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A COMPARATIVE ANALYSIS OF WISC-III PERFORMANCE OF TRAUMATIZED AND NON-TRAUMATIZED CHILDREN

by

Mitchell J. Samet

A dissertation submitted to the graduate faculty in Educational Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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Abstract

A COMPARATIVE ANALYSIS OF WISC-III PERFORMANCE
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by

Mitchell J. Samet

Advisor: Professor P. A. Saigh

The present study compared the WISC-III subtest, IQ, and index scores of two groups of adolescents, PTSD positive and stress exposed PTSD negative. Students with a history of learning or mental disorders, head trauma, substance abuse, and those taking psychopharmacological medication were excluded from the study. Also, students with co-morbid ADHD, conduct disorder, major depression or psychosis were excluded. A total of 167 adolescents, age range 11-17 years, were sampled from urban and suburban schools. Thirty-five subjects were selected for inclusion in the study. The subject groups were comparable with respect to race/ethnicity, gender and SES. Three separate MANCOVAs were performed in order to test for WISC-III subtest, IQ, and index differences between diagnostic groups. Data analysis revealed no significant between group differences for any of the dependent measures, while controlling for SES. The data analysis failed to support the hypotheses and indicated no significant differences in cognitive functioning between the PTSD positive and PTSD negative groups. A general discussion regarding the observed results, implications of the study, limitations, and directions for future research is presented.

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Introduction

History

Posttraumatic stress disorder (PTSD) is indicated by the development of characteristic symptoms following exposure to a traumatic event which is outside the realm of normal human experience. The DSM-IV (American Psychiatric Association, 1994) lists a number of diagnostic criteria specific to PTSD, such as exposure to a significant trauma, reexperiencing the traumatic event, avoidance of trauma-related stimuli, and increased symptoms of arousal. More specifically, these symptoms involve repeated trauma-related thoughts or nightmares, avoidance, blunted affect, and a host of anxiety-related symptoms such as increased arousal and memory impairment.

The characteristic symptoms of PTSD have been chronicled for centuries, under a variety of terms. Daly (1983) quotes Samuel Pepys' vivid 1666 account regarding the Great Fire of London, in which Pepys

described his great terror and sleeplessness due to recurring thoughts of the fire. Saigh (1992) made reference to the celebrated nineteenth-century nosologist, Emil Kraepelin, who used the term "Schreckneurose" ("fright neuroses") to characterize the disorder. In his original account, Kraepelin (1896) described "multiple nervous and psychic phenomena arising as a result of severe emotional upheaval or sudden fright which would build up sudden anxiety: it can therefore be observed after serious accidents and injuries, particularly fires, railway derailments or collisions" (quoted in Saigh, 1992, p. 1).

During the First World War, Frederick Mott (1919) and Ernest Southard (1919) utilized the terms war-induced startle response, war neuroses and shell shock to describe the psychic condition which occurred following war-related traumas. Mott (1919) described a British soldier's recollections of his experiences while trapped behind enemy lines, after which the soldier reexperienced the trauma through recurring thoughts and dreams. Southard (1919) clearly described

significant startle response and physiological (pulse rate) changes when a French soldier was exposed to sudden noises. Saigh, Green and, Korol (1996) describe similar symptomology, such as nightmares, sleep impairment, recurring thoughts, and trauma-related avoidance, in a number of accident and disaster studies from the 1930s and 1940s. Clearly, the early literature involving traumatized adults significantly influenced the way in which the psychiatric community conceptualized reactivity to extreme stress.

Saigh and Fairbank (in press) note that with the advent of World War Two, mental health practitioners comprehensively evaluated and treated thousands of psychiatric casualties, including a number of significant examinations from the child-clinical perspective. Bodman (1941) provided one of the earliest examinations of war-related trauma in relation to children. Eight percent of the British children he surveyed presented significant psychiatric symptoms (nightmares, war-related fears, avoidance, and reactivity) after surviving the Nazi air raids. Mercer and Despart (1943) found similar symptomology, as well

as academic difficulties, in French children exposed to war-related traumas. Additionally, the research of the 1940s, which so adequately chronicled the features of PTSD among childhood war survivors, was extended to include the victims of natural disasters. For example, Adler (1943) documented trauma-related nightmares, recurring thoughts, sleep disturbance, and avoidance behaviors among the survivors of the Boston Coconut Grove Fire. Thus, the research completed during World War Two provided a more comprehensive examination of posttraumatic reactions, and extended the field to include children and adolescents, as well as non-war-related traumas.

Following the Second World War, a number of researchers evaluated the after effects of war among combatants and civilians. Grinker and Spiegel (1945a, 1945b) published two critical works which examined the effects of World War Two on those soldiers returning from battle (returnees). The returnee's symptoms of "Combat Neuroses" included restlessness, aggression, depression, memory impairment, sympathetic overactivity, concentration impairment, alcoholism,

nightmares, phobias, and suspicion (Saigh, 1992). Wolf and Ripley (1947) examined American POW's adjustment to Japanese camps, where they suffered from physical torture, mistreatment and malnutrition. Almost 23% of the returned prisoner population suffered significant PTSD symptoms. Carey-Trefzer (1949) observed similar disturbances among British school children who had been exposed to significant war stressors. In fact, more then 17% of Carey-Trefzer's population exhibited characteristic psychic impairment, as well as notable academic impairment within the classroom.

Researchers also examined the psychological effects of internment among various prisoner-of-war (POW) survivors. Friedman (1949) found similar symptoms among the Jewish survivors of the Nazi death camps. Friedman's "Bauchenwald Syndrome" was marked by significant somatic complaints among these children, as well as sleep disturbance, startle response, and anxiety. Eitinger (1962) observed fatigue, poor concentration, irritability and traumatic recollections, among Norwegian survivors of the Nazi death camps. The prevalence of post-World War Two

psychiatric symptomology prompted sweeping changes in how the psychiatric community was to deal with the psychological effects of extreme stress.

In 1952, the American Psychiatric Association published the first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-I). The DSM-I characterized Gross Stress Reaction as a psychological reaction to extreme stress in individuals that were previously normal. The APA's inclusion of this disorder represented an important first step in providing a formal nosology within the field. However, the DSM-I was descriptive in nature, and did not provide clear diagnostic criteria for clinical use. As such, research within the field was obscured by misdiagnosis and a lack of clarity.

With the second edition of the DSM (DSM-II, APA, 1968), the term Gross Stress Reaction was replaced by the term Transient Situational Disturbance, which was characterized by an acute reaction of varying intensity to severe environmental stressors. The DSM-II made clear that Transient Situational Disturbance occurred in individuals without prior underlying mental

disorders, and represented an acute reaction to traumatic environmental stress. Unfortunately, the DSM-II also suffered from methodological shortcomings, and did not provide the much needed operational criteria suitable for clinical use (Spitzer & Fleiss, 1974).

Stress-related research in the 1950s and 1960s was characterized by examinations of Korean War casualties, as well as pioneering research involving the responses of civilians to natural and industrial disasters. From the child-clinical perspective, Bloch, Silber and, Perry (1956) described characteristic symptoms of avoidance, fear, nightmares, and startle response, among child survivors of a catastrophic tornado in Vicksburgh, Mississippi. Similar reactions were observed relative to children's reactions to earthquakes (Langdon & Parker, 1964), floods (Bennet, 1966), and nautical disasters (Friedman & Linn, 1957; Yule, 1990; Yule, Udwin, & Murdoch, 1990; Yule & Udwin, 1991,).

The research of the 1970s was characterized by increased interest in the field of traumatic stress,

most notably in response to the pressing problems of returning Vietnam war veterans. Although initial reports seemed to minimize the effects of the Vietnam conflict, Horowitz and Solomon (1975) published an influential paper which clearly described what they termed "Delayed Stress Response Syndrome" among Vietnam war veterans. The authors reported characteristic nightmares, painful and emotional moods, aggressive and self-destructive behavior, and impulsivity, in a large percentage of returning Vietnam veterans. The 1970s were also marked by the ground breaking research of Burgess and Holmstrom (1974), who coined the term "Rape Trauma Syndrome" to denote an acute emotional reaction among sexually assaulted women. According to Burgess and Holmstrom (1974), the rape victims initially experienced an acute reaction characterized by anger, fear, guilt, and a host of physical complaints (headache, soreness). A second, more long term, reaction was marked by nightmares, fears, avoidance, and sexual dysfunction, which seemed to parallel the post-traumatic reactions of disaster and combat survivors. This research extended the examination of

traumatic stress to include victims of violent crimes, and pioneered later research regarding sexual and physical abuse.

Saigh et al. (1996) note that the early research in the field of traumatic stress was characterized by poor methodology, a lack of diagnostic criteria, and poor reliability. Although it was clear that traumatized individuals often developed pervasive psychological difficulties, the poor systems of classification with non-objective terminology served to obscure much of the past research. In fact, because of this lack of discipline and continuity, the American Psychiatric Association sought to reformulate the diagnostic criteria for Transient Situational Disturbance. In so doing, "the DSM-III Reactive Disorders Committee subsequently drew on clinical experience and the available literature to formulate the diagnostic criteria for what came to be called Posttraumatic Stress Disorder" (Saigh et al., 1996, p. 10). The DSM-III (APA, 1980) utilized objective clinical experience and an exhaustive review of the prior literature to develop clear operational criteria

for this condition. In addition, the DSM-III provided a detailed set of diagnostic criteria for identifying individuals with the disorder. The DSM-III describes PTSD as the "development of characteristic symptoms following a psychiatrically traumatic event that is generally beyond the realm of normal human experience". The "stressor producing this syndrome would evoke significant symptoms of distress in most people and is outside the range of such common experiences as simple bereavement, chronic illness, business loss or marital conflict" (APA, 1980, p. 236).

The PTSD classification soon gained considerable currency among clinicians and researchers. Saigh (1992) cites a dramatic increase in PTSD citations in United States medical journals (Medline) over the decade following DSM-III publication. Revisionary efforts in the field resulted in the publication of the DSM-III-R in 1987. In addition to clear diagnostic criteria, the DSM-III-R also provided examples of different classes of trauma and grouped symptoms into several clusters. The DSM-III and III-R prompted a flurry of research within the child-clinical

perspective. More recent studies of at risk children can be clustered into three distinct groups: (1) those which examined war-related traumas; (2) traumas involving natural/industrial disasters or accident victims; and (3) traumas involving criminal victimization such as rape, physical abuse and sexual abuse.

In 1988, the APA initiated the development of the DSM-IV. The DSM-IV work group on PTSD began a series of multi-site trials in an attempt to examine a variety of stressors in relation to PTSD symptoms. The work group, under the direction of Jonathan Davidson and Edna Foa, also examined the inclusion of several additional symptoms and characteristics, conducted a detailed literature review, examined epidemiology, and explored a host of related disorders. The DSM-IV was published in 1994, and represents the most current and widely recognized diagnostic manual for mental disorders in use in the United States.

As we look back one century at the research on traumatic stress, one observes tremendous development within the field over a relatively short period of

time. The symptoms that were first described as Schreckneurose slowly became known as Shell Shock or War Neuroses. During world war II, the term Combat Neuroses or Battle Fatigue became symbolic of these same symptoms. Later, in the first edition of the DSM, the term Gross Stress Reaction was utilized, which later gave way to Delayed Stress Response Syndrome. Finally, with the third edition of the DSM, Posttraumatic Stress Disorder was recognized as a discrete psychiatric disorder with operationalized criteria for formulating a diagnosis.

While early accounts of PTSD can best be described as an assorted jumble of trauma-related symptoms, current descriptions are clear, well defined, clinically derived diagnostic criteria. Moreover, Saigh (1992) observed that PTSD can be developed through direct traumatization, by observation, or by learning about a serious threat to oneself or significant others. Although the characteristic symptoms of PTSD were once examined only within the confines of war or catastrophic natural disasters, the field has been expanded to include crime victims,

victims of physical or sexual assault, accidental disasters such as car accidents, serious physical injury or fires, and deliberately cased disasters such as torture, war camps, and domestic violence. Finally, researchers have examined the impact of PTSD to include children and adolescents, in addition to adults. Saigh et al. (1996) note that specific reference to children was first made in the DSM-III-R, and similar provisions are now included in the current DSM-IV.

