

COMORBIDITY OF ATTENTION-DEFICIT/HYPERACTIVITY
DISORDER AND POSTTRAUMATIC STRESS
DISORDER AMONG LOW INCOME URBAN YOUTH

A Thesis

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Abstract

Chronic exposure to violence is becoming increasingly common for urban children, placing them at an increased risk of developing psychopathology. For children exposed to chronic violence, two common diagnoses are Attention-Deficit/Hyperactivity Disorder (ADHD) and Posttraumatic Stress Disorder (PTSD). However, symptom overlap between these disorders has made differential diagnosis difficult. Most studies looking at the comorbidity between ADHD and PTSD have focused only on maltreated children. This study is the first to look at comorbid rates of ADHD and PTSD for children exposed to chronic violence, not limited to maltreatment. Specifically, this study evaluated rates of PTSD symptoms in children with and without ADHD. Contrary to the hypothesis, children diagnosed with ADHD were not significantly more likely to meet criteria for PTSD nor did they exhibit more symptoms of PTSD than children without ADHD.

Introduction

The incidence of psychopathology among children has increased substantially during the past decade. For example, Costello and Mustillo (2003) conducted a longitudinal study of children from the age of nine until they turned sixteen and found that during the course of the study, 36.7% of the children developed at least one psychiatric disorder.

The most commonly diagnosed disorder in children is Attention-Deficit/Hyperactivity Disorder (Barkley, 1990). Studies investigating the prevalence of ADHD from 1990 until 2000, have found that 8.1% to 17.8% of American children suffer from this disorder (Buitelaar, 2002). ADHD is diagnosed more often in males than females and in children from lower socioeconomic status (SES) families than higher income families (Biederman, Faraone, & Monuteaux, 2002; Biederman, Milberger, Faraone, & Kiely, 1995; Gingerich, Turnock, & Litfin, 1998 ;).

In a study done by Stevens (1981), parents, teachers, and school psychologists were more likely to report children from low SES families and ethnic minority children as clinically significant for hyperactivity and attentional problems compared to their higher income and Caucasian peers. Barkley (1990) postulates that “Social Drift” can explain the high prevalence of ADHD among low SES children. According to the theory of “Social Drift,” children with ADHD do not benefit from their educational experience as much as their non-ADHD peers and subsequently do not succeed in the workforce as well. Their children, therefore, grow up in the lower SES bracket. Although Barkley’s theory relies on genetics to explain the discrepancy among diagnosis across SES brackets, an adoption study found a significant correlation between adopted families SES and the adoptee’s subsequent diagnosis of ADHD (Cadoret & Stewart, 1991). Discrepancy between ADHD diagnosis across SES has been found both within the United States and internationally (Gingerich, Turnock, Litfin, & Rosen, 1998).

Controversy has developed around the diagnosis of ADHD due to the fact that it is highly comorbid with a variety of other psychological disorders (Biederman, Newcorn, & Sprich, 1991; Connor, Edwards, Fletcher, Baird, & Barkley, 2003). Children and adolescents with comorbid disorders often present with more severe symptoms of ADHD and have a higher risk of problems into adulthood. Biederman et al. (1991) conducted a review of studies and found that in both epidemiological and clinical samples of children and adolescents with an ADHD diagnosis, the most common comorbid disorder was conduct disorder. Specifically, for children diagnosed with ADHD, 35-50% also met diagnostic criteria for Conduct Disorder (CD), 35% were diagnosed with Oppositional Defiant Disorder (ODD), 15-75% with mood disorders, and 25% with anxiety disorders. Therefore, differential diagnosis of ADHD is complicated by this high rate of comorbidity.

For children who have witnessed or who have been a victim of a traumatic event, recent research has found significant rates of comorbidity between ADHD and Post Traumatic Stress Disorder (PTSD) (Cuffe, McCullough, & Pumariega, 1994; Famularo, Kinscherff, & Fenton, 1996; Weinstein, Staffelbach, & Biaggio, 2000; Glod & Teicher, 1996; McLeer, Callaghan, Henry, & Orvaschel, 1994). Comorbid ADHD and PTSD diagnoses have been found in maltreated children both with a primary diagnosis of PTSD as well as children with a primary diagnosis of ADHD (McLeer, Deblinger, Henry, & Orvaschel, 1992; McLeer, Callaghan, Henry, & Wallen, 1994; Merry & Andrews, 1994). Children from urban, low SES families are at a higher risk of witnessing or being a victim of one type of traumatic event, that of violence (Buka, Stichick, Birdthistle, & Earls, 2001; Fitzpatrick & Boldizar, 1993).

The purpose of this study, therefore, is to look at the rates of ADHD and PTSD symptomatology among children from a low SES, urban environment. Specifically, it will

compare rates of PTSD symptomatology in clinically referred ADHD children and non-ADHD children. The following review delineates the diagnostic criteria for both PTSD and ADHD. Following is discussed both the developmental expression of PTSD in children as well as its childhood prevalence. Risk factors of PTSD, especially those experienced by urban youth from low SES families are examined. The ADHD and PTSD literature is then tied together to discuss the comorbidity between PTSD and ADHD diagnoses for children who have experienced trauma, namely violence; how these disorders can have similar profiles; and the importance of distinguishing between these disorders in order to increase treatment efficacy.

Attention-Deficit/Hyperactivity Disorder Literature

According to the DSM-IV-TR, an ADHD diagnosis is warranted when the person meets either six or more symptoms of inattention and/or six or more symptoms of hyperactivity/impulsivity (American Psychiatric Association (APA), 2000). Symptoms of inattention include difficulty sustaining attention, not following through on instructions, forgetful, easily distracted, and difficulty with organization. Symptoms of hyperactivity/impulsivity include fidgeting, talking excessively, difficulty engaging in leisure activities quietly, blurting out answers, and difficulty waiting turn. Furthermore, these symptoms must be present before age seven and create impairment in at least two different settings.

Diagnosis of ADHD is subtyped into ADHD with predominantly hyperactive/impulsive features, ADHD with predominantly inattentive feature, and ADHD combined type. Buitelaar (2002) stated that, although most children who are clinically referred for ADHD meet the criteria for combined type, epidemiological studies have found that ADHD inattentive type is actually most common.

