliers we provided and handed them to children as they exited the school bus, resulting in a rather high percent of Head Start children participating. Parents and children were uniformly very positive about Head Start. Children often volunteered that their school was called "Head Start" and that it was "fun" or they had a "nice teacher". Parents also reported that Head Start teachers were very helpful to them. In one case, a teacher had developed a way to help a child with severe PTSD to cope when she was triggered at school. In another case, a Head Start teacher was listening and providing advice to a mother whose children had developmental delays as a result of physical abuse they experienced by an ex-partner from whom the family was hiding. One parent of a child who had great difficulty attending for even a few seconds had been asked to remove her child from two (non-Head Start) preschools, and was attempting to get social security benefits for him so that she could afford to stay home to care for him.

Participating families were predominately Caucasian (n = 67) and were of lower to middle socioecomomic status. Most lived in a medium-sized city in Oregon; some lived in nearby rural areas. Forty-six (58%) of the participating children were girls. Fifty-four (68%) of participating parents were married or living with another parent. Two grandmothers, three aunts, and five fathers participated (and are referred to as "parents" throughout this dissertation). The remaining parents were biological or stepmothers. All participating parents

were primary caregivers and had physical custody of the participating child. Four pairs of children were related to one another. Two were cousins, two were twins, two were non-twin siblings and two were half-siblings. Four of these childtelren were removed and results for unrelated children were similar to those presented here for all of the children.

Procedure

An Institutional Review Board approved the procedure. Families participated in one lab session that lasted between one and two hours. Two families who were unable to complete the session in two hours returned for a second session. Parents were compensated with $40, and children received a small toy. When necessary, participants were provided with taxi transportation to the laboratory.

Parents signed informed consent forms, and experimenters explained the procedures to children at the beginning of lab sessions. Children then completed a variety of tasks with an experimenter. Parents watched children on a video screen while completing questionnaires on the child's trauma history, trauma symptoms, and behavior as well as additional questionnaires not reported here.

At the end of the session, researchers provided parents with information on community resources. In accordance with the human subjects protocol, researchers were prepared to report abuse if participants directly told the researchers about it. However, no participants gave the researchers information that required a report. Researchers assisted some parents in locating community resources (e.g. domestic violence services, counseling or food banks).

Measures

Questionnaires

Parents completed the Brief Traumatic Experiences Survey-Parent Version (BTES-P, see Appendix A). The BTES-P a modified version of the adult self-report Brief Traumatic Experiences Survey (BTES; Freyd & Goldberg, 1999). The BTES-P asks parents to report on a range of experiences that their children might have experienced, including being in a natural disaster, witnessing violence, and being physically, sexually or emotionally abused. The measure also asks about death of immediate family members. The BTES-P was presented on a computer, and parents completed it outside of the presence of the researcher. For each item that the parent endorsed, follow-up questions asked for the number of times each event occurred, and the dates of the first and last incident. In this way, parents were able to anonymously report on abuse that their children had experienced.

Parents completed the Trauma Symptom Checklist for Young Children (TSCYC, Briere et al., 2001) on their child's trauma symptoms. The TSCYC yields depression, anxiety, dissociation, sex concerns, anger/aggression, and post-traumatic stress scales. The post-traumatic stress subscale consists of separate intrusion, avoidance and arousal subscales. The TSCYC also includes two scales designed to measure under- and over-reporting of symptoms. Briere and colleagues (2001) report alphas ranging from 0.81 for Sexual Concerns to 0.93 for PTSD-Total, with an average scale alpha of 0.87 in samples of abused children. In this sample, scale alphas ranged from 0.55 for Sexual Concerns to 0.92 for PTSD-Total.

Parents also completed the Child Behavior Checklist (CBCL, Achenbach, 1991). The CBCL is a well validated observer-report measure that yields the following scales: somatic complaints, withdrawn behavior, anxious/depressed behavior, social problems, thought problems, aggressive behavior, attention problems and delinquent behavior. These scales can be combined to produce global internalizing and externalizing scales.

Memory Task

During the lab visit, children completed a memory task and three other tasks not presented here. A researcher accompanied children to a room designed for studies involving preschool children. It was equipped with a child-sized table and chairs. The room was designed to be minimally distracting: there was minimal art work on the walls and the windows were covered with plain curtains. The room was also equipped with a video camera. The camera was connected to a television in an adjacent room, where a parent completed questionnaires and observed their children during the study.

The memory task was designed to test memory under selective and divided conditions for both neutral and threat-related stimuli. The task was designed to be similar to adult tasks that have been previously published (e.g. DePrince & Freyd, 1999). The task had both selective and divided attention phases. During the selective attention phase, experimenters asked the children to sit in a child-sized chair and to look at pictures in a book that was placed in front of them on a child-sized table. The experimenter sat next to them and turned the pages every 10 seconds, and did not talk to the children while presenting the stimuli to the children.

Children were presented with eight pictures in each of the selective and divided

attention phases. Four of the pictures in each phase were chosen to be threat-related or charged and four were neutral. The pictures were all the same size and were taken from Berenstain Bear children's books. An example of a neutral picture is a scene in which Mama bear is pushing a wheelbarrow and Sister bear is looking at wheelbarrow wheel. An example of a charged picture is a scene in which Papa bear is slamming his fist on the dinner table while Sister and Brother bear watch with scared faces. Thus, the charged pictures did not directly portray abuse, but may have reminded children of stressful or abusive events that they had experienced (if they had experienced any such events).

During the divided attention phase, in addition to looking at the pictures in the book, children were asked to listen to a tape of an experimenter reading a list of animal names (e.g. "horse", "cow", "sheep"). Children held a toy sheep that squeaked when squeezed. Children were instructed to squeak the sheep when and only when they heard the word "sheep." An animal name was presented every 2 seconds and the word sheep was presented once in every 10-second interval. Children were told that this was called "the sheep game". Prior to beginning the divided attention phase, experimenters taught the children to play the sheep game using a tape of an experimenter giving instructions and reading a practice list of animals.

Following the selective attention task, participants were shown each test picture and asked: "Is this a picture you saw while we were looking at the first book or is this the first time you've seen it?" Every other question, the order was reversed and participants were asked: "Is this the first time you've seen the picture, or did you see it while we were looking at the first book?" Following the divided attention task, the phrase "while we were looking at the first book" was replaced with "while we were playing the sheep game."

In addition, the order of the attention conditions and stimuli presented was counterbalanced. That is, some children looked at pictures in a book under selective attention first and then looked at pictures while playing the sheep game. Other children completed the divided attention condition first and then completed the selective attention condition. Independent of the attention condition order, some children viewed one set of stimuli first (i.e. the pictures in a red binder) and then viewed a second set of stimuli (i.e. pictures in a blue binder). Other children viewed the blue binder first and then the red binder.

The task differs from similar adult tasks in several ways. First, it is not computerized. Stimuli were presented as pictures in a book and time was kept using a stopwatch. Second, pictures were used instead of words due to preschoolers' inability to read and lack of vocabulary for traumatic events. Third, threat-related pictures that were suggestive of stressful and traumatic events were used rather than images of overtly abusive or traumatic events. This was due to concerns about triggering negative reactions in traumatized children as well as upsetting parents and children who had not experienced trauma. Fourth, children's limited attention span limited the number of items presented. Similar tasks with adults typically include many more trials than were included in this task. Fifth, adult tasks often use a variety of memory tasks, including free and cued recall tasks. The nature of the picture stimuli used with the preschoolers did not readily permit a recall test. Instead, a single recognition memory test was used.

At the end of each memory test, experimenters rated children on the following items using a five-point scale ("none of the time" to "all of the time"): "Was the child seated?" and "Was the child looking at the pictures?" After the divided attention phase, experimenters also

completed the following item using the same scale: "Was the child playing the sheep game?" (That is, was the child listening to the tape and trying to squeeze the sheep at the right time?) Experimenters also recorded the number of omission errors (failures to squeak when the word sheep was presented) and commission errors (squeaking when the word sheep was not presented) during the divided attention phase.

Results

Traumatic Life Events

Parents reported that the participating children had experienced a wide range of traumatic experiences. Computer failure led to missing trauma data for four children. The remaining 76 children were classified as having no reported traumatic events, some traumatic events, or chronic traumatic events. Children of parents who answered "no" to every item on BTES-P were included in the "no reported trauma events" group. Children of parents who reported at least one event on the BTES-P and fewer than five instances of any traumatic events were included in the "some reported trauma events" group. Children of parents who reported five or more instances of any traumatic event were included in the "reported chronic trauma events" group.

Thus, children in the "reported chronic trauma"[3] group may have been exposed to one kind of trauma (e.g. witnessing domestic violence) on at least five separate occasions. Table 4 presents descriptive statistics on the number of different kinds and number of separate

incidents reported for children in each trauma group.[2]

Table 4. Descriptive Statistics for Children's Parent-Reported Traumatic Events.

		Kinds of Events		Number of Events	
Group	*n*	*M* (*SD*)	Range	*M* (*SD*)	Range
No trauma	41	0	–	0	–
Some trauma	25	1.40 (0.16)	1 - 3	1.72 (0.20)	1 – 4
Chronic trauma	10	3.60 (0.43)	2 - 6	19.20 (6.75)	5 – 69
Total Sample	76	.95 (1.38)	0 - 6	3.12 (9.76)	0 – 69

Most of the events that children experienced would meet DSM-IV criteria for a PTSD stressor. In a few cases, there was insufficient information to label them this way. For example, a child may be living with an older sibling who has severe behavior problems, but the parent did not specify if or how the older siblings victimized the participating child. These cases came to our attention when the parent answered "yes" to a final BTES-P question, indicating that the child had experienced a "seriously traumatic" event that had not been included in the survey. Some information was available from parents' written description of the event(s) or situation.

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2. Throughout the rest of the paper, the three trauma groups are abbreviated by dropping the "reported". (e.g. the "reported chronic trauma group" becomes the "chronic trauma group"). It is important to keep in mind that these groups are derived from parent reports and likely under-represent the severity and frequency of trauma in general and abuse in particular in some cases and may over-represent trauma in others.

Our measure of trauma measured frequency (and duration for some ongoing situations), but did not provide a separate measure of severity. For example, a child who witnessed a parent raped and murdered would be scored the same as a child who witnessed a parent who sustained bruises in a fight. The items were worded such that all items were serious events.

Since the children were between four and five years of age, children in the chronic trauma group experienced, on average, at least one traumatic event per year of life. All of the children in the chronic trauma group had experienced at least one form of abuse (i.e. emotional, physical, sexual abuse and/or witnessing domestic violence). Six of the 10 chronically traumatized children had experienced more than one form of abuse. Some parents of children in the "some trauma" group reported relatively infrequent abuse (e.g. being sexually abused three times). Other parents reported a range of non-abusive traumatic events (e.g. experiencing the death of a parent). This group also included children who experienced ongoing traumatic experiences such as living without parents who had abandoned them or living in hiding from an abusive parent. Ongoing situations such as these were classified as one traumatic event for the purposes of these analyses. In the case of repeated events, such as witnessing domestic violence, parents gave their best estimate of the number of episodes and that number was included in the total number of events.

Attention Problems and Trauma Symptoms

Do Traumatized Children Have More Attention Problems, Dissociation and PTSD Symptoms than Non-traumatized Children?

Parent-reported Child Behavior Checklist (CBCL) attention problems were available for 79 of the participating 80 children. One parent failed to complete the second half of the CBCL. That parent's child is classified in the chronic trauma group. One other parent failed to complete most of the questionnaires in her packet, including

the Trauma Symptom Checklist for Young Children (TSCYC). That parent's child is classified in the no trauma group.[3] As a result, TSCYC PTSD[4] and dissociation scores are available for 79 of the 80 children who participated. Table 5 presents descriptive statistics for CBCL attention problems, TSCYC dissociation, and TSCYC PTSD total and subscale scores by trauma group.