Current Nosology

PTSD is characterized by the development of a series of significant psychological symptoms following exposure to an extreme traumatic stressor. According to the DSM-IV, the traumatic stressor typically involves "direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate" (APA, 1994, p.

424). The characteristic symptoms which result from the trauma include persistent avoidance of stimuli associated with the trauma, persistent reexperiencing of the traumatic event, a numbing of general responsiveness, and symptoms of increased arousal. PTSD is not diagnosed if the disturbance lasts less than one month, and the disturbance must cause clinically significant distress or impairment in the individual's social, occupational, or other important areas of functioning. PTSD can be specified as acute (duration of symptoms is less than three months), chronic (duration of symptoms is three months or longer, or with delayed onset (indicates at least six months have passed between the traumatic event and the onset of the symptoms).

The stressor producing these symptoms would be markedly distressing to almost any person, and is usually experienced with great fear, terror, and helplessness. For example, common traumas include a serious threat to one's life, catastrophic destruction of one's home or community, or observing someone being hurt or injured in a serious accident or violent act.

The trauma can be experienced directly by the individual, through vicarious observation, or simply by learning about a serious threat or harm to oneself or a significant other. The trauma can be experienced alone (e.g., assault, rape, shooting), or within a group setting (e.g., military combat, work, school). The stressors which can produce these characteristic symptoms may include "natural disasters (e.g., floods, earthquakes), accidental disasters (e.g., car accidents with serious physical injury, airplane crashes, large fires, collapse of physical structures), or deliberately caused disasters (e.g., bombing, torture, death camps) (APA, DSM-III-R, 1987, p. 248).

The traumatic event is persistently reexperienced in a variety of ways: (1) the individual may have recurring, intrusive recollections of the traumatic event; (2) recurrent distressing dreams about the event; (3) sudden acts or feelings as if the traumatic event were about to recur; (4) intense psychological distress when exposed to events that may resemble or symbolize an aspect of the traumatic event; and (5) intense physiological reactivity on exposure to cues

which resemble an aspect of the traumatic event (APA, 1994).

In addition to reexperiencing the trauma, the individual displays persistent avoidance of stimuli associated with the trauma and a general numbing of responsiveness that was not present prior to the traumatic event. PTSD sufferers may attempt to avoid thoughts or feelings associated with the trauma, avoid activities and situations that may arouse recollections of the trauma, and be unable to recall important aspects of the trauma. In addition, these individuals often experience diminished interest in significant activities, feelings of detachment from others, flattened affect, and a sense or a foreshortened future.

Persistent symptoms of increased arousal include sleep disturbance, anger or irritability, poor concentration, hypervigilance, exaggerated startle response, and physiological reactivity to events which are connected to the trauma (APA, DSM-III-R, 1987).

Several associated features accompany the core symptoms of PTSD. Depression and anxiety are common in

PTSD adults and children, sometimes sufficiently severe to be diagnosed as an Anxiety or Depressive Disorder. Additionally, impulsive behavior is not an uncommon symptom. There may be increased risk of Panic Disorder, Agoraphobia, Obsessive-Compulsive Disorder, Social Phobia, Specific Phobia, Major Depressive Disorder, Somatization Disorder, and Substance-Related Disorders. PTSD sufferers often exhibit physiological symptoms, such as memory impairment, headache, vertigo, and difficulty with concentration. Feelings of guilt occur with disaster survivors and war returnees. "Impairment may be mild or severe and affect nearly every aspect of life"... "emotional lability, depression, and guilt may result in self defeating behavior or suicidal actions" (APA, 1987, p, 249). Avoidance behaviors may interfere with interpersonal relationships, marriage and family life, and performance within a variety of work and school settings. Finally, psychoactive substance abuse is a common complication.

Validity of the PTSD Classification

Although the psychological effects of trauma have

been documented for centuries and empirically examined for decades, "the notion that people may develop significant and chronic impairments as a function of exposure to extreme events has not always been readily accepted" (Saigh & Fairbank, in press, p. 3). As such, a number of comparative studies have been conducted, in recent years, to test the validity of the PTSD classification. These validity studies utilize several differential methods to examine PTSD, including psychophysiological measures (e.g., heart rate, blood pressure), biological measures (e.g., epinephrine and norepinephrine levels), and case control research utilizing psychometric self-reports (e.g., MMPI, BDI, STAI). In addition, there is a growing body of literature which has documented cognitive and academic impairment within the PTSD population.

Psychophysiological Measures: Psychophysiological measures of PTSD examine significant physical changes that may result when PTSD sufferers are exposed to traumatic stimuli. For example, Ornitz and Pynoos (1989) measured the startle response of children diagnosed with PTSD, as compared to a nonclinical

control group. In this examination subjects were exposed to bursts of white noise, and eye blink reflexes, in response to the noise, were recorded for both the experimental and control children. Despite a small subject pool, the authors did find significantly greater eye blink response with the PTSD children, as compared to a PTSD negative control group.

Blanchard, Kolb, Pallmeyer, and Gerardi (1982) compared Vietnam veterans diagnosed with PTSD with a non-veteran PTSD-negative control group. The subjects were exposed to recordings of combat sounds while a number of physical reactions (blood pressure, skin temperature, forehead muscle activity, and skin resistance) were monitored. The physical data suggested that the PTSD veteran group differed significantly from the control subjects when exposed to the traumatic recordings. Blanchard and his colleagues concluded that the PTSD subjects reacted differentially to the combat recordings, as measured by their psychophysiological responses.

In a similar study, Blanchard, Kolb, Gerardi, Ryan, and Pallmeyer (1986) compared Vietnam veterans

with PTSD to a non-PTSD veteran group, also utilizing combat recordings to stimulate physiological responses. In this examination, PTSD veterans demonstrated significantly higher heart rates from the non-PTSD veterans following exposure to the traumatic stimulus.

Biological Measures: Viewed from a more biological model, Blanchard, Kolb, Prins, Gates, and McCoy (1991) examined the norepinephrine levels of veteran PTSD sufferers, in comparison to non-PTSD veterans. Blood plasma, taken before and after exposure to combat-related auditory stimuli, revealed significant differences in norepinephrine levels between the two groups. The authors determined that PTSD veterans manifested a 30% increase in plasma norepinephrine level following exposure to the traumatic stimuli, while the non-PTSD veterans demonstrated a nonsignificant norepinephrine increase.

Kosten, Mason, Giller, Ostroff, and Harkness (1987) determined that both norepinephrine and epinephrine levels were inflated for PTSD cases, as compared to patients with major depression, bipolar disorder, and schizophrenia. In addition, Kudler,

Davidson, Meador, Lipper, and Ely (1987) found that the PTSD positive subjects "rarely exhibited nonsuppression on the dexamethasone suppression test" (quoted in Saigh, 1992, p. 12).

Davidson et al. (1993) examined the relationship between baseline clinical phenomena among war veterans (e.g., depression, anxiety, severity of PTSD symptoms) and response to pharmacotherapy with amitriptyline. Data was collected from an eight week, placebo-controlled, double-blind study of 62 war veterans, utilizing a variety of self-report and rating scales. The results suggested that response to amitriptyline is related to measures of depression, anxiety, PTSD, personality, and intensity of combat trauma.

Psychological Self-Report Measures: Validity studies were also completed utilizing case-control methodology, in which subjects were compared on a number of self-report inventories. Roberts, Dolan, Penk, Gearing, Robinowitz and Patterson (1982) found elevated Minnesota Multiphasic Personality Inventory (MMPI) scores on scales 0, 4, and 6 among veterans with PTSD.

Similarly, Fairbank, Keane, and Malloy (1983) observed that PTSD patients evidenced higher ratings on all of the MMPI scales. Fairbank, Keane, and Malloy (1983) also found inflated scores on the State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970), the Beck Depression Inventory (BDI; Beck, Ward, Mandelson, Mock, & Erbauch, 1961), and the Zung Depression Inventory (ZDI; Zung, 1965), in comparison to clinical and non-clinical control groups.

Saigh (1988) found comparable results within a child-clinical comparison. He administered the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978), the Children's Depression Inventory (CDI; Kovacs, 1981), the Test Anxiety Scale (TAS; Spielberger, 1980), and the Conners Teacher Rating Scale (CTRS; Conners, 1969) to adolescents diagnosed with chronic PTSD, those with test phobia, and a non-clinical control group. "As hypothesized, the test phobic group has significantly elevated scores on the test anxiety scale and the PTSD group evidenced significantly higher scores on the omnibus anxiety, depression, and misconduct scales " (Saigh & Fairbank,

in press, p. 4).

In a later study, Saigh (1989a) found similar results among comparable groups of PTSD, test phobic, and control children. As in the prior adolescent study, PTSD children experienced higher levels on the RCMAS, CDI, and CTRS. The results of Saigh's (1988, 1989a) investigations paralleled the findings of earlier adult studies, advanced the PTSD classification to include children and adolescents, and added to the validity of the PTSD classification.

Finally, Saigh, Mroweh, Zimmerman, and Fairbank (1995) utilized case-control methodology to examine the relation between exposure to trauma, PTSD, and perceived self-efficacy among Lebanese youths exposed to war stressors. The authors found that youths with a positive PTSD diagnosis revealed significantly lower self-efficacy ratings on eight of nine subtests of the Multidimensional Scales of Perceived Self-Efficacy (MSPSE; Bandura, 1989).

Cognitive/Academic Measures: A number of recent investigations have examined the validity of the PTSD classification by examining the academic, intellectual,

or cognitive impairment that may result following traumatic exposure. For example, Gurvits, Lasko, Schachter, Khune, Orr, and Pittman (1993) determined that Vietnam veterans with PTSD had significantly more neurological soft signs than a matched group of combat veterans without PTSD.

Sutker, Winstead, Galina, and Allain (1991) compared 22 Korean conflict veterans with 22 war veterans who had been taken prisoner during the Korean conflict, on various measures of problem solving, personality characteristics, mood states, and psychiatric clinical diagnoses. Although the two groups were similar in background and personal characteristics, they differed significantly in cognitive, behavioral, and interpersonal functioning. Examining cognitive functioning, the former POWs achieved lower on the problem-solving measures of the Wechsler Adult Intelligence Scale-Revised (WAIS-R, Wechsler, 1981). Group differences were not significant on the full scale IQ, verbal IQ, performance IQ, and summary scores of the WAIS-R, although a significant difference was observed on the

digit span subtest. In addition, the POW group performed lower on several subtests of the Wechsler Memory Scale (Wechsler & Stone, 1945). Sutker et al. conclude that psychiatric symptoms documented over thirty years prior persisted in severity and chronicity, and that long-term cognitive deficits were also common sequelae of POW confinement.

Bremner, Steinberg, Southwick, Johnson, and Charney (1993) compared dissociative symptom areas in Vietnam combat veterans with PTSD, as compared to Vietnam veterans without PTSD, utilizing the Structured Clinical Interview for DSM-IV (SCID-D). The SCID-D yields a total score, as well as scores in five symptom areas, including amnesia, depersonalization, derealization, identity confusion, and identity alteration. While the PTSD patients had higher dissociative symptoms in each of the symptom areas, amnesia was the symptom area with the greatest measurable difference between the PTSD and non-PTSD groups. The PTSD veterans described significant lapses in memory lasting from hour to days, blocks of missing time that could not be accounted for, and the

forgetting of important personal information, such as their name or address.

Bremner et al. (1993) compared the intellectual and memory functioning of patients with PTSD, as compared to that of a matched group of Vietnam combat veterans without PTSD. Intelligence was assessed utilizing the WAIS-R. Memory was assessed by a battery of neuropsychological tests, including the Russell revision of the Wechsler Memory Scale, the Selective Reminding Test (Hannay & Levin, 1985), and with selected WAIS-R subtests. The PTSD patients had significantly impaired scores on the logical memory component (short-term recall, delayed recall) of the Wechsler Memory Scale, as well as on all the verbal and visual subtests of the Selective Reminding Test. There were no significant differences between the PTSD and comparison groups on prorated full-scale IQ, as measured by the WAIS-R.

