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Comparison of the Trauma Symptom Checklist for Children, UCLA PTSD Index, and Child Behavior Checklist in Children with a Trauma History

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Comparison of the Trauma Symptom Checklist for Children, UCLA PTSD Index, and Child Behavior Checklist in Children with a Trauma History

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Abstract

The purpose of this dissertation was to study a host of PTSD assessment-related problems in children with a trauma history (N = 110) who were seeking treatment at a community mental health clinic. Exploratory factor analyses using the trauma-related and non-trauma-related subscales on the Child Behavior Checklist (CBCL; Achenbach 1991), UCLA PTSD Index (Pynoos 1998) , and the Trauma Symptom Checklist for Children (TSCC; Briere 1996) were conducted. Results indicated that in children aged 7 to 11, but not in older children aged 12 to 17, the UCLA PTSD Index and the TSCC trauma-related scales formed a trauma factor. The CBCL “trauma” scale did not load onto this trauma factor. Although there were no racial differences on the TSCC “PTS” scale, African-American children were more likely than Caucasian children to have clinical elevations on the UCLA PTSD Index “PTSD overall severity score”; Caucasian children were more likely than African-American children to have clinical elevations on the CBCL “trauma” scale. These differences were partially accounted for by an estimate of household income, however, there continued to be a trend indicating that there were racial differences on clinically significant elevations on the UCLA PTSD Index “PTSD overall severity score” question and the CBCL “trauma” scale. Also, the TSCC "PTS" scale performed significantly above chance and had moderate specificity and high sensitivity when compared with the UCLA PTSD Index "PTSD full diagnosis likely" question. The CBCL "trauma" scale performed significantly above chance and demonstrated moderate specificity and moderate sensitivity when contrasted with the UCLA PTSD Index "PTSD full diagnosis likely" question. However, the TSCC “PTS” scale performed better when compared to the UCLA PTSD Index “PTSD full diagnosis likely” question than the CBCL “trauma” scale did when compared to the UCLA PTSD Index “PTSD full diagnosis likely” question. Lastly, secondary analyses indicated that children in this sample were unlikely to meet DSM-IV criteria for avoidance cluster symptoms. However, African-American children were more likely than Caucasian to have a clinically significant number of avoidance symptoms. These findings indicate that many of the trauma focused instruments appear to adequately, but not ideally, assess for children’s PTSD symptoms. Future directions and limitations of this study are discussed.

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Child Sexual Abuse

CSA is a serious and pervasive problem (Ackerman, Newton, McPherson, Jones & Dykman, 1998). However, the reported extent and prevalence of CSA varies according to the type of sample studied (e.g., volunteers, college students, sampling across a population of children) and how the data are collected (e.g., in-person interview, questionnaire, telephone interview) (Goldman & Padayachi, 2000). Estimates of the prevalence rate of CSA range from 0% to 19% for males and 11% to 45% for females (Badgely, Allard, McCormick, Proudfoot, Fortin, Ogilvie, Rae-Grant, Gelinas, Pepin & Sutherland, 1984; Finkelhor, Hotaling, Lewis & Smith, 1990; Goldman & Padayachi, 2000). Also, children's socioeconomic status (SES) is a factor that has been found to influence risk for exposure to traumatic events. Studies have found that children from lower SES categories are more likely to experience various types of trauma, such as CSA, than children from higher SES categories (Duncan, 1996; Pfefferbaum, 1997; Sadowski & Friedrich, 2000; Shaunesey, Cohen, Plummer & Berman, 1993).

CSA victims display more psychological problems than non-CSA victims, including; somatic complaints, low self-esteem, aggressive behavior, hyperactivity, delinquent behavior, self-injuring behavior, substance abuse, sexualized behavior, fear, suicidal thoughts and actions, nightmares, and learning problems (Kendall-Tackett, Williams & Finkelhor, 1993). Individuals who experience CSA are also at an increased risk for many types of psychological disorders such as PTSD (Bennet, Hughes, & Luke, 2000; Kendall-Tackett et al., 1993).

Posttraumatic Stress Disorder in Children

PTSD is a serious and relatively common disorder exhibited by children who have experienced CSA. Studies have found that between 21% to 64% of CSA victims have PTSD (Deblinger, McLeer, Atkins, Ralphe & Foa, 1989; Kiser, Heston, Milsap & Pruitt, 1991; McLeer, Deblinger, Atkins, Foa & Ralphe, 1988; Timmons-Mitchell, Chandler-Holtz, & Semple, 1997). PTSD consists of three clusters of symptoms: reexperiencing, hyperarousal, and avoidance. These symptoms arise after experiencing a traumatic event that included death, possible death, bodily injury, or danger to an individual's "physical integrity." Adults' reaction to the traumatic event must include "intense fear, helplessness, or horror"; children must have either the same type of reaction or "disorganized or agitated behavior" (DSM, Fourth Edition, Text Revision, 2000).

The reexperiencing cluster includes: recurrent and intrusive upsetting thoughts and/or remembrances about the event (including repetitive play in children), recurring nightmares about the event (including general nightmares in children), reliving the event, severe distress when exposed to cues that represent the event, and heightened physical reactions to cues that represent the event. The hyperarousal cluster includes: difficulty maintaining sleep, irritability, problems concentrating, hypervigilance, and heightened startle response. The avoidance cluster includes: attempts to avoid emotions and cognitions related to the event, attempts to avoid places and people that are related to the event, failure to remember main details of the event, lessened interest in activities that were previously enjoyed, disinterest in other people, restricted affect, and feeling they have a foreshortened future (DSM, Fourth Edition, Text Revision, 2000). These avoidance symptoms are commonly categorized into two groups: symptoms that directly involve the trauma (i.e., failure to remember main details of the event), and symptoms that involve

constriction of affect and the child's general environment (i.e., disinterest in other people). Research has shown that differences exist in the type of avoidance symptoms and how avoidance symptoms are displayed between children and adults (Scheeringa, Zeanah, Drell & Larrieu, 1995; Scheeringa, Zeanah, Myers & Putnam, 2003; Trickett, Reiffman, Horowitz & Putnam, 1997). One example is that children may tend to avoid reminders of the trauma that are not included in the DSM-IV criteria of emotions, cognitions, places, and people that are related to the event (Coates & Schechter, 2004). Children may also behaviorally exhibit a "constriction of play" instead of voicing a decreased interest in activities that were previously enjoyed (Coates & Schechter, 2004). Also, children may withdraw socially, which could be conceived of as a behavioral example of articulating feelings of disinterest in other people. Children also may display regression in developmental level. This can be conceptualized as an avoidance symptom and may be a behavioral representation of numbing and a diminished participation in important events. (Scheeringa, Peebles, Cook & Zeanah, 2001; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003) A key point is that it is extraordinarily difficult to asses children's avoidance symptoms through verbalization, and thus these symptoms must often be assessed through their behaviors (Scheeringa & Zeanah, 1995). Thus, there may be conceptual and practical issues to understanding how children can present the DSM-IV criteria.

In order to qualify for a diagnosis of PTSD, children or adults must exhibit at least one reexperiencing cluster symptom, at least three avoidance cluster symptoms, and at least two hyperarousal cluster symptoms. (DSM, Fourth Edition, Text Revision, 2000). Children or adults can have various combinations of symptoms in each of these clusters, and can exhibit uneven distribution of symptoms among clusters (i.e., a child may display every hyperarousal symptom but only the minimum number of avoidance and reexperiencing symptoms). Unfortunately, a

significant problem exists with children qualifying for a diagnosis of PTSD based on DSM-IV criteria. Research has shown that it can be difficult for children to meet enough DSM-IV criteria to qualify for this diagnosis, even after undergoing quite severe trauma (Scheeringa, Zeanah, Myers et al., 2003). It has been postulated that this is because DSM-IV criteria for PTSD are not developmentally sensitive, as PTSD was originally conceptualized to classify the difficulties some adult male war veterans had after combat exposure (Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003; Trickett, Reiffman, Horowitz & Putnam, 1997; Yehuda & McFarlane, 1995). Although children do display intense reactions to traumatic stress, applying PTSD criteria that were developed on adult males to children is problematic.

PTSD and Children's current developmental stage and age at onset of trauma

The types of trauma symptoms displayed by children, and how these symptoms are manifested, tend to differ markedly from adults who have experienced a trauma. These differences are tied to the verbal capabilities, cognitive abilities, and independence level that are unique to children in various developmental stages. Therefore, examining PTSD symptomatology from a developmental perspective is essential. However, in many studies children's current developmental stage is not clearly delineated from their age at onset of the trauma. Symptoms that are intended to be associated with age of onset of abuse will be presented, but the symptoms will be the current symptoms the children display. This is problematic because many studies do not indicate if the children are in the same developmental stage they were in when the abuse first occurred. If the children have progressed from one developmental stage to another, it cannot be concluded that their current symptoms are associated with their age at onset of the trauma, but rather that they are a reflection of the symptoms associated with the children's current developmental stage. Due to the confounding

of age of trauma onset and current developmental stage, a clear distinction between these two factors is difficult.

Children tend to have several trauma reactions that are not seen as frequently in adults. Children who have relatives with mood disorders are more likely to exhibit mood symptoms than younger children or adults (Perry, 1994). They also are more likely than adults to exhibit "posttraumatic reenactment play" (Coates & Schechter, 2004; Pynoos, 1990). Some literature indicates that after experiencing a traumatic event, children are more likely to exhibit behavioral extremes, such as hostile or withdrawn behavior, than older children (Manly, Jungmeen, Rogosch & Cicchetti, 2001; Pynoos, 1990). Also, it has been suggested that psychological symptoms such as emotional lability and impulsivity, which are hypothesized to be linked to heightened sympathetic nervous system activity, are features of childhood PTSD (Perry, 1994). Additionally, it has been hypothesized that some traumatized children are misdiagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) when these difficulties (attention, aggressive behavior) are better conceptualized as being related to a manifestation of their PTSD hyperarousal (Pynoos, 1990). Another finding is that children's flashbacks tend to be less complex than adults (Pynoos, 1990).

In children, the avoidance symptoms are most likely to be expressed differently from the traditional DSM-IV symptom criteria. Children appear to be more prone to develop restricted affect and to somaticize their symptoms (e.g., have frequent headaches or stomach aches; Pynoos, 1990). Somaticizing might indicate that a child is avoiding thoughts or feelings about the trauma, and instead focusing his or her distress on more concrete, physical ailments. Dissociative symptoms also appear to be more common in children than in adults (Trickett, Reiffman, Horowitz & Putnam, 1997). Thus, it appears that avoidance symptoms are important

and fairly common symptoms that occur in children. It also appears that these avoidance symptoms tend to manifest quite differently in children than in adults.

PTSD and Duration of CSA

Duration of CSA is a factor that potentially impacts the rate of PTSD in children who have been abused; a substantial body of literature remains divided as to whether the duration of CSA produces an incremental impact on children. A study involving 90 children who had suffered CSA, approximately half of whom met criteria for PTSD, found that the duration of abuse was positively correlated with a greater likelihood of meeting criteria for PTSD (Wolfe, Sas & Wekerle, 1994). This study divided duration of abuse into three categories: "isolated", under one year, and more than one year. Duration of more than one year was the category statistically associated with increased likelihood of developing PTSD. A particular strength of this study was that it used a sample of CSA victims that closely represented typical CSA victims in regards to duration of CSA and whether the perpetrator was in a primary care-giving role. Additionally, in this study the duration of abuse was correlated to frequency of abuse. However, as the authors noted, this study did contain a higher than typical proportion of CSA that involved the perpetrator using, or threatening to use force. Therefore, it is uncertain if the association between duration of abuse and likelihood of developing PTSD would apply to CSA victims that did not experience the use of, or threatened use of force. Furthermore, all children in this study were currently involved in the criminal justice system relating to the CSA, and therefore this additional stressor may have increased the likelihood of these children developing PTSD.

A study by Mennen & Meadow (1995) did not find that the duration of CSA was significantly correlated with higher levels of psychopathology such as: depression, anxiety, and self-esteem. The CSA in this study was generally perpetrated by males whom the girls knew

(including approximately half in a primary care giving role), and lasted on average for three years (with a standard deviation of three years). These abuse characteristics make a straightforward interpretation of these results somewhat challenging. This type of CSA is not typical, as most CSA is characterized by a much shorter duration and does not involve males in a primary care-giving role (Mennen & Meadow, 1995; Wolfe et al., 1994). Thus, it is difficult to apply these findings about the effects of duration of abuse to children whose CSA markedly differed from the girls in this study. The mean duration of abuse of three years might indicate that the data was skewed towards long abuse duration, possibly obscuring the effects of duration. CSA might be so devastating that the first few instances have a profoundly damaging effect on children, and subsequent instances do not significantly increase the survivors' distress. Therefore, a study investigating duration not defined in terms of years but rather defined in terms of incidents might be better able to tease out the effects of duration. Therefore, although this study is informative, it is not definitive.

In summary, although it appears as if longer duration of CSA is associated with poorer outcomes, this association may only exist for children whose CSA fits certain criteria. Nevertheless, this is an important factor to consider.

PTSD and Severity of CSA

The severity of the abuse is another factor that contributes to the development and expression of symptoms following trauma. Whether the CSA included intercourse or penetration, whether force was used during the CSA, and the relationship of the child to the perpetrator are three abuse characteristics that are frequently used to assess CSA severity. The literature generally indicates that children who experience CSA that involved penetration suffer more severe psychological distress than children who experience CSA without penetration

(Briggs & Joyce, 1997; Mennen, 1995; Mennen & Meadow, 1995). A study involving females found that those whose CSA involved penetration had significantly lower levels of self-esteem as well as higher levels of anxiety and depression than the girls whose CSA did not involve penetration (Mennen & Meadow, 1995).

A study of 73 adult female CSA survivors found that when the abuse included sexual intercourse, the women had a significantly higher PTSD score than women who did not experience abuse with sexual intercourse (Briggs & Joyce, 1997). Specifically, these women had higher scores on portions of the measure assessing "dissociation", "intrusive thoughts", and "hyperarousal". However, generalizing these results to children is problematic; this study used only adult females and was measuring current symptomatology, not the symptomatology displayed by these women when they were children. The mean age of participants in this study was 31.5, and the authors defined CSA as abuse taking place under age 16. Therefore, for most participants a substantial amount of time had passed since the CSA. Nonetheless, this study is useful because the findings correspond to several studies using children as participants (e.g., Mennen, 1995; Mennen & Meadow, 1995). Thus, the preponderance of research indicated that there is an association between CSA involving penetration and more serious psychological symptoms.

Research has also indicated that severity of psychological distress is associated with the use of force during the abuse (Mennen & Meadow, 1995; Wolfe et al., 1994). A study involving 90 children who had suffered CSA, approximately half of whom met criteria for PTSD, found that the use of force, or being told force would be used was positively correlated with the proportion of children who met criteria for PTSD (Wolfe et al., 1994). Previously Mennen and Meadow (1995) found that this characteristic was associated with higher scores on measures of

depression and self-esteem and a non-significant trend for higher scores on a measure of anxiety. Therefore, CSA involving intercourse, penetration, and whether force was employed appear to be associated with the development and expression of symptoms following trauma.