Table 5. Descriptive Statistics for Parent-Reported CBCL Attention Problems and TSCYC PTSD and Dissociation by Trauma Group

Trauma Group	Attention Problems	Dissociation	PTSD	Avoidance	Intrusion	Arousal
None	3.02 (3.37)	11.23 (3.26)	31.88 (6.40)	10.05 (2.57)	9.95 (1.87)	11.88 (2.97)
Some	3.08 (3.04)	10.92 (2.58)	34.12 (6.25)	10.32 (1.82)	10.60 (2.14)	13.20 (3.58)
Chronic	3.22 (3.56)	11.30 (3.37)	44.20 (15.32)	14.70 (6.46)	15.70 (5.66)	13.80 (4.57)
Overall	3.07 (3.24)	11.13 (3.03)	34.27 (8.91)	10.76 (3.47)	10.93 (3.29)	12.57 (3.46)

Note. Values presented without parentheses represent mean scores. Values presented within parentheses represent standard deviations.

A one-way ANOVA was performed with one contrast designed to test for differences in attention problems between the no trauma and chronic trauma groups. Because the CBCL attention problems scores were positively skewed, the ANOVA was performed on both raw attention problem scores and square-root transformed scores. Neither the overall ANOVA nor the contrast was significant for either the raw or transformed scores (*p*s = 0.87 - 0.99).

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3. This (grand)parent reported no traumatic events for her (grand)child, despite the fact that the child was being raised by this grandparent and the grandparent did not know where his parents were living. The child also had extreme difficulty completing any of the lab tasks, as he had trouble focusing for more than a few seconds and could not remain seated more than a few seconds. While the data that was collected on this child has been included in the analyses, it is suspected that this parent either was unable to complete all of the measures due to literacy problems or was unwilling to complete all of the measures, possibly due to confidentiality concerns.

4. Unless otherwise noted, PTSD score refers to the total PTSD scale on the TSCYC, comprised of the avoidance, intrusion and arousal subscales.

A separate ANOVA was performed to test for differences in TSCYC PTSD scores by trauma group. Polynomial contrasts were conducted to test for linear and quadratic trends. As shown in Table 6, the PTSD scores differed by trauma group, with children who had experienced more trauma also having higher parent-reported PTSD scores.

Table 6. ANOVA for PTSD Scores by Trauma Group

Source	*Df*	*F*	*p*
	Raw Scores		
Between	2	9.42***	<0.001
Linear	1	18.80***	<0.001
Quadratic	1	3.34	0.07
Within	72	(64.56)	
	Scores with Outlier Recoded		
Between	2	8.31**	0.001
Linear	1	16.61**	0.001
Quadratic	1	2.33	0.13
Within	72	(51.34)	

Note. Values enclosed in parentheses represent mean square errors.
** p <0.01. *** p<0.001.

One multiply traumatized child had a PTSD score more than two standard deviations above the next lowest score.[5] When this score was recoded to the next highest score and the same analyses performed, the overall ANOVA remained significant, as did the linear trend. The quadratic trend, however, was not significant.

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5. This child appeared to have a PTSD reaction at the beginning of her lab visit. When she entered the lab room, set up with child size furniture and a clipboard on a table, she withdrew into a corner, did not speak, and bit the skin on her hands. This continued for approximately 20 minutes despite the efforts of her (foster) parent and a clinical psychologist to reassure her. The parent later explained that the child had been interviewed repeatedly by social workers in similar rooms regarding suspected sexual abuse and that the child had had a similar reaction to a good touch/bad touch lesson in her preschool. Thus, it appears that this child's high PTSD score reflected real symptoms. This high score may be an outlier for this community sample, but may not be an outlier for a foster care or clinical sample.

Next, three one-way ANOVAs were performed to test the hypothesis that parents of traumatized children would report more of each kind of PTSD symptoms (avoidance, intrusion and arousal) than would parents of non-traumatized children. As shown in Table 7, results indicated that parents of traumatized children reported more avoidance and intrusion symptoms than did parents of non-traumatized children. In addition, the linear contrast term was significant for both variables, suggesting a dose response similar to that found for the total PTSD scale. Parents of traumatized children did not report more arousal symptoms when compared to parents of non-traumatized children.

Table 7. ANOVA for PTSD Subscales by Trauma Group

Source	*df*	*F*	*p*
		Avoidance	
Between	2	9.10***	<0.001
Linear	1	17.46***	<0.001
Quadratic	1	5.98*	0.017
Within	72	(9.91)	
		Intrusion	
Between	2	18.11***	<0.001
Linear	1	35.66***	<0.001
Quadratic	1	9.37**	0.003
Within	72	(7.41)	
		Arousal	
Between	2	1.90	0.157
Within	72	(11.67)	

Note. Values enclosed in parentheses represent mean square errors.
* $p < 0.05$. ** $p < 0.01$. *** $p < .001$.

A fourth one-way ANOVA was performed with one contrast to test for differences in dissociation scores between the no trauma and chronic trauma groups.

Because dissociation scores were positively skewed, these analyses were performed both for the raw dissociation scores and square-root transformed scores. Neither the ANOVA nor the contrast was significant for either the raw or transformed scores (ps = 0.91 - 0.96).

Separate analyses were performed for boys and girls. There were no differences between traumatized and non-traumatized boys and girls for dissociation, arousal, avoidance and intrusion. Traumatized girls had significantly higher intrusion scores (M = 9.78 vs. 12.33, p = 0.47), and marginally higher avoidance (M = 9.64 vs. 12.14, p = 0.057) and arousal scores (M = 11.14 vs. 13.67, p = 0.054), but not dissociation scores, compared to non-traumatized girls.

In sum, traumatized children did not have more parent-reported attention problems or higher dissociation scores compared to non-traumatized children. Traumatized children did have higher overall PTSD scores than did non-traumatized children. The linear trend suggests that PTSD scores increase as the number of traumatic events increases. Traumatized children also had higher avoidance and intrusion scores than did non-traumatized children. The quadratic trend for avoidance and intrusion suggests that the increase in avoidance and intrusion is most pronounced for children who have experienced chronic trauma.

Are Trauma Symptoms Related to Attention Problems?

Table 8 presents correlations between raw CBCL attention problems and TSCYC dissociation scores. Because the attention problems scale and the dissociation scales were positively skewed, Table 8 also presents correlations between square-root transformed attention problems and dissociation scales. As shown in Table 8, dissociation was highly

correlated with attention problems for the full sample as well as for the separate traumatized and non-traumatized groups.

Table 8. Zero-order Correlations between Parent-Reported CBCL Attention Problems, TSCYC Dissociation and TSCYC PTSD Scores

	Attention Problems (Sqrt Attention Problems)
Total Sample	
Dissociation	0.77 ***
(Sqrt dissociation)	(0.58***)
Traumatized Children	
Dissociation	0.67***
(Sqrt dissociation)	(0.45**)
Non-traumatized Children	
Dissociation	0.87***
(Sqrt dissociation)	(0.72***)

Note: Values without parentheses represent correlations for raw scores. Values enclosed in parentheses represent correlations for transformed scores. Here, the some and chronic trauma groups have been combined into one trauma group.
**$p < 0.01$. *** $p < 0.001$.

Table 9 presents correlations between TSCYC PTSD subscales and CBCL attention problems. TSCYC arousal was highly related to CBCL attention problems for the full sample as well as within the traumatized and non-traumatized groups. TSCYC avoidance was related to CBCL attention problems in both groups, with slightly higher correlations for the non-traumatized children. TSCYC intrusion was related to CBCL attention problems for traumatized but not for non-traumatized children.

Table 9. Correlations between CBCL Attention Problems and TSCYC PTSD Subscales Avoidance, Intrusion and Arousal

	PTSD (PTSD w/recoded outlier)	Avoidance	Intrusion	Arousal
Total Sample				
Attention Problems	0.60 ***	0.49***	0.31***	0.75***
Sqrt Attention Problems	(0.53***)	0.41***	0.30***	0.63***
Traumatized Children Only				
Attention Problems	0.60***	0.41*	0.40*	0.77***
Sqrt Attention Problems	(0.54**)	0.36*	0.37*	0.65***
Non-traumatized Children Only				
Attention Problems	0.69***	0.652***	0.238	0.763***
Sqrt Attention Problems	(0.63***)	0.538***	0.240	0.641***

Note: Values without parentheses represent correlations for raw scores. Values enclosed in parentheses represent correlations for transformed PTSD and attention problems scores. *$p<0.05$. **$p < 0.01$. *** $p < 0.001$.

Correlations for traumatized and non-traumatized children calculated separately for boys and girls were similar to the results presented in Tables 8 and 9 with the following exceptions. Traumatized and non-traumatized boys' and traumatized girls' dissociation and attention problems were positively correlated (rs = 0.619 to 0.831). However, dissociation and attention problems scores were not significantly correlated for non-traumatized girls (rs = 0.150 – 0.301). Similarly, traumatized and non-traumatized boys' and traumatized girls' attention problems and arousal scores were positively correlated (rs = 0.631 to 0.876). However, non-traumatized girls arousal scores were not related to attention problems (rs = 0.046 to 0.092).

Inspecting the items that make up the TSCYC arousal subscale reveals four items that are clearly related to attention, and are nearly identical to items on the CBCL attention

problems scale. The TSCYC items are: "having trouble concentrating," "having trouble sitting still," "not being able to pay attention," and "being tense". Corresponding CBCL items are "cannot concentrate or pay attention for long," "cannot sit still; is restless or hyperactive" and "is nervous, high-strung, or tense."

To measure the extent of the relation between these CBCL attention and TSCYC arousal items, a short CBCL attention problems scale consisting of the three items listed above was correlated with a TSCYC arousal scale consisting of the four items listed above. The correlation between these the 3-item CBCL scale and the 4-item TSCYC scale was 0.81, $p < 0.001$. As a comparison, the mean of the remaining items on the CBCL attention problems scale was correlated with the mean of the remaining items on the TSCYC arousal scale. The correlation was 0.40, $p < 0.001$. When the same correlation was rerun, controlling for the items on the 3-item CBCL attention problems and the 4-item TSCYC arousal scales was 0.16, $p = 0.17$. In contrast, the correlation between the 3-item CBCL attention problem scale and the 4-item TSCYC scale, controlling for all other items on the CBCL attention problems and TSCYC arousal scales, was 0.69, $p < 0.001$. These results suggest a strong relation between seven, very similar items on the CBCL attention problems scale and the TSCYC arousal scale and a weak relation between the remaining items on the scales.

As was the case with arousal items on the TSCYC, several TSCYC dissociation items are very similar to CBCL attention problems items. CBCL items "stares blankly", "is confused or seems to be in a fog" and "daydreams or gets lost in his/her thoughts" are similar to TSCYC items "acting like he or she was in a trance", not paying attention because he or she was in his or her own world", seeming to be a million miles away", "staring off into space",

"spacing out" and "living in a fantasy world".

Since some CBCL attention problems items were very similar to most of the TSCYC dissociation items, the CBCL attention problems scale was split into two subscales--a CBCL dissociation-like attention problems subscale and the rest of the CBCL attention problems subscale. Each was correlated with the full TSCYC dissociation scale. Correlations between the 3-item CBCL dissociation-like scale and the TSCYC dissociation scale were slightly higher ($r = 0.79, p < 0.001$) than between the remaining CBCL items and the TSCYC dissociation scale ($r = 0.64, p < 0.001$).

Similar analyses to those performed on the parent-rated data were performed for experimenter ratings on children's behavior during the memory task. Experimenter ratings were not available for two children (one due to experimenter error and one due to child non-compliance). In three cases, data was not available for one phase. In those cases, the rating for the phase that was available was double-weighted. Experimenter ratings had ceiling effects: most children remained seated and on-task most of the time.