McNally and his colleagues (1990, 1993) examined a novel cognitive index for measuring PTSD, in order to overcome the possible limitations of subjective self-report indices. If we examine the DSM-III-R diagnostic

criteria for PTSD, trauma-related thoughts and intrusive cognitions are the hallmark of the disorder. "Indeed, most attempts to quantify intrusive thoughts, flashbacks, and nightmares have been based on self-report measures" (McNally, English, & Lipke, 1993, p. 1), which can be inherently subjective. The Modified Stroop Color-Naming paradigm was utilized to measure intrusive cognition in patients with PTSD. "Delays in color-naming (i.e., Stroop Interference) occur when the meaning of the word automatically attracts the subject's attention despite the subject's effort to attend to the color of the word" (McNally, English, & Lipke, 1993, p. 3). Delays in color-naming of emotionally charged words were associated with involuntary semantic activation, or cognitive interference. McNally, Kaspi, Reimann, and Zeitlin (1990) found that PTSD patients exhibited Stroop interference for trauma-related words, but not for OCD, positive, or neutral words. The 1993 study (McNally, English and Lipke) which replicates and extends the previous research, determined that Vietnam combat veterans exhibited Stroop interference for combat-

related words, and added to the reliability and validity data on the paradigm.

McNally and Shin (1995) examined adult intellectual functioning as a predictor for chronic PTSD symptomology. Examining male Vietnam veterans, the examiners compared performance on the Shipley scale as a measure of general intelligence. The results suggest that intelligence predicts variance in chronic PTSD symptoms beyond that predicted by combat exposure. As such, "the lower a subject's intelligence, the more severe that subject's PTSD symptoms tended to be" (p. 7).

Examined from a child-clinical perspective, Saigh (1987a, 1987b, 1987c) completed a series of experiments which examined the cognitive and emotional impact of in vitro flooding with traumatized adolescents. In the first study (Saigh, 1987a), in vitro flooding was used to treat a 14-year-old male patient with PTSD. Four traumatic scenes were identified and presented, utilizing stimulus-response imagery cues. The patient's progress was measured through the subject's subjective units of disturbance (SUDS). In addition,

the subjects level of anxiety, depression, assertion, avoidance, short-term memory, and concentration were assessed before treatment, immediately after the treatment, and during a four month follow-up. The efficacy of the flooding treatment was most significant on the anxiety indices.

In a similar study, Saigh (1987b) utilized an in vitro flooding package to treat a 10-year-old Lebanese girl who had been exposed to war-related stressors. Utilizing a multiple baseline design, SUDs were used to measure the treatment efficacy of the flooding package for each traumatic scene. The results suggest that in vitro flooding had positive and extended influence on the subject's affective, behavioral, and cognitive functioning. Of particular note, the subject's performance on the WISC-R Digit Span and Coding subtests evidence marked improvement (DS: 9-11-11; CD: 8-10-10) over the course of treatment.

In a follow-up study, Saigh (1987c) utilized a similar in vitro flooding package to treat PTSD among three Lebanese children who had been exposed to war-related trauma. The outcome data revealed positive

changes in the children's affective, behavioral, and cognitive functioning, following exposure to the flooding package.

Saigh and Mrouegh (1993) utilized the Metropolitan Achievement Test (MAT: Prescott, Balow, Hogan, and Farr, 1986) and the Lebanese General Ability Scale (LGAS; Saigh, 1986b) to examine the scholastic achievement of three groups of Lebanese adolescents. In this study, the first group met the diagnostic criteria for PTSD, the second group was comprised of traumatized but non-PTSD adolescents, while the third group consisted of non-clinical control subjects. According to the MAT results, the PTSD subjects performed appreciably lower than their counterparts across seven different areas of achievement (Reading vocabulary, reading comprehension, mathematics, spelling, language, & science). The authors conclude that "these observations provide a clear basis of support for the hitherto untested assumption that academic under achievement may be an associated feature of PTSD in adolescents" (Saigh & Mrouegh, 1993, p. 17).

Finally, in an unpublished manuscript, Egan (1992)

provides elementary evidence of intellectual impairment among children with PTSD. In archival data collected from the Carondelet Child Center, where nearly all of the children report prior incidents of physical abuse(86%), neglect(76%), or sexual abuse(37%), the author examined the children's intellectual performance on the Wechsler Intelligence Scale for Children-Revised (WISC-R). A review of the children's records revealed a significant difference between the verbal and performance subtests of the WISC-R, with the performance IQ score falling 7 points higher on average. Although this represents only preliminary data, this report does raise questions regarding the intellectual performance of PTSD sufferers.

Whereas these studies reflect a selected overview of an expanding literature base, it is apparent that there is a good deal of empirical data to support the validity of the PTSD classification as a unique psychiatric entity. On the other hand, it is of interest to note that appreciably fewer studies have examined the validity of the class as it relates to children and adolescents. Although some preliminary

evidence does exist regarding the cognitive/ intellectual impairment of traumatized adults, there is a paucity of evidence which empirically examines the intellectual impairment of children and adolescents with PTSD.

Epidemiology

In order to understand the nature and scope of PTSD as a psychiatric classification, it is valuable to present accurate information about the prevalence of the disorder in relation to the general population and those individuals who are in particular risk. Saigh et al. (1996) suggest that reliable quantification of the prevalence of a disorder is also important to investigators interested in issues involving the etiology of a condition. Also, viable epidemiological estimates are important to social policy makers regarding the allocation of resources to fund prevention and treatment programs.

Norris (1992) pointed out that the majority of the general population has been exposed to a significant trauma during their lifetime; this would include war-related traumas, cases of victimization, and exposure

to natural or industrial disasters. Despite this exposure, reliable estimates predict that only one percent of the general population (Helzer, Robins and McEvoy, 1987) develops significant psychiatric symptomology as a result of the trauma.

Viewed from an historical perspective, Rachman (1978) determined that analysis of the British psychiatric literature, following World War II, indicates that the majority of the population survived the Nazi air raids surprisingly well. He determined that combat veterans and war survivors did not differ significantly from the general population in psychiatric morbidity. Also, Taylor, Ross, and Quarantelli (1976) found extremely low rates of severe mental illness among the survivors of a 1974 Xenia Ohio tornado. However, Breslau, Davis, Andreski, and Peterson (1991) estimate the lifetime rate of PTSD within a general population of Detroit youths to be approximately 9%; estimates for specific at-risk groups can run as high as 80% (for female rape victims) in the Breslau et al. study.

Although PTSD studies have originally focused on

adult war veterans, there is an expanding body of literature which confirms the prevalence of PTSD among children and adolescents. Yet, despite this strong data base, comparable large-scale community-based investigations have not been effected with school-age populations. Epidemiologists have failed to reach a consensus regarding the incidence of PTSD among children. Although community data is not available regarding the prevalence of PTSD among child and adolescent populations, information is readily available among children that are at risk. With this in mind, a brief review of the prevalence of child and adolescent PTSD is presented herein, focusing primarily on children and adolescents who were either exposed to war-related stressors, criminal victimization, or natural/ industrial disasters or accidents.

War-Related Studies:

Examining childhood survivors of the Cambodian conflict, Kinzie and his colleagues documented the American emigration of a group of Cambodian adolescents who had been exposed to extreme stress by the violent Pol Pot regime. The adolescents had experienced

catastrophic war-related trauma when they were torn from their homes and families, witnessed many violent deaths and beatings, and were forced to endure starvation, forced labor, beatings, and deplorable living conditions. In the first study (Kinzie, Sack, Angell & Mason, 1986), 40 adolescents were administered the Diagnostic Interview Scale (DIS) approximately 2 and 1/2 years after their immigration to the United States. Of those sampled, 20 subjects (50%) met the DSM-III diagnostic criteria for PTSD.

In a three year follow-up, Kinzie, Sack, Angell, Clarke, and Ben (1989) located and re-examined 27 of the original Cambodian subjects, and found psychiatric morbidity in 30% of those sampled. Later, Sack, Clarke, Him, Dickason, Goff, Lanham and Kinzie (1993) conducted a further follow-up of the 40 original Pol Pot survivors. Of the 19 subjects who were examined across all three studies, 11 (58%) were PTSD positive in 1986, 9 (47%) met criteria in 1989, and 6 (32%) were PTSD positive almost ten years after leaving Cambodia.

Saigh (1988) examined eleven female students attending the American University of Beirut, who were

subjected to devastating and traumatic artillery bombardment within close proximity to their homes. Utilizing a structured interview format based upon the DSM-III, Saigh found a majority of the students had reported elevated levels of anxiety and depression following the bombing. Diagnostic assessment revealed that nine of the eleven students, or 82% of the sample, met the diagnostic criteria for PTSD one month after the bombardment. On the other hand, one student (9% of the initial sample) was PTSD positive almost a year after the catastrophic event.

Saigh (1989a) completed a case-control examination of 840 Lebanese children who had been exposed to significant war-related trauma. The subjects were referred for assessment by medical and mental health practitioners following exposure to extreme forms of war-related stress. Utilizing the Children's PTSD Inventory (Saigh, 1989b), 230 children, or 32.5% of the sample, met the DSM-III diagnostic criteria for PTSD, one to two years following exposure to the traumatic events.

Most recently, research following the Gulf War

has also focused on child and adolescent reactions to war-related stress. Saigh and Fairbank (in press) note the unpublished work of Nader, Pynoos, Fairbanks, Frederick, Al-Ajeel, and Al-Asfour (1993), who examined 51 adolescents attending a Kuwaiti summer school at the time of the invasion. Five months after Iraqi forces were driven from Kuwait, the researchers found 70% of the children were PTSD positive, utilizing an Arabic Reaction Index. Similarly, Weisenberg, Schwarzwald, Waysman, Solomon, and Klingman (1993) administered a Hebrew version of the Reaction Index to 492 Israeli children who had been present during the Gulf War. These children had been sealed in rooms and wore gas masks during Iraqi missile attacks. Three weeks after the war, almost 26% of these Israeli children presented significant symptoms of acute PTSD.

Criminal Victimization Studies

The National Center on Child Abuse and Neglect (1988) estimates that one and one-half to two million children are physically abused each year in the United States. Russell (1983) found that adult women have reported rates of childhood intra-familial and extra-

familial sexual abuse in perhaps one third of all homes. Also, Finkelhor and Hoteling (1984) estimate that 150,000 to 200,000 new sexual abuse cases are perpetrated each year. In addition, children are involved in increasing numbers of violent crimes, including aggravated assaults, burglaries, and shootings, especially within urban locations.

Given the apparent phenomenon of violence against American youth, Kilpatrick, Saunders, Veronnen, Best, and Von (1987) assessed the prevalence of crime-related PTSD among 391 Charleston, S.C. residents. Utilizing the Diagnostic Interview Scale (DIS), the authors found that 295, or 75% of those children sampled, had been victimized in some way. Among those examined by Kilpatrick et al., 53% were sexually assaulted, approximately 10% were crime victims, almost 6% were robbed, and over 45% were burglarized. Among the 295 citizens who were victimized, 27.8% evidenced a lifetime PTSD diagnosis and 16.5% were PTSD positive at the time of the study. Of particular note, over 57% of female rape victims were positive for PTSD at some time in their life.

A small number of studies have been completed that examined victimization of child and adolescent groups. One study of note, Terr (1981), examined a sample of 23 children, age 5-14 years, who were abducted and buried alive in a school bus. Five months following the abduction, the children completed a comprehensive clinical interview. According to Terr, all of the children sampled suffered from acute posttraumatic emotional problems. In a four year follow-up, Terr (1983) concluded that all of the original sample continued to suffer from PTSD, despite receiving psychological counseling.

Pynoos, Frederick, Nader, Arroyo, Steinberg, Eth, Nunez, and Fairbanks (1987) examined 5-13 year old survivors of a school shooting, approximately one month following the incident. Utilizing the Reaction Index, the authors estimated that 60% of the surviving children exhibited significant PTSD symptomology. Additionally, the investigators observed that PTSD symptoms varied as a function of the degree of stress exposure, as youths exposed to catastrophic trauma exhibited the most significant emotional reactions. In

a follow-up study, Nader, Pynoos, Fairbanks, and Frederick (1990) determined that almost three fourths of those exposed to high levels of trauma during the shooting continued to exhibit significant PTSD symptoms fourteen months after the shooting. In a similar study, Schwartz and Kowalski (1991) administered a self-report inventory, similar to the Reaction Index, to 64 children who had been exposed to another school shooting. Approximately 27% met diagnostic criteria for PTSD almost one year following the incident.