Another measure of severity of CSA that has been extensively investigated is the relationship of the child to the perpetrator. Unfortunately, as with many factors related to CSA, a straightforward connection between the relationship of the child to the perpetrator and severity of psychological symptoms does not appear to exist. Although studies have found that CSA perpetrated by a biological father or an adult who took on a father role are associated with more negative outcomes (McLeer et al., 1988), other studies have not found this direct relationship (Mennen, 1995; Mennen & Meadow, 1995). Studies have delineated how abuse related factors (e.g., whether the abuse involved penetration, use of force) appear to be differently associated with more negative outcomes depending in part on whether the CSA perpetrator was the father or not (Mennen, 1995; Mennen & Meadow, 1995). Abuse involving penetration was associated with greater severity of symptoms when the abuse was perpetrated by a biological father or an adult who took on a father type role. However, when the perpetrator did not have this relationship with the child, this association did not exist (Mennen & Meadow, 1995). Additionally, the relationship between use of force and severity of symptoms only existed when the CSA perpetrator was not a biological father or an adult who took on a father type role (Mennen & Meadow, 1995). Therefore, it appears that this factor encompasses too many other variables (e.g., amount of trust in the perpetrator, is the perpetrator responsible for ensuring the child's safety) to allow an unambiguous interpretation of role of this factor. Although it appears likely that this is a significant factor in determining outcomes after CSA, not being able to cleanly operationally define this factor makes it exceedingly difficult to explain its association

with children's psychological functioning following CSA. Clearly more research is needed to disentangle the critical elements inherent in perpetrator status.

Racial differences in PTSD and Psychological Distress

Another complicating factor in the development of PTSD and trauma-related symptoms in children is that the rates of psychological distress and disorders appear unequally distributed across races. Minorities who experienced a childhood or adulthood trauma, such as CSA, child abuse, sexual assault, motor vehicle accident, war trauma, natural disasters, serious medical illness, victim of crime, or war trauma, were more likely to develop PTSD in childhood or adulthood than Caucasians, according to a meta-analysis of 77 articles (Brewin, Andrews & Valentine, 2000). This finding held up even after the authors accounted for the fact that the minority group had a lower SES status and therefore increased risk for PTSD. However, a contrasting meta-analysis found that minority children appeared to be at a lower risk for developing psychological disorders and distress than Caucasian children after accounting for SES (Samaan, 1998). Several notable differences exist between these two meta-analyses. Only individuals who had experienced a trauma were included in the Brewin et al. study, whereas the articles used in the Samaan study included both clinical and community samples. Factors associated with the development and expression of PTSD were the focus of the former study, and race and SES status as risk factors for general pathology were the focus of the latter study. Lastly, significantly more articles were used in the Brewin et al. study than the Samaan study, thus increasing the power of the Brewin et al. study and possibly helping ensure this sample was more representative of individuals who experience a trauma than the Samaan study. Therefore, given the focus and scope of the two meta-analyses, it is likely that the former study provides more valuable and specific information about trauma-related symptoms than the latter study.

In addition to the above meta-analyses, several individual studies provide illumination into the possible role that race has in trauma-related psychological distress in children. Physically abused minority children also appear to be at higher risk for developing depressive, anxious, and somatic symptomotology than Caucasian children (Lau, Huang, Garland, McCabe, Yeh, & Hough, 2006). African-American, Asian, and Latino children have also shown a trend for higher depression scores on the Children's Depression Inventory (CDI) than Caucasian children (Siegel, Aneshensel, Taub, Cantwell & Driscoll, 1998).

The possible increased risk for psychological distress among minority children is complicated by the possibility that some of the instruments used to measure psychological distress, such as the CBCL, might be biased to over-pathologize minority children (McCarty & McMahon, 2003; Sandberg et al., 1991). The above studies should be viewed with caution, as several studies have found that nonclinical minority children tend to have significantly higher elevations on the CBCL, including the depression scales, than nonclinical Caucasian children (McCarty & McMahon, 2003; Sandberg, Meyer-Balhburg & Yager, 1991). Thus, it appears that the CBCL might be constructed in such a way that minority children would have higher elevations than Caucasian children, even if both groups were experiencing an equal level of symptoms. Therefore, it cannot be conclusively determined that the traumatized minority children truly were experiencing more distress than the traumatized Caucasian children, as the measures used to assess their symptoms might also tend to over-pathologize minority children, as the CBCL is suggested to do. Therefore, although the preponderance of research indicates minority children are more likely to have elevated scores on measures assessing for psychological distress, there are conflicting findings. Given the paucity of trauma specific literature, more research should be conducted to determine possible differences in trauma

reactions among minority and Caucasian children. This research should be conducted with attention to factors such as: SES, duration of trauma, severity of trauma and possible instrument biases.

Measures used to assess PTSD in children

As the above literature review illustrates, PTSD expression is quite varied; a number of complex and interacting factors influence the development and manifestation of these symptoms. Given this varied expression of PTSD in children, and the significant number of children who experience PTSD symptoms following a trauma, it is imperative that the measurement tools used to assess PTSD accurately assess the expression of PTSD symptoms in children. Three commonly used measures to assess PTSD symptoms in children are the Trauma Symptom Checklist for Children (TSCC), the UCLA PTSD Index, and the Child Behavior Checklist (CBCL). A widely noted difficulty that exists across these instruments is that measuring internalizing symptoms (i.e., avoidance cluster symptoms) in children is a difficult task (Kurt & Merrell, 1998). This is largely due to children's limited verbal ability which hinders their ability to communicate their thoughts and feelings. Self-report measures, such as the TSCC and the UCLA PTSD Index, are generally used to elucidate the internalizing difficulties children are experiencing. (Kurt & Merrell, 1998) However, the use of self-report measures can be problematic because they rely on the children to possess the ability to comprehend their thoughts and feelings as well as express them accurately (Kurt & Merrell, 1998; Sadowski & Friedrich, 2000).

UCLA PTSD Reaction Index

The UCLA PTSD Index for the DSM-IV is a self-report measure for children age 8-18 based on DSM-IV criteria. This measure has questions that first assess for the presence of a

trauma and the child's reaction to the trauma, then specifically assess for DSM-IV PTSD symptoms (Steinberg, Brymer, Decker & Pynoos, 2004). It is frequently used to assess for trauma-related symptoms in children in the United States and abroad who have experienced a variety of traumatic events, and can be used to determine if a diagnosis of PTSD is probable as it maps directly onto DSM-IV PTSD criteria (Steinberg et al., 2004).

However, a critique of this measure is that children express PTSD symptoms that can differ quite markedly both from adults and from current DSM criteria, which is based on adult presentation of the disorder (Coates & Schechter, 2004; Manly et al., 2001; Perry, 1994; Pynoos, 1990; Scheeringa, Peebles et al., 2001; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003; Trickett et al., 1997; Yehuda & McFarlane, 1995). Therefore, measures that are strictly based on current DSM criteria may not be especially helpful or valid measures of PTSD in children. These measures may not cover the variety of presentations of psychological distress manifested by children after experiencing a traumatic event. Additionally, convergent validity of this instrument was measured using other child PTSD measures that also rely heavily on current DSM criteria. Although convergent validity was high, this is not necessarily an indication that this measure is truly assessing the full spectrum of PTSD presentation in children. Another possible problem with this measure is that it might be relatively insensitive to avoidance symptoms, as children may not possess the necessary cognitive and verbal skills to accurately endorse DSM-IV based avoidance questions (Scheeringa & Zeanah, 1995). Some examples of this possible endorsement problem are the statements, "I have trouble feeling happiness or love" and "I have trouble feeling sadness or anger", assessing for the avoidance symptom of "restricted range of affect" (DSM, Fourth Edition, Text Revision, 2000). Given children's cognitive and verbal limitations, it might be difficult for them to realize

they have lost the capacity to experience a range of emotions and then articulate this to others, as is needed on a self-report measure such as the UCLA PTSD Index. However, this is not an indication that children are not experiencing this symptom, and individuals such as caregivers might be able to notice a change in children's affective expression and the emotional range they display. Therefore, this possible relative insensitivity to avoidance symptoms is likely not unique to the UCLA PTSD Index, but also characterizes other self-report measures as well.

Trauma Symptom Checklist for Children (TSCC)

The Trauma Symptom Checklist for Children (TSCC) has 54 self-report questions, some of which are based on DSM-IV PTSD criteria, and some of which address other symptoms and reactions to trauma that children display, and is appropriate for children age 8-16 (Sadowski & Friedrich, 2000).

This scale has several strengths that the UCLA PTSD Index lacks. The TSCC, especially the "posttraumatic stress" (PTS) subsection, is particularly helpful at identifying symptoms that arise as a result of CSA (Sadowski & Friedrich, 2000). A particular advantage of this scale is the range of symptoms, behaviors, and distress for which it assesses. As previously reported, children express a variety of reactions to trauma, many of which are captured by the TSCC questions (Coates & Schechter, 2004; Pynoos, 1990; Manly et al., 2001; Perry, 1994; Pynoos et al., 1999; Trickett et al., 1997; Scheeringa & Zeanah, 1995; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003). Thus, is appears this measure would be particularly adept at identifying trauma associated symptoms. Unfortunately, this also increases the probability that other symptoms will be misinterpreted as a trauma response (Crouch, Smith, Ezzell & Saunders, 1999; Sadowski & Friedrich, 2000; Wolfe et al., 1994). Traumatized children display a range of psychological difficulties, such as depression, anxiety, hyperactivity,

and defiant behavior (Bennet et al., 2000; Kendall-Tackett et al., 1993; Williams & Finkelhor, 1993). It is exceedingly difficult, and in many cases impossible, to determine if these problems arose after the children experienced a traumatic event or if these difficulties were premorbid, since most children were not given assessment measures or received psychological treatment before the trauma occurred. There is also a fair amount of symptom overlap among children with PTSD only, children with PTSD and comorbid depression, and nontraumatized children with depression on measures that assessed for depressive symptoms. This makes it difficult to determine if the depressive symptoms in traumatized children are related to the abuse they experienced (Runyon, Faust & Orvaschel, 2002). Also, although children who have been traumatized tend to score higher on measures assessing for psychological distress than nontraumatized children or "normal" children who were used to standardize the measures, the nontraumatized children and the "normal" children typically do endorse items on these measures (Finzi, Ram, Shnit, Har-Even, Tyano & Weizman, 2001; Lynch & Cicchetti, 1998; Mennen & Meadow, 1994). Thus, the positive endorsement of an item on the TSCC could indicate either a child is experiencing a trauma-related symptom or a non-trauma-related symptom.

Unfortunately, although a generally strong instrument, the relative insensitivity to avoidance symptoms is a notable weakness of the TSCC (Sadowski & Friedrich, 2000). The TSCC PTS scale was more highly correlated with the "hyperarousal" and "intrusive thoughts" subsections than the "avoidance" subsection on the Children's Impact of Traumatic Events Scale-Revised (CITES-R), another measure that assesses for PTSD symptom in children (Crouch et al., 1999; Sadowski & Friedrich, 2000). This lack of concordance is likely because the "posttraumatic stress" (PTS) scale includes statements about all three PTSD symptom clusters, but most statements pertain to reexperiencing symptoms.

Child Behavior Checklist

The Child Behavior Checklist is a caregiver report measure for children age 6-18 that consists of 113 Likert style questions about general psychological symptomatology. This measure is widely used to assess for emotional and behavioral difficulties in children. However, it was not designed to specifically assess for trauma related symptomatology nor PTSD in children, therefore the questions are not based on DSM PTSD criteria nor empirically derived trauma reactions in children. A PTSD scale consisting of a subset of existing questions has been proposed, but there is a dearth of research on the adequacy of this scale to assess for PTSD symptoms (Ruggiero & McLeer, 2000). Using this scale to assess for trauma-related symptoms in children may also be problematic because some literature indicates that minority children tend to have higher elevations on the CBCL scales than Caucasian children (Sandberg et al., 1991). Therefore, in minority children, it may be difficult to determine if the symptoms being endorsed are an accurate assessment of children's trauma-related distress, or an artifact of the CBCL's possible tendency to over-pathologize minority children. A possible benefit of using the CBCL to assess for trauma-related symptoms is that this measure might be more sensitive to behaviorally manifested avoidance cluster type symptoms and other behaviorally manifested internalizing symptoms, since it is a caregiver-report measure. A shortcoming of self-report measures, such as the TSCC, is the possible relative insensitivity to avoidance symptoms and other internalizing symptoms that children lack the cognitive and verbal abilities to articulate. For example, statements such as "feels or complains that no one loves him/her", "stubborn, sullen, or irritable", and "confused or seems to be in a fog" might be ways that caregivers would describe children's behavioral manifestation of the avoidance cluster symptom of "restricted range of affect" (DSM, Fourth Edition, Text Revision, 2000). Therefore, it is possible that the

CBCL might be more adept at identifying behaviorally manifested internalizing symptoms and disorders in traumatized children than self-report measures such as the TSCC and UCLA PTSD Index. However, there is a currently a lack of research in this area.

Inter-rater agreement of psychological symptoms

A complicating factor when assessing for PTSD in children is the moderate concordance between caregiver and child report of emotional and behavioral difficulties. Children tend to be better at reporting internalizing symptoms and distress (i.e., depressive and PTSD symptoms) than their caregivers, whereas the opposite is true for externalizing symptoms (i.e., attention and behavior difficulties) (Moretti, Fine, Haley, & Marriage, 1984; Muris, Meesters, & Spinder, 2002; Wrobel & Lachar, 1998). Studies have found a moderate to low correlation between caregiver and child report of PTSD symptoms (Chaffin & Shultz, 2000; Gerring, Slomine, Vasa, Grados, Chen, Rising, Christensen, Denckla & Ernst, 2002). These studies used the CBCL and the Diagnostic Interview for Children and Adolescents (DICA) parent report version as the caregiver report measures, and the CITES-R and the DICA child report version as the self-report measures. Research has shown the utility of using child self-report measures to identify trauma symptoms and internalizing symptoms. However, it cannot be concluded that child-report measures are superior to parent-report measures when assessing for trauma symptoms. Children might lack the necessary cognitive and verbal abilities to recognize and express some trauma-related symptoms, such as avoidance cluster symptoms or other internalizing symptoms. A better way to assess for these symptoms might be to look for their behavioral manifestation, which could be accomplished by using a caregiver report measure. A caregiver report measure for younger children exists (the Trauma Symptom Checklist for Young Children), but currently, there is no well-studied caregiver-report measure of PTSD for older children, although some

research has been conducted on the trauma scale of the CBCL (Briere, Johnson, Bissada, Damon, Crouch, Gil, Hanson & Ernst, 2001). Further investigation of the utility of this scale to assess for behaviorally manifested trauma-related symptoms would be beneficial. Using both self-report and parent-report measures to assess for PTSD symptoms in children would likely increase the amount of knowledge clinicians have about how children are presenting their trauma-related symptoms. This would allow clinicians to develop more thorough treatment plans and case conceptualizations, because they would be better able to understand a child's unique presentation of trauma-related distress.