Three scales were derived from the five questions experimenters used to rate children's behavior during the memory task. An on-task scale was made up of the mean of the experimenter's responses to whether the child was looking at the pictures (recorded after both attention phases) and the question about whether the child was playing the sheep game (recorded once after the divided attention phase). The mean of the experimenter's responses to whether the child was seated (recorded after each attention phase) made up a second scale. Finally the mean of all five items comprised the overall experimenter-rated attention scale. The

on-task and child-seated scales were positively correlated ($r = 0.58, p < 0.001$). Loosely, the on-task scale was designed to correspond to the ADHD symptom of inattention and the child-seated scale was designed to correspond to the ADHD symptom of hyperactivity. Together, these items were designed to reflect typical requirements in a preschool classroom (i.e. to be seated, to look at a book, and to follow the rules of a game).

Table 10 presents descriptive statistics for experimenter rated behavior. One-way ANOVA revealed no significant differences between trauma groups. Table 11 presents correlations between the experimenter behavior ratings and parent-rated trauma symptoms. Correlations were small and most did not reach significance. Table 11 also presents correlations between parent-reported CBCL attention problems and the experimenter-rated scales. There was very little agreement between parent-reported attention problems and the experimenter ratings of children's behavior during the memory task.

In sum, dissociation, avoidance, and arousal were positively related to parent-reported attention problems for both traumatized and non-traumatized children. Intrusion was related to attention problems for traumatized children only. Some of the strength of some of these relations may be due to very similar items that appear on measures of trauma symptoms and attention problems. Experimenters rated both traumatized and non-traumatized children similarly in terms of their behavior during the memory task conducted during the lab visit.

Table 10. Means and Standard Deviations for Experimenter Rated Behavior by Trauma Group

	On-task	Seated	Overall
Non-Traumatized	4.20 (0.62)	4.87 (0.39)	4.47 (0.47)
Traumatized	4.22 (0.59)	4.83 (0.63)	4.47 (0.54)

Note. The values without parentheses represent mean ratings. The values presented within parentheses represent standard deviations.

Table 11. Correlations Between Trauma Symptoms and Experimenter Rated Attention by Trauma Group

	Experimenter Ratings		
	On-task	Seated	Overall
Total Sample			
Dissociation	-0.11	-0.06	-0.10
Sqrt Dissociation	-0.09	-0.03	-0.08
PTSD overall	-0.17	-0.20	-0.21
PTSD w/recoded outlier	-0.25*	-0.22	-0.27*
Avoidance	-0.21	-0.28*	-0.26*
Intrusion	-0.10	-0.24*	-0.17
Arousal	-0.14	-0.03	-0.11
CBCL Attention Problems	-0.28*	-0.08	-0.23*
Traumatized Children			
Dissociation	0.03	0.14	0.84
Sqrt Dissociation	0.04	0.15	0.09
PTSD overall	-0.21	0.20	-0.23
PTSD w/recoded outlier	-0.27	0.28	-0.30
Avoidance	-0.21	0.29	-0.27
Intrusion	-0.22	0.35	-0.30
Arousal	-0.11	0.10	-0.03
CBCL Attention Problems	-0.24	0.13	-0.09
Non-traumatized Children			
Dissociation	-0.25	-0.32	-0.30
Sqrt Dissociation	-0.23	-0.28	-0.27
PTSD overall	-0.17	-0.24	-0.22
PTSD w/recoded outlier	-0.26	-0.17	-0.27
Avoidance	-0.26	-0.32*	-0.31
Intrusion	0.09	0.03	0.07
Arousal	-0.20	-0.25	-0.24
CBCL Attention Problems	-0.39*	-0.42**	-0.44**

* $p < 0.05$. ** $p < 0.01$.

Do Dissociative Children Remember Neutral and Charged Pictures Differently from Non-Dissociative Children under Selective and Divided Attention?

Children completed a memory task that was designed to be similar to adult memory tasks that have demonstrated differences in memory ability for neutral and charged stimuli under selective and divided attention based on dissociation scores in adults. Two findings would support the similarity of this task to the previously reported adult tasks. First if, overall, children have better memory for charged pictures than for neutral pictures, there will be some evidence that the charged pictures were more salient to the children. Second if, overall, children have better memory scores in the selective attention condition than in the divided attention condition, there will be some evidence that the children were dividing their attention and that the task increased children's cognitive load. Ideally, there will be no effects of the order of either attention condition or stimuli presentation.

Nine children appeared to not understand the instructions for the recognition memory task. The questions used to elicit responses about memory for the items were lengthy and may have been too difficult for some children. The nine excluded children answered either "yes" or "no" to every question. There were no differences in age or number of traumatic events experienced between the excluded children and the rest of the sample.

First, two ANOVAs were conducted to test for effects of the order in which participants completed the selective and divided attention phases of the memory task and of the order of the stimuli sets they viewed. A 2 (picture type) by 2 (attention condition) by 2

(dissociation group) by 2 (attention condition order) ANOVA revealed neither significant main effects of attention condition order nor any interactions between attention condition order and the other variables (*p*s 0.31 - 0.95). A 2 (picture type) by 2 (attention condition) by 2 (dissociation group) by 2 (stimuli order) was also conducted. Again, the main effect of stimuli order was not significant, nor were any interactions with between stimuli order and the other variables (*p*s 0.31 - 0.88). Since there were no main effects of attention condition order or stimuli set order, nor any significant interactions between these variables and picture type, attention condition or dissociation group, further analyses did not include the attention condition order and stimuli set order variables.

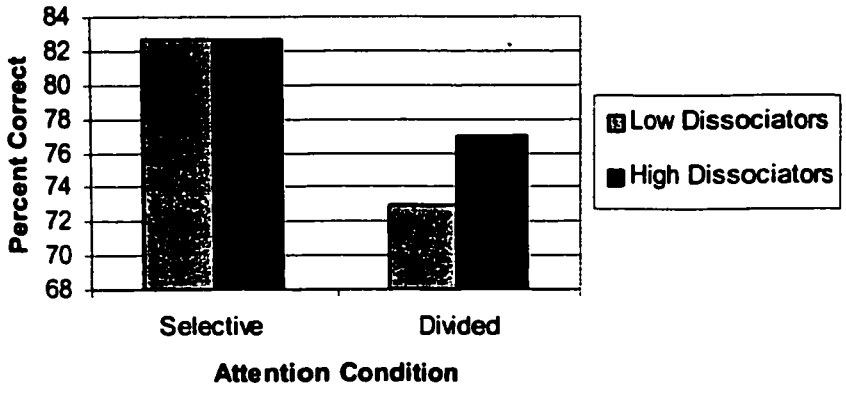
Second, a 2 (dissociation group) by 2 (attention condition) ANOVA collapsing across picture type was conducted to test for a pattern previously reported for adults in which low dissociators outperform high dissociators under selective attention, but the opposite pattern is found for divided attention. The only significant effect was that participants had better memory for pictures presented under selective attention than under divided attention, $F(1,66) = 18.93, p < 0.001$ (see Table 12 for descriptive statistics). Though not significant, high dissociators' mean score on the memory task was higher than the low dissociators' mean score in the divided attention condition (see Figure 1).

Table 12. Descriptive Statistics for Memory Test by Attention Condition and Dissociation Group

	Selective Attention			Divided Attention		
	%	*M*	*SD*	%	*M*	*SD*
Low Dissociators (*n* = 43)	82.69	13.23	2.48	72.94	11.67	2.23
High Dissociators (*n* = 25)	82.75	13.24	2.18	77.00	12.32	2.53

Note. % = percent correct on memory test. Means are mean number correct on memory test.

Figure 1. Memory Task Performance by Dissociation Group and Attention Condition



Third, separate 2 (attention condition) by 2 (picture type) ANOVAs were conducted for high and low dissociators (based on a median split of TSCYC dissociation scores). Collapsed across attention condition, low dissociators had significantly better memory for charged pictures (M = 12.88, SD =2.36) than for neutral pictures (M = 12.02, SD = 2.13), F (1,42) = 8.62, p = 0.005. There was a trend for high dissociators to have better memory for charged pictures (M = 13.12, SD= 2.30) than for neutral pictures (M = 12.44, SD = 2.36), as well, F (1,24) = 3.25, p = 0.08. The interaction of attention condition by picture type was not significant for either group (low dissociators, p =0.64; high dissociators, p = 0.94).

There are important differences between adult and child dissociation that may lead to different findings for preschoolers than have been found with adults. First, the measures of adult and child dissociation differ in that adult measures are self-report and measures for

young children are observer-report. As a result of the reporter and the development of thought and behavior through childhood, items on the adult and child dissociation measures differ significantly. Also, developmental factors may lead many non-traumatized preschoolers to be classified as highly dissociative while this is generally not true for adults. In this study, 16 (21%) of the 75 children who had both dissociation scores and trauma history had dissociation scores above the median for this sample and had no reported trauma history.

For these reasons, additional analyses were performed to test for differences in memory between traumatized and non-traumatized children. First, a 2 (picture type) by 2 (trauma group) ANOVA was run for selective attention memory scores. None of the main effects or interactions were significant (ps = 0.12 - 0.62).

The same ANOVA was conducted for the divided attention memory scores. As shown in Tables 13 and 14 and Figure 2, this revealed a significant main effect of picture type as well as a significant picture type by trauma group interaction. Participants obtained higher scores for charged pictures than for neutral pictures. The interaction indicated that traumatized and non-traumatized participants scored approximately equally for neutral items, but traumatized participants obtained lower scores for charged pictures compared to non-traumatized participants.

Table 13. Descriptive Statistics for Divided Attention Memory Test

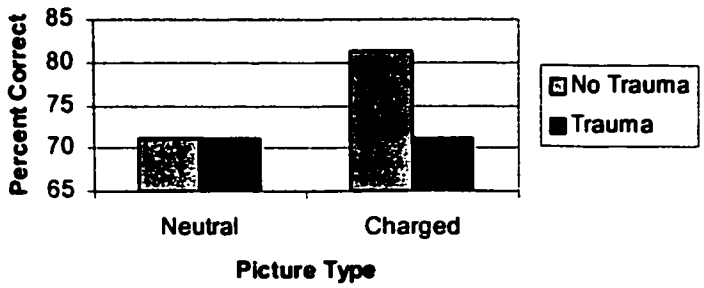
	No Trauma	Trauma
Neutral Pictures	5.7 (1.39)	5.7 (1.42)
Charged Pictures	6.5 (1.11)	5.7 (1.65)

Table 14. Sources of Variance for Divided Attention Memory Test Scores

Source	*df*	*F*	*p*
	Within Subjects		
Picture Type	1	5.06*	0.03
Picture Type x Trauma Group	1	4.24*	0.04
Error	62	(1.10)	
	Between Subjects		
Trauma Group	1	1.59	0.21
Error	62	(2.75)	

Note. Values enclosed in parentheses represent mean square errors.
*$p < 0.05$.

Figure 2. Divided Attention Memory Test Percent Correct by Picture Type and Trauma Group



This interaction is the same as the effect found for adults who were tested for memory of words during a divided attention Stroop task (DePrince & Freyd, 1999), except that, for preschoolers, trauma status and not dissociation status predicted children's performance. These results are consistent with the view that children exposed to trauma, particularly chronic family abuse, develop an attention style that helps keep threatening information out of awareness.

To summarize the results, the memory task presented here did not have attention condition or stimuli order effects. Overall, children performed better on the selective attention

memory test than on the divided attention memory test. Also, overall, children had better memory for charged pictures than for neutral pictures. These results speak to the validity of the test.

Children's memory for charged and neutral material did not differ by dissociation status. Rather, trauma status was related to memory in the divided attention condition. In the divided attention condition, traumatized children's memory for neutral pictures was comparable to non-traumatized children. However, traumatized children's memory for charged pictures was poorer than was non-traumatized children's memory.