As noted above, family violence and abuse is not uncommon in our society, and children often experience or witness significant trauma within their homes. As one would expect, symptoms of PTSD have been documented among children and adolescents exposed to family violence. For example, McLeer, Deblinger, Atkins, Foa, and Ralphe (1988) completed a DSM-III-R PTSD symptom checklist with 31 sexually-abused children, ages 3-16 years, who were referred from an outpatient psychiatric clinic. Fifteen youngsters, or 48% of the sample, met diagnostic criteria for PTSD. Among the children sampled, 75% met criteria for PTSD after being abused

by their fathers, 67% after abuse by strangers, and 25% were PTSD positive after abuse by other trusted adults. In a later study, McLeer, Deblinger, Henry, and Orvaschel (1991) administered the K-SADS to 92 sexually-abused children, ages 3-6 years. Like the prior study, PTSD rates varied significantly according to the abuser. In this study, 54% were PTSD positive after being abused by their fathers, 43% after abuse by trusted adults, and 10% after abuse by strangers.

McLeer, Callaghan, Henry, and Wallen (1994) examined the prevalence of psychiatric disorders among both sexually- and non-sexually-abused children, utilizing a structured clinical interview format. The groups did not differ in the number of positive DSM-III-R diagnoses. However, the observed 42.3% prevalence rate among sexually-abused children was significantly greater than the observed 8.7% prevalence rate among the non-sexually-abused children. Using a similar methodology, Merry and Andrews (1994) found that over 18% of sexually-abused children and adolescents warranted a positive PTSD diagnosis, twelve months after disclosure.

Kiser, Ackerman, Brown, Edwards, McColgan, Pugh, and Pruitt (1988) examined children who had reportedly been abused within a day care setting. Of the ten children examined, 9 (90%) met the DSM-III-R diagnostic criteria for PTSD, utilizing a structured clinical interview. In a larger follow-up study, Kiser, Heston, Millsap, and Pruitt (1991) examined 163 day care children who had been reported as physically or sexually abused. Of the abused children sampled, 55% met the DSM-III-R criteria for PTSD as indicated by a clinical interview. Adams, Everett, and O'Neil (1992) examined children, ages 4-12 years, admitted to a psychiatric out-patient unit. Of the 98 subjects sampled, over 63% reported histories of physical or sexual abuse. Clinical interviews suggested that 20% of the physically abused children and 43% of the sexually-abused children had positive PTSD diagnoses.

Disaster and Accident Studies

The occurrence of catastrophic natural disasters or accidents can have significant impact on the emotional adjustment of the victims. Although natural and industrial disasters are an unfortunate part of

life, disaster studies that have examined PTSD among the victims are relatively rare. As such, the number of studies that have researched PTSD among youth, after a natural or industrial disaster, is rather modest.

Green, Lindy, Grace, Glesser, Leonard, Korol, and Winget (1990) administered the Structured Clinical Interview for the DSM-III-R (SCID, Spitzer & Williams, 1986) to 120 adult survivors of the Buffalo Creek flood disaster. Although the assessment was conducted 14 years after the disaster, over 28% were PTSD positive in 1990. In addition, the authors reviewed the original 1974 interview data and found that over 44% of the earlier subjects would meet present DSM-III-R PTSD criteria.

Madakasira and O'Brien (1987) found a significant reaction to a tornado that devastated Pitt County, South Carolina. In the 1987 study, the authors administered an expanded version of the Hopkins Symptom Checklist (Derogatis, Lipman, & Rickles, 1974) to 116 of the tornado survivors, five months after the disaster. Madakasira and O'Brien found that 69 subjects, or over 59% of the sample, met the DSM-III

criteria for PTSD.

Three months following Hurricane Hugo, which destroyed much of Berkeley County, South Carolina, Lonigan, Shannon, Finch, Daughtery, and Taylor (1991) examined a large sample of school-age survivors. The authors administered a modified version of the Reaction Index to 5,687 children, ages 9-19. Within the sample, 5% were PTSD positive following no exposure to Hurricane Hugo, 10% were PTSD positive following mild exposure to hurricane related events, 15% were PTSD positive following moderate exposure, and 29% met criteria following severe exposure to the hurricane. The authors concluded that PTSD reactions were moderated by the degree of exposure to the traumatic, hurricane-related events, such that greater exposure was positively correlated with higher levels of psychiatric morbidity.

PTSD has also been chronicled following exposure to significant industrial accidents, such as shipping disasters (Yule et al., 1990, 1991), toxic waste spills (Earls, Smith & Young, 1988), and the Three Mile Island nuclear accident (Handford et al., 1986). In the

later, Handford, Mayes, Humphrey, Bagnato, Bixler, and Kales (1986) developed a questionnaire and administered the instrument to 35 children, ages 6-19 years, who lived nearby the nuclear reactors. None of the children surveyed were positive for PTSD 18 months after the accident. Similar results were found by Earls, Smith, and Jung (1988), who found no significant reaction on the DICA following exposure to dioxin contamination. In comparison, Milgram, Toubiana, Klingman, Raviv, and Goldstein (1988) reported a significantly greater reaction to a school bus collision among the 410 seventh grade students assessed. In response to a Hebrew version of the Reaction Index, over 57% of the subjects were found to meet PTSD criteria one week after the accident; over 16% were PTSD positive nine months following the incident.

The results suggest that PTSD reactions to various accidents varied significantly within stressor categories, in relation to the type of accident, the level of risk, and in response to the severity of the subject's exposure.

Summary

PTSD is indicated by the development of characteristic symptoms of anxiety, depression, avoidance, and arousal, following exposure to a traumatic event that is outside the realm of normal human experience. Although the nomenclature has changed, severe stress reactions have been chronicled for centuries. Early examinations of gross stress reactions were hindered by poor nosology, unreliable diagnostic measures, and an absence of adequate psychometric tools for measuring these stress reactions.

Although the psychological effects of trauma have been documented for centuries and researched for decades, the notion that people may develop significant and chronic impairments as a result of traumatic stress has not been so readily accepted. To this end, a number of studies have been presented which examined the syndromal validity of PTSD for school age children.

Whereas these studies reflect a selected overview of an expanding literature base, it is apparent that there are a good deal of empirical studies to support

the validity of the PTSD classification as a unique psychiatric entity. It is evident, however, that a good deal of variability exists in examining PTSD, both between and within stressor groups, in relation to the severity of the stressor, and in relation to the group that was traumatized. Despite this variability, it becomes clear that a small proportion of the general population will indeed exhibit the characteristic symptoms of PTSD following exposure to a sufficient stressor, and these reactions may interfere with the individual's level of functioning. It also appears that war-related events and criminal or violent victimization are associated with higher levels of PTSD, as compared with less deliberate events such as natural or industrial disasters. Silent stressors, such as a nuclear accident or chemical contamination, are associated with lower levels of PTSD.

Chapter Two

The following chapter introduces the research problem and theoretical rationale for the current dissertation study. In addition, this chapter includes information regarding the research methodology, the subject selection process, the independent and dependent measures, the case-control design, consent procedures, and the research hypotheses.

Method

Statement of Problem

"Since the time of the first world war, military psychiatrists have treated soldiers who wander off the battlefield, having forgotten their names or other pieces of important information" (Bremner et al., 1993, p. 1015). Amnesia, cognitive impairment, and difficulty with short-term and long-term recall have been well documented among adult war veterans with PTSD (Bremner et al., 1993a; Bremner et al., 1993b; Southwick, Yehuda, & Giller, 1993; Sutker, Winstead, Galina, & Allain, 1991). In addition, Gurvits, Lasko, Schachter, Khune, Orr, and Pittman (1993) determined

that Vietnam veterans with PTSD demonstrate greater neurological soft signs, as compared to non-PTSD controls. McNally et al. (1993) provided systematic evidence of cognitive variations among PTSD cases, utilizing the Stroop Color Naming Test among adult war veterans.

The selected literature review, presented in Chapter One, provides several examples of cognitive impairments among PTSD adult subjects. For example, Sutker, Winstead, Galina, and Allain (1991) found significant cognitive deficits among Korean prisoners of war (POWs). McNally, English, and Lipke (1993) found significant delays in the Stroop color-naming of emotionally charged words for PTSD veterans. Similarly, Bremner and his colleagues (1993a, 1993b) reported that adult veterans with PTSD displayed amnesia and significantly subaverage scores on the Wechsler Memory Scale, selected WAIS-R subtests, and the Verbal Selective Reminding Test. Also, Gurvits, Lasko, Schachter, Khune, Orr, and Pittman (1993) determined that Vietnam veterans with PTSD had significantly more neurological soft signs than combat

veterans without PTSD. Finally, McNally and Shin (1995) have determined that estimated WAIS-R Full-Scale IQ scores are predictive of PTSD symptomology, in that cognitive disadvantage may be a risk factor for chronic PTSD.

Examined from a child-clinical perspective, Saigh (1987a, 1987b, 1987c), determined that children with PTSD demonstrated significant improvement in their cognitive functioning following a course of in vitro flooding. Saigh, Mrouegh, and Bremner (in press) also observed that adolescents with PTSD had significantly lower achievement test scores. Additional evidence of cognitive impairment among youths with PTSD was reported by Saigh and Mrouegh (1993) and Egan (1992).

Examined comprehensively, it may be said that individuals with PTSD have manifested a wide range of intellectual impairments. On the other hand, it is also apparent that comparative information involving the cognitive performance of stress-exposed youth (aside from research on academic achievement and performance variations following imiginal exposure) with and without PTSD has not been systematically

explored.

Purpose of the Study:

The current project was designed to compare the intellectual performance of youth with PTSD relative to the performance of stress-exposed youth that do not meet diagnostic criteria for PTSD. In effect, this investigation sought to establish if stress exposure is generally associated with intellectual impairments or whether intellectual impairments are specifically associated with PTSD.

Subjects

One-hundred and sixty seven students, age 11-17, were referred for assessment by teachers, school-based support teams, and administrators from one urban and three suburban schools. All of these individuals who were referred reported histories involving abuse and/or neglect. In addition, 42 students were identified as having been exposed to abuse or neglect through institutional chart reviews.

Given that a number of studies have reported intellectual impairments among youths with: ADHD (Barclay, 1990; Barclay, DuPaul & McMurray, in press),

conduct disorder (Hogan and Quay, 1984; Hubble & Groff, 1981), depression (Blumberg & Izard, 1985; Slotkin, Forehand, Fauber, McCombs, & Long, 1988), learning disabilities (Kendall & Hammen, 1996), substance abuse (Kendall & Hammen, 1996), mental retardation, head trauma, and pervasive developmental disorder (Hodges & Plow, 1990; Nelson & Israel, 1997), subjects were excluded from the study if their school records indicated positive histories for these disorders or conditions. Youth were further excluded from the study if they were previously enrolled in special education classes or if they had been identified as having a non-physically handicapping condition. In addition, students receiving psychopharmacological medication within 30 days of the scheduled assessments were excluded. Youth who received an administration of the WISC-III within six months of the data collection were also excluded. This process led to the exclusion of 32 of 167 students.

One-hundred and thirty-five of the remaining youth received administrations of the Children's PTSD Inventory (Saigh, 1994) and the following DICA modules:

ADHD, conduct disorder, major depression and psychosis. This process led to the exclusion of 100 subjects due to comorbid conditions and the inclusion of 35 youths. Table 1 presents a description of exclusionary conditions:

Table 1

Summary of Comorbid Exclusionary Conditions

Condition	Incidence
Conduct Disorder	45
Attention-Deficit Hyperactivity Disorder	30
Major Depressive Disorder	17
Psychotic Disorder	8

Eighteen subjects met diagnostic criteria for PTSD and 17 others had been exposed to similar stressors and did not meet criteria for PTSD. The students who met criteria for a positive PTSD diagnosis reported a variety of specific stressors, but all were incidents of violent victimization. Figure 1 presents a verbatim account of the student narrative reports for the PTSD

positive group, as indicated by the Children's PTSD Inventory.