Posttraumatic Stress Disorder Literature

The term Post Traumatic Stress Disorder (PTSD) was coined in 1980 and first entered the DSM classification system with the advent of the DSM-III as an anxiety disorder (Tomb, 1994). The creation of this diagnostic category helped define the relationship between experiencing trauma and the development of subsequent psychological problems. It is a unique disorder in that it is partly defined by an etiological event, namely the trauma. Since the introduction of PTSD into the psychological lexicon, there has been a definitional shift from a focus on the severity of the event a person experiences towards a focus on the patient's reaction to the event. Currently, according to the DSM-IV-TR classification system, a person must experience actual or threatened harm and react with feelings of "fear, helplessness, or horror" to even be considered as having PTSD (American Association of Child and Adolescent Psychiatry (AACAP), 1998; APA, 2000; Tomb, 1994).

To meet diagnostic criteria for PTSD a person must have symptoms from each of three symptom clusters: Generalized psychological numbing or avoidance, physiological arousal, and symptoms consistent with the persistent reexperiencing of the traumatic event. According to the DSM-IV-TR, the person must experience three or more symptoms from the numbing/avoidance cluster that were not present before the trauma. Symptoms from this cluster include efforts to avoid thoughts of, or talk about the event; inability to recall important aspects of the trauma; feelings of detachment; restricted affect; and a sense of a foreshortened future.

With regard to the second symptom cluster, physiological arousal, two or more symptoms must be present. These symptoms include irritability, difficulty concentrating, hypervigilance, and sleep difficulties. One symptom from the third symptom cluster, persistent reexperiencing of the traumatic event, must be present. Symptoms in this cluster include recurrent dreams of the

event, psychological or physiological distress at cues that symbolize the event, and feeling that the traumatic event is reoccurring. All identified symptoms must be present for a month or longer and must cause significant distress or impairment in social, occupational, or other important areas of functioning.

There are three subtypes of PTSD: acute, chronic, and delayed onset. The “acute” subtype occurs when the duration of the symptoms last less than three months. The “chronic” subtype occurs when the symptoms last three months or longer. Delayed-onset PTSD occurs when the onset of symptoms begin at least six months after the traumatic event. Acute Stress Disorder was included in the DSM-IV to encompass those who have PTSD symptoms that appear within one month of the traumatic event but last less than one month. However, once symptom duration exceeds one month, the diagnosis should be changed from Acute Stress Disorder to PTSD (APA, 2000).

Developmental Expression of PTSD

Regardless of developmental stage, Terr (1991) proposes four distinct characteristics that will be present in all children diagnosed with PTSD. These are repeatedly perceived memories of the trauma; repetitive behavior; trauma-specific fears; and changes in attitudes about people, life, and the future. Repeated memories of the trauma can occur at any age, despite the fact that explicit, verbal memory does not develop until age five (Scheeringa, Zeanah, Drell, & Larrieu, 1995; Terr et al., 1987). This is because behavioral memory occurs due to visual rather than verbal memory. Other ways in which the trauma can be perceived include tactile, positional, or smell memories. Memories are most likely to occur when children are relaxing, such as right before bed time, while watching TV, or during class. Repetitive behavior, however, may occur so frequently that it becomes an ingrained part of the person’s personality. The fourth

characteristic Terr discusses, that of a sense of foreshortened future, was observed first in children exposed to trauma before it was ever considered a symptom of adulthood PTSD.

Research has shown, however, that developmental differences exist in the expression of PTSD. For example, Arroyo and Eth (1995) found that infants between the ages of 28 and 36 months were likely to show separation anxiety, exaggerated startle responses, nightmares, and developmental regression when exposed to trauma. Young children between the ages of three and five years, however, often present with avoidant symptoms. Specifically, they appear more withdrawn and with poor social skills. School-aged children often regressed developmentally, specifically by engaging in repetitive play, exhibiting hypervigilance and decreased concentration, more fears, and a sense of foreshortened future.

Modifications of PTSD criteria based on a child's development are included in the DSM criteria. There are four specific areas in which the DSM-IV-TR differentiates PTSD expression between adults and children. First, the feelings of helplessness, fear, or horror are often witnessed in children as disorganized or agitated behavior. The other three child-specific criteria can be found in the reexperiencing cluster of symptoms. First, recurrent distressing thoughts of the trauma may be exhibited in children as repetitive play where themes or aspects of the trauma are expressed. Second, the presence of nightmares specific to the trauma may be expressed as nightmares without recognizable content in children. Finally, the criteria of feeling or acting as if the trauma was recurring, in young children might be expressed as trauma-specific reenactment.

Kerig and colleagues (2000) argue that, although some developmental modifications are made in the DSM-IV-TR, these are not broad enough. For example, they highlight that recurrent thoughts exhibited through repetitive play pertains only to young children. However, these

thoughts are often present as rescue fantasies in school-aged children and adolescents. Another example, Kerig and colleagues use is that distress caused by exposure to cues of the trauma, has no developmental consideration within the DSM-IV-TR. However, school-aged children and adolescents have been shown to have both trauma specific and mundane fears when presented with such a cue, while young children will often exhibit separation anxiety, stranger anxiety, and regressive fears. For symptoms within the avoidance and numbing cluster, adults will often actively avoid thoughts or feelings that are associated with the trauma. Children, however, will often “space out,” thus appearing inattentive. This difference, however, is not specified in the DSM-IV-TR. Research has not indicated developmental differences for symptoms within the arousal cluster (Kerig, Fedorowicz, Brown, & Warren, 2000).

Prevalence of PTSD

Research of PTSD among children has begun to focus on PTSD development among both maltreated and/or low-income urban youth. Giaconia and colleagues (1995) found that of adolescents who were studied longitudinally from age five to eighteen, from a predominantly white, working class environment, 6.3% met PTSD diagnostic criteria. However, for those who were exposed to a specific trauma, 14.5% developed PTSD. Prevalence increases when looking at low income, inner-city youth where prevalence has been found to be around 27-29% (Fitzpatrick & Boldizar, 1993; Wright & Stabb, 1996). PTSD is also believed to be a common consequence of maltreatment with estimates ranging from 18 to 62 percent for physically and/or sexually abused children (Merry & Andrews, 1994; McLeer, Dixon, Henry, Ruggiero, Escovitz, Niedda, & Scholle, 1998).