CHAPTER III

STUDY 2: ATTENTION, POST-TRAUMATIC STRESS AND DISSOCIATION IN SCHOOL AGE CHILDREN

Chapter 3 presents results of the second of two studies in this dissertation. Study 2 investigates relations between trauma symptoms and ADHD symptoms in a sample of school-age children. The goal of the study was to specifically examine the effects of trauma in a sample of children who have significant ADHD symptoms.

Method

Participants

The sample consisted of twenty-nine parents and 8- to 11-year-old children (*M* age = 9.27 yrs., *SD* = 0.94) who responded to fliers posted in after-school programs, community centers, social service offices, tutoring offices, and similar public locations. The fliers invited parents to participate in a study of "life stress and attention" with their children. "Life stress" was not defined. The fliers informed parents that children who had difficulty with attention were welcome, whether or not they had experienced stressful life events.

Participating parents were predominantly Caucasian (n = 25), as were participating children (n = 24). Families came from a wide range of socioeconomic backgrounds. Most lived in a medium-sized city in Oregon; some lived in nearby rural areas. Fourteen (48 %) of the

participating children were girls. Twenty-two (76%) parents were living with a spouse or partner. Two grandmothers and one father participated (and are referred to as "parents" throughout this dissertation). The remaining parents were biological, adoptive, or stepmothers. All participating parents were the primary caregivers and had physical custody of the participating child. Four children (from 2 families) participated with a half-sibling.

Procedure

An Institutional Review Board approved the procedure. Families were accepted into the study after completing the Attention Deficit Hyperactivity Disorder Test (ADHDT, Gilliam, 1995). Children who had a raw score of 8 or higher on any of the hyperactivity, impulsivity or inattention scales were included in the study. This represented at least moderate difficulty with ADHD symptoms. For example, a child could achieve a score of eight by having a "mild problem" with 8 of 13 hyperactivity items or by having a "severe problem" with 4 of the 13 hyperactivity items. Families participated in one lab session that lasted approximately one to one and one-half hours. Parents received $20 and children received a toy in compensation for their time and effort.

Parents signed consent forms and children signed assent forms. Children then completed two lab tasks and a questionnaire with an experimenter. Children participated in a room designed for studies of school-age children. One desk contained a computer for tasks not described here. Children used a second desk to complete a questionnaire. The room was designed to not be distracting to children. There were minimal decorations on the walls and the window was covered with blinds. The room also contained a video camera. Parents

watched children on a video screen from an adjacent room while completing questionnaires on their children's trauma history, behavior, and symptoms of several disorders.

At the end of the session, experimenters provided parents with information on their child's performance. In accordance with the human subjects protocol, experimenters were prepared to report abuse if participants directly told them about it. No participants gave experimenters information that necessitated a report. Researchers assisted parents in locating community resources, such as child and family counselors, as needed.

Parents were not formally asked what kind of school or classroom setting their children attended. Informally, some parents volunteered this information during the course of the study. One child had recently transferred from a small, therapeutic school for severely emotionally disturbed children who could not be accommodated in public school. She transferred because the family moved, not because the services were no longer needed. Two children were enrolled at a public alternative school that was designed to be less structured than typical public schools. The school did not assign homework and learning was, in general, more informal than in most schools. Three children were homeschooled. Each of the homeschooling parents indicated that they were doing so because a public school teacher or counselor had told them that their child was difficult to manage or because they feared their child would have difficulty learning in a public school. One of these children had an IQ score more than 4 standard deviations above the mean, and the family had been advised by a psychologist to either move to a larger city that had a special school for very gifted children or to homeschool. The psychologist's opinion was that the child's difficulty with attention (as well as bipolar symptoms) were due to being bored at school and the psychologist was skeptical

that the school could accommodate this child's needs. The parents agreed with the psychologist and reported that the child (as well as his siblings) have fewer depression and inattention symptoms since beginning homeschooling.

In general, parents and children were very positive about their teachers. Reports of teachers walking children home from school, being especially sensitive to family situations (such as divorce, adoption, domestic violence and homelessness), and providing special support to children in stressful situations were common. So common, in fact, that it appeared that parents were relying on teachers to provide mental health services that went beyond a teachers' training. Parents and children seemed to trust their school teachers very much and were more willing to accept assistance and advice from the teacher than from another professional, such as a social worker or therapist. There were only two complaints about schools or teachers. One parent of a child who had trouble concentrating reported that she believed the informal alternative school the child attended did not provide enough structure or homework. Another parent and child reported ongoing emotional abuse from a teacher prior to moving to the area where the study was conducted. This consisted of telling the child he was "stupid" and not intervening to prevent other children from physically attacking and injuring the child. At the previous school, the child was suspected of having ADHD and was performing below grade level. At the new school, the child did not have these difficulties. In all, parents and children's stories indicated that teachers were very important and influential people in these families' lives.

Measures

Parent Measures

A researcher asked parents who were interested in participating to complete the ADHDT over the phone, to ensure that children accepted into the study had some difficulty with attention or hyperactivity. The ADHDT is based on DSM-IV symptoms of ADHD and provides separate, normed scores for hyperactivity, impulsivity and inattention. Gilliam (1995) reports scale alphas for parent-reported scores of 0.92 (hyperactivity), 0.89 (impulsivity), and 0.93 (inattention).

Parents completed several of the same measures as the parents in the preschool study presented in Chapter 2. They completed the BTES-P for children's traumatic experiences (see Appendix A). In addition to the BTES-P, parents answered questions about whether or not their child had experienced several forms of abuse, and whether or not children's services had been contacted about suspected abuse (see Appendix B). They also completed the TSCYC on their children's trauma symptoms.

Parents completed the Child Dissociative Checklist (CDC, Putnam & Peterson, 1994). The CDC is a 20-item, observer-report questionnaire for children aged 5 to 12. Parents are asked to report on how much each item describes their child using the following scale: "(0) Not True", "(1) Somewhat or Sometimes True", or "(2) Very True". Putnam and Peterson (1994) report alphas of 0.78 and 0.95 in two studies. In these studies, test-retest reliability correlations were 0.69 and 0.73.

Parents also completed the SNAP-IV Teacher and Parent Rating Scale (Swanson, 1992; 2002). The SNAP-IV includes hyperactivity/impulsivity and inattention scales based on DSM-IV criteria, as well as a number of other scales related to children's attention and behavior. The SNAP-IV also includes items from other DSM-IV disorders with symptoms similar to ADHD, including two items assessing PTSD symptoms and two items assessing adjustment disorder symptoms. Parents are asked to report how much each item describes their child using the following scale: "Not at all" (0), "Just a little" (1), "Quite a bit" (2), and "Very Much" (3).

Parents also completed the Behavioral and Emotional Rating Scale (BERS, Sharma, 1998). The BERS is a 52-item measure that asks parents to report on the child's strengths, yielding the following scales: interpersonal strength, family involvement, intrapersonal strength, school functioning and affective strength. Parents are asked to report on how much each items describes their child using the following scale: "very much like the child" (3), "like the child" (2), "not much like the child" (1) and "not at all like the child "0). Due to a copying error, two items on the school functioning subscale ("attends school regularly" and "uses note-taking and listening skills in school") were omitted from the version that the parents in the study completed. The author presents subscale alphas from 0.84 to 0.97 (Sharma, 1998).

Parents completed the Parent Report of Children's Reaction to Stress (PRCRS, Fletcher, 1996). This is a measure of PTSD that first asks parents to provide a written description of a traumatic event that they child has experienced. Next, parents completed 49 questions about their child's behavior. Most questions ask parents to compare the child's functioning before and after the event. Questions correspond to DSM-IV criteria. The author

reports a total score alpha of 0.86 in a mixed clinical and community sample (Carlson, 1997; Fletcher, 1996).

Unless otherwise noted, scales were computed using means of items rather than sums. This prevented the necessity to substitute a score or drop participants who had missing data for a small number of items. One parent took a questionnaire packet home to complete it but did not return it. That family is missing data for the TSCYC, PRCRS, BTES-P and other trauma questions, and some questions about family history of ADHD and age of onset of ADHD symptoms.

Child Measures

Children completed the Trauma Symptom Checklist for Children (TSCC, Briere, 1996). The TSCC is a 44-item self-report measure for children ages eight to 16. It yields depression, anxiety, anger, post-traumatic stress and dissociation scales. The dissociation scale can be broken into overt and fantasy dissociation subscales. Two validity scales are also included. Briere (1996) reports alphas ranging from 0.82 to 0.89 for the scales in a sample that included both clinical and non-clinical groups.

Results

Traumatic Life Events

Parents reported a range of traumatic and abusive experiences, as shown in Table 15.

The 28 children with BTES-P data were classified two ways: by trauma history and by abuse history. Children of parents who answered "never" to every BTES-P and the follow-up abuse questions were included in the "no trauma" group. Children of parents who reported that the children had experienced one or more BTES-P items were included in the "some trauma" group. Most of the children experienced events that would be considered severe stressors under the DSM-IV PTSD definition. Sixteen children experienced more than one kind of trauma. One child experienced emotional abuse only; one experienced physical abuse only. Two children experienced "seriously traumatic" events not listed without other forms of trauma.

Children were also divided into two groups ("abused" and "not abused") on the basis on a set of questions directly asking if the child had been physically, sexually or emotionally abused or neglected (referred to as "abuse questions", see appendix B). Thirteen parents reported that their child had been abused or neglected at least once. It is likely that some parents who did not label their child's experience as "abuse" nevertheless had been abused by legal standards. (For example, one parent reported that her son had been spanked, leaving marks, but did not label this as physical abuse.) There was evidence (from the BTES-P trauma questions and from the parents' description of a traumatic event obtained as part of the PRCRS) that those children whose parents labeled as abused had experienced serious abuse. (For example, the parent who reported emotional abuse only described an ex-spouse who called the child repeatedly over a period of years to tell her inappropriate and hurtful things. For example, he told her that he loved his other children, but not her. He also told her that her mother never wanted her and did drugs during pregnancy to try to abort her.) Parents who answered "never"

to every question about abuse or neglect were included in the "no abuse" group. In all, it is likely that that abused group represents children who meet a legal definition of abuse. Some of the children in the trauma group probably also meet these definitions, and some of the children whose parents reported no trauma or abuse may have experienced some abuse as well.

Table 15. Frequency of Children's Experience with Trauma by Type of Event

	Number of Children	% of Children
Domestic Violence	12	43
Physical Abuse	6	21
Sexual Abuse	3	11
Emotional Abuse	9	32
Non-domestic Violence	8	29
Neglect	4	14
Natural disaster/accident	5	18
Parent/sibling die	2	7
Other	14	50
None	8	29

Note: Percents do not add to 100 because many children experienced more than one type of event.

"Domestic Violence" was coded when parents reported that someone close to the child seriously attacked another person or when anyone attacked a family member. Eight of the 12 children listed has having experienced domestic violence had witnessed someone close to them attack a family member. "Other" trauma was coded when parents responded that children had experienced a "seriously traumatic" event that was not asked about on the survey. "Non-domestic violence" was coded when parents reported that children witnessed an assault on someone who was not close to them by another person who was not close to them. One child was assaulted by someone who was not close to him (a peer), and was included in this category.

In addition to the 13 parents who labeled their child's experience as abuse, five parents reported experiences on the BTES-P that appeared to be abusive (e.g. spankings that left marks, witnessing spankings that left marks, witnessing "someone close" attack someone else). Of these eighteen parents, five indicated that, to their knowledge, children's services had been contacted regarding suspected abuse. One child had a children's services report for physical abuse only; one had a report for neglect only. The remaining four children had reports for multiple forms of abuse. Of the ten parents who reported no abuse, neglect or domestic violence (either on the BTES-P or on the abuse questions), one reported that her child had a children's services report for suspected physical abuse. These reports were reports from the community of suspected abuse and may or may not have been substantiated by the authorities.