Figure 1

Narrative Reports of Traumatic Stressors

Student 1:	"My mother used to beat us with a belt. My father used to beat mom with a broom stick, especially when he was on the drugs. Mom was hurt pretty bad a few times, in the hospital, before he left".
Student 2:	"My father used to hit me a lot. The last time he hit me he threw me down the stairs and out of the house; then he chased me with the car and I had to hide in the woods until the police came".
Student 3:	"My mom's boyfriend used to beat her up. The last time it got so bad I had to stab him with a knife to stop him".
Student 4:	"I saw my brother shot. Also, my stepfather used to beat mom up really bad. He used drugs and even set fire to my house".
Student 5:	"Two boys in school took me into the locker room and forced me to have oral sex with them".
Student 6:	"Someone broke into my house and my mother got beat up really bad, put in the hospital. I was home asleep, and my neighbor woke me up...I saw mom all bloody and the ambulance came and took her to the hospital".

Figure 1 (cont.)

Student 7: "Two men drove up to the house...my father and me were on the stoop. When dad went to them they started to yell and push, and one man shot my dad in the head".

Student 8: "I've seen my father and mother fighting a lot". (?) "He used to beat her bad, punch her in the face and make her bleed. One time he split her head open and she needed stitches in the hospital ...that is when we left".

Student 9: "Got beat up by dad pretty bad. He threw me against something and I was bleeding pretty bad. Dad also beat up mom pretty bad...punched her out and made her nose bleed".

Student 10: "Mom was into the drugs pretty bad... stepdad was also into the drugs. He used to beat me up pretty bad...used a belt and a broom stick"

Student 11: "When I was little in Nicaragua, I saw a lot of bad things happen. I saw people I knew get shot, my dad was killed in the war, my mom got sick and died one night. There were bombs at night that you could hear, and lots of dead bodies"

Student 12: "When mom and dad were together they used to fight a lot. Dad would get physical with mom, and sometimes would really hurt her" (?)..."Sometimes he would punch her...she wound up in the hospital two or three times, until he left".

Figure 1 (cont.)

Student 13: "I had a date rape"..."I had a 30 year old friend who invited me to his house; one thing led to another and when I said no he forced himself on me and raped me...I couldn't stop it".

Student 14: "My parents were really mean"...they killed my cat and used to beat me with the belt. Also, I had a bad fire in the house, and got scared when the fireman came in and got me out. Also, I saw a 'drive by'...a guy I knew got shot right in front of me".

Student 15: "My brother came in the house and the police came to get him. My mother said he was not home but they saw him come in the house and pushed their way in the house. They pushed in the house and my brother ran into my room and out the window. They tried to get him but he went down the fire escape. He jumped down from there and ran out to a stream. The police caught him and beat him down real hard".

Student 16: "My uncle molested me when I was six years old. Also, I used to see my dad beat up my mom pretty bad".

Student 17: "I got hit by a car...it ran over my ankle and broke it. Also, I saw a guy from the neighborhood get beat up by the cops. Also, I had a friend get a bottle smashed over his head, he was bleeding a lot and his head was gashed open".

Figure 1 (cont.)

Student 18: "My grandfather would pick me and my brother from school when I was in second grade...with my brother in the back seat of the car he would drive to a dark part of the parking lot at the train station, and he would sexually abuse me...I had to be quiet".

Table 2 presents the distribution of the sample by race/ethnicity.

Table 2

Distribution of Sample by Race/Ethnicity

	Group		
	Overall (n = 35)	PTSD Positive (n = 18)	PTSD Negative (n = 17)
Black	11(31%)	7(39%)	4(24%)
White	11(31%)	5(28%)	6(35%)
Hispanic	9(26%)	4(22%)	5(29%)
Interracial/Other	4(12%)	2(11%)	2(12%)

A Chi-square analysis revealed no significant difference between the PTSD positive and PTSD negative

groups on measures of race/ethnicity (χ^2 = .992(3), p = .803).

Table 3 presents the distribution of the sample by gender.

Table 3

Distribution of Sample by Gender

	Group		
	Overall (n = 35)	PTSD Positive (n = 18)	PTSD Negative (n = 17)
Male	28(80%)	14(78%)	14(82%)
Female	7(20%)	4(22%)	3(18%)

A Chi-square analysis revealed no significant difference between the PTSD positive and PTSD negative groups by gender (χ^2 = .114(1), p = .735).

The Hollingshead Four-Factor Index of Social Status, a measure of the covariate (SES), was calculated for each experimental subject. The mean SES score for the sample group equaled 32.71 (SD = 13.39), with a minimum score of eight and a maximum score of

66. Table 4 presents the means and standard deviations of the comparison groups for SES.

Table 4

Means and Standard Deviations of the Comparison Groups for SES (Hollingshead Index)

Group			
PTSD Positive (n = 18)		PTSD Negative (n = 17)	
Mean	SD	Mean	SD
33.61	15.45	31.76	11.19

A t-test was calculated and indicated no significant differences between the groups for socioeconomic status (t = -.40(33), p =.69).

Diagnostic Measures

Children's PTSD Inventory: The Children's PTSD Inventory (Saigh, 1994) was utilized to diagnose PTSD among the experimental subjects. The Children's PTSD Inventory is a diagnostic interview scale developed according to the DSM-IV criteria for formulating an

Axis I diagnosis of PTSD. The inventory consists of five subtests that are scored dichotomously (1 for the presence and 0 for an absence of symptoms) for the major components of PTSD: (1) exposure to a significant trauma outside the range of usual human experience, and situational reactivity to the trauma; (2) reexperiencing the trauma through recollections or dreams; (3) avoidance of stimuli associated with the trauma and numbing of affect; (4) persistent symptoms of increased arousal; and (5) significant distress. Field trials have documented both the reliability and validity of the DSM-IV version of the Children's PTSD Inventory. In terms of inter-rater agreement, as based on 25 consecutive cases seen independently by two doctoral-level psychology students, perfect agreement (*Kappa* = 1.00, $p < .001$) was reported (Saigh, Yasik, Oberfield, Inamdar, Rubenstein, McHugh, & Nester, 1997). Saigh et al. (1997) also reported that a *Kappa* of .92 ($p < .01$) was observed when clinically-derived criterion diagnoses were compared with diagnoses that were made through administration of the Children's PTSD Inventory.

Diagnostic Interview for Children and Adolescents: The Diagnostic Interview for Children and Adolescents (DICA, Reich, 1994), a structured clinical interview, was used to diagnose a number of related disorders that are known to impact on children's intellectual performance. The DICA is divided into a series of modules that are indicative of specific childhood disorders, according to DSM-IV diagnostic criteria. Selected subtests from the DICA were used to determine the presence or absence of ADD, conduct disorder, major depression, and/or psychosis among the experimental subjects. Reliability and validity estimates for the DICA suggest that the structured interview format provides a sound diagnostic tool, far superior to informal interview methods. Inter-rater reliability estimates on the DICA indicated 85% agreement among 10 independent examiners exposed to videotaped interviews (Herjanic & Reich, 1982). Test-retest reliability estimates resulted in 89% agreement for individual symptoms, over several months. Validity for the DICA was supported by discriminant validity studies (kappa = .76), and by comparison of clinically-derived discharge

diagnoses of inpatients conducted by psychiatric personnel. A moderate kappa value was observed for ADD and conduct disordered groups.

Clinical Interview: As part of the screening process, detailed background information was collected for each experimental subject used in the study. The data were collected through informal interviews with the subjects, parents, teachers, clinical staff, and through a careful review of the child's past medical, psychological, psychiatric, and educational records. The interview was used to confirm each subject's age, school, gender, grade, and ethnicity. The clinical interview also helped determine the parent/guardian's marital status, occupation, and level of education. In addition, the interview was used to screen for prior head trauma, current medications, or any history of prior learning disabilities. The record reviews and clinical interviews were used to screen for potential confounding conditions, such as dementia, delirium, mental retardation, pervasive developmental disorder, and substance-related disorders, and to insure the subjects were not taking psychopharmacological

medication. All background information was included on the standardized "research cover sheet" (See Appendix A).

Dependent Variables:

WISC-III: Intellectual performance was measured by the Wechsler Intelligence Scale for Children-Third Edition (Wechsler, 1991, WISC-III), an individually-administered clinical instrument for assessing the intellectual ability of school-age children. The WISC-III represents the most widely utilized and accepted intellectual measure currently in use in the United States (Sattler, 1992). The WISC-III is organized into a four factor model (Wechsler, 1991) which includes Factor I: Verbal Comprehension (VC); Factor II: Perceptual Organization (PO); Factor III: Freedom from Distractibility (FD); and Factor IV: Processing Speed (PS). Figure 2 presents the WISC-III subtest composition of each factor-based index:

Figure 2

Indices Derived from Factor Analysis of Subtests

Subtest	VC	PO	FD	PS
Picture Completion		X		
Information	X			
Coding				X
Similarities	X			
Picture Arrangement		X		
Arithmetic			X	
Block Design		X		
Vocabulary	X			
Object Assembly		X		
Comprehension	X			
Symbol Search				X
Digit Span			X	

The WISC-III contains 13 subtests, six of which form the Verbal Scale (Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span) and seven of which form the Performance Scale (Picture Completion, Coding, Picture Arrangement, Block Design,

Object Assembly, Symbol Search, and Mazes). Performance on the 13 subtests were tabulated into the Verbal IQ (VIQ), Performance IQ (PIQ), and Full Scale IQ (FSIQ) Scores. In addition to the three IQ scores around which the WISC-III is organized, factor-based index scores were also calculated (Verbal Comprehension, Perceptual Organization, Freedom from Distractibility, and Processing Speed).

The WISC-III was standardized with a sample of 2,200 cases, including 200 children from each of eleven age groups ranging six to sixteen years (Wechsler, 1991). The sample included 100 males and 100 females for each age group, and were proportionate for such factors as race, parental education and geographic region, according to U.S. census data. Sattler (1992) notes that the WISC-III has excellent reliability. The three scales have internal consistency reliability coefficients of .89 or above across the entire standardization group. Split-half correlations for the individual subtests range from .70 to .87. Average internal consistency for the Full Scale IQ Score is .96. Test-retest reliability was assessed with 353

children from six age groups, with intervals ranging from 12 to 63 days (Wechsler, 1991). Stability coefficients for the Full Scale IQ ranged from .92 to .95. Inter-scorer agreement on all the WISC-III subtests averaged in the high .90s. Construct validity, as determined by factor analysis, has determined that the Full Scale IQ Score represents a fair estimate of *g*, or global ability. Concurrent and predictive validity studies reported in Wechsler (1991) found the WISC-III to be highly correlated with other intellectual measures. Concurrent validity estimates indicate the WISC-III FSIQ to be highly correlated (r = .89) with the earlier WISC-R FSIQ.

A detailed description of each WISC-III subtest, IQ and index scores is provided below:

Information: The Information subtest contains 30 questions that sample a broad range of general knowledge, including names of objects, dates, and historical, scientific, and geographical facts. Performance on this subtest is a good measure of general ability and is dependent on subjects' long-term memory, social and cultural background, and the extent

of their formal and informal educational opportunity. Wechsler (1991) notes the Information subtest has a split-half reliability coefficient of .84, and correlates highly with the Vocabulary (r = .70) and Similarities (r = .66) subtests, and the VIQ (r = .75).

Similarities: The Similarities subtest contains 19 pairs of words; the child is required to explain the similarity between the two items in each pair. After several initial one point items, the subject may earn either zero, one, or two points, depending on the conceptual level of his or her response. This subtest most closely measures verbal concept formation, although Similarities may also tap long-term memory, expressive language skills, and cultural opportunities. Similarities has a split-half reliability coefficient of .81 and correlates most highly with Vocabulary (r = .69) and Information (r = .66) (Wechsler, 1991). It correlates moderately with the FSIQ (r = .72) and VIQ (r = .75), and to a lesser degree with the PIQ (r = .55).

Arithmetic: The Arithmetic subtest contains 24 mathematics problems, each of which must be solved

without paper and pencil. Initial problems may involve simple counting or operations (addition, subtraction), while the later problems may involve multi-step word problems. Each item contains a time limit, with bonus points available on the final six items for swift problem completion. The Arithmetic subtest requires the child to follow verbal directions, concentrate on selected parts of the word problem, use numerical problem solving, and work within a time limit. The subtest is a fair measure of general ability, and has a high loading for the Freedom from Distractability factor. Arithmetic has a split-half reliability coefficient of .78, and correlates most highly with Similarities (r = .55) and Information (r = .57) (Wechsler, 1991). It correlates moderately with the FSIQ (r = .65) and VIQ (r = .62), and to a lesser degree with the PIQ (r = .54).