Study Objectives

Aim 1:

Children's reactions to traumatic events are wide-ranging and complex. Research has suggested that symptoms such as lability, impulsivity and aggressive behavior, generally thought to be indicative of a mood disorder and/or ADHD, might be conceptualized as trauma-related symptoms. Traumatized children are also likely to have comorbid disorders and difficulties (e.g., somatic complaints, low self-esteem, delinquent behavior, self-injuring behavior, substance abuse, sexualized behavior, fear, suicidal thoughts and actions, learning problems) in addition to PTSD symptoms (Bennet, Hughes, & Luke, 2000; Kendall-Tackett, Williams & Finkelhor, 1993). A more thorough understanding of possible trauma-related symptoms would allow clinicians to better conceptualize and treat these children's difficulties. An exploratory factor analysis was conducted using the trauma-related and non-trauma-related scales on the CBCL, UCLA PTSD Index, and TSCC to determine if a trauma factor composed of the UCLA PTSD Index reexperiencing, avoidance, and hyperarousal severity score scales and TSCC PTS scale

existed. The objective of Aim 1 is to increase understanding of possible trauma-related symptoms in children and determine how these measures are associated with each other.

Aim 2:

Research suggesting that there are racial differences in the presentation of PTSD symptoms in children and in the patterns of clinically significant elevations on the TSCC and CBCL further obstruct the clear understanding and assessment of trauma symptoms in children. The role of a factor such as SES, which research has indicated impacts the likelihood that children will experience trauma and the trauma-related symptoms they display, requires further elucidation. The objective of Aim 2 is to examine possible differences in clinical elevations on the UCLA PTSD Index "PTSD overall severity score scale", the TSCC "PTS" scale, and CBCL "trauma" scale between Caucasian and African-American children.

Aim 3:

The UCLA PTSD Index is an extensively used diagnostic instrument for assessing PTSD in children. The items from the UCLA PTSD Index map directly onto DSM-IV criteria for PTSD and the scale can be used to determine a probable diagnosis of PTSD. Similarly, the TSCC is another widely used measure to assess PTSD symptoms and other trauma related symptoms in children who have experienced a trauma. However, there is a dearth of research investigating how these extensively used measures contrast with one another. The CBCL also is frequently given to children who have been traumatized, and a trauma scale has been devised using a subset of 20 questions, even though the CBCL was not originally designed to specifically assess for trauma symptoms. Despite the widespread use of the CBCL, there is little research on the CBCL "trauma" scale, including how it contrasts with the UCLA PTSD Index and its usefulness at identifying PTSD symptoms and diagnostic classification in children. Given the

scarcity of research in this area, the goal of Aim 3 is to expand knowledge of the instruments by contrasting the UCLA PTSD Index to the TSCC “PTS” scale and the CBCL “trauma” scale in separate ROC Curve Analyses.

Hypotheses

Aim 1 Hypotheses:

A) The TSCC “PTS” scale and the UCLA PTSD Index reexperiencing, avoidance, and hyperarousal severity scales will form a trauma factor when an exploratory factor analysis is conducted using scales of the TSCC, UCLA PTSD Index and CBCL. This is predicted because these measures are purported to assess symptoms that might arise after children experience trauma, and it is predicted that these symptoms are significantly different from the other distress that children might experience following a trauma.

B) The CBCL "trauma" scale will not produce significant factor loadings onto the trauma factor in an exploratory factor analysis using scales of the TSCC, UCLA PTSD Index and CBCL. This is predicted because the questions on this scale were drawn from existing questions that are used to calculate elevations on other clinical scales (e.g., “anxious/depressed”, “aggressive behavior”). Thus, it is predicted that these symptoms are not significantly different from other types of distress children display, either following or unrelated to a traumatic event.

Aim 2 Hypothesis:

Research has indicated that there are racial differences in PTSD symptoms in children as well as differences in elevations on the TSCC and CBCL. A comparison will be made of the number of Caucasian and African-American children with significant elevations on the TSCC “PTS” scale, the UCLA PTSD Index “PTSD full diagnosis likely” scale, and the CBCL “trauma” scale. The TSCC “PTS” scale and the CBCL “trauma” scales are continuous, with a clearly

delineated cut-score to indicate if a child's score is in the clinically significant range or in the normal range. Scores below this cut point will be considered PTSD-negative and scores above this cut point will be considered PTSD-positive so the frequencies of these diagnostic classifications can be compared. It is predicted that significantly more African-American children than Caucasian children will have elevated scores on these scales. In addition, it is possible that SES will influence the relationship between race and clinically elevated scores on these measures. Therefore, analyses also will be conducted examining psychological distress in African-American and Caucasian children using the proxy variable of income as a covariate. It is predicted that significant differences in symptoms between African-American and Caucasian children will not exist after including this covariate.

Aim 3 Hypotheses:

A) Using ROC curve analysis, it is predicted that the TSCC "PTS" scale will have high sensitivity and moderate specificity when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale (see Table 1 for an explanation of the ROC Curve analysis terms). The TSCC "PTS" scale will have a moderate false positive and false negative rate when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale. It is predicted that the TSCC "PTS" scale will have high positive predictive power, moderate to high negative predictive power and high overall diagnostic power when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale. The kappa for the TSCC "PTS" scale is predicted to be high. These relationships are predicted because both measures were devised to assess for trauma-related symptoms and both measures are child-report. The raw score means, standard deviations and Z-scores for the TSCC "PTS" scale and the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale grouped by PTSD diagnosis using the UCLA PTSD Index will also be examined.

B) It is predicted that the CBCL “trauma” scale will have only moderate sensitivity and specificity when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale using ROC curve analysis. The CBCL “trauma” scale will have moderate positive predictive power, low negative predictive power and low overall diagnostic power when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale. The kappa for the CBCL “trauma” scale is predicted to be high. These performances are predicted because of the likely low to moderate concordance between the CBCL “trauma” scale and UCLA PTSD Index "Full PTSD Diagnosis Likely" scale as they are different reporter measures (parent vs. child) and the CBCL “trauma” scale does not contain questions originally designed to assess for trauma symptoms. Also, the CBCL “trauma” scale will likely have lower sensitivity and specificity to trauma related symptoms when contrasted with the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale. This is because it shares questions with other clinical scales, and elevations on these scales will likely cause elevations on the trauma scale, regardless of whether the children are experiencing significant trauma symptoms. The raw score means, standard deviations and Z-scores for the CBCL “trauma” scale and the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale grouped by PTSD diagnosis using the UCLA PTSD Index will also be examined.

Table 1

Definition of ROC Curve Analysis Terms

Term	Definition
sensitivity	capacity to correctly classify true cases of a disorder
specificity	capacity to correctly classify cases without a disorder
false-positive rate	individuals without PTSD identified as having PTSD
false-negative rate	individuals with PTSD identified as not having PTSD

Definition of ROC Curve Analysis Terms (cont.)

positive predictive power	capacity for both measures to correctly classify true cases of a disorder
negative predictive power	capacity for both measures to correctly classify cases without a disorder
overall diagnostic power	ability to detect PTSD
kappa	inter-test agreement

General Methods

Participants

The participants in this study were 110 children who received services at the Children's Advocacy Services of Greater St. Louis (CASGSL). The children were referred to CASGSL through various local mental health agencies, child protective services, victim assistance programs, police detectives, and therapists following the disclosure of CSA. The data were collected as part of an initial assessment in preparation for treatment at CASGSL; thus the current study used these archival data. Exclusionary criteria included: an inability to substantiate abuse and/or no history of trauma, significant suicidal and/or homicidal ideation or attempts, a significant history of sexual offending, active thought disorder, and lack of a non-offending primary caregiver or legal guardian who could participant in the child's treatment.

The age range chosen for this study was 7-18 years-old, and the mean age of the 110 children in the main sample was 12.0 years (SD = 2.76). This age range was selected because it encompassed children who were given all three measures, have language skills that are developed enough to be able to complete self-report measures, and represents the age range

reported in most previous literature on PTSD in children. Children younger than 7 were excluded from this study because previous literature has shown that preschoolers tend to exhibit trauma-related symptoms in a markedly different manner than school age children. This difference likely is due to the significant developmental differences that exist between preschool and school age children (Coates & Schechter, 2004; Pynoos, 1990; Scheeringa, Peebles et al., 2001; Scheeringa & Zeanah, 1995; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Meyers et al., 2003). Participants included 42 males (38.2%) and 68 females (61.8%). There were 44 Caucasian children (40.0%), 62 African-American children (56.4%), 2 Hispanic children (1.8%), 1 Asian-Pacific child (0.9%), and 1 child whose race was identified as "other" (0.9%). The participants tended to be from low income families, with 71.9 % of the families having a yearly income of $40,000 or less, and 45.5% of the families earning $20,000 or less per year. Participants' caregivers completed the CBCL (the TSCC and UCLA PTSD Index were completed by the participants). The majority of caregivers who completed the CBCL were the participants' biological parent (75.5%) or a foster parent (9.1%). Other caregivers who completed the CBCL included a non-parent adult relative of the participant (4.5%) or an agency staff member, such as the participant's Children's Division caseworker (2.7%). The relationship of the individual completing the CBCL to the participant was unknown for some participants (8.2%). It is noted that a limitation of having a caregiver such as a Children's Division caseworker or a non-parent adult relative is that these individuals might not be able to provide information that is as accurate as a parent might be able to provide. See table 2 for a summary of participants' demographic characteristics.

The participants had experienced a variety of traumas, with sexual abuse being the most common primary trauma (60.0%). Other primary traumas included sexual assault (e.g., rape by a

stranger), physical abuse, witnessing domestic violence, emotional abuse, homicide of a family member, being in a serious accident, witnessing or experiencing community violence, traumatic loss of a family member, being the victim of a crime, neglect as a result of having an impaired caregiver, or having experienced serious multiple traumas (including combinations of any of the preceding types of abuse) (see Table 3). Data were missing for eight children. However, these eight children did experience Criterion A events, as indicated by their positive endorsements of Criterion A traumas on the UCLA PTSD Index, including sexual abuse, physical abuse, witnessing domestic violence, neighborhood violence (directed at themselves and/or others), being in a war zone, being in a bad accident, having scary and/or painful medical treatment, and hearing about the violent death or injury of a family member. Although these eight children all reported experiencing at least one traumatic event, their primary traumatic event was not indicated. Thus the traumatic event that in the children's subjective experience was the most distressing, their stated primary traumatic event, was not noted for these eight children. All of these traumas can be conceptualized as meeting Criterion A for PTSD, as children could reasonably be expected to think they are facing death or severe physical injury to themselves or others and experience feelings of fear, helplessness or horror during these traumas (DSM, Fourth Edition, Text Revision, 2000).

Table 2

Summary of Participant Characteristics (N=110)

Characteristic	Number of Cases/(Percent of Cases)
Age	
7-11	54 (49.1%)
12-17	56 (50.9%)

Summary of Participant Characteristics (N=110) (cont.)

Gender	
Males	42 (38.2%)
Females	68 (61.8%)
Race	
African-American	62 (56.4%)
Caucasian	44 (40.0%)
Hispanic	2 (1.8%)
Asian-Pacific	1 (0.9%)
“Other”	1 (0.9%)
Income	
$20,000 per year or under	50 (45.5%)
$40,000 per year or under	29 (26.4%)
Over $40,000 per year	23 (20.8%)
Caregiver completing CBCL	
Parent	83 (75.5%)
Foster Parent	10 (9.1%)
Adult Relative	5 (4.5%)
Agency Staff	3 (2.7%)
Not Known	9 (8.2%)

Table 3

Number/Percent of Children who Identified the Below Traumas as their Primary Trauma and Percent of Children who Endorsed Experiencing a Single Trauma vs. Multiple Traumas

Criterion A Trauma	Children Identifying is as their Primary Trauma and Number/Percent who Experienced a Single Trauma vs. Multiple Traumas
sexual abuse	66 (60%)
single trauma	8 (12.1%)
multiple trauma	58 (87.9%)
sexual assault (e.g., rape by a stranger)	6 (5.5%)
single trauma	2 (33.3%)
multiple trauma	4 (66.7%)
physical abuse	6 (5.5%)
single trauma	1 (16.7%)
multiple trauma	5 (83.3%)
witnessing domestic violence	5 (4.5%)
single trauma	0 (0.0%)
multiple trauma	5 (100.0%)
serious multiple traumas	4 (3.6%)
single trauma	0 (0.0%)
multiple trauma	4 (100.0%)

Number/Percent of Children who Identified the Below Traumas as their Primary Trauma and Percent of Children who Endorsed Experiencing a Single Trauma vs. Multiple Traumas (cont.)

emotional abuse	3 (2.7%)
single trauma	1 (33.3%)
multiple trauma	2 (66.7%)
being in a serious accident	3 (2.7%)
single trauma	1 (33.3%)
multiple trauma	2 (66.7%)
witnessing or experiencing community violence	3 (2.7%)
single trauma	1 (33.3)
multiple trauma	1 (33.3)
traumatic loss of a family member	3 (2.7%)
single trauma	1 (33.3%)
multiple trauma	2 (66.7%)
homicide of a family member	1 (0.9%)
single trauma	0 (0.0%)
multiple trauma	1 (100.0%)
being the victim of a crime	1 (0.9%)
single trauma	0 (0.0%)
multiple trauma	1 (100.0%)

Number/Percent of Children who Identified the Below Traumas as their Primary Trauma and Percent of Children who Endorsed Experiencing a Single Trauma vs. Multiple Traumas (cont.)

neglect as a result of having an impaired caregiver	1 (0.9%)
single trauma	1 (100.0%)
multiple trauma	0 (0.0%)

Note: Percentages were calculated using the frequencies function on SPSS. Percentages do not add up to 100% because identified primary trauma data were missing for eight children. Additionally, data about types of traumas experienced on the UCLA PSTD Index was not collected for one child whose primary trauma was community violence.

Table 4

Means and Standard Deviations for TSCC scales (N=110)

	Mean	Standard Deviation
"anxiety"	54.5	13.8
"depression"	51.4	13.1
"anger"	50.0	11.6
"PTS"	54.9	12.3
"dissociation"	51.9	13.5
"underresponsive"	53.5	12.7
"hyperresponsive"	57.0	15.5

Table 5

Means and Standard Deviations for CBCL scales (N=110)

	Mean	Standard Deviation
"anxious/depressed"	63.0	10.7
"somatic complaints"	61.8	9.4
"withdrawn/depressed"	63.7	11.0
"social problems"	61.1	10.5
"attention problems"	63.6	11.2
"aggressive behavior"	64.0	11.2
"rule-breaking behavior"	62.0	8.5
"thought problems"	61.3	9.8
"internalizing problems"	63.4	11.1
"externalizing problems"	62.6	10.1
"total problems"	63.8	10.1

Table 6

Means and Standard Deviations for UCLA PTSD Index scales (N=110)

	Mean	Standard Deviation
reexperiencing severity score	8.5	5.9
avoidance severity score	10.6	7.0
hyperarousal severity score	10.4	4.7
"PTSD severity score"	29.5	15.6

Measures

Participants were given a variety of measures during the intake and initial assessment phase prior to therapy. The measures used in this study are described below.