Thus, in this sample, 28% of children whose parents reported what could be considered suspected abuse on the questionnaire had any children's services report. Thirty-eight percent of children whose parents labeled their children's experiences as abuse had any children's services report. Ten percent of children whose parents did not report any abuse (either on the BTES-P or abuse questions) had a children's services report.

In this sample, there were no differences in the years of education attained by the participating parents between the traumatized and non-traumatized groups or between the abused and non-abused groups. Two parents did not answer the questions pertaining to income. For the parents who gave income information, the average household income of the traumatized children (M = \$23,946, SD = 33,765) was lower than for the non-traumatized

children (M =$45,125, SD = 19,417; t (24) = 2.04, p = 0.04). Similarly, the average household income was lower for the abused children (M = $19, 769, SD = 21,023) than for the non-abused children (M = $39, 628, SD = 26, 982). One reason for the low mean income and high standard deviation for the traumatized and abused groups is that a few parents were unemployed and entered an income of $0. If these families had other sources of income (unemployment, SSI, food stamps, etc.), the value of those sources of income was not included in our estimate of family income. Also, several parents mentioned that they had quit their jobs to homeschool or provide after-school care for children who were having difficulty in school or group child care. Two parents also mentioned that they were separated from their partner directly because of the stress of parenting a child with challenging behaviors.

Of the eight children classified as non-traumatized, six (75%) were boys. Of the twenty children who were classified as traumatized, eight (40%) were boys. Of the 15 children classified as non-abused, nine (60%) were boys. Of the 13 children classified as abused, five (38%) were boys. These differences were not significant.

ADHD Symptoms

Three children had been diagnosed with ADHD prior to beginning the study. One child was being treated with medication for attention and hyperactivity problems. Table 16 presents mean scores on the SNAP-IV inattention, hyperactivity/impulsivity and combined scale, as well as the number of participants who had difficulty with inattention only, hyperactivity/impulsivity only or both inattention and hyperactivity. One (traumatized, non-

abused) child had both inattention and hyperactivity/impulsivity scores that were below both cutoffs.

There were no significant differences on either SNAP-IV inattention or hyperactivity/impulsivity scores between traumatized and non-traumatized children or between boys and girls. Abused children had higher inattention scores (t, 26, = 2.04, p = 0.05) and combined inattention/hyperactivity/impulsivity scores (t, 26, = 2.13, p = 0.04) than did the non-abused children.

Table 16. SNAP-IV Scores by Abuse Group

	M	*SD*	# (%) Above Cutoff
Abused (n=13)			
Inattention	2.44	0.49	0 (0)
Hyp./Imp.	2.13	0.34	1 (8)
Both Subscales	--	--	12 (92)
Non-abused (n=15)			
Inattention	2.08	0.44	1 (7)
Hyp./Imp.	1.95	0.50	3 (20)
Both Subscales	--	--	10 (67)
Total Sample (n=29)			
Inattention	2.26	0.49	1 (3)
Hyp./Imp.	2.89	0.43	4 (14)
Both Subscales	--	--	23 (79)

Note: "Hyp./Imp." = Hyperactivity/Impulsivity. Only children who had elevated scores on either inattention or hyperactivity/impulsivity (not both scales) are included on the "inattention" and "hyp./imp" rows. "# (%) Above Cutoff for Both Subscales" represents child who had scores above the cutoff for both the inattention and hyperactivity/impulsivity scales.

Some have suggested that children with ADHD are at higher risk for abuse because they are difficult to parent. It is unlikely that the abused children in this study only experienced abuse related to parents' reactions to their behavior, given the sexual abuse, neglect and domestic violence reported in this sample. It is possible that children who have difficulty with

inattention or hyperactivity are at risk to experience all kind of abuse. If so, studying these links may provide information that may help prevent abuse and treat abused children. In particular this research may benefit parents and children who believe that the child's behavior contributed to the abuse.

Trauma, Trauma Reactions and ADHD Symptoms

Are SNAP-IV PTSD Items Related to Parent- and Child-Reported PTSD?

The SNAP-IV, primarily an ADHD measure, includes several items designed to screen for other disorders that may mimic ADHD symptoms. The two SNAP-IV items designed to screen for PTSD are: "77. Currently is hypervigilant (overly watchful or alert) or has exaggerated startle response" and "78. Currently is irritable, has anger outbursts, or has difficulty concentrating." The two adjustment disorder items are "79. Currently has an emotional (e.g. nervous, worried, hopeless, tearful) response to stress" and "80. Currently has a behavioral (e.g. fighting, vandalism, truancy) response to stress." These items were combined to create three scales. A PTSD scale was formed by taking the mean of the two PTSD items. An adjustment disorder scale was formed by taking the mean of the two adjustment disorder items. A general stress response scale was formed by taking the mean of all four items.

As shown in Table 17, individual SNAP-IV PTSD and adjustment disorder items were positively correlated with several TSCYC PTSD subscales, particularly avoidance and arousal. Item 79 (emotional reaction to stress) was correlated with TSCYC intrusion. The SNAP-IV

PTSD scale was not significantly correlated with either the TSCYC or TSCC total PTSD scales. The SNAP-IV adjustment scale was significantly correlated with TSCYC avoidance, arousal and total PTSD scales. The four items together (stress response scale) was also significantly correlated with the TSCYC avoidance, arousal and total PTSD scales.

Table 17. Correlations between SNAP-IV Stress Response and TSCYC and TSCC PTSD Scores

	TSCYC				
	Avoidance	Intrusion	Arousal	Total PTSD	TSCC PTSD
SNAP 77	0.17	-0.07	0.37^	0.20	0.03
SNAP 78	0.38*	0.03	0.51**	0.42*	0.37^
SNAP 79	0.36^	0.38*	0.30	0.46*	0.10
SNAP 80	0.48**	0.20	0.34^	0.46*	-0.22
SNAP PTSD	0.21	-.06	0.49**	0.28	0.29
SNAP Adjustment	0.50**	0.36^	0.38**	0.55**	-0.06
SNAP Stress Response	0.46*	0.19	0.51**	0.51**	0.11

Note: ^ $p < 0.10$. * $p < 0.05$. ** $p < 0.01$.

To summarize, the SNAP-IV PTSD and adjustment disorder items were correlated with a number of parent-reported PTSD scales. In general, the SNAP-IV PTSD and adjustment disorder scales were not correlated with TSCC PTSD scales. One possible reason involves the way children interpreted the TSCC PTSD items. Some of the TSCC PTSD items refer to "bad things", "scary things" or "things I didn't like" (e.g. "wishing bad things had never happened"). Some children commented that they meant things like a scary movie or getting a bad grade on a test. Children's varying definitions of "bad" or "scary" events may have contributed to noise variance that obscured relations between parent- and child-reported post-traumatic reactions.

Do Family History or Age of Onset Differ between Traumatized and Non-traumatized Children? Between Abused and Non-abused Children?

Parents were asked if the child had a parent, sibling, or other relative who had, or was suspected of having, an attention disorder. Fifteen parents (54%) indicated that their child had at least one relative who has or is suspected of having an attention disorder. There was a trend for traumatized children to be more likely to have a relative with a diagnosed or suspected an attention disorder (chi-square = 3.68, $p = 0.06$) Sixty-five percent of traumatized children had a family member with ADHD versus 25% of non-traumatized children. Abused children were significantly more likely than non-abused children to have a family member with diagnosed or suspected ADHD (chi-square = 5.32. $p = 0.02$). Seventy-seven percent of abused children had a family member with ADHD compared to 33% of non-abused children. Traumatized children were no more likely than non-traumatized children to specifically have a parent with suspected or diagnosed ADHD. There was a trend for abused children to be more likely than non-abused children to have a parent with suspected or diagnosed ADHD (chi-square = 3.48, $p = 0.06$). Forty-six percent of abused children had a parent with ADHD versus 20 percent of non-abused children.

Parents were also asked: "How old was your child when the problems with attention and/or hyperactivity started?" Five parents did not answer the question. Some of the parents who did not respond indicated that they did not view their child's behavior as a "problem", even though they were aware that their children had more difficulty with attention and/or hyperactivity than other children. Of the parents who gave an age, the mean age was 3.1 years ($SD = 2.4$), and ranged from birth to eight years of age.

There was no main effect of abuse or trauma history on age of onset of ADHD symptoms. There was a main effect of sex (F (1,22) = 89.76, $p < 0.001$). Parents reported first noticing boys' ADHD symptoms at a mean age of 1.7 years (SD = 1.7, range 0 to 4 yrs.) and girls' ADHD symptoms at a mean age of 4.4 years (SD = 2.16, range: 0 to 8 yrs.). However, a significant interaction of sex by abuse history indicated that the effect of sex was more pronounced for the non-abused children (F, (1,22) = 10.82, $p = 0.004$; see Table 18).

Table 18. Mean Age of Onset of ADHD Symptoms by Abuse History and Sex

	M (yrs.)	*SD*	Range (yrs.)
Abused Children			
Boys	3.25	1.50	1-4
Girls	3.62	2.08	3-7
Non-Abused Children			
Boys	0.86	1.22	0-3
Girls	6.00	1.41	5-8

In sum, abuse was related to having a family member with suspected or diagnosed ADHD. There was a trend for abused children to be more likely than non-abused children to have a parent with suspected or diagnosed ADHD. There was a main effect of sex on age of onset of ADHD symptoms: parents reported an earlier age of onset for boys than for girls. Parents of abused children reported similar ages of onset for boys and girls. In contrast, parent of non-abused children reported earlier ages of onset for boys than for girls.

Is Trauma Related to ADHD Symptoms and School Functioning?

Parents were also asked to indicate whether they believed their child's problems with

attention and/or hyperactivity were related to stressful life events by endorsing one or more of the following statements:

1. She/he had attention/hyperactivity problems before the event, and these problems got worse during or after the event.

2. She/he developed attention/hyperactivity problems during or after a stressful event that he or she did NOT have prior to the event.

3. She/he has experienced repeated or ongoing stressful events that may be contributing to his/her attention/hyperactivity problems.

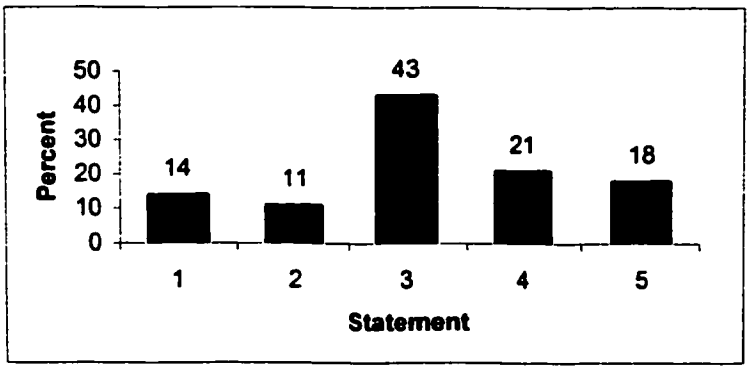
4. She/he has not experienced any stressful event that has affected his/her attention/hyperactivity problems.

5. If none of the above describe the situation, or if you would like to add some information, please explain here (open-ended response).

Of the 28 parents who completed the questionnaire, 21 parents endorsed exactly one of the statements. Three parents did not check any (perhaps because they did not view their child as having a "problem"). Four parents endorsed more than one statement. As shown in Figure 3, the highest percentage of parents (43 percent) endorsed statement three, indicating that they believed ongoing or repeated stressful events were implicated in their child's difficulty with attention and/or hyperactivity. The lowest percentage of parents (11 percent) reported that they believed their child first developed attention problems following a stressful event that the child did not have prior to the event. Thus, most parents in this sample believed stressful

life events were a factor in their children's ADHD symptoms. More parents perceived chronic stressful events rather than one particular event played a role in their child's symptoms.