Vocabulary: The Vocabulary subtest contains 30 words arranged in order of increasing difficulty. The subject is asked to explain orally (define) each word presented, and the response is awarded zero, one, or two points, depending on the accuracy of the response.

This test of word knowledge may tap a variety of factors, such as verbal fluency, learning ability, richness of ideas, long-term memory, and concept formation. The Vocabulary subtest is the best measure of general ability and is the most reliable WISC-III subtest. Vocabulary has a split-half reliability coefficient of .87, and correlates most highly with Similarities (r = .69), Information (r= .70), and Comprehension (r = .64) (Wechsler, 1991). It correlates moderately with the FSIQ (r = .74) and VIQ (r = .78), and to a lesser degree with the PIQ (r = .56).

Comprehension: The Comprehension subtest contains 18 questions that deal with problem situations involving social and ethical mores, interpersonal relations, knowledge of one's body, and an awareness of the world around us. Comprehension involves understanding a given situation and utilizing proper judgement and problem solving skills. Responses may reflect a child's moral and cultural knowledge, social judgement, common sense, and the subject's grasp of social conventionality. The Comprehension subtest is a

good measure of general ability and is highly loaded on the Verbal Comprehension factor. Comprehension has a split-half reliability coefficient of .77 and correlates most highly with Vocabulary (r = .64), Similarities (r = .59) and Information (r = .56) (Wechsler, 1991). It correlates moderately with the FSIQ (r = .64) and VIQ (r = .67), and to a lesser degree with the PIQ (r = .49).

Digit Span: For the supplementary Digit Span subtest, the child listens to a series of digits given orally by the examiner and then is asked to repeat the digits from memory. In the first part, Digits Forward, the subjects are asked to repeat strings of numbers from two to nine digits in length. Digits Backwards, which follows, involves recalling series of numbers from two to eight digits in length, in reverse order. Digit Span is a reliable measure of short-term auditory memory and concentration. While Digits Forward primarily involves rote learning and memory, Digits Backwards involves more advanced mental imagery and numerical sequencing. Digit Span has a split-half reliability coefficient of .85 and correlates most

highly with Arithmetic (r = .43) (Wechsler, 1991). It correlates poorly with the FSIQ (r = .43), VIQ (r = .42), and PIQ (r = .35).

Picture Completion: The Picture Completion subtest contains 30 drawings of objects from everyday life, each missing an important element which the child must identify. The subject must identify and name the missing object within a twenty-second time limit. This subtest measures visual discrimination, attention to detail, reasoning, alertness, and concentration. Also, Picture Completion may measure perceptual and conceptual abilities and the ability to discriminate essential from non-essential details. Picture Completion is a fair measure of general ability and draws highly from the Perceptual Organization factor. Picture Completion has a split-half reliability coefficient of .77 and correlates most highly with Block Design (r = .52), Object Assembly (r = .49), and Information (r = .47) (Wechsler, 1991). It correlates poorly with the FSIQ (r = .58), VIQ (r = .52), and PIQ (r = .54).

Coding: The Coding subtest requires the child to

copy symbols that are paired with other symbols, such as numerals. Coding A is administered to children under eight years of age, while the more complex Coding B is utilized for subjects 8 to 16 years of age. Coding measures the subject's ability to learn an unfamiliar task and taps the child's clerical speed and accuracy, visual-motor coordination, short-term memory, and concentration. Coding also measures the child's performance on speeded (timed) tasks. Coding is a poor measure of general ability, but does load for the Freedom from Distractability factor. Coding has a split-half reliability coefficient of .79 and correlates most highly with Symbol Search (r = .53) (Wechsler, 1991). It has a low correlation with the FSIQ (r = .33), VIQ (r = .29), and PIQ (r = .32).

Picture Arrangement: For Picture Arrangement, the subject is required to place a series of related pictures into a logical sequence, within a specified period of time. The 14 series of pictures are similar to short comic strips, but without words or written cues. This subtest measures the child's ability to comprehend and evaluate a total situation, while using

trial-and-error experimentation to solve the problem. Picture Arrangement measures the subject's ability to form a whole from it's parts, planning ability, visual organization, and reasoning. This subtest represents only a fair measure of general ability, but is loaded on the Perceptual Organization factor. Picture Arrangement has a split-half reliability coefficient of .76 and correlates most highly with Block Design (r = .41), Information (r = .40), Vocabulary (r = .40), and Similarities (r = .39) (Wechsler, 1991). It has a low correlation with the FSIQ (r = .52), VIQ (r = .45), and PIQ (r = .49).

Block Design: The Block Design subtest contains 12 items and consists of two-dimensional red and white printed figures and three-dimensional blocks used to form the pictured figures. This subtest measures the child's ability to perceive and analyze forms by breaking down the whole design into component parts and then assembling the blocks to represent the whole figure. Block Design is the best measure of general ability among the Performance Scale subtests and is highly related to the Perceptual Organization factor.

Block Design has a split-half reliability coefficient of .87 and correlates most highly with Object Assembly (r = .61), Picture Completion (r = .52), and Arithmetic (r = .52) (Wechsler, 1991). It has a moderate correlation with the FSIQ (r = .66), and the PIQ (r = .65), and to a lesser degree with the VIQ (r = .57).

Object Assembly: The Object Assembly subtest requires that the subject assemble jigsaw puzzle pieces into common objects, within a specific time limit. Additional points are awarded for swift completion of the puzzles. Object Assembly tests the subjects ability to synthesize objects into a whole, as well as the subject's visual-motor dexterity and perceptual ability. This subtest represents a fair estimate of general ability and is loaded on the Perceptual Organization factor. Object Assembly has a split-half reliability coefficient of .69 and correlates most highly with Block Design (r = .61) (Wechsler, 1991). It has a somewhat low correlation with the FSIQ (r = .58), a moderate correlation with the PIQ (r = .60), and a low correlation with the VIQ (r = .48).

Symbol Search: The supplementary Symbol Search

subtest requires the subject to quickly recognize familiar symbols present within an array of symbols, within a limited amount of time. The subject is asked to identify (Yes/No) whether a simple geometric figure appears imbedded within a series of similar figures. Part A is given to children under 8 years, while the more complex Part B is administered to children 8 to 16 years of age. This subtest measures attention to detail, clerical speed, and concentration. Symbol search is not strongly related to general ability, but is loaded for the Processing Speed factor. Symbol Search has a split-half reliability coefficient of .76, and correlates most highly with Coding (r = .53) (Wechsler, 1991). It has a somewhat low correlation with the FSIQ (r = .56), PIQ (r = .58), and VIQ (r = .44).

Mazes: The supplementary Mazes subtest consists of ten maze problems where the child is asked to draw a pencil line from the center of the maze to the outside, with few clerical errors and within a limited amount of time. In order to complete each maze successfully, the subject must follow directions, use planning and

strategy, and demonstrate good fine-motor dexterity. Mazes is a poor indicator of general ability, but does contribute moderately to the Perceptual Organization factor. According to Wechsler (1991), mazes has a split-half reliability coefficient of .70 and correlates most highly with Block Design (r = .31). It has a low correlation with the FSIQ (r = .31), PIQ (r = .35), and VIQ (r = .23).

Verbal Comprehension Index: This index score is formed by combining the results of the Information, Similarities, Vocabulary, and Comprehension subtest scores of the WISC-III. Verbal Comprehension measures verbal knowledge and understanding obtained by formal and informal education, and reflects the application of verbal skills to new situations. This measure of verbal ability is a variable common to most of the Verbal Scale subtests. According to Wechsler (1991), the split-half reliability coefficient for this index is .94, with a stability coefficient of .93.

Perceptual Organization Index: This index score is formed by combining the results of the Picture Completion, Picture Arrangement, Block Design, and

Object Assembly subtests. This index score measures the subject's ability to interpret and organize visually perceived material while working under a time limit. The index score measures a factor common in most of the Performance Scale subtests. According to Wechsler (1991), the split-half reliability coefficient for this index is .90, with a stability coefficient of .87.

Freedom from Distractibility Index: This index score is formed by combining the results of the Arithmetic and supplementary Digit Span subtests. The Freedom from Distractibility score measure the subject's ability to attend and concentrate, but also may be related to numerical proficiency and sequencing skills. According to Wechsler (1991), the split-half reliability coefficient for this index is .87, with a stability coefficient of .82.

Processing Speed Index: This index score is formed by combining the results of the Coding and supplementary Symbol Search subtests. Processing Speed involves the subject's ability to employ a high degree of attention and concentration in processing

information rapidly by scanning an array. According to Wechsler (1991), the split-half reliability coefficient for this index is .85, with a stability coefficient of .84.

Verbal IQ: The Verbal IQ is formed by combining the results of the Verbal Scale subtests. The deviation IQ is determined by comparing the examinee's score with those earned by a representative sample of age peers. The Verbal IQ measures the subject's performance across the full battery of verbal and verbal comprehension tasks. According to Wechsler (1991), the split-half reliability coefficient for the Verbal IQ is .95, with a stability coefficient of .94.

Performance IQ: The Performance IQ is formed by combining the results of the Performance Scale subtests. The deviation IQ is determined by comparing the examinee's score with those earned by a representative sample of age peers. The Performance IQ measures the subject's performance across the full battery of tasks involving performance, perceptual organization, and non-verbal abilities. According to Wechsler (1991), the split-half reliability coefficient

for the Performance IQ is .91, with a stability coefficient of .87.

Full Scale IQ: The Full Scale IQ is formed by combining the results of the Verbal and Performance subtests, excluding the supplementary subtests under normal test conditions. The deviation IQ is determined by comparing the examinee's score with those earned by a representative sample of age peers. The Full Scale IQ represents the most reliable and accurate predictor of general ability. This score is also highly related to scholastic aptitude and the child's potential for academic success. According to Wechsler (1991), the split-half reliability coefficient for the Full Scale IQ is .96, with a stability coefficient of .94.

Covariate

Hollingshead Four Factor Index of Social Status: The Hollingshead Four Factor Index of Social Status (Hollingshead, 1975) was utilized as a covariate, since a positive correlation (r = .33) has been reported between a family's socioeconomic status and children's intelligence test scores (Sattler, 1992). The Hollingshead index is conceptually based on a

multidimensional model of social status, derived from four factors: (1) occupation; (2) level of education; (3) marital status; and (4) gender. The Hollingshead index provides a composite score (ranging from 8 to 66) derived from the first three factors. Parental occupation is graded on a 9-point scale ranging from manual laborers (level 1) to higher executives (level 9), based on United States census ratings. Education level, based on the number of years of school achievement, is scored on a 7-point scale ranging from less than seventh grade (level 1) to graduate/ professional training (level 7). The third factor, marital status, is used to determine whether one or two parent's occupational data should be utilized in calculating a SES score. For example, Hollingshead Index scores may be based on one family member's occupation (i.e., single, head of household) or an average of two occupations (i.e., two spouses gainfully employed). The last factor, gender, is not considered in the Hollingshead scoring.

The Hollingshead index has been utilized in a variety of psychological and sociological studies to

examine such factors as juvenile delinquency (Gray-Ray & Ray, 1990), maladaptive behavior (Peniston & McLean, 1979), behavioral disorders (Suh & Carlson, 1977), language functioning (Geffner & Hochberg, 1976), and visual-motor malformation (Amante, 1975). Validity data (construct) for both education and occupation is based upon 1970 census data and the National Opinion Research Council (NORC), and ranges from .835 (males) to .849 (females). The Hollingshead index and the NORC prestige index are correlated at r = .927. Gottfried (1985) reported that the Hollingshead index was extremely reliable in test-retest conditions, and was highly correlated (r = .672 - .781) with other SES measures. Gottfried (1986) concluded that the Hollingshead index represents a "highly reliable and valid measure of socioeconomic differentiation in the United States" (p. 86).

Procedure

Two masters-level psychology students functioned as examiners for the initial phase of the dissertation study. The examiners were trained to administer and score the DICA and Children's PTSD Inventory in analog

training sessions, under the supervision of a New York State certified school psychologist. The examiners were naive regarding each subject's previous diagnosis. The examiners received a research cover sheet which included identifying information about each subject (e.g., the reason for referral, pertinent family information, history of prior trauma, and school information).