Diagnosing PTSD in Children

Rates of PTSD in children are considered underestimated because the “diagnostic bar” is set too high. Studies looking at the prevalence of PTSD within communities, among victims of domestic violence, witnesses and targets of violence, and victims of sexual abuse have indicated that many of these children only meet partial diagnostic criteria for PTSD (Davidson, Hughes, Blazer, & George, 1991; McCloskey & Walker, 2000; Berman, Kurtiness, Silverman, & Serafini, 1996; McLeer, Callaghan, Henry, & Wallen, 1992). For example, Berman, Kurtiness, Silverman, and Serafini (1996) found among high school students living in urban environments, high rates of PTSD symptomatology for those exposed to traumatic events, with an average of ten symptoms. However, while 34.5% of those exposed to traumatic events met PTSD criteria, 48.8% were symptomatic but did not meet full criteria.

In considering subthreshold PTSD, McLeer, Deblinger, Henry, and Orvaschel (1992) and Silva and colleagues (2000) found that those exposed to traumatic events who did not meet the diagnostic criteria for PTSD were most likely to develop symptoms classified as cluster B, or the reexperiencing symptom cluster. However, symptoms least likely to be experienced by children exposed to trauma but who do not meet the diagnostic criteria for PTSD is inconsistent with McLeer, Deblinger, Henry and Orvaschel (1992) finding sexually abused children least likely to meet full criteria for symptoms within cluster C, or avoidant behaviors, while Silva and colleagues (2000) found inner-city children least likely to meet full criteria for symptoms in cluster D, or persistent arousal. Overall Tomb (1994) argues that:

The cutoff point for PTSD remains troublesome, particularly because PTSD-like symptoms are prevalent in the community at large and subthreshold PTSD is common (p.24).

Although full diagnostic criteria are not being met among these children, the level of symptomatology remains high. Therefore, Lubit, Rovine, Defrancisci, and Eth (2003) and Pfefferbaum (1997) suggest that it is important to consider the level of impairment both at school and at home that is a result of exposure to trauma rather than whether the child meets PTSD criteria.

Among children and adolescents, the amount of exposure to a traumatic event as well as the subsequent development of PTSD symptomatology varies depending on whether the reporter is the child or the parent (Buka, Stichick, Birdthistle, & Earls, 2000; Groves, 1997; Handford, Mayes, Mattison, Humphrey, Bognato, Bixler, & Kales, 1984). For example, in a NIMH Community Violence Project in 1993, Richters and Martinez found that 61% of young children reported having witnessed or been a victim of violence while only 19% of their parents reported that their children had been exposed to violence. Similarly, 72% of older children reported such violence exposure while only 32% of their parents reported that their children had been exposed.

While Wolfe, Gentile, and Wolfe (1989) found that mothers perceive their children as having more psychological problems than was reported by their children, most research has shown that adults often appear to underestimate trauma symptoms in their children (Handford et al., 1984). For example, Famularo, Kinscherff, and Fenton (1992) found that 39% of maltreated children met criteria for PTSD according to their responses; only 21% of the same children met criteria according to the parents' responses. Specifically, parents are more likely to report externalizing behavior problems with their children than internalizing problems (Lubit, Rovine, Defrancisci, & Eth, 2003; Newman, 2002). Parents are considered the best reporters of behavioral re-enactments, angry behavior, hypervigilance, sleep difficulties, or startle responses

in their children (Newman, 2002). Children are often poor reporters of this information due to denial, avoidance, minimization, amnesia, or communication difficulties.

Risk Factors Associated with PTSD Development

Traumatic events that may lead to the development of PTSD in children include physical and/or sexual abuse, domestic violence, being robbed, being in a fire, witnessing a serious accident or death of parent or sibling, being present when family home is robbed, and natural disasters (Emery & Laumann-Billings, 1998; Silva et al., 2000). Additionally, although not traditionally considered qualifying PTSD traumatic events, Giaconia and colleagues (1995) found that adolescent respondents developed high rates of PTSD when a parent is sent to jail or when a parent reveals a past suicide attempt. Specifically, these adolescents were eight times more likely to show symptoms of avoidance or numbing and seven times more likely to meet full PTSD criteria.

Research has shown that PTSD symptomatology is more severe and longer lasting when the traumatic event is by human design rather than natural disaster (Malmquist, 1986). Norris (1992) found that 7-11% of those with PTSD were exposed to violent crimes while only 5-8% of those with PTSD were exposed to environmental hazards. Similar results were found by McCloskey and Walker (2000) who found that 83% of those diagnosed with PTSD came from violent homes.

PTSD has been diagnosed both in victimized children as well as children who witnessed violence. For example, McCloskey and Walker (2000) found that 38% of school aged victims of trauma developed PTSD while 21% who witnessed trauma did so. Berman et al. (1995), however, found no significant difference in PTSD development between witnesses and victims of childhood violence.

Violence Exposure

Children's exposure to violence is becoming increasingly more common. For example, homicide is the third leading cause of death among elementary and middle school students (Children's Defense Fund Report, 1995). Fitzpatrick and Boldizar (1993) found that among low-income inner-city African American youth ages 7 to 18, 70% were victims of at least one violent act and 85% had witnessed at least one violent act. Overstreet, Dempsey, Graham, and Moely (1999) studied violence exposure among low-income children between the ages of 10 and 15 and found that 92% had heard guns fired in their neighborhood, 83% knew someone killed by violence, 55% had witnessed a shooting, 43% had seen a dead body in their neighborhood, 37% had been victims of physical violence, and 10% had been threatened with murder. Furthermore, exposure to violent events was chronic with over 50% of children having witnessed three or more arrests and/or assaults, over 50% having known three or more people shot or murdered, and 30% who knew three or more people who had been robbed or stabbed. Schwab-Stone and colleagues (1999) found that on average, 6th, 8th, and 10th graders in an urban school system reported witnessing three different types of violence. Such prominent exposure to violence is concerning with studies showing that 50% of children exposed to trauma before age 10 develop psychological problems in their lifetime.