Figure 3. Percent of Parents Who Endorsed Statements about Trauma and Attention Problems



Note: Percents do not add to 100 because four parents endorsed more than one statement. Percents are based on a sample size of 28, which includes three respondents who did not endorse any of the statements.

As part of the PRCRS, parents were first asked to describe a stressful event that the child had experienced. Then, parents reported on their child's behavior before and after the event. Only children who had experienced a stressful event have PRCRS data.

Many parents had difficulty completing these questions. For children who had experienced ongoing or repeated stressful events, it was difficult to compare the child's functioning before and after any one event. It was also common that stressful situations (such as living with an abusive parent) lasted over more than one developmental stage. For example, parents who lived with abusive partners from the time their child was two until the child was six would be comparing the behavior of toddler to a school-age child. It was difficult to say whether a school-age child had more difficulty concentrating compared to before the event, if

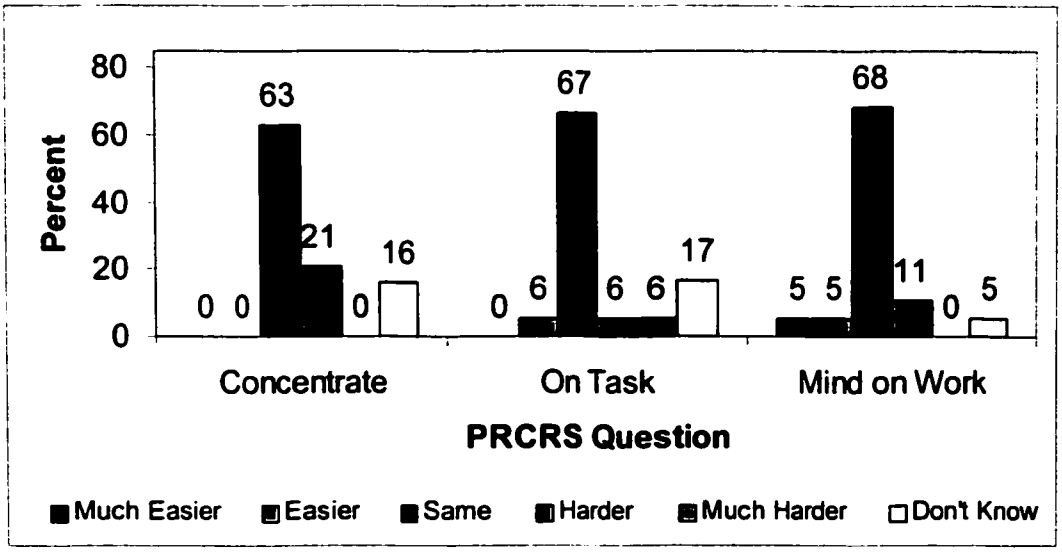
the child was a toddler before the stressful events began.

In addition, many parents described and reported on a relatively mild event (e.g. moving or having a pet run away) even if the child had experienced more serious events (as reported on the BTES-P). This might reflect the parents' reluctance to think about or describe the worst events, or could represent an attempt to pick one concrete event in the context of an ongoing stressful situation. For example, the parent of one abused child reported on the child's moving to a new school. This would seem to be a very mild event compared to the physical and sexual abuse she had experienced. The parent explained to the researcher, however, that the move had been from a therapeutic day school for emotionally disturbed children to a regular classroom in a rural school district. The new school was less prepared to deal with the child's suicidal and homicidal ideation. Disrupting the child's relationships with her previous teachers and therapists was very upsetting, and, given the child's previous history and emotional state, could be considered traumatic for this child.

With these caveats in mind, the results from three PRCRS questions pertaining to attention and hyperactivity are presented in Figure 4. The PRCRS questions were: "Compared to before the stressful event(s), how easy is it for your child to concentrate on things these days?"; "Compared to before the stressful event(s), how easy is it these days for your child to stick to one task until it is completed?", and "Compared to before the stressful event(s), how easy is it these days for your child to keep his or her mind on schoolwork?." Parents used the following scale to respond: (1) Much easier, (2) Easier, (3) About as Easy or Hard; (4) Harder; (5) Much Harder; (6) Don't Know. As shown in Figure 4, the majority of parents answers "About as Easy or Hard" for all three questions. This finding is consistent with the finding

that most parents perceived chronic stressful events to be related to ADHD symptoms rather than one particular stressful event.

Figure 4. Percent of Parents Reporting on Attention and Hyperactivity Problems as Compared to Before a Particular Stressful Event.



Parents also completed the BERS school functioning scale. This scale asks to what extent children are reading and doing math at grade level, studies for tests, completes homework, etc. There is some content overlap with ADHD symptoms (e.g. pays attention in class), but in general asks about overall school behavior. There were no mean differences in school functioning scores by trauma or abuse history. Instead, a continuous measure of abuse was created by adding up the number of incidents of abuse reported by the parents on the abuse questions (see Appendix B). Because the response scale allowed respondent to give a range of incidents (e.g. 2 - 5 times, 6 - 20 times), the minimum number of incidents in each range endorsed by the parents was used. For example, if a parent indicated the child had been

physically abused 6 – 20 times, six times were counted. For this scale, only parent-reported physical, sexual or emotional abuse or neglect were included (as is the case with the dichotomous abuse measure).

Because abused children had higher SNAP-IV inattention and combined inattention/hyperactivity/impulsivity scores, the continuous abuse measure was entered in a linear regression equation to predict SNAP-IV combined scores. Incidents of abuse predicted SNAP-IV scores ($R = 0.38$, $F(1, 26) = 4.26$, $p = 0.049$).

In order to answer the question of whether both abuse and ADHD symptoms predicted school functioning scores, a two-stage regression was used. The residuals from the regression testing the effect of abuse on SNAP-IV combined scores were entered as a predictor of school functioning, as was the continuous measure of abuse. In this way, the regression tested the effect of abuse and the effect of the portion of the variance in SNAP-IV combined scores not accounted for by abuse on school functioning.

The model was significant, accounting for approximately 41% of the variance in school functioning scores ($R = 0.65$, $F(2, 25) = 8.95$, $p = 0.001$). The residuals from the first regression (that is, the portion of variance in ADHD scores not predicted by abuse) significantly predicted school functioning ($B = -0.006$, $\beta = -0.453$, $p = 0.007$). Incidents of abuse also predicted school functioning ($B = 0.770$, $\beta = -0.461$, $p = 0.006$). Thus, abuse predicted children's school functioning independently of their ADHD symptoms.

Because some of the items on the school functioning scale overlapped with ADHD symptoms, a separate school functioning scale was formed by taking the mean of two items:

"reads at or above grade level" and "computes math problems at or above grade level." Unexpectedly, combined SNAP-IV inattention/hyperactivity/impulsivity scores were not correlated with children's combined math and reading ability as measured by this short scale. Instead, incidents of abuse was marginally correlated with math and reading ability ($r = -0.36, p = 0.06$).

In sum, most parents said they believed ongoing or stressful events were contributing to their children's difficulty with attention and/or hyperactivity. Very few believed that the problems first began following one particular stressful event. Perhaps because the PRCRS, like many measures of PTSD, does not address ongoing or repeated events well, parents did not report that their children had more difficulty with attention or hyperactivity following a stressful event chosen by the parent. Supporting parents' belief that stressful life events were contributing to ADHD symptoms, abuse was related to ADHD symptoms. Abuse and ADHD symptoms predicted school functioning separately.

Are Trauma Symptoms Related to ADHD Symptoms and School Functioning?

Descriptive statistics for trauma symptom and ADHD measures are presented in Table 19. Correlations between parent- and child-reported trauma symptoms were examined first. Five TSCCs were excluded due to high hyper-response or under-response validity scale scores. (Children completed this measure in front of a researcher, and while their parent watched via television from the next room. Some children appeared unwilling to report accurately on their symptoms under these conditions.) As shown in Table 20, correlations between parent and child measures were generally low and insignificant, with the exception of

Table 19. Descriptive Statistics for Parent- and Child-Reported Trauma and ADHD Symptoms

	M	*SD*
Parent Measures		
SNAP-IV		
Hyperactivity/Impulsivity	2.0	0.4
Inattention	2.6	0.5
Combined	2.1	0.3
TSCYC		
Avoidance	1.4	0.4
Intrusion	1.4	0.3
Arousal	2.0	0.3
PTSD	4.7	0.7
Dissociation	2.0	0.9
CDC	7.6	4.8
Child Measure (TSCC)		
PTSD	8.9	4.7
Overt Dissociation	4.5	2.9
Fantasy Dissociation	3.2	2.3
Total Dissociation	7.6	4.6

Table 20. Correlations between Parent- and Child-Reported Trauma Symptoms.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
Parent									
TSCYC									
1. Avoidance	--								
2. Intrusion	.46**	--							
3. Arousal	.30	.25	--						
4. Total PTSD	.81***	.77***	.66***	--					
5. Dissociation	.41*	.13	.53**	.47*	--				
6. CDC	.52**	.44	.44*	.62***	.41*	--			
Child (TSCC)									
7. PTSD	-.03	.11	.25	.13	.11	.03	--		
8. Overt Diss.	.07	.14	.53*	.31	.18	.21	.50	--	
9. Fantasy Diss.	-.23	.13	.22	.04	-.14	.41	.65**	.59**	--
10. Total Diss.	-.07	.16	.46*	.22	.05	.05	.64**	.92***	.86***

Note: Diss. = dissociation. *n* for TSCYC and CDC measures = 28. *n* for TSCC measure = 24.
* $p < 0.001$. ** $p < 0.01$. *** $p < 0.001$.

Table 21. Correlations between ADHD Symptoms and Trauma Reactions

	SNAP-IV		
	Hyperactivity/ Impulsivity	Inattention	Combined
PTSD			
TSCYC			
Avoidance	0.27	0.09	0.23
Intrusion	0.37	0.25	0.40*
Arousal	-0.02	0.60**	0.40*
Total PTSD	0.28	0.40*	0.45*
TSCC PTSD	-0.34	0.14	0.08
Dissociation			
TSCYC Dissociation	0.11	0.25	0.24
CDC	0.45*	0.56**	0.67***
TSCC			
Overt	0.05	0.34	0.29
Fantasy	-0.33	0.33	0.05
Total	-0.13	0.38	0.20

* $p < 0.005$. ** $p < 0.01$. *** $p < 0.001$.

parent-reported arousal and child-rated overt dissociation. As discussed in regard to the SNAP-IV PTSD and adjustment disorder scales, one reason for the lack of agreement between parents and children on the PTSD scales may be children's inconsistent definitions of events described as "bad" or "scary" on the TSCC.

Next, correlations between post-traumatic stress symptoms and ADHD symptoms were examined. As shown in Table 21, contrary to the hypothesis but consistent with the findings presented in Chapter 2 for preschool children, arousal was related to inattention and not hyperactivity/impulsivity. Contrary to the hypothesis, avoidance was not related to either aspect of ADHD. The total PTSD scale was related to inattention. Child reported PTSD and dissociation measures were not related to hyperactivity/impulsivity or inattention. Parent-reported dissociation on the CDC, but not the TSCYC, was related to

hyperactivity/impulsivity and inattention. Although child self-reported dissociation was not significantly correlated with inattention in this small sample, the correlations were moderate.