During the initial phase of the study, the examiners administered the Children's PTSD Inventory and the selected subtests of the DICA. The Children's PTSD Inventory and the DICA are individually administered structured clinical interviews designed to reliably diagnose psychiatric disorders according to DSM-IV criteria. The examiners also collected detailed information regarding the subject's backgrounds through a semi-structured interview. The initial phase of the study required a 30-40 minute interview.

Subjects who met the criteria for inclusion in the study received an administration of the WISC-III. The intellectual assessments were conducted by several New York State certified school psychologists. The WISC-

III administration required between 60 and 85 minutes. The examiners were not aware of the subject's PTSD diagnosis. Subtest, IQ and index scores were calculated according to the WISC-III procedure manual.

Informed Consent

The parents/legal guardians and subjects were advised both verbally and in writing regarding the purpose of the investigation, procedures to be utilized, and potential drawbacks of the procedures. The guardians and students were given an opportunity to ask questions regarding the study. Following this, written consent (see Appendix C) for the study was obtained from each subject prior to data collection. The participants were provided an opportunity to review the test results and receive test reports. Also, the children were verbally advised regarding the test procedures and the voluntary nature of their participation. The subjects were also informed that they may terminate their involvement in the study at any time, without reprimand.

Design

A case-control design methodology was utilized in

the proposed research study. According to Schlessman and Stolley (1982), case-control research designs contrast a disorder of interest to a related condition and a non-clinical control group. Figure 3 presents a schematic representation of the dependent variables for which comparisons were made.

Figure 3: List of Dependent Variables for Which Comparisons Were Made

	PTSD Positive	PTSD Negative
WISC-III Verbal Subtests		
Information		
Similarities		
Arithmetic		
Vocabulary		
Comprehension		
Digit Span		
WISC-III Performance Subtests		
Picture Completion		
Coding		
Picture Arrangement		
Block Design		
Object Assembly		
Symbol Search		

Figure 3 (cont.)

Verbal Comprehension Index

Perceptual Organization Index

Freedom from Distractability Index

Processing Speed Index

Verbal IQ

Performance IQ

Full Scale IQ

Rationale and Hypotheses

Given the prior evidence of cognitive impairment among children and adults with PTSD, it is reasonable to anticipate that children with PTSD will demonstrate general intellectual impairment on the WISC-III. No intellectual impairment was anticipated for the stress exposed PTSD negative subjects. As such, the following hypothesis was predicated regarding the subject's overall WISC-III performance:

HO1: The Full Scale IQs of the PTSD group will be significantly lower than the Full Scale IQs of the PTSD negative group.

According to the DSM-IV, children with PTSD often develop characteristic symptoms which include

psychogenic amnesia, difficulty with concentration, and an inability to complete tasks. In addition, the prior research suggests that subjects with PTSD exhibit associated features, such as soft neurological impairment, intrusive cognitions, problems with selected attention, and memory impairment. For example, Saigh (1987a, 1987b, 1987c) demonstrated significant short-term memory impairment among children and adolescents with PTSD. As such, it was predicted that the performance of PTSD positive subjects would be significantly impaired on specific WISC-III tasks that involve attention, concentration and short-term memory. In view of these points, the following hypotheses were proposed:

HO2: The Freedom from Distractability Index scores of the PTSD group will be significantly lower than the scores for the PTSD negative group.

HO3: The Processing Speed Index scores of the PTSD group will be significantly lower than the scores for the PTSD negative group.

HO4: The Arithmetic scaled scores of the PTSD group will be significantly lower than the scores for the

PTSD negative group.

HO5: The Digit Span scaled scores of the PTSD group will be significantly lower than the scores for the PTSD negative group.

HO6: The Coding scaled scores of the PTSD group will be significantly lower than the scores for the PTSD negative group.

HO7: The Symbol Search scaled scores of the PTSD group will be significantly lower than the scores for the PTSD negative group.

A careful review of the literature failed to reveal additional cognitive skills that are characteristically associated with PTSD. Indeed, there is a paucity of evidence to suggest impairment across Factor I: Verbal Comprehension or Factor II: Perceptual Organization of the WISC-III, for these childhood clinical groups. This would include the following WISC-III scaled subtest and index scores: Information, Similarities, Vocabulary, Comprehension, Picture Completion, Picture Arrangement, Block Design, Object Assembly, Verbal Comprehension Index, and the Perceptual Organization Index. Therefore, the present

investigator was not able to offer a rationale to anticipate significant between group differences for these factors. In view of this, the following hypotheses were tested:

HO8: The Information scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO9: The Similarities scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO10: The Vocabulary scaled scores of the PTSD positive and the PTSD negative control groups will not be significantly different.

HO11: The Comprehension scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO12: The Picture Completion scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO13: The Picture Arrangement scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO14: The Block Design scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO15: The Object Assembly scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO16: The Mazes scaled scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO17: The Verbal Comprehension Index scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO18: The Perceptual Organization Index scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO19: The Verbal IQ scores of the PTSD positive and PTSD negative groups will not be significantly different.

HO20: The Performance IQ scores of the PTSD positive and PTSD negative groups will not be significantly different.

Chapter Three

Results

This chapter describes the data analysis for the current study. Descriptive statistics as well as summary statistics are presented for the sample. In addition, information involving the data analyses is presented.

Initially, raw scores on the WISC-III were converted to age appropriate scaled scores, according to the directions for administration and scoring. Performance on the thirteen subtests, three IQ scores, and four index scores were tabulated. A mean score and standard deviation for the comparison groups (PTSD Positive or PTSD Negative) was calculated for each subtest, IQ, and index score.

Three separate Multivariate Analysis of Covariance (MANCOVA) analyses were performed in order to test the hypotheses listed in chapter two. The first analysis utilized the thirteen WISC-III subtest scores as dependent measures, while the second analysis

considered IQ score differences, and the third analysis examined the four index scores as the dependent measures. The MANCOVA procedures were utilized in lieu of performing 20 separate ANCOVA analyses in order to reduce the probability of a Type I error (Tabachnick & Fidell, 1989). However, it would be inappropriate to perform a single MANCOVA procedure because the dependent variables are linearly dependent. In each of the three MANCOVA procedures the independent variable was PTSD group with two levels (PTSD Positive, PTSD Negative), and the covariate was socioeconomic status (Hollingshead Index Score).

The first analysis, which examined between group differences as measured by the WISC-III subtest scores, revealed no significant differences on any of the dependent measures using a multivariate Wilks Lambda test, $F(13,20) = .59$, $p < .43$. Table 5 contains the means and standard deviations, adjusted for SES, for each of the WISC-III subtest scores, along with the univariate F statistics and p values for each variable.

Table 5

MANCOVA Statistics for WISC-III Subtest Analysis

	PTSD Positive		PTSD Negative			
Variable	Mean	SD	Mean	SD	F	p
Information	8.50	2.94	7.82	2.46	.44	.51
Similarities	8.50	3.31	8.82	2.88	.16	.69
Arithmetic	7.28	2.89	8.35	2.26	1.41	.24
Vocabulary	8.28	2.95	7.76	3.27	.18	.67
Comprehension	8.72	2.52	8.24	2.80	.21	.65
Digit Span	8.78	3.21	9.65	2.57	.82	.37
Picture Completion	10.06	2.80	9.71	2.97	.11	.74
Coding	7.33	2.64	8.18	3.61	.58	.45
Picture Arrangement	7.17	4.05	8.59	2.69	1.61	.21
Block Design	7.83	3.33	8.82	2.24	1.33	.26
Object Assembly	8.33	3.20	8.00	2.53	.08	.78
Symbol Search	8.50	3.09	8.47	3.20	.00	.99
Mazes	8.61	3.10	8.65	1.84	.00	.97

Note. Adjusted for S.E.S.

Given the observed results, none of the hypotheses for the WISC-III subtest scores can be supported.

The second analysis, which examined between group differences as measured by the WISC-III IQ scores, revealed no significant group differences on any of the dependent measures using a multivariate Wilks Lambda test, $F(3,30) = .91$, $p < .39$. Table 6 contains the means and standard deviations, adjusted for SES, for each of the WISC-III IQ scores, along with the univariate F statistics and p values for each variable.

Table 6

MANCOVA Statistics for WISC-III IQ Analysis

	PTSD Positive		PTSD Negative			
Variable	Mean	SD	Mean	SD	F	p
Verbal IQ	90.28	13.07	90.06	11.78	.00	.99
Performance IQ	88.67	14.89	91.53	12.66	.46	.51
Full Scale IQ	88.61	13.06	90.18	12.08	.21	.65

Note. Adjusted for S.E.S.

Given the observed results, none of the hypotheses for the WISC-III IQ scores can be supported.

The third analysis, which examined group differences as measured by the WISC-III index scores, revealed no significant between group differences on any of the dependent measures using a multivariate Wilks Lambda test, $F(4,29) = .88$, $p < .44$. Table 7 contains the means and standard deviations, adjusted for SES, for each of the WISC-III indexd scores, along with the univariate F statistics and p values for each variable.

Table 7

MANCOVA Statistics for WISC-III Index Analysis

	PTSD Positive		PTSD Negative			
Variable	Mean	SD	Mean	SD	F	p
Verbal Comp.	92.06	12.99	90.12	13.23	.12	.74
Percep. Org.	91.67	15.26	93.53	12.38	.23	.63
Freedom Dist.	89.78	12.29	95.35	11.97	1.81	.19
Proc. Speed	90.50	15.19	90.59	15.09	.00	1.0

Note. Adjusted for S.E.S.

Given the observed results, none of the hypotheses for the WISC-III index scores can be supported. It should be noted that the adjusted means in the MANCOVA analysis are very similar to the means not adjusted for S.E.S., as noted in Table 6, because the covariate (SES) was not found to be a significant predictor of the dependent measures in the current analysis.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary

The present study compared the WISC-III subtest, IQ, and index scores of two groups of adolescents, PTSD positives and stress exposed PTSD negatives. Students with a history of learning or mental disorders, head trauma, substance abuse, and those taking psycho-pharmacological medication were excluded from the study. Also, students with co-morbid ADHD, conduct disorder, major depression, or psychosis were excluded. A total of 167 adolescents, age range 11-17 years, were sampled from urban and suburban schools. Thirty-five subjects were selected for inclusion in the study. The subject groups were comparable in respect to race/ethnicity, gender, and SES.

Three separate MANCOVAs were performed in order to test for WISC-III subtest, IQ, and index differences between diagnostic groups. Data analysis revealed no significant between group differences for all of the dependent measures, while controlling for SES.

Although the results suggest a positive trend in the anticipated direction for several of the hypotheses that were listed, the data analysis failed to support these hypotheses. A general discussion regarding the observed results, implications of the study, limitations, and directions for future research is presented in this chapter.

Discussion and Implications

The non-significant differences observed between the PTSD positive and the stress exposed PTSD negative groups, as reported in the previous chapter, do not support the hypotheses of between group differences as measured by the WISC-III. It may also be said that these results contradict the adult literature on PTSD, which have reported significant deficits in short-term memory and concentration among adults with PTSD.

It is recalled that Sutker, Winstead, Galina, & Allain (1991) reported significant cognitive deficits among Korean POWs for both the WAIS-R and the Wechsler Memory Scale. McNally, English, and Lipke (1993) also reported significant delays in the Stroop color-naming

of emotionally charged words among PTSD veterans. Similarly, Bremner and his colleagues (1993a, 1993b) reported that adult veterans with PTSD displayed amnesia and significantly subaverage scores on the Wechsler Memory Scale, selected WAIS-R subtests, and the Verbal Selective Reminding Test. The results also seem to contradict pioneering research from the child-clinical perspective (Saigh, 1987a; Saigh, 1987b; Saigh, 1987c; Saigh & Mrouegh, 1993; Saigh, Mrouegh, & Bremner, in press), which has reported scholastic impairments and deficits in short-term memory, concentration, and achievement test performance among both child and adolescent groups.

It should be recalled that the DSM-IV (1994) specifies that individuals with PTSD have an increased risk for several related problems, such as panic attacks, major depressive disorder, self-destructive behavior, and substance abuse.