Demographic characteristics

Children's ages, race, and annual household income were obtained via caregiver report. Annual income was available in the original database for the majority of the participants. However, these data were missing for 41 (37%) of the participants. Therefore, a review of the self-report and interview records was conducted to determine the number of people in the family and the family's sliding scale fee for therapy. This information was used to establish the family's annual income by inserting it into the chart that is used to ascertain a family's fee for therapy. This chart is generally used to determine the sliding scale fee based on number of individuals in the family and the family's annual income. In this study this chart was used to determine the family's annual income based on the number of individuals in the family and the sliding scale fee for therapy. The information provided by this chart allowed the family's annual income to be determined within $20,000. This level of specificity was sufficient, as the original data for income was coded into intervals of $20,000 (e.g., $0-20,000; $20,001-40,000). For eight (7%) of the participants, self-report and interview records were not available, and thus their income was not able to be extrapolated.

One potential complication to this procedure of reverse-engineering the income values was whether there were frequency differences in how often this procedure was used in the different racial groups. Indeed, chi-square analysis revealed that extrapolated income was used significantly more frequently for African-American than Caucasian children ($\chi^2 = 5.02$, df = 1, $p = .03$) (see Table 7). Therefore, a series of one-way ANOVAs were run to determine if there

were significant mean differences on the UCLA PTSD Index “PTSD overall severity score”, CBCL “trauma”, and TSCC "PTS" scales between these two groups of children. Analyses were conducted on these scales because these were the scales used in Aim 2 analyses investigating possible racial differences in clinical scale elevations. These analyses were conducted to ensure that there were no significant differences in PTSD symptoms in African-American and Caucasian children whose family income was extrapolated, and children whose family income was not extrapolated. Findings indicated there were no significant differences between Caucasian children with extrapolated and non-extrapolated family income and African-American children with extrapolated and non-extrapolated family income on means on the TSCC "PTS", UCLA PTSD Index "PTSD overall severity score", and the CBCL “trauma” scales ($F = 1.43$, $df = 3$, $p = .24$, partial eta squared = .04; $F = .96$, $df = 3$, $p = .42$, partial eta squared = .03; $F = 1.84$, $df = 3$, $p = .15$, partial eta squared = .06, respectively).

Table 7

Use of Extrapolated Income and Non-Extrapolated Income in African-American and Caucasian Children

Income	African-Americans	Caucasians	χ^2 (1)
Extrapolated Income	25	8	5.024*
Non-Extrapolated Income	34	31	

*$p < .05$

UCLA PTSD Index. The UCLA PTSD Index for the DSM-IV is a self-report paper and pencil measure for children age 8-18 based on DSM-IV criteria. The first section consists of 13 yes/no questions assessing for the presence of a trauma that meets DSM-IV criteria A1 of experiencing a significant trauma. This section is followed by 13 yes/no questions that determine whether the child meets the DSM-IV A2 criteria of experiencing significant emotional distress during the trauma (DSM, Fourth Edition, Text Revision, 2000). Children then read 22 Likert style statements directly based on DSM-IV PTSD criteria and decide whether they have experienced these symptoms "none", "little", "some", "much", or "most" days during the past month. A pictorial representation of these categories is available to help children decide which category best describes how these statements apply to them. Children receive a score on several scales, including the "severity score" and whether they have met criteria for each PTSD symptom cluster, a "PTSD severity overall score", a "Full PTSD Diagnosis Likely", and "Partial PTSD Likely." The measure's internal consistency and test-retest reliability is good (Steinberg et al., 2004). The convergent validity to the Schedule for Affective Disorders and Schizophrenia for School-Age Children PTSD Module, is considered to be good (Steinberg et al., 2004) and although this measure is widely used, normative data are not available (Steinberg et al., 2004).

Trauma Symptom Checklist for Children. The Trauma Symptom Checklist for Children (TSCC) is a paper and pencil measure that has 54 self-report Likert style questions, some of which are based on DSM-IV PTSD criteria, and some of which address other symptoms and reactions to trauma that children display, and is appropriate for children age 8-16 (Crouch et al., 1999; Sadowski & Friedrich, 2000). This measure has also been found to be valid in children age 17, and has been used in multiple studies with children age 8-17, although it was not

originally normed on 17-year-olds (Briere, 1996; Crouch et al., 1999; Fricker & Smith, 2001; Sadowski & Friedrich, 2000). Children are asked to rate if a statement "never", "sometimes", "lots of times", or "almost all the time" applied to them. The scales of this measure include: "posttraumatic stress", "anger", "depression", "anxiety", "sexual concerns", and "dissociation." Additionally, the "dissociation" scale has two component subscales, "overt dissociation" and "fantasy dissociation", and the "sexual concerns" scale has two component subscales, "sexual preoccupation" and "sexual distress." Notably, the "posttraumatic stress" ("PTS") scale includes statements about all three PTSD symptom clusters, but most statements pertain to reexperiencing symptoms. Two validity scales, under-response and over-response are also included. Reliability and validity are considered to be good (Crouch et al., 1999; Lanktree & Briere, 1995; Sadowski & Friedrich, 2000). The reported internal consistencies for the subscales range from .66-.89, with most scale consistencies falling between .82-.89. Validity is also deemed good, as the appropriate scales correlate with the Children's Depression Inventory and the CBCL (Briere, 1996).

Child Behavior Checklist. The Child Behavior Checklist is a caregiver report paper and pencil measure for children age 6-18 that consists of 113 Likert style questions about general psychological symptomatology. Caregivers are asked to describe if the statements are "not true (as far as you know)", "somewhat or sometimes true", or "very true or often true" as applied to their child within the past six months. There are also questions that are not used to calculate children's elevations on the clinical scales, but rather assess for social and school functioning. The scales include: "anxious/depressed", "withdrawn/depressed", "somatic complaints", "social problems", "thought problems", "attention problems", "rule-breaking behavior", and "aggressive behavior." Additionally, children receive a score on "internalizing problems", "externalizing

problems" and "total problems". The CBCL can also be used to determine a child's elevation on several scales purported to assess for DSM style disorders. These scales include: "affective problems", "anxiety problems", "somatic problems", "attention deficit/hyperactivity problems", "oppositional/defiant problems", and "conduct problems." Reliability is deemed good, with reported internal consistencies of .54-.93 (Achenbach, 1991). Validity also is deemed good, given its widespread use in research and clinical settings. However, a possible weakness of the CBCL is that some literature indicates a tendency for the measure to over-pathologize minority children (Sandberg et al., 1991).

It has been proposed that a PTSD scale can be derived from the CBCL (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). Few studies have investigated the utility of this scale, and the literature is mixed as to the scale's reliability and validity (Ruggiero & McLeer, 2000). This scale consists of 20 existing questions on the CBCL that were chosen based on their similarity to DSM delineated PTSD symptoms (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). Examples of the questions used are "can't concentrate, can't pay attention for long", "clings to adults or too dependent", "nightmares", "too fearful or anxious", "headaches", "nausea, feels sick", "stubborn, sullen, or irritable", "sudden changes in mood or feelings", "trouble sleeping", and "unhappy, sad, or depressed" (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). This study utilizes this scale as well as the traditional CBCL scales.

Procedure

A telephone intake was conducted with the child's primary caretaker and/or legal guardian prior to beginning treatment at CASGSL, a portion of which was dedicated to ensuring children meet inclusion criteria for treatment. After this initial screening, a therapist conducted an in-depth face-to-face assessment to conclusively determine the appropriateness of the child

beginning therapy at CASGSL. Children began treatment after the assessment sessions were completed. The assessment battery included the measures used in this study as well as other measures that will not be reported on here (e.g., the Child Sexual Behavior Inventory). The order of administration of assessment instruments was chosen by individual clinicians; therefore it is unlikely that the measures were always given in the same order. The child report measures were completed during the assessment session with the clinician, and caregivers were generally not present during that administration. The CBCL was completed by caregivers during the assessment session, or was completed outside of the session and then jointly reviewed with the clinician.

Results

Data Screening

Prior to conducting the main data analyses, the dataset was screened according to the recommendations of Tabachnik and Fidell (2001). Data screening took the form of analyzing univariate descriptives including the means and standard deviations for all scale scores on the CBCL, UCLA PTSD Index, and TSCC to ensure these scores were normally distributed. This process included inspection of skewness and kurtosis for these scale scores, and inspection of graphs of these scale scores to determine possible outliers. The data were found to be reasonably normally distributed, with the exception of the CBCL scale scores for three of the participants. These three participants were excluded from all further analyses due to having scores on the CBCL that were more than five standard deviations below the mean. Therefore, this study had a sample size of 110 participants. Some participants were missing data on individual items on the CBCL, UCLA PTSD Index, and TSCC. However, no participants were missing a substantial number of individual items, so their traditional scale scores were able to be calculated. Thus,

none of the participants were missing scores on the traditional scales of the CBCL, UCLA PTSD Index, and the TSCC. There was not a pattern involved with these missing data, thus these missing data appear to be randomly rather than systematically distributed. It is highly unlikely that this missing data significantly affected participants' traditional scale scores. However, given that the CBCL "trauma" scale is not a traditional scale, but rather a recently developed ad-hoc scale, participants needed data for all 20 CBCL "trauma" scale questions in order for this scale to be scored. Thus, this missing data did lead to only 101 participants having a CBCL "trauma" scale score.

Aim 1- Exploratory factor analysis with the trauma-related and non-trauma-related scales on the CBCL, UCLA PTSD Index, and TSCC

The primary goal of Aim 1 was to ascertain if there was a trauma factor composed of the UCLA PTSD Index scales and TSCC "PTS" scale, and if it was clearly separate from the factors formed by the other scales on the UCLA PTSD Index, TSCC, and CBCL when analyzed via and EFA.

Analytic Strategy.

An exploratory factor analysis (EFA) was conducted to test the hypotheses of Aim 1. An EFA rather than a confirmatory factor analysis (CFA) was chosen because the goal of Aim 1 was to determine if there were factors present that indicated that the trauma related scales of the TSCC, UCLA PTSD Index, and CBCL were highly correlated to each other and distinct from non-trauma related scales. Previous research has not explored this specific question, and an EFA would allow preliminary analyses of the possible trauma related and non-trauma related factors formed by the TSCC, UCLA PTSD Index, and CBCL. Another reason an EFA was performed was that hypotheses about the potential mechanisms influencing the formation of these possible

factors, a necessary element of CFA, could not be proposed due to lack of research in this area. Thus this method was used to explore the factors present when the intercorrelations between the scales on the TSCC, UCLA PTSD Index and CBCL were analyzed. The EFA variables were: the avoidance, reexperiencing, and hyperarousal severity score scales of the UCLA PTSD Index; the “PTS”, “anger”, “depression”, “anxiety”, and “dissociation” scales of the TSCC; and the “trauma” “anxious/depressed”, “withdrawn/depressed”, “somatic complaints”, “social problems”, “thought problems”, “attention problems”, “rule-breaking behavior”, and “aggressive behavior” scales of the CBCL. Factors were extracted from the factor loadings produced from these variables after examining the eigenvalues and the scree plot (Tabachnick & Fidell, 2001). Orthogonal rotation was used to extract factors, and a variable must have had a minimum of a .5 factor loading to have been considered to be significantly loading onto a factor (Tabachnick & Fidell, 2001). The data were analyzed to determine if a distinct “trauma factor” was present comprised of the TSCC “PTS” scale and the UCLA PTSD Index avoidance, hyperarousal and reexperiencing severity scales.

Findings.

An EFA using all participants produced three factors. The first factor accounted for 31% of the variance, and was comprised of the "anxiety", "depression", "anger", PTS", "dissociation" reexperiencing, avoidance, and hyperarousal scales of the TSCC and UCLA PTSD Index. This factor was conceptualized as the "Child Report" factor. The second factor accounted for 21.1% of the variance, and was comprised of the “anxious/depressed”, “somatic complaints”, “withdrawn/depressed”, “thought problems”, and “trauma” scales of the CBCL. This factor was conceptualized as the “Parent Report-Internalizing” factor. The third factor accounted for 19.7% of the variance, and was comprised of the “social problems”, “attention problems” “aggressive

behavior", and "rule-breaking behavior" scales of the CBCL. This factor was conceptualized as the "Parent Report-Externalizing" factor. The findings of the EFA are summarized in Table 8.

Table 8

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales (N = 110)

	Factor Loadings		
Scale	Child Report	Parent Report-Internalizing	Parent Report-Externalizing
"anxious/depressed" (CBCL; PR)	.300	**.769**	.335
"somatic complaints" (CBCL; PR)	.040	**.822**	.076
"withdrawn/depressed" (CBCL; PR)	.051	**.810**	.153
"social problems" (CBCL; PR)	.230	.398	**.733**
"attention problems" (CBCL; PR)	.179	.463	**.687**
"aggressive behaviors" (CBCL; PR)	.101	.297	**.840**
"rule-breaking behavior" (CBCL; PR)	.060	.038	**.892**
"thought problems" (CBCL; PR)	.106	**.615**	**.588**
"trauma" (CBCL; PR)	.157	**.868**	.421
"anxiety" (TSCC; CR)	**.841**	.079	.086
"depression" (TSCC; CR)	**.813**	.200	.165

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales (N = 110) (cont.)

"anger" (TSCC; CR)	**.685**	.044	.306
"PTS" (TSCC; CR)	**.894**	.025	-.037
"dissociation" (TSCC; CR)	**.781**	.075	.062
reexperiencing (UCLA; CR)	**.823**	.106	.023
avoidance (UCLA; CR)	**.750**	.078	.107
hyperarousal (UCLA; CR)	**.743**	.145	.138

Note: Factor loadings over .50 appear in bold. PR = parent report and CR = child report.

The EFA with all participants produced factors that were problematic, as the factors appeared to be indicating a strong correlation between scales that shared the same reporter (e.g., child or parent report), which might have been obscuring possible correlations between trauma and non-trauma related scales. Additionally, there was a lack of clarity to the factors since three of the scales loaded highly onto two factors. It was hypothesized that differences might exist between younger and older children because the trauma literature suggests that children's ages might alter the expression of PTSD symptoms (Coates & Schechter, 2004; Manly et al., 2001; Pynoos, 1990; Scheeringa, Peebles et al., 2001; Scheeringa & Zeanah, 1995; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003; Trickett et al., 1997). In order to explore possible differences in factor patterns in more homogeneous groups of younger and older children, secondary EFAs were conducted.