In order to clarify why CDC scores were related to inattention but not TSCYC scores, correlations between items on the CDC and TSCYC and the SNAP-IV inattention and hyperactivity scales were calculated. The items that were significantly correlated with the inattention scale from the CDC were:

- Child shows rapid changes in personality. He or she may go from being shy to being outgoing, from feminine to masculine, from timid to aggressive. ($r = 0.38, p < 0.05$).
- Child is unusually forgetful or confused about things he or she should know, e.g. may forget the names of friends, teachers, or other important people, loses possessions or gets lost easy ($r = 0.53, p < 0.01$).
- Child shows marked day-to-day or even hour-to-hour variations in his or her skills, knowledge, food preferences, athletic abilities, e.g. changes in handwriting, memory for previously learned information such as multiplication tables, spelling, use of tools or artistic ability. ($r = 0.58, p < 0.01$).
- Child has a difficult time learning from experience, e.g. explanations, normal punishment do not change his or her behavior. ($r = 0.41, p < 0.05$).

The items on the TSCYC that were correlated with the SNAP-IV inattention scale were:

- Seeming to be in a daze ($r = 0.51, p < 0.01$).
- Spacing out ($r = 0.45, p < 0.05$).
- Staring off into space ($r = 0.45, p < 0.05$).
- Seeming to be a million miles away ($r = 0.57, p < 0.01$).

These item-scale correlations suggested that the CDC was measuring some items that

were related to children's inattention that were not captured by the TSCYC scale. To further test this hypothesis, a two stage regression was used. Due to the relation between CDC and TSCYC dissociation scores, entering both as predictors in a regression would result in multicollinearity. Instead, TSCYC scores were first used to predict CDC dissociation scores, and the residuals were saved. TSCYC scores predicted CDC dissociation scores ($\beta = 0.17, p = 0.03$). Next, TSCYC dissociation scores and the CDC residual scores were entered in a regression to predict SNAP-IV inattention scores. The model was significant ($R = 0.56$, $F(2, 25) = 5.76, p = 0.009$). CDC residual scores predicted inattention scores ($B = 1.06, \beta = 0.50, p = 0.006$). TSCYC dissociation scores did not predict inattention scores ($B = 0.13, \beta = 0.25, p = 0.14$).

Next, relations between dissociation, ADHD, and school functioning were explored. Again, because dissociation and ADHD symptoms were positively correlated, a two stage regression procedure was used. CDC scores were used to predict SNAP-IV combined ADHD scores first. CDC scores significantly predicted SNAP-IV combined scores ($R = 0.67$, $F(1,26) = 20.83$. $p < 0.001$). Next, the residuals from the first regression (i.e. the portion of variance in SNAP-IV combined scores not accounted for by CDC scores) and CDC scores were used to predict BERS school functioning. The model was significant, accounting for about 39% of the variance in school functioning scores ($R = 0.62$, $F(2,25) = 7.95, p = 0.002$). SNAP-IV residuals predicted school functioning ($B = -0.68, \beta = -0.33, p = 0.048$) as did CDC scores ($B = -1.14, \beta = -0.53, p = 0.002$). Thus, both ADHD symptoms and dissociation predicted school functioning independently.

Again, because some BERS school functioning items overlapped with ADHD

symptoms, a similar regression was used to predict a scale comprised only of two questions regarding the children's ability to read and do math at grade level. The model was significant (R = 0.46, F (2,25) =3.41, p = 0.049). CDC scores predicted children's scores on the reading and math questions (B = -0.268, = -0.46, p = 0.016). The SNAP-IV residuals (i.e. the portion of SNAP-IV scores not accounted for by CDC variance) did not predict scores on the reading and math questions (B = 0.45, β = 0.08, p = 0.661).

To summarize, parent- and child-reported trauma symptoms showed very little concordance. Among parent-rated measures, post-traumatic arousal was correlated with inattention. Parent-rated dissociation as measured by the CDC was related to both hyperactivity/impulsivity and inattention. However, parent-rated TSCYC dissociation was not related to ADHD symptoms. Examining item-scale correlations suggests that certain items on the CDC that are not found on the TSCYC dissociation scale may be related to inattention in this sample. Parent-reported dissociation (as measured by the CDC) and combined SNAP-IV ADHD symptoms predicted children's school functioning independently. When entered in a regression together, only CDC dissociation scores, and not the portion of variance of ADHD symptoms not accounted for by CDC scores, predicted the children's ability to read and do math at grade level (as reported by parents).

CHAPTER IV

MAJOR FINDINGS AND CONCLUSIONS

Chapters 2 and 3 presented findings on relations between trauma and ADHD symptoms in preschool and school-age children. The studies were designed to explore the role that trauma plays in the etiology of ADHD, with the goal of identifying factors for further investigation in future studies of the etiology and treatment of ADHD in children. The main findings from the two studies and their implications for future research are discussed here.

Methodology: Innovations and Implications

Both studies used a new method of recruiting participants who had experienced a range of stressful life experiences, including abuse. Parents responded to fliers that read "children who have and have not experienced stressful life events are needed" in order to obtain a community sample that included non-referred children. In fact, parents need not have labeled their children's experiences as "abusive" in order to participate. The range of experiences reported by parents in both studies suggests that many parents perceive abusive situations as being stressful for their children. In Study 2, in which parents were provided with information about their children's symptoms, all parents of children informed of significant symptoms of a mental health issue spontaneously asked for copies of the results to take to a counselor (and for a referral to a counselor if they did not already have one). This included parents who were living with abusive partners and who were the perpetrators of abuse and

neglect. The response of parents to these fliers indicates the parents' awareness of a problem in the family, and a willingness to seek services for their children.

Studies of child abuse in non-referred child samples are rare. Most studies of adults involve retrospective reports of abuse whereas most studies of children involve children's services records (Becker, 2001). More studies of non-referred children are needed to compare research conducted on child and adult samples. Since non-referred children may differ in important ways from referred children, studying non-referred children is also important for the treatment of all abused children.

A second implication concerns public policy and clinical treatment of abusive families. Parents' willingness to disclose abuse and ask for help with treatment for their children in the context of these research studies indicates some concern for their children. Services for these parents may be effective if they are offered in a way that works toward the parents' shared goal of improving children's mental well-being.

Trauma Symptoms and ADHD Symptoms

Both studies indicated significant correlations between post-traumatic stress and dissociative symptoms and ADHD symptoms. Both post-traumatic and dissociative symptoms were related to ADHD symptoms in both preschool and school-age children. Some of the relation between trauma symptoms may be due to similar items, particularly related to inattention, that appear on both trauma symptom and ADHD measures. For school age children, abuse predicted school functioning over and above ADHD symptoms. These

findings suggest that teachers, parents and clinicians should be aware that trauma symptoms can mimic ADHD symptoms. Also, the finding that abuse is related to school functioning separately from ADHD symptoms suggests that treatment for abused children may need to include more than just treatment for symptoms of inattention, hyperactivity and impulsivity.

Trauma and Memory

Chapter 2 presented an interaction whereby trauma history was related to memory only for threat-related stimuli presented under divided attention. Under divided attention only, traumatized children had poorer memory for threat-related stimuli as compared to non-traumatized children in the same condition. Unlike previous results where dissociative adults had poorer memory for threat-related stimuli under divided attention, for preschoolers in this sample, trauma history and not dissociation scores predicted memory performance.

There are several possible reasons for this difference. First, adult and child dissociation measures differ considerably due to children's limited ability to understand and verbalize internal states and due to developmental changes in dissociation between preschool and adulthood. During preschool, many dissociative symptoms (e.g. having an imaginary friend who represents a part of the child's self, spending a lot of time in fantasy play, etc.) are difficult to distinguish from normative preschool behavior. Supporting the possibility of differences between preschool and adult dissociation, in this preschool sample, trauma and dissociation were unrelated. In adult studies, dissociation is consistently related to trauma history (Putnam, 1997, p. 63).

DePrince & Freyd (DePrince & Freyd, 1999) suggest that dissociative adults come to perform better under divided attention over time as they use divided attention to manage reminders of trauma in the environment. The ability to operate in this "cognitive environment" may have developed over the period of time that dissociative people were frequently confronted with reminders of abuse, as is often the case with family abuse when children live with and depend on the abuser for basic needs. In this case, children may use divided attention to keep reminders of abuse out of awareness enough so that they may maintain attachments to their caregivers (Freyd, 1996).

Several of the traumatized preschoolers in Study 1 were living in chronically abusive or stressful homes similar to those reported by most dissociative adults. It may be that preschoolers have not had enough experience using divided attention to cope with threat-related information for them to have developed a dissociative cognitive style. Under divided attention, the non-traumatized preschoolers appeared to increase their focus on the threat-related stimuli relative to the neutral stimuli. For a child who has experienced little or no trauma, under cognitive load, it makes sense to attend to threatening aspects of the environment so as to take action to avoid the danger. For preschool children, often the best way to be protected is to seek out a trustworthy adult who will protect them or explain the situation to them. For traumatized children, under cognitive load, it may not make sense to pay particular attention to threat-related information. If there are no adults who will protect them or explain the situation, it may be adaptive to ignore the threat. If these children were to try to react to the threatening information on their own they risk drawing attention to themselves (for example by yelling or crying or trying to intervene between angry adults) putting them in

harm's way. Traumatized preschooler may not yet have developed the same dissociative cognitive style observed in dissociative adults. Nonetheless, these results suggest that traumatized preschoolers are beginning to ignore threat-related information under similar conditions in which dissociative adults are able to ignore threat-related information.

In order to understand the memory results, more research is needed on the development of dissociation throughout childhood so that better measures of dissociation for young children may be developed. Research on cognitive mechanisms of dissociation throughout development are also needed. This research will not only be useful for understanding basic attention and memory processes, but for the treatment of traumatized children and adults. Such research will also be helpful in disentangling dissociative symptoms from attention-related symptoms that have other causes. Studies on the implications of trauma on education are also needed.

Until the results of further studies are available, teachers, clinicians and parents should be aware of possible traumatic triggers present in preschoolers' everyday life. Study 1 highlights two examples of this. First, the traumatized girl who became upset at the sight the lab room that was intended to be welcoming, but resembled child abuse interview rooms, is an example of how seemingly ordinary situations can be frightening to a traumatized child. Traumatized children may have similar reactions when taking tests or visiting with a school nurse or counselor in an unfamiliar room.

The memory task illustrates a second example. The stimuli were taken from popular books produced for preschool children. Taken out of context, as they were in the memory

task, likely makes the pictures more frightening. Nevertheless, the books illustrate the point that children's material contains images that traumatized children may process differently from non-traumatized children. Themes of being lost, lonely, or having made a parent mad or disappointed are not uncommon in books written for children. Even seemingly benign content can be upsetting (for example, a picture of a bed if a child was sexually abused in a similar bed or a picture of a person if the person reminds them of the abuser). When children avoid or remembering information, adults should be aware of the possibility that the material may be triggering memories of trauma. Trauma-related reactions may be difficult to differentiate from learning problems of different origins. Teachers, clinicians and parents may need to be especially careful to useful multiple ways of assessing academic performance and to help children cope with traumatic triggers in order to effectively teach children and work with learning differences.

Differences Between Trauma- and Non-Trauma-Related ADHD

Chapter 3 presented several findings related to similarities and differences between ADHD symptoms in traumatized and non-traumatized children. There was no attempt in Study 2 to screen children into the study on the basis on sex. Approximately equal numbers of boys and girls participated. Research on ADHD has included many more boys than girls, in part because it is difficult to recruit enough girls with ADHD symptoms, particularly hyperactive/impulsive symptoms (Arnold, 1996; Hinshaw et al., 1997). In clinical samples, boys diagnosed with ADHD outnumber girls nine to one. In epidemiological samples, boys outnumber girls four to one (Cantwell, 1996). The discrepancy between clinical and

epidemiological studies has been attributed to adults' tendency to miss ADHD symptoms in girls. It is interesting that Study 2, in which an attempt was made to include traumatized children, there was no difficulty in recruiting parents who believed their daughters had difficulty with ADHD. Further, previous studies have consistently shown sex differences on dimensional scales (such as the SNAP-IV) on subscales (inattention, impulsivity and hyperactivity) (Arnold, 1996). Contrary to this finding, there were no sex differences in this sample that included abused children on SNAP-IV subscales: most children had elevated scores on both inattention and hyperactivity/impulsivity subscales and there were no mean sex differences on either scale. Epidemiological studies that include traumatized children would provide additional information about this issue.