For children from economically disadvantaged families, chronic exposure to violence is prevalent (Buka, Stichick, Birdthistle, & Earls, 2001; Gladstein, Slater, & Heald, 1992; Fitzpatrick & Boldizar, 1993; Berton and Stabb, 1996; Breslau et al., 1994; Moses, 1999; Schwab-Stone et al., 1995). For example, Gladstein, Slater, and Heald (1992) compared violence exposure between inner city and upper-middle class youths. Results indicated that inner-city youth were more likely to know a victim of a violent act or a murder victim than were

the upper-middle class youth (45% and 67% respectively for the inner-city children and 25% and 14% for the upper-middle class youths respectively). Additionally, only 12% of the inner-city children denied being victims of violence, knowing victims of violence, or witnessing violence while 25% of the upper-middle class youths denied these things. It is important to note that on average, the inner-city children were six years younger than the comparison group: Meaning that they had experienced more violence in less time than the comparison.

The impact of chronic violence exposure on the psychological functioning of exposed children is evident in the literature (Berton & Stabb, 1996; Margolin & Gordis, 2000; Singer, Anglin, Song, & Lunghofer, 1995). For example, Berton and Stabb (1996) looked at violence exposure and subsequent development of PTSD symptomatology among heterogeneous SES urban high school students and found that 29% met diagnostic criteria for PTSD, which is much higher than studies of PTSD prevalence among the general population (Davidson, Hughes, Blazer, & George, 1991; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Furthermore, the variable most predictive of PTSD development was self reported domestic or community violence. Another study of urban high school students from low-income families found an even greater prevalence of PTSD. Specifically, 34.5% met full diagnostic criteria and 48.8% were symptomatic but did not meet full criteria. Although 16.7% of the sample were completely asymptomatic, none who had been exposed to trauma were completely asymptomatic.

Differential Diagnosis of PTSD and ADHD

Children from a low socioeconomic status family are at a greater risk of developing psychopathology (Biederman, Milberger, Faraone, & Kiely, 1995; Biederman, Faraone, & Monuteaux, 2002; Gingerich, Turnock, & Litfin, 1998; Linares, Heeren, Brontiman, Zuckerman, Augustyn, & Tronier, 2001). Among the violence exposed, inner-city youths of modern society,

two prominent disorders are ADHD and PTSD. As studies such as McLeer, Deblinger, and Orvaschel (1992) and McLeer, Callaghan, Henry, and Wallen (1994) have shown, there is a high rate of comorbidity between these disorders for children exposed to violence. This has been especially studied among maltreated children. For example, McLeer and colleagues (1994) matched two clinical populations of children, one group who had been sexually abused and one group who had not, on demographic statistics including family income. Among the sexually abused group of children, 23.1% met criteria for both ADHD and PTSD, with a diagnosis of ADHD as the most common (46%) and PTSD as the second most common (42.3%).

Conversely, a study performed by McLeer and colleagues (1992) looked at the psychopathology of ninety-two sexually abused children and found that 54% who received a primary diagnosis of PTSD also met the diagnostic criteria for ADHD. Similar results were found in studies conducted by Famularo, Kinscherff, and Fenton (1992) and Merry and Andrews (1994), which found that maltreated children with a primary diagnosis of PTSD were likely to meet the qualification for a host of other psychological disorders including ADHD. Merry and Andrews (1994), for example, found that within a sample of sexually abused children, 18.2% met the diagnostic criteria for PTSD. Rates of ADHD, however, among this sample were more than double that found within the community.

A study conducted by Glod and Teicher (1995), which measured the circadian rhythm of abused children, determined that children with a PTSD diagnosis exhibited rhythms comparable to levels identified with ADHD. Specifically, children with ADHD, and in this study those with PTSD, were found to have continuously high activity patterns during the day with continuously low patterns during the night. Furthermore, Glod and Teicher (1995) found that the activity levels of abused children diagnosed with ADHD were equal to the levels of abused children with

PTSD, even if these children did not meet the DSM diagnostic criteria for ADHD.

Unfortunately, the comorbidity between PTSD and ADHD has not been looked at closely outside of maltreated populations.

Differential diagnosis of PTSD and ADHD, however, can be difficult due to symptom overlap. Weinstein, Staffelbach, and Biaggio (2000) suggest that the overlap of symptoms might be due to three different causes. First, many symptoms of PTSD resemble those of ADHD. Second, symptoms of PTSD and ADHD may actually co-occur. Finally, there may be specific symptoms that are common to both disorders. What the actual relationship is between PTSD and ADHD, however, has not been determined and remains a source of arguments within the literature.

How the symptoms are related to each other is also difficult to determine. Symptoms of PTSD that resemble those of ADHD occur mainly within the persistent arousal cluster. Specifically, these are sleeplessness, irritability or anger, difficulty concentrating, hypervigilance, and exaggerated startle response (Kiser, Heston, Millsap, & Pruitt, 1991; Weinstein, Staffelbach, & Biaggio, 2000). These symptoms can be a result of the “flight or fight” mentality that may develop after experiencing a traumatic event. Specifically, those who are traumatized may become hypersensitive to their surroundings and have difficulty filtering out trivial stimuli, much as the ADHD child who is “often distracted by extraneous stimuli” (APA, 1994). This thought is echoed by Perry (1997) who suggests that the traumatized child diagnosed with ADHD does not truly have an internal deficit in their ability to attend to a task, but rather that they are hypervigilant to their surroundings.

Symptom overlap, however, of PTSD and ADHD is based not only on the persistent arousal cluster. For example, Ford and colleagues (2000) found that ADHD children exposed to

a traumatic event also had high scores on the intrusive reexperiencing cluster. Generally, Weinstein, Staffebach, and Biaggio (2000) suggest that both the inattention and hyperactivity of ADHD is associated with symptoms from each of the three PTSD symptom clusters. For example, inattention associated with ADHD is similar to PTSD symptoms such as 1) acting as if the traumatic event were recurring, 2) psychological distress at exposure to cues associated with the trauma and 3) problems concentrating. For the ADHD category of inattention, this is three examples of one symptom from each PTSD that is manifested. This pattern can also be seen for the ADHD category of Hyperactivity/impulsivity.

Biologically, Glod and Teicher (1995) found that manifestation of PTSD and ADHD on the circadian rhythm of abused children is very similar. Specifically, they determined that abused children diagnosed with PTSD exhibited circadian activity levels comparable to those seen from children diagnosed with ADHD.