An EFA using the 54 participants ages 7 to 11 (mean = 9.6, SD = 1.28) produced four factors. The first factor accounted for 24.2% of the variance, and was comprised of the "anxiety", "PTS", "dissociation", reexperiencing, avoidance, and hyperarousal scales of the

TSCC and UCLA PTSD Index. This factor was conceptualized as the "Child Report-Trauma" factor. The second factor accounted for 21.9% of the variance, and was comprised of the “social problems”, “attention problems” “aggressive behavior”, “rule-breaking behavior”, and “thought problems” scales of the CBCL. This factor was conceptualized as the “Parent Report-Externalizing” factor. The third factor accounted for 19% of the variance, and was comprised of the “anxious/depressed”, “somatic complaints”, “withdrawn/depressed”, and “trauma” scales of the CBCL. This factor was conceptualized as the "Parent Report-Internalizing” factor. The fourth factor accounted for 11.5% of the variance, and was comprised of the “depression” and "anger” scales of the TSCC. This factor was conceptualized as the “Child Report- Non-Trauma” factor (see Table 9).

Table 9

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales, ages 7-11 (N = 54)

	Factor Loadings			
Scale	Child Report-Trauma	Parent Report-Externalizing	Parent Report-Internalizing	Child Report-Non-Trauma
“anxious/depressed” (CBCL; PR)	.157	.407	**.737**	.273
“somatic complaints” (CBCL; PR)	-.019	.060	**.785**	-.043
“withdrawn/depressed” (CBCL; PR)	.077	.159	**.822**	.052

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales, ages 7-11 (N = 54) (cont.)

"social problems" (CBCL; PR)	.174	**.731**	.356	.193
"attention problems" (CBCL; PR)	.037	**.802**	.270	.089
"aggressive behaviors" (CBCL; PR)	-.005	**.872**	.224	.172
"rule-breaking behavior" (CBCL; PR)	.224	**.919**	-.016	-.078
"thought problems" (CBCL; PR)	.055	**.613**	**.520**	.124
"trauma"(CBCL; PR)	.052	**.479**	**.840**	.124
"anxiety" (TSCC; CR)	**.753**	.130	.011	.351
"depression" (TSCC; CR)	.480	.099	.193	**.787**
"anger" (TSCC; CR)	.293	.208	.106	**.848**
"PTS" (TSCC; CR)	**.868**	-.041	-.056	.287
"dissociation" (TSCC; CR)	**.700**	.047	-.077	.459
reexperiencing (UCLA; CR)	**.907**	.059	.025	.009
avoidance (UCLA; CR)	**.775**	.112	.106	.075
hyperarousal (UCLA; CR)	**.666**	.220	.324	.068

Note: Factor loadings over .50 appear in bold. PR = parent report and CR = child report.

Another EFA using the 56 participants ages 12 to 17 (mean = 14.3, SD = 1.53) produced three factors. The first factor accounted for 33.3% of the variance, and was comprised of the

"anxiety", "depression", "anger", "PTS", "dissociation", avoidance, reexperiencing, and hyperarousal scales of the TSCC and UCLA PTSD Index. This factor was conceptualized as the "Child Report" factor. The second factor accounted for 25.3% of the variance, and was comprised of the "anxious/depressed", "somatic complaints", "withdrawn/depressed", "attention problems", "thought problems", and "trauma" scales of the CBCL. This factor was conceptualized as the "Parent Report-Internalizing" factor. The third factor accounted for 15.9% of the variance, and was comprised of the "social problems", "aggressive behavior", and "rule-breaking behavior" of the CBCL. This factor was conceptualized as the "Parent Report-Externalizing" factor (see Table 10). Thus, there still appears to be method variance that might be obscuring correlations between trauma-related and nontrauma-related scales, especially in older children.

Table 10

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales, ages 12-17 (N = 56)

	Factor Loadings		
Scale	Child Report	Parent Report-Internalizing	Parent Report-Externalizing
"anxious/depressed" (CBCL; PR)	.324	**.801**	.212
"somatic complaints" (CBCL; PR)	.087	**.832**	.050
"withdrawn/depressed" (CBCL; PR)	.014	**.791**	.131

Summary of Exploratory Factor Analysis Results for CBCL, TSCC, and UCLA PTSD Index scales, ages 12-17 (N = 56) (cont.)

"social problems" (CBCL; PR)	.229	**.502**	**.668**
"attention problems" (CBCL; PR)	.282	**.646**	**.519**
"aggressive behavior" (CBCL; PR)	.132	.411	**.764**
"rule-breaking behavior" (CBCL; PR)	-.025	.138	**.883**
"thought problems" (CBCL; PR)	.110	**.706**	**.527**
"trauma"(CBCL; PR)	.199	**.904**	.318
"anxiety" (TSCC; CR)	**.850**	.174	.019
"depression" (TSCC; CR)	**.863**	.221	.160
"anger" (TSCC; CR)	**.733**	-.027	.364
"PTS" (TSCC; CR)	**.889**	.138	-.038
"dissociation" (TSCC; CR)	**.743**	.169	.064
reexperiencing (UCLA; CR)	**.836**	.182	-.020
avoidance (UCLA; CR)	**.778**	.060	.126
hyperarousal (UCLA; CR)	**.837**	.063	.074

Note: Factor loadings over .50 appear in bold. PR = parent report and CR = child report.

Aim 2- Chi-Square and MANCOVA analyses on possible differences in scale elevation on the CBCL, UCLA PTSD Index, and TSCC between Caucasian and African-American children

The primary goal of Aim 2 was to investigate if there were differences in rates of clinical elevations between Caucasian and African-American children on the UCLA PTSD Index "PTSD full diagnosis likely", the TSCC "PTS", and CBCL "trauma" scales when analyzed using Chi-Squares.

Analytic Strategy.

The data analyzed in Aim 2 were from a subset (n=106) of participants from the main dataset. For Aim 2, only African American (n=62) and Caucasian (n=44) participants were compared. Initially, Chi-Square analyses were conducted to evaluate Aim 2. The variables employed were the participants' race (African-American or Caucasian) and clinically elevated vs. non elevated scores on the TSCC "PTS" scale, UCLA PTSD Index and "PTSD full diagnosis likely" scales. If the observed frequencies were significantly different than the expected frequencies these data were re-analyzed via a multivariate analysis of covariance (MANCOVA). The selection variable was the participants' race (African-American or Caucasian) and the covariate was the family income level. The dependent variable was the participants' scores on the TSCC "PTS" scale, UCLA PTSD Index "PTSD overall severity score" scale and the CBCL "trauma" scale. The MANCOVA was used to determine if African-American and Caucasian participants displayed significantly different elevations on these scales after accounting for the variance attributable to the covariate.

Findings.

Chi-Square analyses revealed that significantly more African-American than Caucasian children had clinically significant elevations on the UCLA PTSD Index "PTSD full diagnosis

likely" scale (χ^2 = 6.23, df = 1, p = .01) (see Table 11). However, significantly more Caucasian than African-American children had clinically significant elevations on the CBCL trauma scale, the opposite of what was predicted (χ^2 = 6.50, df = 1, p = .01) (see Table 12). There were no significant differences between Caucasian and African-American children's clinical elevations on the TSCC "PTS" scale (χ^2 = 1.22, df = 1, p = .27; Fisher's Exact Test p = .30) (see Table 13).

Table 11

Clinically Significant and Non-Clinically Significant Elevations on the UCLA PTSD Index "PTSD Full Diagnosis Likely" Question Among African-American and Caucasian Children

PTSD Diagnosis	African-Americans	Caucasians	χ^2 (1)
PTSD Likely	20	5	6.234*
PTSD Not Likely	42	39	

*p < .05

Table 12

Clinically Significant and Non-Clinically Significant Elevations on the CBCL "trauma" Scale Among African-American and Caucasian Children

PTSD Diagnosis	African-Americans	Caucasians	χ^2 (1)
PTSD Likely	37	34	6.501*
PTSD Not Likely	21	5	

*p < .05

Table 13

Clinically Significant and Non-Clinically Significant Elevations on the TSCC "PTS" Scale Among African-American and Caucasian Children

PTSD Diagnosis	African-Americans	Caucasians	χ^2 (1)
PTSD Likely	12	5	1.220*
PTSD Not Likely	50	39	

*p = ns

Since the Chi-Squares on the CBCL trauma scale and the UCLA PTSD Index "PTSD full diagnosis likely" were significant, these measures were further investigated via a multivariate analysis of covariance (MANCOVA). The selection variable was the participants' race (African-American or Caucasian), the covariate was income, and the dependent variables were the participants' scores on the UCLA PTSD Index "PTSD overall severity score" scale and the CBCL "trauma" scale. The UCLA PTSD Index "PTSD overall severity score" was used instead of the "PTSD full diagnosis likely" score because the former is a continuous variable.

Previously conducted ANOVAs found no significant differences between Caucasian children with extrapolated and non-extrapolated family incomes and African-American children with extrapolated and non-extrapolated family income on the TSCC "PTS", UCLA PTSD Index "PTSD overall severity score", and the CBCL "trauma" scales. Therefore, the MANCOVA comparing African-American and Caucasian participants' scores on the UCLA PTSD Index "PTSD overall severity score" scale and the CBCL "trauma" scale after accounting for the possible effects of income could be safely conducted. The findings revealed that after removing the variance associated with income, there was still a trend indicating that race continued to have a main effect on the dependent variables of UCLA PTSD Index "PTSD overall severity score"

scale and the CBCL "trauma" scale when these variables were considered together as a combined DV ($F = 2.62$, $df = 2$, $p = .08$, partial eta squared = .06). There continued to be a main effect for race on the CBCL trauma scale after removing the effects of income ($F = 3.89$, $df = 1$, $p = .05$, partial eta squared = .04). However, after removing the variance associated with income there was not a significant effect for race on the PTSD UCLA Index "PTSD overall severity score" ($F = .18$, $df = 1$, $p = .68$, partial eta squared = .01).

Aim 3- ROC Curve analyses comparing and contrasting the TSCC and CBCL to the UCLA PTSD Index

The primary goal of Aim 3 was to compare the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale to the TSCC "PTS" and CBCL "trauma" scales to expand knowledge about how these scales perform to identify PTSD.

Analytic Strategy.

The specificity and sensitivity of the CBCL "trauma" scale and the TSCC "PTS" scale as contrasted to the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale was analyzed using a receiver-operator curve (ROC). This analysis has been used by researchers to investigate the usefulness of a measure compared to a measure that is widely considered to be a useful and accurate way to assess if an individual meets DSM diagnostic criteria for a disorder, such as PTSD (Griffin, Uhlmansiek, Resnick & Mechanic, 2004; McFall & Treat, 1999; Meehl & Rosen, 1995; Mossman & Somoza, 1989; Sheeran & Zimmerman, 2002). This analysis plots individuals' scores on two measures to generate a curve, which allows the sensitivity and specificity of the measure to be determined for all possible scores on the measure as compared to the established measure. Thus various cut-scores (the particular score at which children who receive a score below this point can reasonably be assumed to be in the "normal" range, and

children who receive a score above this point can reasonably be assumed to be in the “clinical” range) can be examined to determine the most practical cut-score for the specific sample being investigated. The curve created by these sensitivity and specificity data points also makes it possible to determine if the measure under examination is better than chance at revealing the presence of a disorder.

Supplementing the ROC Curve analysis, cross-tabulations contrasting the CBCL “trauma” and the TSCC “PTS” scales to the UCLA PTSD Index “Full PTSD Diagnosis Likely” question also were conducted. The results of these two types of analyses allow for the determination of the false positive rates, false negative rates, positive predictive power, negative predictive power, overall diagnostic power and kappa (see Table 1 for a full description of these terms).

The means and standard deviations of the CBCL “trauma” scale, the TSCC “PTS” scale and the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale grouped by PTSD diagnosis on the UCLA PTSD Index were calculated. A multivariate analysis of variance (MANOVA) was conducted on the Z-scores of the CBCL “trauma” scale and the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale to compare these measures. An MANOVA was also conducted on the Z-scores of the TSCC “PTS” scale and the UCLA PTSD Index "Full PTSD Diagnosis Likely" scale to compare these measures. Z-scores were utilized so the scores on these scales could be compared on a common metric.

Findings.

The TSCC "PTS" scale performed significantly better than chance at identifying likely cases of PTSD (area under the curve = .896, $p < .001$, see Figure 1 for ROC Curve figure). The cut-score of 19 was associated with the highest kappa (.73) for this sample, and the TSCC "PTS"

scale had moderate sensitivity (.72) and high specificity (.96) at this cut-score. At this cut-score, the false-positive rate was low (.04), the false-negative rate was low (.28), the positive predictive power was high (.86), the negative predictive power was high (.92), and the overall diagnostic power was high (.91). The TSCC "PTS" scale's sensitivity was slightly worse than predicted, and the specificity, false-positive rate, false-negative rate, and negative predictive power were better than predicted. The cut-scores recommended for use on the TSCC "PTS" scale are 15, 17, 18, or 20 depending on the child's age and gender. See tables 14.1, 14.2, and 14.3 for a comparison of the sensitivity, specificity, false-positive rate, false-negative rate, positive predictive power, negative predictive power, overall diagnostic power, and kappa for a cut-score of 19 and the suggested cut-scores.

Figure 1

ROC Curve for the TSCC when Compared to the UCLA PTSD Index, with the Diagonal Line Representing Chance Performance of the TSCC

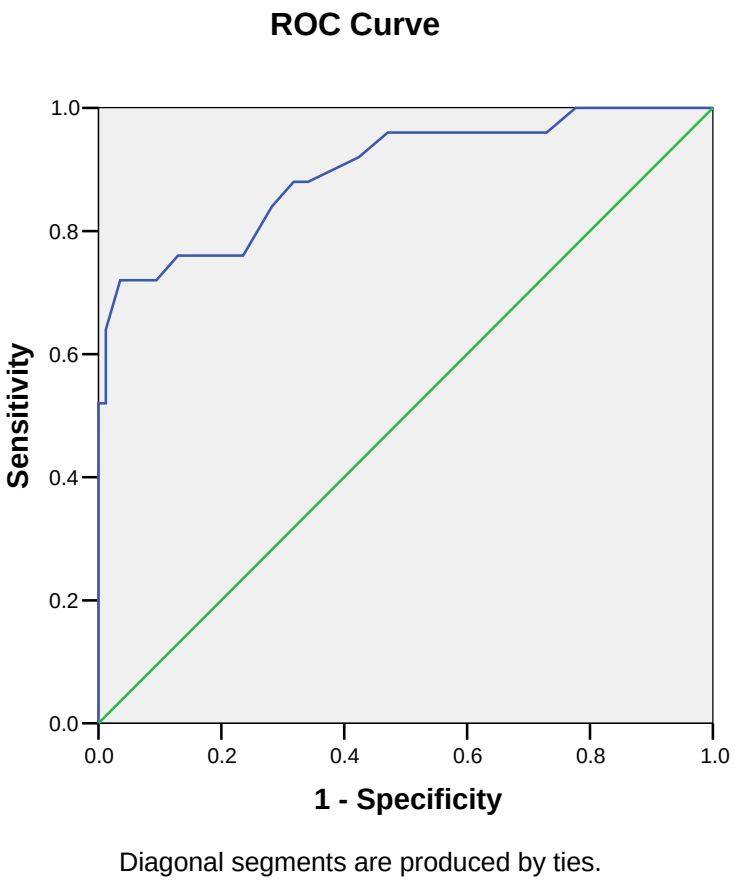

Table 14.1

Performance Measures of the TSCC "PTS" to Detect PTSD Status Relative to the UCLA PTSD Index Diagnosis of PTSD

Statistic	TSCC cut-score =19	TSCC cut-score = 20
Sensitivity	.72	.64
Specificity	.96	.99
False-positive rate	.04	.01
False-negative rate	.28	.36
Positive predictive power	.86	.94
Negative predictive power	.92	.90
Overall diagnostic power	.91	.91
Kappa	.73	.71

Table 14.2

Performance Measures of the TSCC "PTS" to Detect PTSD Status Relative to the UCLA PTSD Index Diagnosis of PTSD

Statistic	TSCC cut-score =17	TSCC cut-score = 18
Sensitivity	.76	.72
Specificity	.87	.91
False-positive rate	.13	.09
False-negative rate	.24	.28

Performance Measures of the TSCC "PTS" to Detect PTSD Status Relative to the UCLA PTSD Index Diagnosis of PTSD (cont.)