The lack of sex differences in this community sample of children who had experienced a range of traumatic events suggests that traumatized children may have significantly different symptom profiles than do the children who have been recruited for most studies of ADHD. One possibility is that parents of traumatized children perceive their children's behavior differently than do parents of non-traumatized children. Another possibility is that trauma-related ADHD tends to result in both inattention and hyperactivity/impulsivity symptoms in all children whereas non-trauma-related ADHD tends to result in different symptoms for boys and girls.

There were sex differences in one area: age of onset of ADHD symptoms for non-abused children. Parents reported similar ages of onset (around 3.5 years) for non-abused boys and girls, but very different ages of onset for abused boys and girls (about 10 months vs. 6 years). This was a retrospective, parent report measure of onset of symptoms, and thus may be

biased in a number of ways. For example, parents who are told by teachers that their children has ADHD symptoms may look back over their child's life and remember behavior that is consistent with ADHD. Some retrospective biases are likely to also operate prospectively. For example, if a mother believes ADHD has a strong genetic cause, and the mother believes the child's father has ADHD, then the mother may be more likely to see ADHD symptoms in her child throughout the child's life, not just when looking back on an earlier time period.

In this sample, abused children were more likely than non-abused children to have a relative (and marginally more likely to specifically have a parent) who has diagnosed or suspected ADHD. Having a parent with ADHD might lead parents and other adults to suspect ADHD at a young age. Yet, most of the parents of abused children indicated that they believed their children's difficulty with ADHD was due to chronic stress. They also reported a later age of onset for abused boys than for non-abused boys.

The difference in age of onset for ADHD symptoms between non-abused boys and non-abused girls is consistent with several research studies on sex differences in ADHD symptoms. These studies suggest that boys have more hyperactive/impulsive behavior that is recognized as a problem earlier than the inattention problems that only begin to become a problem for girls after they begin school (Cantwell, 1996). This pattern did not hold for the abused boys and girls in this sample, however. The similar ages of onset for the abused boys and girls is consistent with the evidence that both boys and girls had significant difficulty with both hyperactivity/impulsivity and inattention. A hypothesis consistent with the data is that trauma results in both inattention and hyperactive/impulsive symptoms for some children, and that these symptoms similarly affect boys and girls beginning, on average, in preschool.

A prospective, multi-informant study of abused and non-abused children would be able to help clarify whether this effect is specific to parent reports or a result of retrospective bias. This may be an important issue in the diagnosis and treatment of ADHD, particularly with regard to the age at which screening for attention problems and treatment should be targeted. Regardless of the cause, parents' beliefs about when their child's problems began may affect whether and when they seek treatment, and what kinds of treatment they prefer. For example, a parent who believes her child's problems with ADHD began in infancy may be more likely to believe it is a biological problem that is not a phase that the child will outgrow. Parents may choose to homeschool or use stimulant medication in order to deal with what they perceive as a long-term situation. On the other hand, parents who believe their child's problems started when their child began school may try to change teachers or wait and see if their child outgrows the problems.

Of the parents who indicated that they believed stress was related to their children's ADHD symptoms, the highest percentage of parents indicated that they believed it was ongoing stressful events, not the stress of a particular one-time event. Parents of abused children may have begun to see behavioral or emotional problems when their children were approximately three years old. At three, children are becoming more verbal, and some issues that may have been within the normal range for two-year-olds (e.g. difficulty paying attention to a story, hitting other children, etc.) are less acceptable to parents and teachers of three-year-olds. Parents who were aware of abuse might have attributed these problems to the abuse as these problems arose. A prospective, multi-informant study would help clarify this point as well.

In Study 2, abused children had higher SNAP-IV ADHD scores than did non-abused children. It is possible that abused children develop problems with attention and hyperactivity/impulsivity as a result of the abuse they experience. It is also possible that children with attention and hyperactivity/impulsivity problems are at increased risk to be abused. For example, a parent of a child who is difficult to control may be more likely to emotionally or physically abuse the child due to conflicts over discipline. However, abused children in this sample experienced a range of abuse that included domestic violence, sexual abuse and neglect. It is possible that parents of a child who has problems with attention and hyperactivity/impulsivity may have more arguments--over their child's behavior or due to the stress of parenting--and this could lead to children who have ADHD symptoms to be more likely to experience domestic violence. It is also possible that sexually abused and neglected children were at increased risk for abuse and neglect because of their attention and hyperactivity/impulsivity problems. There may be a circular relation whereby abused children develop ADHD symptoms which puts them at increased risk for further abuse. At this point, possible pathways between ADHD symptoms and abuse are speculative. An intergenerational study that disentangles trauma symptoms from ADHD symptoms would help clarify this point and provide suggestions for effective intervention.

Understanding these pathways has enormous implications for public policy and treatment. Currently, information for parents emphasizes genetic causes of ADHD. For example, a handout entitled "Parenting a Child with AD/HD" produced by a group called Children and Adults with Attention Deficit Hyperactivity Disorder (CHADD, 2002a) tell parents:

Parenting a child with attention-deficit/ hyperactivity disorder, or any disability, can be overwhelming at times. All parents sometimes feel anger, fear, grief, frustration and fatigue while struggling to help their child. However, parents needn't waste limited emotional energy on self-blame. AD/HD is a hereditary disorder, and is not caused by poor parenting or a chaotic environment.

CHADD is a large, well-known parents' advocacy and support group that is funded, in part, by pharmaceutical companies (CHADD, 2002b).

This dissertation replicated previous studies in finding that ADHD symptoms are related to abuse. The Study 2 findings suggest that parents of children with ADHD *should* be concerned about their "anger, fear, grief, frustration and fatigue". To the extent that these emotions lead to perpetration of child abuse or to not protecting children from an abuser, parents should be concerned that their child is vulnerable to abuse. For abused children who have ADHD symptoms, it is very likely the case that some or all of their ADHD symptoms are due to abuse. Alternatively, or in addition, it is likely the case that children's ADHD symptoms put them at risk to experience abuse. Either way, it is irresponsible to make a blanket statement telling parents to not attend to their own feelings or that their behavior will not affect their children's ADHD symptoms.

Limitations and Conclusions

There are some limitations of Studies 1 and 2. Neither study employed a representative sample of families. Parents self-selected into the study based on their interpretation of the

"stressful life events" their children had experienced and, in the case of Study 2, their interpretation of their children's difficulty with attention and/or hyperactivity/impulsivity. Both samples would have benefited from including more families. Both studies relied heavily on parent-report measures. An attempt was made to obtain teacher-reported measures for the Study 2, but not enough teacher surveys were returned to be analyzed. Parent-report abuse measures are limited in that parents may not disclose or be aware of all abuse that their child has experienced.

Despite these limitations, Studies 1 and 2 revealed new evidence of the role of trauma in ADHD symptoms. Results from both studies support the need for additional studies of the role of abuse in the etiology and treatment of ADHD. In particular, studies designed to understand the causal role of abuse in ADHD symptoms and vice versa are needed. Given the differences in age of onset, parents' perceptions of the role of stressful life events in ADHD, and lack of sex differences found in previous studies that have not recruited abused children, studies into the construct and etiology of ADHD are needed. The effect of parents' perceptions of environmental causes of ADHD, their understanding of non-medicinal treatments and parents desire to seek treatment should also be addressed.

Until additional studies are completed, there are several tentative implications of this study for parents, pediatricians, teachers and clinicians. Adults should be aware that trauma-related symptoms, even in children who are not diagnosed with a disorder, may contribute to ADHD symptoms. Professionals should consider the possibility that children are experiencing abuse (including witnessing domestic violence and other forms of emotional abuse that may have fewer physical indications) that is contributing to ADHD symptoms. Professionals

should not assume that parents of abused children are totally unconcerned about their children's well-being. Offering interventions designed to work with parents to improve children's well-being and to help parents navigate the children's services system is likely to be a better approach than trying to treat a child without addressing abuse or by reporting abuse without follow-up. Parents and teachers should be alert for triggers of trauma, and adjust teaching and testing so that children's trauma symptoms are not mistaken for a learning disorder or behavioral problem. Public policy downplaying the role of the environment in ADHD symptoms should be reconsidered in light of studies of ADHD in abused children. These studies at least suggest that some parents of ADHD children need help addressing issues of abuse.

To conclude, these studies revealed a significant number of unreferred families in the community who are concerned about their children's inattention, hyperactivity and other mental health issues. Following up on ways that trauma is related to children's mental health issues will help provide these children with better mental health treatment, parenting and education.

APPENDIX A

BRIEF TRAUMATIC EVENTS SURVEY-PARENT VERSION

(Freyd Goldberg Brief Traumatic Events Survey- Parent Version)

For each of the following events, please circle your response to indicate your best estimate of how many times the event has happened to your child. For these questionnaires, please consider "your child" to be the child who is participating in the study today.

1. Been in a major earthquake, fire, flood, hurricane, or tornado that resulted in significant loss of personal property, serious injury to your child or someone your child was close to, the death of someone your child was close to, or the fear of your child's own death.

   never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

2. Been in a major automobile, boat, motorcycle, plane, train, or industrial accident that resulted in similar consequences.

   never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

3. Witnessed someone with whom <u>your child was very close</u> (such as a parent, brother or sister, caretaker, or intimate partner) committing suicide, being killed, or being injured by another person so severely as to result in marks, bruises, burns, blood, or broken bones.

   never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

4. Witnessed someone with whom your child was <u>not</u> so close undergoing a similar kind of traumatic event.

   never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

5. Witnessed someone <u>with whom your child was very close</u> deliberately attack another family member so severely as to result in marks, bruises, blood, broken bones, or broken teeth.

   never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

6. Your child was deliberately attacked that severely by someone with whom your child was very close.

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

7. Your child was deliberately attacked that severely by someone with whom your child was not close.

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

8. Your child was made to have some form of sexual contact, such as touching or penetration, by someone with whom your child was very close (such as a parent, caregiver or relative).

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

9. Your child was made to have such sexual contact by someone with whom your child was not close

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

10. Your child was emotionally or psychologically mistreated over a significant period of time by someone with whom your child was very close (such as a parent or caregiver).

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

11. Experienced the death of a sibling or parent.

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

12. Experienced a seriously traumatic event not already covered in any of these questions.

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

---

APPENDIX B

FOLLOW-UP ABUSE QUESTIONS

Please circle the best answer for the following questions.

To your knowledge, has your child ever experienced

13. physical abuse by someone with whom your child was very close (such as a parent or caregiver)?

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

14. sexual abuse by someone with whom your child was very close (such as a parent or caregiver)?

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

15. sexual abuse by someone with whom your child was not close?

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

16. emotional abuse by someone with whom your child was very close (such as parent or teacher)?

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

17. physical neglect (lack of supervision or unsafe living conditions) by someone with whom your child was very close (such as parent or regular babysitter)?

never 1 time 2-5 times 6-20 times 21-100 times more than 100 times

To your knowledge, has Services to Children and Families, the police, or some similar authority ever been contacted regarding

18. physical abuse of your child?

never 1 time 2 times 3-5 times 6-10 times more than 10 times

19. sexual abuse of your child?

never 1 time 2 times 3-5 times 6-10 times more than 10 times

20. emotional abuse of your child?

never 1 time 2 times 3-5 times 6-10 times more than 10 times

21. physical neglect (lack of supervision or unsafe living conditions)?

never 1 time 2 times 3-5 times 6-10 times more than 10 times

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