It is important that an accurate diagnosis between ADHD and PTSD is made, because treatments of these two disorders are vastly different (Kerig, Fedorowicz, Brown, & Warren, 2000; Pfefferbaum, 1997; Weinstein, Staffebach, & Biaggio, 2000). Treatment of ADHD often consists of teaching skills of behavioral management, social skills training, and the use of stimulant medication (Weinstein, Staffebach, & Biaggio, 2000). PTSD treatment, however, attempts to alleviate emotional distress and help the person regain a sense of security through such techniques as therapeutic re-exposure to the traumatic event, systematic desensitization, play therapy, and clearing up cognitive distortions (Kerig, Fedorowicz, Brown, & Warren, 2000; Pfefferbaum, 1997). If no attention is paid to the PTSD symptoms, they are only likely to continue or increase. Therefore, McLeer, Callaghan, Henry, and Waller (1994) suggest that if the symptoms of ADHD are actually a result of traumatic abuse, and not true ADHD, it is often

better to treat the PTSD symptoms than to use psychostimulants to treat the ADHD symptoms. It is recommended that those who are considered “at risk” for exposure to a traumatic event, be routinely screened for exposure during routine health visits (Singer et al., 1995). This is especially important for those presenting with behavior problems (Weinstein et al., 2000).

Summary and Rationale for Current Study

Children from lower income families are likely to develop more psychopathology than children from families in a higher SES bracket (Gingerich, Turnock, & Litfin, 1998; Linares et al., 2001; Biederman, Milberger, Faraone, & Kiely, 1995; Biederman, Faraone, & Monuteaux, 2002). The lower a family’s SES, the larger the number of stressful events a family experiences. One type of stress experienced by inner city, low-income children is that of violence.

Although parents often underestimate the extent to which their children experience daily violence, studies such as those conducted by Fitzpatrick and Boldizar (1993) and Overstreet and colleagues (2000) exemplify the reality of the scope of violence exposure. Furthermore, chronic violence exposure increases the risk of developing psychological problems (McGruder-Johnson, Davidson, Gleaves, Stock, & Finch, 2000). Studies of PTSD development among inner city, violence exposed youth indicate a substantially higher percentage than that found among children from the general population (Davidson, Hughes, Blazer, & George, 1991; Wright & Stabb, 1996).

The development of the diagnosis of PTSD was an attempt to help define the relationship between trauma and subsequent psychological problems, including generalized psychological numbing or avoidance, physiological arousal, and symptoms consistent with the persistent reexperiencing of the trauma. However, the overlap in symptomatology between PTSD and another common diagnosis for low-income children, ADHD, makes differential diagnosis

between these two disorders difficult (Weinstein, Staffelbach, & Biaggio, 2000). Accurate diagnosis, however, is extremely important as these two disorders are treated in entirely different ways.

The purpose of this study, therefore, is to (1) investigate the prevalence of PTSD symptomatology among children from a low SES who do and do not meet diagnostic criteria for ADHD and (2) investigate the type of PTSD symptoms exhibited by children who do and do not meet the diagnostic criteria for ADHD. This is the first study to focus on the comorbidity between these disorders solely in a population considered to be at a substantially higher risk of developing these disorders.

Hypotheses

1. Children diagnosed with ADHD will have a higher rate of PTSD diagnosis than non-ADHD children.
2. Children diagnosed with ADHD will exhibit more PTSD symptoms than non-ADHD children.
3. Children with ADHD will have higher clinically significant ratings on the posttraumatic stress on the TSCC than children without ADHD.

Method

Participants

Parents (defined as primary caretakers) of 59 children between the ages of 8 and 12 ($M=9.73$, $SD=1.85$) were recruited from the pediatric clinic waiting room in Baton Rouge, Louisiana. The sample consisted of 28 children diagnosed with ADHD and 31 children who were not diagnosed with ADHD. The clinic was a public pediatric clinic predominantly serving socioeconomically disadvantaged, African-American patients throughout the charity hospital system in Louisiana. The non-clinical sample was comprised of patients waiting there for pediatric appointments. These children had no diagnosed chronic disorders nor were they seeing the doctor for any significant medical reasons. Additionally, these participants did not meet criteria for any externalizing behavior disorders, including ADHD, Conduct Disorder, or Oppositional Defiant Disorder. There was one dyad (2%) that was excluded from this group due to missing data.

The clinical sample consisted of patients who attended the ADHD pediatric clinic held weekly at the same hospital. The clinic is a multidisciplinary environment where parent training and behavior modification instruction is conducted by clinical psychology interns and where, if necessary, medication is provided by pediatric physicians. All participants from the ADHD clinic met criteria for ADHD. Of the families that agreed to participate, four dyads from this group were excluded due to the children not meeting criteria for ADHD while one dyad was excluded due to the child having a chronic medical condition. Seven parent/child dyads refused to participate from the ADHD clinic and five from the regular pediatric clinic. The people from the regular clinic who refused to participate reported being concerned about the time needed to complete the questions. Five of those who refused from the behavior clinic population stated

that they just were not interested without giving a reason, while two stated that they were concerned about time. Socioeconomic status (SES) was measured using Hollingshead's (1975) four-factor index of social position, which takes into account education, occupation, sex, and marital status in estimating SES. Using this index, a value ranging from 8 to 66 is calculated, which can be further subdivided into five levels, with lower levels indicating lower SES. Table 1 shows the demographic characteristics and SES distribution among participants.

As seen in Table 1, the participating families were predominantly African American (93%); with 5% being Caucasian and 2% Hispanic. The mother's had a mean age of 36. The median family yearly income range reported was between \$0-\$4,999. The median SES value fell in Level I, corresponding to farm laborers and menial service workers.