Positive predictive power	.63	.69
Negative predictive power	.93	.92
Overall diagnostic power	.85	.86
Kappa	.59	.62

Table 14.3

Performance Measures of the TSCC "PTS" scale to Detect PTSD Status Relative to the UCLA PTSD Index Diagnosis of PTSD

	TSCC cut-score =15
Statistic	
Sensitivity	.76
Specificity	.76
False-positive rate	.24
False-negative rate	.24
Positive predictive power	.49
Negative predictive power	.92
Overall diagnostic power	.76
Kappa	.44

The CBCL "trauma" scale also performed better than chance at identifying likely cases of PTSD (area under the curve = .672, p = .013, see Figure 2 for ROC Curve figure). The cut-score of 17 was associated with the highest kappa (.33) for this sample, and the CBCL "trauma" scale

had moderate sensitivity (.61) and moderate specificity (.77) at this cut-score. At this cut-score, the false-positive rate was low (.23), the false-negative rate was moderate (.39), the positive predictive power was moderate (.44), the negative predictive power was high (.87), and the overall diagnostic power was moderate (.73). The CBCL "trauma" scale's kappa was worse than predicted, and the negative predictive power and overall predictive power were better than predicted. The cut-score recommended for the CBCL "trauma" scale is 8, but few studies exist that investigate the utility of this cut-score (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). See table 15 for a comparison of the sensitivity, specificity, false-positive rate, false-negative rate, positive predictive power, negative predictive power, overall diagnostic power, and kappa for a cut-score of 17 and the suggested cut-score.

Figure 2

ROC Curve for the CBCL "trauma" Scale when Compared to the UCLA PTSD Index, with the Diagonal Line Representing Chance Performance of the CBCL "trauma" Scale

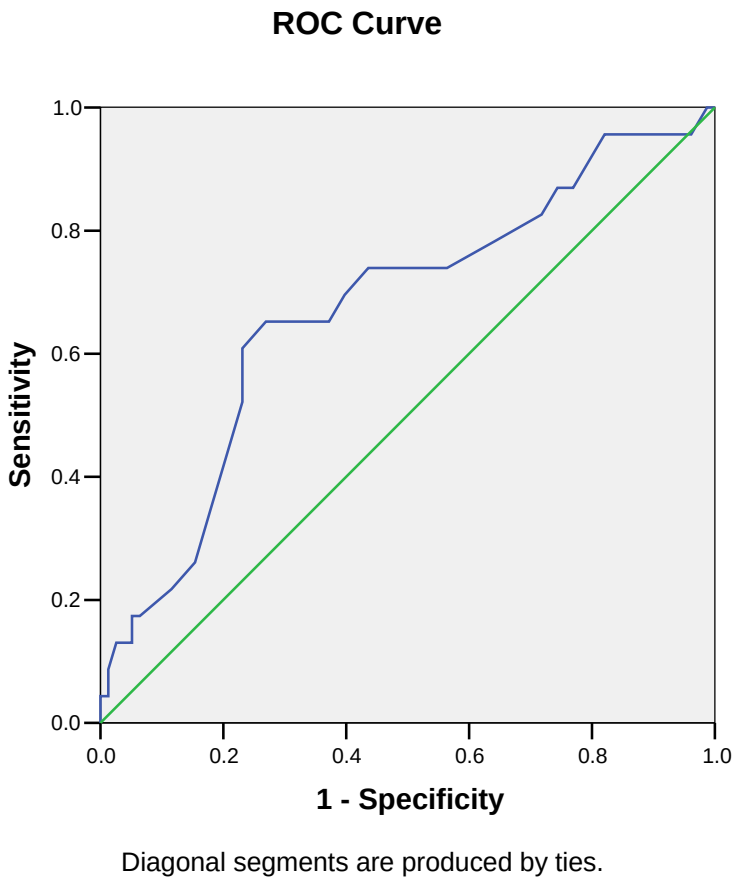

Table 15

Performance Measures of the CBCL "trauma" Scale to Detect PTSD Status Relative to the UCLA PTSD Index Diagnosis of PTSD

Statistic	CBCL cut-score =17	CBCL cut-score = 8
Sensitivity	.61	.83
Specificity	.77	.28
False-positive rate	.23	.72
False-negative rate	.39	.17
Positive predictive power	.44	.25
Negative predictive power	.87	.85
Overall diagnostic power	.73	.41
Kappa	.33	.06

A MANOVA revealed that the Z-score means on the UCLA PTSD Index, TSCC, and CBCL "trauma" related scales differed significantly between children who were likely to have PTSD versus children who were not likely to have PTSD (F = 107.01, df = 1, p <.001; F = 87.87, df = 1, p <.001; F = 103.91, df = 1, p <.001; F = 26.42, df = 1, p <.001; F = 56.88, df = 1, p <.001; F = 7.82, df = 1, p <.01) (see Table 16).

Table 16

Means, Standard Deviations, and z-scores for the TSCC "PTS" Scale, CBCL "trauma" Scale, and UCLA PTSD Index Grouped by PTSD Diagnosis as Determined by the UCLA PTSD Index "Full PTSD Diagnosis Likely" Question

	PTSD (*n*=25)		Non-PTSD (*n*=85)		
Measure	M	SD	M	SD	*F* value
UCLA PTSD Index					
PTSD Severity Score					
Raw score	50.44	7.90	23.28	11.27	
Z-score	1.35	.51	-.40	.72	107.01**
Reexperiencing cluster					
Raw score	16.12	3.02	6.27	4.52	
Z-score	1.29	.51	-.38	.76	87.87**
Avoidance cluster					
Raw score	19.72	4.31	7.85	5.00	
Z-score	1.32	.62	-.39	.72	103.91**
Hyperarousal cluster					
Raw score	14.60	3.42	9.16	4.33	
Z-score	.89	.72	-.26	.92	26.42**
TSCC					
PTS scale					

Means, Standard Deviations, and z-scores for the TSCC "PTS" Scale, CBCL "trauma" Scale, and UCLA PTSD Index Grouped by PTSD Diagnosis as Determined by the UCLA PTSD Index "Full PTSD Diagnosis Likely" Question (cont.)

Raw score	19.72	5.71	9.52	5.46	
Z-score	1.13	.82	-.33	.78	56.88**
CBCL					
"Trauma scale"					
Raw score	17.17	8.83	12.01	7.45	
Z-score	.50	1.10	-.15	.93	7.82*

Note: * $p < .01$, ** $p < .001$

Secondary Analyses- Investigation of children's patterns of clinically significant elevations on the reexperiencing, avoidance, and hyperarousal cluster scores on the UCLA PTSD Index

Potential differences in clinical elevations between children on the reexperiencing, avoidance, and hyperarousal scales on the UCLA PTSD Index were also analyzed. Overall, 63.6% of children met criteria for the reexperiencing cluster, 29.1% of children met criteria for the avoidance cluster, and 59.1% of children met criteria for the hyperarousal cluster. When children met both the reexperiencing and avoidance cluster criteria, 92.6% also met the hyperarousal cluster criteria. When children met both the avoidance and hyperarousal cluster criteria, 89.3% also met the reexperiencing cluster criteria. However, when children met both the reexperiencing and hyperarousal cluster criteria, only 46.3% met the avoidance cluster criteria. Thus, it appears that children are much less likely to have enough symptoms to meet the clinical criteria on the avoidance cluster than to meet the clinical criteria on the reexperiencing and hyperarousal clusters.

Chi-square analyses were conducted to determine if gender, age or race was related to clinical elevations on these scales. The variables examined were the participants' gender (male or female), race (African-American or Caucasian), age group (ages grouped from 7-11 or 12-17) and scores on the reexperiencing cluster criteria met, avoidance cluster criteria met, and hyperarousal cluster criteria met variables. No significant differences between male and female children's clinical elevations on the reexperiencing, avoidance, or hyperarousal clusters existed (χ^2 = .01, df = 1, p = .91; χ^2 = 1.93, df = 1, p = .16; χ^2 = 1.27, df = 1, p = .26). Chi-Square analysis also did not reveal any significant differences between younger and older children's clinical elevations on the reexperiencing, avoidance, or hyperarousal clusters (χ^2 = 1.09, df = 1, p = .30; χ^2 = .09, df = 1, p = .77; χ^2 = .12, df = 1, p = .72. There were also no significant differences between African-American and Caucasian children's clinical elevations on the reexperiencing and hyperarousal clusters (χ^2 = .01, df = 1, p = .93; χ^2 = .75, df = 1, p = .39). However, significantly more African-American children than Caucasian had clinically significant elevations on the avoidance cluster (χ^2 = 5.15, df = 1, p = .02) (see Table 17).

Table 17

Clinically Significant and Non-Clinically Significant Elevations on the UCLA PTSD Index Avoidance Scale Among African-American and Caucasian Children

Avoidance Cluster Criteria	African-Americans	Caucasians	χ^2 (1)
Meets Avoidance Cluster Criteria	24	8	5.146*
Does Not Meet Avoidance Cluster Criteria	38	36	

*$p < .05$

Discussion

Aim 1- Investigation of the trauma-related and non-trauma-related scales on the CBCL, UCLA PTSD Index, and TSCC

Summary and Explanation of Findings.

The hypotheses for this aim were generally supported for children ages 7-11, but were not supported for children ages 12-17. The TSCC "PTS", "anxiety", and "dissociation" scales and the UCLA PTSD Index reexperiencing, avoidance, and hyperarousal scales formed a distinct factor in the younger children. This factor also included the "anxiety" and "dissociation" scales, which were not originally hypothesized to be a part of this factor. However, these scales are theoretically related to PTSD, as PTSD is categorized as an anxiety disorder, and dissociation has been linked to trauma exposure in children (DSM, Fourth Edition, Text Revision, 2000; Trickett, Reiffman, Horowitz & Putnam, 1997). Since this factor included scales that either

directly assessed for PTSD symptoms or assessed for symptoms closely related to exposure to trauma, it was conceptualized as a "Child Report-Trauma" factor. The other factors present in younger children were "Parent Report-Externalizing", "Parent Report-Internalizing", and "Child Report- Non-Trauma". The CBCL "trauma" scale was not significantly correlated to the "Child Report-Trauma" factor, but was correlated to the "Parent Report-Internalizing" factor.

Convergence and Divergence with Existing Literature.

Thus, it appears that in younger children a factor exists that is comprised of the scales of the UCLA PTSD Index and TSCC that most closely assess for PTSD-type symptoms. This finding supports the existing literature that indicates both of these measures are adept at assessing for PTSD in younger children (Crouch et al., 1999; Sadowski & Friedrich, 2000; Steinberg et al., 2004). As previously noted, the UCLA PTSD Index is based closely on DSM-IV criteria while the TSCC is based both on DSM-IV centered criteria and other trauma related symptoms that children often display (Sadowski & Friedrich, 2000; Steinberg et al., 2004). Including some of the developmentally sensitive symptoms fits with previous studies that have indicated that children tend to display some trauma symptoms that differ from the PTSD symptoms that adults typically display (Coates & Schechter, 2004; Manly et al., 2001; Perry, 1994; Pynoos, 1990; Scheeringa, Peebles et al., 2001; Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003; Trickett et al., 1997; Yehuda & McFarlane, 1995). On the TSCC the questions that assess for these developmentally sensitive trauma-related symptoms are included on the "PTS", "anxiety", and "dissociation" scales. As all three of these scales were correlated with the UCLA PTSD Index scales, not just the TSCC "PTS" scale, it appears that these trauma-related symptoms in children might be conceptualized as PTSD symptoms that are displayed in a manner that is concordant with children's developmental level. Thus, this "Child

Report-Trauma" factor appears to confirm that the UCLA PTSD Index and TSCC are useful instruments to assess for PTSD in children, while also indicating that a broader definition of PTSD symptoms in children might be warranted.

The CBCL "trauma" scale was correlated with the "Parent Report-Internalizing" factor, which consisted entirely of other scales of the CBCL, but not the "Child Report-Trauma" factor. The CBCL "trauma" scale was created using existing questions on the CBCL that were not originally designed to assess for trauma symptoms in children, and it has not been extensively studied (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). It is possible that this scale is not able to accurately assess for trauma related symptoms in children, and thus it was not substantially correlated to the "Child Report-Trauma" factor. However, another possible explanation exists. Previous research has shown that inter-rater agreement of psychological symptoms (e.g., parent report versus child report) tends to be low to moderate (Chaffin & Shultz, 2000; Gerring et al., 2002). Children appear to be better at elucidating internalizing symptoms, such as PTSD symptoms, and parents appear to be more adept at noticing and describing externalizing symptoms (Moretti et al., 1984; Muris et al., 2002; Wrobel & Lachar, 1998). Therefore, it is possible that even if the CBCL "trauma" scale was measuring PTSD symptoms in children, it would not be correlated to the "Child Report-Trauma" factor because of the poor concordance between self-report and parent-report measures, and the relative inability of parents to accurately identify the internalizing symptoms their children are experiencing.