McLeer, Callaghan, Henry, and Wallen (1994) reported that 23.1% of the sexually abused youth had PTSD and ADHD; 15.4% had PTSD and conduct disorder

(CD); and 11.5% had PTSD, ADHD and CD. The authors also reported that PTSD was not the most frequently diagnosed disorder among the sexually abused subjects, as 46.0% met diagnostic criteria for ADHD. Merry and Andrews (1994) reported that only two of the PTSD positive cases (16.7%) met criteria for PTSD alone. Eighty-three percent of those youth presenting with PTSD met the criteria for at least one other psychiatric condition as determined by administration of the DISC-II. Separation anxiety was evidenced in 41.6% of the youth with PTSD. Twenty-five percent of the youth with PTSD met criteria for oppositional defiant disorder. Similarly, 25.0% met criteria for ADHD. Major depression was denoted in 16.7% of the youth with PTSD. Overanxious disorder, functional enuresis and depressive disorder (NOS) were noted at 8.3% of the PTSD sample. In a similar study, Diamond, Saigh, and Fairbank (in press) utilized the DICA-P to examine comorbidity among 17 preschool youth who meet criteria for PTSD following physical abuse. Of these preschoolers, one (5.8%) met criteria for ADHD and one

(5.8%) also met criteria for a speech disorder.

It is also of interest to note that many of the studies that reported significant variations on measures of cognitive functioning when stress exposed individuals with and without PTSD were compared, had not controled for the potential influence of comorbid disorders. As such, the results that were reported by earlier investigators may have been affected by the presence of comorbid conditions and not exclusively PTSD. Given these points and the extant findings, one may question if concentration and short-term memory impairment is a symptom of PTSD or if the existing literature has reflected the influence of PTSD and a related disorder.

Examined from a different perspective, it is important to recall that the WISC-III is an omnibus index of cognitive functioning (Sattler, 1992) that was not expressly constructed to denote concentration impairment. It is recalled that the content of a number of WISC-III subtests is indicative of academic skills and social knowledge (e.g., the Information,

Vocabulary, Arithmetic and Comprehension subtests) that are less likely to measure impaired concentration. As such, it may be argued that the WISC-III is not sensitive to the type of cognitive impairment that is experienced by children and adolescents with PTSD.

The effects of testing may have also contributed to the nonsignificant results that were observed. Since many of the subjects were drawn from a clinical sample, it is possible that these individuals had received a prior administration of the WISC-III. It is to be noted that New York state mandates a triennial psychological examination every three years, and these evaluations often include an administration of the WISC-III. Although subjects were excluded if they had received a WISC-III administration less than six months before they were seen by the investigator, the possibility of a "practice effect" can not be ruled out.

It is also important to note that SES (the covariate) was not a significant predictor of IQ for the selected sample, despite a positive correlation

between SES and IQ in the general population. The results revealed that the adjested means were very similar to the means not adjusted for S.E.S., as the covariate did not significantly predict the dependent measures. In effect, this suggests that the covariate did not account for a significant amount of the variability in the sample. Therefore, the use of SES as a covariate did not add to the power of the data analyses.

Limitations

The observed results must be tempered with the realization that the subject pool consisted of 28 males and 7 females with an age range of 11 to 17 years. It should also be noted that the subjects were carefully selected from a clinically-referred population. In addition, the selected subjects were screened to control for the effects of a number of comorbid disorders. While this approach presents a good deal of theoretical merit, it should be understood that PTSD generally occurs with other disorders (e.g., ADHD; major depression; and conduct disorder). As such, the

external validity of the observed results may be limited to comparison groups with similar demographic and clinical characteristics.

The observed results should also be tempered with the understanding that the dependent variable involved a standardized, individually-administered omnibus intellectual measure, which was employed on a single occasion in the subject's development. In view of this, it is possible that a different outcome may have been observed if a different cognitive measure had been employed, if the measure had been completed at another point in the child's development, or if another examiner had been utilized.

Finally, given that the principal investigator was involved in both the screening\selection of subjects and the data analysis, the possibility on an examiner expectation effect must be considered. Barber and Silver (1968) reported that an examiner's expectancies and desires can significantly affect the outcome of an experiment. The examiner's expectancies can impact on results due to the possibility of intentionality, vague

criteria, misrecording of responses, or fudging of data. Although procedural safeguards were in place to minimize the risk of bias, an examiner expectation effect may have occurred.

Recommendations

Given the observed results in the present study, a number of recommendations for future research are indicated. These recommendations are as follows:

1. In view of the nonsignificant differences between the PTSD positive and PTSD negative adolescents, it is recommended that future researchers should effect a follow-up study with a larger sample size. Given the additional power that is associated with a larger sample, it is conceivable that a statistically significant outcome may be observed.

2. It is also recommended that future researchers effect a similar study with different dependent variables more sensitive to concentration or memory impairment. There are several commercially available cognitive tools designed specifically for measuring problems with memory or concentration. Measures such

as the Wechsler Memory Scale-Revised (Wechsler, 1987) or the Wide Range Assessment of Memory and Learning (Adams & Sheslow, 1990) may represent more sensitive measures of cognitive impairment.

3. Future researchers may wish to effect a similar study utilizing a design with several different groups such as PTSD only, PTSD and ADHD, PTSD and CD, PTSD and major depression, and stress exposed PTSD negative. Such a design would be of value in comparing youths with "pure" PTSD to youths with PTSD and frequently observed comorbid disorders.

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Appendix Listing

Appendices

Appendix A

RESEARCH COVER SHEET

NAME_____ SCHOOL_____
DATE OF BIRTH_____ GRADE_____
DATE OF EVAL_____ ETHNICITY_____
AGE_____ GENDER_____
FATHER OCCUP:_____ MOTHER OCCUP:_____
FATHER EDUC:_____ MOTHER EDUC:_____
FAMILY MAKEUP:_____ S.E.S. SCORE_____

DICA ADHD SCORE _____ YES NO
DICA C-D SCORE _____ YES NO
DICA MOOD SCORE _____ YES NO
DICA PSYCHOT. SCORE _____ YES NO
SIGNIFICANT HEAD TRAUMA? YES NO
LEARNING DISABLED? YES NO
PDD/DELIRIUM/DEMENTIA/SUBSTANCE ABUSE? YES NO

PTSD INVENTORY SCORE PTSD NEGATIVE ____ ____
PTSD POSITIVE ____ ____
Circle: Acute PTSD Chronic PTSD Delayed Onset PTSD

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WISC-III SCORE

VERBAL SUBTESTS		PERFORMANCE SUBTESTS	
Information	___	Picture Completion	___
Similarities	___	Coding	___
Arithmetic	___	Picture Arrangement	___
Vocabulary	___	Block Design	___
Comprehension	___	Object Assembly	___
(Digit Span)	___	(Symbol Search)	___
		(Mazes)	___

VERBAL IQ	___	VERBAL COMPREHENSION	___
PERFORMANCE IQ	___	PERCEPTUAL ORGANIZATION	___
FULL SCALE IQ	___	FREEDOM FROM DISTRACT.	___
		PROCESSING SPEED	___

NARRATIVE ACCOUNT OF PTSD INCIDENT

_____

_____

Appendix B

Section 1012 of the Family Court Act defines an abused child as follows:

1. "Abused child" means a child less than 18 years of age whose parent or other person legally responsible for his or her care -

   (a) inflicts or allows to be inflicted upon such child physical injury by other than accidental means which causes or creates a substantial risk of death, or serious or protracted disfigurement, or emotional health or protracted loss or impairment of the function of any bodily organ, or

   (b) creates or allows to be created a substantial risk of physical injury to such child by other than accidental means which would be likely to cause death or serious or protracted impairment of physical or emotional health or protracted loss or impairment of the function of any bodily organ, or

   (c) commits, or allows to be committed, a sex offense against such child, as defined in the penal law, provided, however, that the corroboration requirements contained therein shall not apply to proceedings under this article.

Section 1012 of the Family Court Act defines a neglected child as follows:

2. "Neglected child" means a child less than 18 years of age -

   (a) whose physical, mental, or emotional condition has been impaired or is in imminent danger of becoming impaired as a result of the failure of his or her parent or other person legally responsible for his or her care to exercise a minimum degree of care

1. in supplying the child with adequate food, shelter or education in accordance with provisions of part one of article sixty-five of the education law, or medical, dental, optometrical or surgical care though financially able to do so or offered financial or other reasonable means to do so; or

2. in providing the child with proper supervision or guardianship, by unreasonably inflicting or allowing to be inflicted harm or a substantial risk thereof, including the infliction of excessive corporal punishment; or by using a drug or drugs; or by misusing alcoholic beverages to the extent that he or she loses self-control of his or her actions; or by any other acts of a similarly serious nature requiring the aid of the court; provided, however, that where the respondent is voluntarily and regularly participating in a rehabilitative program, evidence that the respondent has repeatedly misused a drug or drugs or alcoholic beverages to the extent that he or she loses self-control of his or her actions shall not establish that the child is a neglected child in the absence of evidence establishing that the child's physical, mental or emotional condition has been impaired or is in imminent danger of becoming impaired as set forth in paragraph (i) of this subdivision; or

(b) who has been abandoned, in accordance with the definition and other criteria set forth in subdivision five of section three hundred eighty-four-b of the social services law, by his or her parents or other person legally responsible for his or her care.

Appendix C

CONSENT FORM

Title of the Study: A Comparative Analysis of WISC-III Performance of Traumatized and Non-Traumatized Children.

Principal Investigator: Mitchell J. Samet, M.S., P.D., New York State and Nationally Certified School Psychologist; Ph. D. Candidate, CUNY Graduate Center.

Purpose of Study: In an effort to learn about the intellectual functioning of school-age children, we are asking children with a variety of backgrounds and past experiences to participate in a research project.

Procedures: Children who agree to participate in the study will be asked a variety of questions regarding past stressful experiences. The students will also be asked to respond to a structured interview that is intended to reflect their background, experiences, thoughts and behaviors. Participating youths will be interviewed to determine if they have been exposed to events involving actual or threatened injury or harm. The interview will be used to determine the presence of any childhood behavior or mood disorders (approx. 10 minutes).

Once completed, certain children will be administered the Wechsler Intelligence Scale for Children-Third Edition, which requires approximately 45 minutes to complete. This information will be tabulated and the results will be available for both parents and school staff.

Possible Discomfort or Inconvenience: Participation in the study will take place only if the youth and his/her parents agree, with the understanding that the youth is free to quit at any time without reprimand. Since part of the assessment process will include questions involving potential exposure to traumatic stress, some subjects may experience a degree of anxiety during the interview. If it is apparent that a subject becomes upset during the interview, these children will be debriefed. Individual test scores and interview results will be kept confidential. After each test administration, personal test scores and interview results will be transferred to a data entry form that will not mention the name of the participants. The results and family demographic information will not be shared without parental permission. However, if child abuse/neglect is suspected, or if the child appears to present a threat to himself/herself or others, a report will be made in accordance with N.Y. State law. The actual test booklets will remain under lock in Mr. Samet's office for a period of five years, at which time the information will be destroyed.

Potential Benefits: In addition to providing an updated IQ score for the participants, the current study may help to identify each student's learning style and cognitive strengths and weaknesses. The structured interviews may also help identify personality attributes helpful in clinical work with the students.

Use of the Results: The data from this study will be analyzed to determine any intellectual differences between children with a variety of experiences or personality characteristics. It is anticipated that the results from this study will be utilized in a doctoral dissertation, and for publication in a scientific journal.

Other Questions: Should additional questions arise, parents and children may contact Mr. Samet at (914) 478-2913 or Dr. Saigh at (212) 642-2271.

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Parent/Guardian Authorization

I have read all the information that appears on the Consent Form. and I give my permission to have _____ participate in the study. I understand that participation in the study is completely voluntary. and that anyone participating in the study may withdraw at any time without reprimand. It is further understood that the results of this study may be published in a scientific journal, and that the names of the participants will not be revealed. Finally. I understand that I have an opportunity to ask questions, and receive the evaluation results at a later time.

I understand my rights and voluntarily consent to have my son/daughter/guardian participate in the study.

_____
Child's Name

_____ _____
School Administrator Date

Child Authorization

I have read or have had read to me all of the information that appears in the Consent Form. I understand that I do not have to be involved in this study and that I may quit the study at any time without being punished in any way. I also understand that the results of this study may be published in a scientific magazine, and that the names of the children that participate will not be mentioned.

I understand my rights and freely agree to participate in the study.

_____
Name

_____ _____
Signature Date