Table 1

Demographic information of participating families

	Non-ADHD Freq. (%)	ADHD Freq (%)	Total Freq (%)
<u>Mother's Age (years)</u>			
20-27	13	7	10
28-35	39	57	44
36-43	26	21	24
44-51	16	14	14
52-59	3	0	2
60-67	3	0	2
<u>Mother's Race</u>			
African American	97	82	93
Caucasian	3	14	5
Hispanic	0	4	2
<u>Mother's Marital Status</u>			
Never Married	32	46	41
Married	35	18	24
Separated	10	11	14
Divorced	16	21	19
Widowed	6	0	3

Table 1 continued

	Non-ADHD Freq. (%)	ADHD Freq (%)	Total Freq (%)
<u>Child's Age (years)</u>			
8	23	21	24
9	26	21	25
10	13	18	14
11	23	14	22
12	16	21	24
<u>Child's Gender</u>			
Male	55	79	61
Female	45	21	39
<u>Child's Race</u>			
African American	97	82	93
Caucasian	3	14	5
Hispanic	0	4	2
<u>Family Income (per year)</u>			
Below \$14,999	52	75	63
\$15-49,999	42	25	34
\$50,000 and Above	6	0	3
<u>SES Level</u>			
Level I	35	43	36
Level II	32	36	32
Level III	13	11	10
Level IV	10	4	15
Level V	6	0	3
<u>Number of Children in the Home</u>			
1	16	21	20
2	39	18	24
3	16	36	32
4	13	14	8
5	3	4	5
6	10	0	7
7	3	4	3

Prior to analysis, a comparison of the ADHD and non-ADHD group found that they did not differ significantly in terms of parent's age, number of house members, child's age, race of

the family, or Socioeconomic Status Level (SES) of the family. A Chi-Square analysis, however, indicated that the number of girls in the non-ADHD group (n=14) was significantly higher than in the ADHD group (n=6), $X^2(1, N = 59) = 3.7, p=.05$.

Materials

Demographic Questionnaire.

Participants provided information on the child's age, gender, and race/ethnicity as well parent's age, marital status, education level, occupation, and income level on this one-page demographic questionnaire.

Screen for Adolescent Violence Exposure for Children (KID-SAVE; Flowers, Hastings, & Kelley, 2000).

The KID-SAVE was adapted from the SAVE in order to allow accurate comparisons between school-aged children and adolescents. The KID-SAVE is a self-report scale, which measures children's level of violence exposure for those in grades third through seventh and ages seven to fifteen. It consists of 35 items, administered in a three-point Likert system. Scores ranged from 0 to 105, with higher scores indicating greater violence exposure. Items load onto three factors, Traumatic Violence, Indirect Violence, and Physical/Verbal Abuse. The KID-SAVE also includes an impact scale for each item. Items are administered in a three-point Likert format and accompanied by three faces (smiling, frowning, very upset) in order to assist children in identifying the appropriate answer. Instructions are provided orally.

The reliability of the KID-SAVE has been demonstrated through good internal consistency, with composite scores ranging from .60 to .91 for the Frequency scale and ranging from .62 to .88 for the Impact scale. The lowest alpha coefficient for both the Frequency and the Impact scales was for Physical/Verbal abuse, due mainly to the smaller number of items on this

factor. The KID-SAVE has exhibited good test-retest reliability, with most values above the .70 mark. Furthermore, the KID-SAVE has exhibited excellent construct validity.

Trauma Symptom Checklist for Children (TSCC; Nader, 1997).

The TSCC is a self-report measure of posttraumatic stress and related psychological symptomatology in children ages eight to sixteen. The full version of the TSCC is a 54 item measure that yields validity scales (Underresponse and Hyperresponse) and clinical scales (Anxiety, Depression, Anger, Posttraumatic Stress, Dissociation, Sexual Concerns). The TSCC has been found to demonstrate good internal consistency with overall Cronbach's alpha of .96 and for each subscale: Anxiety, .85; Depression, .89; Posttraumatic Stress, .86; Dissociation, .83; Anger, .84; and Sexual Concerns, .68 (Nader, 1997). Furthermore, studies have demonstrated good construct, convergent, and discriminate validity (Nader, 1997).

Anxiety Disorder Interview Schedule for DSM-IV Parent and Child Versions (ADIS:P/C).

The ADIS is a structured interview schedule that can be used to diagnosis Anxiety disorders, Affective disorders, Externalizing disorders, Adjustment disorder, and Axis III diagnoses. There is both a parent and child version of the interview. It has been found to successfully discriminate anxious and nonanxious people. The ADIS has demonstrated a high agreement for both the child and parent versions with a kappa coefficient of .84 for the child version, .83 for the parent, and a composite kappa coefficient of .78. Reliability has been demonstrated with scores ranging of .85 for the child version, 1.0 for the parent version, and .46 for both interview schedules combined. Good test-retest reliability has been found with scores ranging from .78 to .95 for the child version and .81 to .99 for the parent version. Furthermore the ADIS has demonstrated good concurrent validity. In this study, the interviews for ADHD,

Conduct Disorder, Oppositional Defiant Disorder, and Posttraumatic Stress Disorder were utilized.

Interviews using the ADIS were conducted with parents and the children separately. For the parent interview, questions regarding ADHD, ODD, and CD are grouped under Externalizing Disorders section. Parents are asked whether their child exhibits each symptom of the disorder at home, school, or with friends. The parent is told to answer “yes” only if their child exhibits this behavior “much more than most kids his/her age.” The ADHD parent interview begins with four general questions regarding inattention. If the parent does not endorse any one these questions, follow-up questions regarding inattention are not asked and the examiner skips to questions regarding hyperactivity/impulsiveness. The questioning of the ADIS follows almost exactly from the DSM-IV, with the child needing to meet six criteria from either inattention or hyperactivity/impulsiveness; the symptoms beginning prior to age seven; and that the symptoms cause marked impairment at home, in school, or with friends. Clinical impairment is established by asking the parent about the level of interference these behaviors cause their child. Parents rate the level of interference on a scale of zero to eight, with zero being “Not at all.” These behaviors are considered to be clinically significant if the parent rates interference at a four or higher.

The design of the ADIS allows the examiner to look for clinically significant impairment of ADHD-with predominantly inattentive features (ADHD-I), ADHD-predominantly hyperactive/impulsive (ADHD-H/I), or ADHD with combined features (ADHD-C). In this study, a child’s diagnosis of ADHD was based solely on the results of the ADIS parent interview for ADHD, such that if the child met criteria for any one subgroup of ADHD, the child was included in the clinical sample.

The parent interview for both ODD and CD begins with a very general question asking whether their child exhibits any of the following behaviors. Behaviors specific to each disorder are then named. If the parent does not endorse all of the behaviors, follow up questions are not asked. From the follow up questions, if the child exhibits clinically significant number of symptoms, the level of interference is assessed the same way it was with the ADHD interview.