Factors conceptualized as "Child Report", "Parent Report-Internalizing", and "Parent Report-Externalizing" factors were present in the older children. All scales of the TSCC and UCLA PTSD Index were correlated to the "Child Report" factor, including the TSCC scales "depression" and "anger". This factor was not considered to be a trauma factor because this

factor encompassed all child reported scales, even those not closely associated with PTSD. The "Child Report" factor was distinct from the other two factors, which consisted of the parent reported scales. As previously stated, concordance between child report and parent report measures tends to be low to moderate (Chaffin & Shultz, 2000; Gerring et al., 2002). The formation of distinctive child report and parent factors was likely strongly influenced by this poor concordance rate. It is feasible that this concordance was further lowered by the possibility that the older children might have withdrawn from their parents, making it difficult for the parents to accurately assess their children's internalizing and externalizing symptoms. This withdrawal could have been driven by avoidance cluster symptoms (e.g., feelings of detachment or estrangement from others, restricted range of affect, markedly diminished interest or participation in significant activities), which are key symptoms of PTSD and are thus likely to be present in a clinical sample of children with a trauma history. This could have further decreased the concordance between child and parent report of symptoms in this sample. This particularly low concordance might have led all the child report scales, regardless of their ability to assess for trauma symptoms, to be highly correlated with one another; thus precluding the emergence of a "Child Report-Trauma" factor. Another possible explanation is that the older children significantly differed from the younger children in the severity or duration of trauma. This might have led them to display not only symptoms of PTSD, but also symptoms of other disorders, such as depression (Ackerman et al., 1998; Briggs & Joyce, 1997; McLeer et al., 1988; Mennen, 1995; Mennen & Meadow, 1995; Wolfe, et al., 1994). Therefore, the "Child Report" factor might indeed be able to be conceptualized as a trauma factor, but a trauma factor representing a constellation of symptoms and disorders and not just PTSD without any comorbid and trauma related disorders.

Limitations Related to Aim 1.

Several limitations exist for this aim. The sample size of 110 was adequate for splitting the sample into two groups for exploratory factor analysis, but was not large enough for further breakdown by age. It is possible that different factor patterns would have existed if the analyses were conducted on groups of children that were more similar in age and thus displayed more congruent development levels (e.g., very similar language development). As previously mentioned, it is possible that the older and younger children were different on important abuse characteristics, such as duration and severity of trauma, that were not able to be explored in this study. It is also possible that the younger children received services in a timelier manner following the traumatic event(s) than the older children, perhaps indicating the presence of a more supportive home environment. However, it is also possible that the older children were brought in shortly following the traumatic event(s), and that a wide range of children's ages during the initial traumatic event(s) existed. Previous literature indicates that these factors might be related to the number and intensity of symptoms children display, and this information might have enabled a clearer interpretation of factor patterns (Briggs & Joyce, 1997; McLeer et al., 1988; Mennen, 1995; Mennen & Meadow, 1995; Wolfe, et al., 1994).

Future Research Related to Aim 1.

Several areas of future research would help clarify and expand the findings in aim 1. Obtaining a larger sample with children with specific and clearly defined traumas (i.e., one incident of sexual abuse, physical abuse, war trauma, being in a natural disaster, ongoing domestic violence) would allow investigation into the factor patterns present when different types of trauma are considered. It is possible that a more distinct pattern of trauma related distress and non-trauma related distress exists when the sample is comprised of children with

more clearly defined traumas. This type of research could be used to further clarify concepts such as “complex PTSD”. Another area of future research could involve including the TSCYC, a parent report measure similar to the TSCC, in future EFA’s investigating the factors formed using various trauma related and non-trauma related scales. Using a parent report measure that is specifically designed to assess for trauma symptoms would allow exploration of the correlation of trauma related scales on child report and parent report measures. Thus, using a parent report measure such as the TSCYC that has substantial methodological and statistical data supporting it would likely help illuminate the factor patterns produced by exploratory factor analysis (Briere, Johnson et al., 2001).

Aim 2- Chi-Square and MANCOVA analyses on possible differences in scale elevation on the CBCL, UCLA PTSD Index, and TSCC between Caucasian and African-American children

Summary and Explanations of Findings.

The hypotheses for this aim were partially supported. It was hypothesized that African-American children would be more likely than Caucasian children to have clinically significant elevations on the UCLA PTSD Index "PTSD full diagnosis likely", TSCC "PTS" and CBCL "trauma" scales. It was further hypothesized that these differences would no longer be significant after the potential effects of income were accounted for. As predicted, African-American children had a higher rate of clinically significant elevations on the UCLA PTSD Index "PTSD full diagnosis likely" scale than Caucasian children. However, contrary to the relationship hypothesized, Caucasian children had a higher rate of clinically significant elevations on the CBCL "trauma" scale than African-American children. Moreover, a significant relationship between children's race and clinical elevations on the TSCC "PTS" scale was not found. After removing the possible influence of income, there continued to be a trend indicating

that race was related to elevations on the UCLA PTSD Index "PTSD overall severity score" scale and the CBCL "trauma" scale when these scales were considered together. As expected, there were no longer significant differences on clinical elevations on the UCLA PTSD Index "PTSD overall severity scale" when this scale was considered separately after the possible influence of income was eliminated. However, there continued to be a significant effect of race and children's likelihood to have a clinically significant elevation on the CBCL "trauma" scale when this scale was considered separately after controlling for the possible influence of income.

Convergence and Divergence with Existing Literature.

The finding that African-American children were more likely than Caucasian children to have clinically significant elevations on the UCLA PTSD Index "PTSD full diagnosis likely" scale fits with previous literature indicating that minorities that had experienced a trauma were more likely to develop PTSD than Caucasians who had experienced a trauma (Brewin et al., 2000). When the possible influence of income was removed there continued to be a trend towards a significant difference between African Americans and Caucasians when both the UCLA PTSD Index "PTSD overall severity score" scale and CBCL "trauma" scale were considered together; however, this difference did not exist when the UCLA PTSD Index "PTSD overall severity score" scale was separated from the CBCL "trauma" index. This finding both mirrors and contradicts previous research (Brewin et al., 2000; Samaan, 1998). Secondary analyses on the UCLA PTSD Index reexperiencing, hyperarousal, and avoidance cluster symptoms were conducted to help elucidate this finding. These analyses revealed that significantly more African-American children than Caucasian children had elevated scores on the avoidance cluster scale. These analyses also revealed that if children of all races met criteria for the avoidance and reexperiencing clusters, 92.6% also met the hyperarousal cluster criteria.

If children met criteria for both the avoidance and hyperarousal criteria, 89.3% also met the reexperiencing cluster criteria. However, when children met both the reexperiencing and hyperarousal cluster criteria, only 46.3% met the avoidance cluster criteria. Overall, 63.6% of children met criteria for the reexperiencing cluster, 29.1% of children met criteria for the avoidance cluster, and 59.1% of children met criteria for the hyperarousal cluster. Thus, it appears that it is less likely that children are able to meet clinical criteria on the avoidance cluster than meet clinical criteria on the reexperiencing and hyperarousal clusters. It also seems that if children are able to meet the criteria for the avoidance cluster, they are quite likely to also meet criteria for both the reexperiencing and hyperarousal clusters, thus meeting criteria for PTSD. Given that African-American children were significantly more likely to meet the avoidance cluster criteria than Caucasian children, and that meeting the avoidance cluster criteria is key to meeting full PTSD criteria, it is possible that the greater proportion of African-American children meeting avoidance cluster criteria than Caucasian children was leading to the greater proportion of African-American children than Caucasian children having clinically significant elevations on the "PTSD full diagnosis likely" scale. It is possible this finding indicates that African-American children are more likely than Caucasian children to have avoidance symptoms. Conversely, it is possible that the UCLA PTSD Index is overpathologizing African-American children's behaviors and thoughts and misrepresenting these behaviors and thoughts as avoidance symptoms. However, these interpretations should be viewed with caution, as income appears to be exerting an influence on the correlation between race and scale elevations.

In contrast, the findings that Caucasian children are more likely to have clinically significant elevations on the CBCL "trauma" scale than African-American children, and that these differences existed after removing the possible influence of income, fits with previous

research indicating that Caucasian children are a higher risk for developing various psychological symptoms than minority children (Samaan, 1998). However, the meta-analysis indicating Caucasian children were at an increased risk for psychological distress used both clinical and community samples, as opposed to the current study that used only a clinical sample. This finding also is not in concordance with the literature indicating that minority children appear to be at a higher risk for developing various types of psychological distress such as depressive, anxious, and somatic symptoms, (Lau et al., 2006; Siegel, et al., 1998). Given that the CBCL "trauma" scale is partially comprised of questions assessing for depressive, anxious, and somatic symptoms, it appears that this finding diverges from some of the literature on race and psychological distress. The overrepresentation of Caucasian children with elevated scores on the CBCL "trauma" scale also differs from studies suggesting that the CBCL might have a tendency to over-pathologize minority children (McCarty & McMahon, 2003; Sandberg et al., 1991). This finding should be interpreted cautiously, as there is a paucity of research into the CBCL "trauma" scale's validity and reliability (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). Additionally, the suggested cut-score on the CBCL "trauma" scale is 8, but as explored in Aim 3, the appropriate cut-score for this sample appears to be 17 (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). However, the standard cut-score of 8 was used in this analysis, and it is not clear if this relationship between children's race and their likelihood to have clinically significant elevations on the "trauma" scale would continue to exist if the cut-score of 17 had been used.

Contrary to the CBCL and UCLA PTSD Index results, African-American and Caucasian children did not differ significantly from one another on clinical elevations on the TSCC "PTS" scale. As previously discussed, African-American children were more likely than Caucasian

children to meet clinical criteria for the avoidance cluster in this sample. No differences in meeting reexperiencing and hyperarousal cluster criteria were noted. Also, as previously noted, children who met criteria for the avoidance cluster also were likely to meet criteria for either the reexperiencing or hyperarousal cluster. However, children who met criteria for the reexperiencing and hyperarousal clusters were not as likely to meet criteria for the avoidance cluster. These findings were offered as a possible explanation for the tendency for African-American children to have a higher rate of clinical elevation on the UCLA PTSD Index "PTSD full diagnosis likely" scale. Unlike the UCLA PTSD Index, the TSCC "PTS" scale does not include many questions specifically assessing for avoidance cluster symptoms. The relative lack of avoidance symptoms on the TSCC compared to the UCLA PTSD Index could explain the lack of a significant difference between African-American and Caucasian children on clinical elevations on the TSCC "PTS" scale. It is possible there was not a significant difference between African-American and Caucasians on elevations on this scale since there were no significant differences between the children on the rates of elevations on the reexperiencing and hyperarousal clusters, and these cluster symptoms comprise most of the questions on the "PTS" scale.

Limitations Related to Aim 2.

There are several limitations related to Aim 2. An existing database was utilized, and although it included variables that assessed for factors such as severity and duration of trauma, these variables were clinically informative but were not measured in a sufficiently standard way for them to be used in research. Variables such as Department of Family Services (DFS) involvement, placement outside the home, and legal action having been taken against the alleged perpetrator could be conceptualized as distressing events that might increase the severity of the

trauma the children experience, as children have to cope with multiple difficult events and possible disruption of family bonds. However, these variables have not been sufficiently studied to be conclusively used as indicators of greater trauma severity. Number of incidents of known traumatic events and the duration of the trauma were assessed mainly by parent report, with no corroborating report, and were not reliable enough to be used in a research study. In addition, many of the participants did not have data for these variables, precluding their inclusion in even a purely descriptive manner in this study. This is a limitation as previous research has indicated that these factors might influence the expression of PTSD in children (Briggs & Joyce, 1997; McLeer et al., 1988; Mennen, 1995; Mennen & Meadow 1995; Wolfe et al., 1994). Including such variables might have led to a clearer understanding of the relationship between race, income, and clinical elevations on the various scales. Another limitation is that the tentatively agreed upon cut-score of 8 on the insufficiently researched CBCL "trauma" scale appeared to be a poor fit for this sample, as will be explored in Aim 3. Thus, the conclusions drawn about the CBCL "trauma" scale must be viewed with caution.

Future Research Related to Aim 2.

Several areas of future research would help clarify these findings. Research investigating the patterns of reexperiencing, avoidance, and hyperarousal cluster elevations on the UCLA PTSD Index could be conducted to see if the patterns found in this study could be replicated. This would be informative, as the expression of PTSD symptoms in children is an area that is not sufficiently well understood. Additionally, further investigation into possible racial differences in PTSD expression in children should be conducted, as this literature remains murky. Such a study could use the factors found in Aim 1 as dependent variables in an ANCOVA or MANCOVA analysis with race as the independent variable and income, duration of trauma, and

severity of trauma as covariates. Using factors as variables in an ANCOVA or MANCOVA would allow investigation into possible racial differences in trauma related symptoms that are not highly influenced by racial differences on scales on specific measures (e.g., the UCLA PTSD Index "PTSD full diagnosis likely" scale). This type of study might allow for a clearer understanding of possible racial differences in the expression of PTSD, as the possible bias of the measures used to assess for PTSD would be minimized.

Aim 3- ROC Curve analyses comparing and contrasting the TSCC and CBCL to the UCLA PTSD Index

Summary and Explanation of Findings.

The hypotheses for aim 3 were generally supported. The TSCC had a moderate ability to detect true cases of PTSD and a very good ability to detect children without PTSD when compared to the UCLA PTSD Index in this sample. The TSCC also displayed a low false-positive and false-negative rate in this sample. The overall agreement between the TSCC and UCLA PTSD Index was high, and the measures demonstrated a good ability to concur that children either were likely to have PTSD or were not likely to have PTSD. The ideal TSCC cut-score in this sample was 19, which is slightly higher than the average suggested cut-score on the TSCC (cut-scores range from 15-20). The CBCL had a moderate ability to detect true cases of PTSD and to detect children without PTSD when compared to the UCLA PTSD Index in this sample. The CBCL also displayed a low false-positive rate and a moderate false-negative rate in this sample. The overall agreement between the CBCL and UCLA PTSD Index was low to moderate, and the measures demonstrated a fair ability to concur that children were likely to have PTSD and a good ability to concur that children were not likely to have PTSD. The ideal CBCL cut-score in this sample was 17, which is substantially higher than the suggested cut-score

of 8 on the CBCL (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). Lastly, as predicted, children's scores on the trauma related scales on these three measures differed significantly depending on whether they were likely to have PTSD or not likely to have PTSD.

Convergence and Divergence with Existing Literature.