Questions regarding PTSD on the parent interview of the ADIS begin by asking the parent if their child has had anything upsetting ever happen to them. Specific questions regarding events typically considered as PTSD stressor events, such as being hurt, witnessing someone die, being involved in a natural disaster, being molested, or being physically abused are then asked. If the parent endorses one or more of these events, specific questions regarding PTSD symptoms are asked. The questions are broken along the DSM-IV symptom classification of reexperiencing symptoms, avoidance symptoms, and hyperarousal symptoms. According to the instructions, if the child does not meet criteria for one group of PTSD symptoms then questioning ceases. However, for the purpose of this study all PTSD symptom questions were asked if the parent endorsed a PTSD event. If the child did not meet diagnostic criteria, however, the level of interference of these symptoms was not assessed. If the child did meet criteria, then interference was assessed the same way it was with the ADHD interview.

Children were interviewed regarding ADHD and PTSD symptoms but not about ODD and CD symptoms. This is because there are no questions in the children's version of the ADIS about ODD or CD symptomatology. The ADHD child interview is different from the parent's because the questions are not separated into inattention and hyperactivity questions, rather they are all grouped together. Although there are three different stopping points, where the examiner can stop if the child does not exhibit a specific number of symptoms, an ADHD diagnosis can

only be given if the child exhibits a certain number of behaviors from all of the questions combined. Age of onset of each behavior is assessed but whether these behaviors cause problems at school, at home, or with friends is not. Level of interference of the behaviors is assessed on a scale of 0 to 4, with 0 being “Not at All.” Description of each interference level is accompanied by an “Interference Thermometer” that allows the children to visually conceptualize the concept of interference. Clinically significant interference is determined as a 4.

The child version of the PTSD interview is very similar to the parent interview. First, the children are asked if they had experienced any traumatic events, with follow up questions asked about specific events usually considered as PTSD stressors. Children were then asked about symptoms from each of the three PTSD symptom clusters. As with the parent interview, if the child does not exhibit a significant number of symptoms of any one cluster then questioning is directed to end. However, for the purpose of this study, all questions regarding PTSD symptoms were asked if the child did experience a qualifying event. Level of symptom interference was asked only if the child did meet criteria for each of the three symptom cluster. Interference was assessed the same way as it was with the child ADHD interview.

Procedure

Parents of children between the ages of 8 and 12 years were asked by the experimenter and/or a research assistant to participate in a research study about their child’s behavior, feelings, and exposure to various traumatic experiences. All family members present were provided food and drink and each family was given one raffle ticket to take part in five different drawings of \$20 each.

Once parental consent and child assent were assessed, the parent and child were placed in separate rooms and interviews occurred simultaneously. Written and verbal explanations of the purpose of the study were provided as well as the opportunity to ask questions. Following informed consent, parents completed the demographic questionnaire and the Conners' Parent Rating Scale-Revised (S). The ADIS was then administered by the examiner or research assistant for diagnosing ADHD, ODD, CD, and PTSD. Child interviews were conducted in the same order with them first being administered the ADIS for ADHD and PTSD. After the ADIS was administered, the examiner or research assistant then sat next to the child and read the TSCC and the KID-SAVE to the child while the child looked on.

The food and the raffle tickets were distributed after finishing the interviews. No families refused the raffle tickets although five parents refused the food and drink. All participants were offered information regarding referral sources and procedures for obtaining psychological treatment for themselves and their child. Five child participants were placed on the outpatient waiting list for psychological services while two mothers were referred to adult psychology outpatient.

Results

Clinical Sample

Of those who agreed to participate at the ADHD clinic, 88% met criteria for ADHD. Only those who met criteria were included in the study. Of children diagnosed with ADHD, 50% met criteria for ADHD-C, 28% met criteria for ADHD-I, and 22% met criteria for ADHD-H/I.

Data Analysis

The first main purpose of the paper was to look at rates of PTSD diagnosis among both children diagnosed and not diagnosed with ADHD. A Chi-Square test was used to compare the proportion of children with PTSD in each group. Diagnosis of ADHD was contingent on meeting criteria for ADHD based on parent's reports on the ADIS. Two initial X^2 analyses were done looking at the proportion of children meeting diagnostic criteria for PTSD based on (1) parent's report of their child's PTSD symptoms and (2) child's report of their own PTSD symptoms. The results of the X^2 analysis indicated that there was no significant difference in the proportion of PTSD based on either parent or child report among children diagnosed with ADHD ($n=4$ and $n=2$ parent and child report respectively) and not diagnosed with ADHD ($n=4$ and $n=1$ parent and child report respectively), $X^2(1, N = 59) = .02, p = .581$ and $X^2(1, N = 59) = .47, p = .46$ parent and child report respectively.

In order to determine if there was a significantly different proportion of children in the two groups who met criteria for one of the symptom clusters of PTSD; reexperience, avoidance, and hyperarousal, but not for PTSD in general, a X^2 analysis was performed. The results based on the parent's reports indicated that children with ADHD were not significantly more likely than children without ADHD to meet diagnostic criteria for reexperiencing symptoms ($n=9$ and

n=6 respectively), $X^2(1, 59) = 1.27, p = .20$; for avoidance symptoms (n=4 and n=4 respectively), $X^2(1, N = 59) = .02, p = .59$; or hyperarousal symptoms (n=7 and n=5 respectively), $X^2(1, N = 59) = .72, p = .30$. Furthermore, children with ADHD were not significantly more likely to meet diagnostic criteria than children without ADHD for reexperiencing symptoms (n=7 and n=13 respectively), $X^2(1, N = 59) = 1.89, p = .14$; avoidance symptoms (n=6 and n=10 respectively), $X^2(1, N = 59) = .87, p = .26$; or hyperarousal symptoms (n=10 and n=12 respectively), $X^2(1, N = 59) = .06, p = .51$ according to the child reports.

The second purpose of this paper was to evaluate rates of PTSD symptoms among the clinical and non-clinical sample. A t-test analysis indicated that children with ADHD did not exhibit more PTSD symptoms overall (M=6.6, SD=6.8) than children without ADHD (M=7.0, SD=6.9), $t(56) = .024, p = .81$ (two-tailed). This held true for both parent reports of PTSD symptoms alone (M=2.7, SD=4.4 for ADHD and M=2.0, SD=3.6 for non-ADHD), $t(56) = .71, p = .48$ and the child's responses alone (M=3.9, SD=4.8 for ADHD and M=4.9, SD=5.0 for non-ADHD), $t(57) = .79, p = .43$ (two-tailed).

When looking at symptom presentation of children with ADHD, a t-test analysis approached significance in showing that the parents of children who met criteria for ADHD-I endorsed more PTSD symptoms for their child (M=3.6, SD=4.9) than did the parents of the children who did not meet criteria for ADHD-I (M=1.6, SD=3.3), $t(56) = 1.7, p = .08$ (two-tailed). This analysis was done with children who met criteria for ADHD-I, regardless of whether their final diagnosis was ADHD-I or ADHD-C.

The third purpose of this paper was to look at rates of PTSD endorsement on the TSCC for children diagnosed with ADHD compared to those who were not diagnosed with ADHD. An independent samples t-test indicated that children diagnosed with ADHD did not have

significantly more clinically elevated ratings of PTSD on the TSCC scale ($n=2$) than children without ADHD ($n=4$), $t(57)=1.22$, $p=.47$ (two-tailed).

Other Areas of Interest

A t-test looking at the number of PTSD events experienced by the children who met diagnostic criteria for ADHD and those who did not, approached significance, such that children diagnosed with ADHD experienced more traumatic events according to the parent's responses ($M=1.3$, $SD=1.6$) than did children not diagnosed with ADHD ($M=.64$, $SD=.88$), $t(57)=1.9$, $p=.06$ (two-tailed). This was not true of the children's responses, with children from both the ADHD diagnosed group ($M=.78$, $SD=.92$) and the non-ADHD group ($M=.71$, $SD=.78$) reporting comparable amounts of violence exposure, $t(57)=.619$, $p=.54$ (two-tailed).

However, analysis of the Kid-Save showed that children diagnosed with ADHD were likely to report more instances of abuse ($M=3.3$, $SD=1.7$) than were children not diagnosed with ADHD ($M=2.6$, $SD=1.8$), $t(55)=2.6$, $p=.05$ (two-tailed). Specifically, looking at the three subtypes of ADHD, children diagnosed with ADHD-I were more likely to report instances of abuse ($M=4.3$, $SD=1.9$) than were children without ADHD-I ($M=2.4$, $SD=1.8$), $t(43)=2.4$, $p=.05$ (two-tailed). Additionally, children who met criteria for ADHD-C were more likely to report instances of traumatic violence ($M=3.1$, $SD=1.4$) than were children without ADHD-C ($M=.91$, $SD=1.5$), $t(55)=2.0$, $p=.05$ (two-tailed).

Discussion

This study was conducted in order to look at rates of Posttraumatic Stress Disorder symptomatology among children diagnosed with Attention-Deficit/Hyperactivity Disorder compared to a non-clinical sample. It was conducted with a sample from a low-income, urban environment in a southern state. Recent research has indicated a substantial increase in violence exposure for children living in urban environments, placing them at an increased risk of developing psychopathology. This study compared PTSD rates as well as total number of PTSD symptoms of the children from the two groups: the first of which were children who did not meet criteria for ADHD or any other externalizing behavior disorder and the second of which were children who presented to a behavior clinic and met criteria for ADHD.

Although it was hypothesized that the children with ADHD, would have higher rates of PTSD diagnosis, the results indicated that this was not the case. An ADHD diagnosis was based on the results of the parent's responses on the ADIS, as parents are shown to be better reporters of a child's externalizing behavior. However, a PTSD diagnosis was evaluated based separately on the parent and child reports. This was important in that 0% of the parent/child dyads agreed on whether the child met criteria for PTSD; with 14% of children meeting PTSD criteria according to the parent's report and 5% meeting criteria according to the child's report. These findings vary from those found in recent studies, which have shown that children often report more PTSD symptoms than do their respective parent (Famularo, Kinscherff, & Fenton, 1992).

In the current study, parent and child dyads also disagreed on the quantity of traumatic events a child had experienced. Specifically, the parents of children with ADHD reported that their child had witnessed more traumatic events than did parents of children without ADHD,

while their children, regardless of their diagnosis, reported a comparable number of traumatic events.

As most studies on the comorbidity of PTSD and ADHD have been conducted with abused children, analyzing the results of the KID-SAVE was intended to provide information regarding how witnessing or being a victim of violence not limited to maltreatment could impact a child's behavior. The results showed that children with ADHD-I were more likely than others to report instances of abuse while children with ADHD-C were more likely to report instances of traumatic violence. However, it is important to note that these results could be due to a large number of conducted analyses, whose alpha levels were not corrected for the number of tests used. Therefore, the significant results found here could be spurious in nature, and bear further study.

There are several serious limitations in this study. The first being that ample power was not attained. It was proposed that 100 participants would be recruited, 50 from each group. However, participant total was 59 with 28 being diagnosed with ADHD and 31 who were not. There were many problems in participant recruitment. First, recruitment for the non-ADHD group was easy during the summer months as (1) many children attended appointments for their back to school check-up and (2) many siblings attended appointments with their sick siblings. However, once school began most children did not attend their check-up appointments so the only children in the clinic were sick.

For the group with ADHD, most new patients were younger than the age range proposed. This behavior clinic demographic is different than what is normally seen in the clinic, as most children who attend this clinic are in the 8-12 age range. Therefore, it was eventually necessary to begin recruiting patients who had been attending the clinic for some time. New patients

comprised 32% of the participant sample while the remaining 68% were old patients. The average length of participation for the old patients was 1.9 years. The longest treatment period was 3 years (n=5), with 7 being seen for two years, 4 for one year, and 3 for six months or less. Prolonged treatment at the behavior clinic may have resulted in a decrease in PTSD symptoms, making these children with ADHD less likely to meet PTSD criteria or even endorse PTSD symptoms.

Future studies looking at comorbid rates of PTSD and ADHD should be conducted with ample power in order to accurately determine if there are any significant relationships. Furthermore, due to the difficulty recruiting from a medical clinic during the school year, it is suggested that such studies recruit children from other venues, such as schools and after-care clinics.

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Vita

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