The TSCC displayed a high level of agreement with the UCLA PTSD Index, which was expected as both assess for PTSD symptoms and are self-report measures. Despite this high level of agreement with the UCLA PTSD Index, the TSCC only had a moderate ability to detect PTSD in the children in this sample. The UCLA PTSD Index was based on DSM PTSD criteria, and thus determines if children are likely to have PTSD based on the children meeting or exceeding the DSM criteria. However, the TSCC is not based on DSM PTSD criteria. Thus, children can be above the clinical cut-score on the TSCC and not qualify for a diagnosis of PTSD on the UCLA PTSD Index because they do not meet the minimum DSM requirements for all three clusters, or they can be below the clinical cut-score on the TSCC and qualify for a diagnosis of PTSD on the UCLA PTSD Index because they meet the minimum DSM requirements for all three clusters. This discrepancy between the two measures likely accounts for some of lowered ability of the TSCC to identify children with PTSD. Previous literature indicates that the TSCC is relatively insensitive to avoidance symptoms, and this might have lowered the TSCC's ability to detect PTSD in this sample (Crouch et al., 1999; Sadowski & Friedrich, 2000). Other findings revealed that the African-American children, who represented more than half of the sample, tended to display more avoidance symptoms than Caucasian children. Unlike the TSCC, the UCLA PTSD Index does have a substantial number of questions that assess for the presence of avoidance symptoms. Thus, it is possible that in this sample the TSCC had only a moderate ability to detect PTSD when compared to the UCLA PTSD Index

because the TSCC was not able to identify avoidance symptoms as adeptly as the UCLA PTSD Index. This could have led to the TSCC not identifying PTSD in children with a significant number of avoidance symptoms. However, this shortcoming of the TSCC did not preclude the measure from having a moderate ability to detect cases of PTSD, and a good ability to distinguish those cases that did not have PTSD in this sample. This finding fits with previous research suggesting that the TSCC is a good measure to use when assessing for PTSD symptoms in children that have experienced CSA, which was the primary trauma for many children in this sample (Sadowski & Friedrich, 2000). It appears that despite the utility of both measures to identify PTSD, important differences may exist in their ability to detect certain types of symptoms, such as avoidance symptoms. Additionally, the TSCC cut-score for this sample was slightly higher than most of the suggested cut-scores. This could indicate that the TSCC has a tendency to over identify cases of PTSD in children with a substantial trauma history, such as in this study. It could also indicate that it tends to over-pathologize males, as the recommended cut-scores for males are 15 and 17, depending on their age. Although preliminary, this comparison of the TSCC to the UCLA PTSD Index provides valuable information as these widely used instruments have not been previously directly compared with each other. Additionally, most of the research on the UCLA PTSD Index compares the measures to other instruments that are closely based on DSM-IV criteria, as opposed to measures like the TSCC that are more sensitive to the developmental differences in PTSD expression in children (Steinberg et al., 2004).

The CBCL displayed a low to moderate level of agreement with the UCLA PTSD Index, which was slightly worse than expected. However, given that the CBCL was not designed to assess for PTSD symptoms, and the UCLA PTSD was designed for this purpose, it follows that

the CBCL would not be in moderate or high agreement with the UCLA PTSD Index. Also, the CBCL is a parent report measure while the UCLA PTSD Index is a self report measure, and concordance between parent and child report measures of PTSD in children is generally low to moderate (Chaffin & Shultz, 2000; Gerring et al., 2002). Despite this low to moderate level of agreement with the UCLA PTSD Index, the CBCL had a moderate ability to detect PTSD, as well as a moderate ability to distinguish those cases that did not have PTSD in this sample. However, the cut-score associated with this performance in this sample was 17, which is considerably higher than the cut-score of 8 used in previous studies (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). A possible reason for this discrepancy is that children who had experienced CSA, but were not necessarily displaying psychological distress nor were necessarily referred for psychological treatment, were used in a previous study (Ruggiero & McLeer, 2000). This study's sample consisted entirely of children with a trauma history, many of whom had experienced CSA that had been referred for psychological treatment. However, children with a history of CSA, and who qualified for a diagnosis of PTSD based on their Epidemiologic Version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS-E) score, had a mean score of 13 on the CBCL "trauma" scale in this previous study (Ruggiero & McLeer, 2000). The cut-score in the current sample of children displaying psychological distress is higher than the cut-score for children with PTSD in that previous study. Additionally, the children in another previous study on the effectiveness of the CBCL "trauma" score to determine if the children were likely to have PTSD were significantly younger than the children in this study (Dehon & Scheeringa, 2006). Given that children's developmental stage likely has an effect on the expression of PTSD symptoms, it is possible that the ideal CBCL "trauma" scale cut-score differs between younger and older children because the

symptoms of PTSD they are displaying are different (Coates & Schechter, 2004; Manly et al., 2001; Perry, 1994; Pynoos, 1990; Trickett et al.,1997). Thus, the CBCL "trauma" scale might be more effective at identifying possible cases of PTSD if the cut-score was tailored to reflect the type of trauma related symptoms children in different developmental stages display. Another divergence from previous literature is that Caucasian children with clinically elevated scores were overrepresented on the CBCL "trauma" scale, which differs from previous studies suggesting that the CBCL might have a tendency to over-pathologize minority children (McCarty & McMahon, 2003; Sandberg et al., 1991). However, as previously noted, this racial difference should be interpreted cautiously, as there is a dearth of research on the CBCL "trauma" scale and its possible potential to over-pathologize minority children (Dehon & Scheeringa, 2006; Ruggiero & McLeer, 2000). Despite these difficulties, the CBCL did perform significantly better than chance at identifying possible cases of PTSD in the children in this sample, although it did not perform as well as the TSCC. Thus, it appears that the CBCL "trauma" scale has some utility when assessing for PTSD in children.

Limitations Related to Aim 3.

Several limitations exist for this aim. This study included only children who had experienced a trauma and who were referred for psychological treatment. It is likely that many of these children were experiencing substantial psychological distress, including symptoms of PTSD. Therefore the rates of PTSD in children in this sample might have been higher than the rates of PTSD in children that had experienced a trauma but had not been referred for treatment, or in children with a trauma history but who were in psychological treatment for reasons other than the trauma. Thus, the generalizibility of this finding might be limited. These findings add to the literature in this area, but the lack of previous research makes it difficult to ascertain how

well these results generalize to other populations. A greater sample size would have allowed for basic age breakdowns in these analyses. Given the differences found between younger and older children in Aim 1, further investigation into possible age related differences would have helped clarify these findings. Lastly, although the UCLA PTSD Index is widely used and considered to be effective at assessing for the presence of PTSD in children, it might not be an ideal measure given the difficulties of assessing for PTSD in children and variety of presentation of PTSD in children (Steinberg et al., 2004).

Future Research Related to Aim 3.

Several areas of future research could help clarify and extend these findings. Continued research exploring the validity and reliability of the CBCL "trauma" scale, including investigation about the most appropriate cut-score, should be conducted. This is necessary as questions about this scale's utility at assessing for potential cases of PTSD in children exist. If the CBCL "trauma" scale is deemed to be a valid and reliable scale, research comparing this scale to the TSCYC, a parent report measure assessing for trauma related symptoms in young children, could be conducted to determine the relative strengths and weaknesses of these two measures. As a well-studied parent report measure of PTSD in older children does not currently exist, this type of comparison could provide clinicians with information about the potential benefits and drawbacks of including the CBCL in the battery clinicians use when assessing for PTSD in older children. Continued research comparing the TSCC and UCLA PTSD Index would also be helpful. Given the age differences in formation of "Trauma" factors found in Aim 1, it would be interesting to conduct an analysis that compares the TSCC and the UCLA PTSD Index separately for younger and older children. It is possible that these measures are differentially effective at identifying PTSD in younger and older children. For example, it might

be that the UCLA PTSD Index is generally better at accurately assessing for PTSD symptoms in older children than younger children, as the language used in this measure closely mimics the wording in the DSM-IV and could be difficult for younger children to fully comprehend. Another area of future research could involve including the TSCYC in studies examining the factors formed by various trauma related and non-trauma related scales. Using a parent report measure that is designed to assess for trauma symptoms would allow investigation of the correlation of scales on child report and parent report measures of trauma related symptoms. Thus, using a parent report measure such as the TSCYC that has substantial methodological and statistical data supporting it would likely help illuminate the factor patterns produced by exploratory factor analysis (Briere, Johnson et al., 2001). Research contrasting the ability of the TSCC and UCLA PTSD Index to identify reexperiencing, avoidance, and hyperarousal cluster symptoms would also be useful, given the small number of avoidance symptom questions on the TSCC compared to the UCLA PTSD Index.

Secondary Analyses- Investigation of children's patterns of clinically significant elevations on the reexperiencing, avoidance, and hyperarousal cluster scores on the UCLA PTSD Index

Summary and Explanation of Findings.

On the UCLA PTSD Index, 63.6% of children met criteria for the reexperiencing cluster, 29.1% of children met criteria for the avoidance cluster, and 59.1% of children met criteria for the hyperarousal cluster. When children met both the reexperiencing and avoidance cluster criteria, or both the avoidance and hyperarousal cluster criteria, 92.6% also met the hyperarousal criteria and 89.3% also met the reexperiencing criteria respectively. Conversely, when children met both the reexperiencing and hyperarousal cluster criteria, only 46.3% met the avoidance cluster criteria. Thus, it appears that children are more easily able to meet the clinical criteria on

the reexperiencing and hyperarousal clusters than on the avoidance cluster. Additionally, if children are able to meet the criteria for the avoidance cluster, it seems that they are quite likely to also meet criteria for both the reexperiencing and hyperarousal clusters, thus meeting criteria for PTSD.

Convergence and Divergence with Existing Literature.

This pattern could be the result of children expressing avoidance symptoms in ways that are not captured by the DSM-IV criteria, on which the UCLA PTSD Index is closely based. DSM-IV PTSD symptoms are based on the symptoms adult war veterans displayed after experiencing combat trauma, and researchers have proposed that children express PTSD symptoms differently from adults (Scheeringa, Zeanah, Drell et al., 1995; Scheeringa, Zeanah, Myers et al., 2003; Trickett, Reiffman, Horowitz & Putnam, 1997; Yehuda & McFarlane, 1995). It is possible that children's verbal capabilities, cognitive abilities, and level of independence lead children to express PTSD symptoms that differ from adults' symptoms, but that mirror the reexperiencing, avoidance, and hyperarousal clusters. In particular, children exhibit many symptoms that appear to be a developmentally appropriate expression of the DSM-IV avoidance cluster symptoms (Pynoos, 1990; Trickett et al., 1997). These differences could lead to DSM-IV-based measures underestimating the prevalence PTSD in children, and especially the number of children who meet the avoidance cluster criteria. Indeed, some research indicates that it is difficult for children who have experienced significant trauma(s) to meet DSM-IV criteria for PTSD (Scheeringa, Zeanah, Myers et al., 2003). Thus, the discrepancy in meeting criteria for reexperiencing, avoidance, and hyperarousal symptom clusters in this study could be a result of possible limitations of the UCLA PTSD Index at accurately identifying avoidance symptoms in children.

Limitation Related to Secondary Analyses.

The main limitation related to this secondary analysis was that it was not planned in advance; rather it was conducted to further understand the findings in Aim 2. Thus, no hypotheses were stated in advance. Therefore, there is a risk that these findings are merely an aberration that occurred in this sample and would not be replicated in future studies.

Future Research Related to Secondary Analyses.

Future research investigating this pattern of results on the UCLA PTSD Index would help clarify these findings, as it would indicate if these findings could generalize to other samples. Also, conducting research that involves assessing for proposed developmentally appropriate symptoms of PTSD in children, and administering the UCLA PTSD Index, is important. This type of research would allow the investigation of the possibility that children are experiencing enough PTSD symptoms to meet criteria for all clusters, but since they are displaying developmentally sensitive symptoms rather than DSM-IV symptoms, the UCLA PTSD Index is misclassifying these children as not having PTSD.

General Conclusions

The general goal of this study was to expand knowledge about the presentation of trauma symptoms in children and the ability of various commonly used measures to assess for PTSD symptoms. Many of the trauma focused instruments appear to adequately assess for PTSD symptoms in children; however, some problems were noted. A main problem appeared to be measuring avoidance symptoms in children, as illustrated by the performance of the UCLA PTSD Index. However, despite this difficulty, the UCLA PTSD Index and the TSCC were able to sufficiently identify trauma related symptoms in children. Additionally, in younger children, these instruments were able to assess for PTSD symptoms in children and distinguish these

symptoms from other child reported distress such as depression and anger, both of which also might be trauma related. In older children, the ability of the UCLA PTSD Index and TSCC to measure PTSD symptoms and differentiate them from other child reported distress was not observed. The CBCL "trauma" scale did not display as high a level of identifying PTSD symptoms and discriminating these symptoms from other general distress as the UCLA PTSD Index and TSCC did. Another area of concern is that although racial differences were not noted on the TSCC "PTS" scale, they were noted on the UCLA PTSD Index "PTSD overall severity score" and the CBCL "trauma" scale. African-American children were more likely than Caucasian children to have clinical elevations on the UCLA PTSD Index "PTSD overall severity score". Conversely, Caucasian children were more likely than African-American children to have clinical elevations on the CBCL "trauma" scale. These differences persisted, albeit not as markedly, after accounting for the possible influence of family income. Thus, it appears that either factors such as a child's race and family income are influencing the likelihood a child will display trauma symptoms, or that the UCLA PTSD Index and CBCL are over-pathologizing African-American and Caucasian children, respectively.

Research into the expression of PTSD in children, as well as on the instruments used to assess for PTSD symptoms, should be conducted in order to more completely understand PTSD and the assessment of PTSD in children. This incomplete understanding of the expression and assessment of PTSD in children has several clinical implications. Clinicians should use caution when interpreting the findings of PTSD measures. Also, they should use these instruments as part of their investigation of possible PTSD in children, rather than using them as definitive diagnostic tools. Additionally, clinicians should assess for the presence of developmentally

sensitive symptoms of PTSD in children, rather than rely solely on the DSM-IV criteria when determining if a child has PTSD.

General Limitations

In addition to the limitations noted for specific aims, some general limitations existed. The possible influence of order effects was not systematically controlled for in this study. However, it is improbable that order effects were present, as the order of administration of these instruments was chosen by individual clinicians and it unlikely that the measures were always given in the same order. Furthermore, the CBCL is caregiver report and the TSCC and UCLA PTSD Index are child-report, so the responses on the CBCL most likely do not impact the responses on the TSCC and UCLA PTSD Index. As the TSCC and UCLA PTSD Index were unlikely to be systematically given in the same order (with respect to each other and within the entire assessment battery) it is doubtful that the responses on one measure influenced the responses on the other measure in a systematic manner. Also, only pre-test data was available. This prevented investigation into the utility of the measures to assess for treatment related changes in PTSD symptomatology. It also prohibited the exploration of how clinical judgment correlates with the information from these instruments. This type of information could have allowed greater exploration into factors such as racial differences on the UCLA PTSD Index and CBCL scales, as clinicians' opinions of levels of pathology could have been compared to the outcomes of these measures. This would have enabled the comparison of clinical judgment and clinical elevations on these instruments, in order to clarify if children were truly exhibiting different levels of pathology or if the instruments might be biased.

Future directions

Specific ideas for future research were addressed in the discussion of the aims of this study. In general, the current findings indicated that knowledge of PTSD expression in children is incomplete, and remains a rich and important area for future research. Continued exploration of how children express PTSD symptoms is essential; as it appears that their presentation of symptoms differs substantially from adults' presentation of symptoms. Refining current PTSD measures so they incorporate the developmentally sensitive symptoms of PTSD that children display and developing new instruments that include these symptoms is also an important future area of study. Lastly, when investigating these areas, researchers should be mindful of the possible influences of race, SES, type of trauma, trauma duration, and severity of trauma on the development and expression of PTSD and of the possible bias of PTSD measures.

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