

DISSERTATION

CUMULATIVE TRAUMA AND NEUROPSYCHOLOGICAL FUNCTIONING:
EXAMINING THE ROLE OF RESILIENCE

Submitted by

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ABSTRACT

CUMULATIVE TRAUMA AND NEUROPSYCHOLOGICAL FUNCTIONING: EXAMINING THE ROLE OF RESILIENCE

Previous research has linked childhood trauma to a range of adverse psychological and behavioral consequences which affect a child's wellbeing and ability to be successful socially and academically. Previous studies have also found childhood trauma to be associated with deficits in neuropsychological functioning. It has been proposed that the experience of trauma at critical points disrupts a child's neurodevelopment and that the disruption and subsequent deficits in neuropsychological functioning in part explain the psychological and behavioral struggles exhibited by traumatized children. This study aimed to explore the relation between cumulative trauma and psychological, behavioral, and neuropsychological outcomes among system-involved youth. Resilience and age at onset were included in analyses as potential mediators. Results indicated that more trauma types experienced predicted more psychological symptoms, and more behavioral concerns among youth living with their biological parents. In addition, deficits in executive function, specifically in shifting, were predicted by cumulative trauma. These results demonstrate the importance of accounting for the number of traumas experienced by youth present with related symptoms and behavioral concerns, and highlight the need to continue to explore the influence of cumulative trauma on neuropsychological function.

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DEDICATION

To

Miller Williams Lilliston

TABLE OF CONTENTS

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER 1: INTRODUCTION	1
STATEMENT OF RESEARCH PROBLEM	1
OVERVIEW OF THE PROPOSED STUDY	2
CHAPTER 2: LITERATURE REVIEW	4
CHILDHOOD TRAUMA	4
PREVALENCE AND IMPACT	4
CUMULATIVE TRAUMA	6
OTHER CHARACTERISTICS OF CHILDHOOD TRAUMA	9
IMPACT OF TRAUMA ON DEVELOPMENT	10
TRAUMA AND DEVELOPMENTAL PSYCHOPATHOLOGY	12
RESILIENCE	13
TRAUMA AND NEUROPSYCHOLOGICAL FUNCTION	15
INTELLIGENCE	15
MEMORY	16
EXECUTIVE FUNCTION	18
RATIONALE FOR CURRENT STUDY	20
CHAPTER 3: METHOD	23
PARTICIPANTS	23
PROCEDURE	23
INSTRUMENTS	24
VARIABLES FOR ANALYSIS	28
ANALYSES	31
CHAPTER 4: RESULTS	33
HYPOTHESIS 1	33
HYPOTHESIS 2	38
HYPOTHESIS 3	40
HYPOTHESIS 4	40
CHAPTER 5: DISCUSSION	41
TRAUMA SYMPTOMS AND BEHAVIORAL CONCERNS	42
NEUROPSYCHOLOGICAL FUNCTIONING	44
AGE AT ONSET	48
LIMITATIONS	50
CONCLUSIONS AND CLINICAL IMPLICATIONS	52
REFERENCES	55
APPENDICES	71

LIST OF TABLES

TABLE 1—PERCENT OF PARTICIPANTS REPORTING EACH TRAUMA TYPE BY INSTRUMENT	33
TABLE 2—MEANS AND STANDARD DEVIATIONS FOR TRAUMA SYMPTOMS SUBSCALE AND COMPOSITE VARIABLES	34
TABLE 3—CORRELATION MATRIX FOR ALL INDEPENDENT AND DEPENDENT VARIABLES	35
TABLE 4—MEANS AND STANDARD DEVIATIONS FOR BEHAVIORAL CONCERNS SUBSCALE AND COMPOSITE VARIABLES	36
TABLE 5—SUMMARY OF REGRESSION ANALYSES FOR HYPOTHESIS 1 DEPENDENT VARIABLES	37
TABLE 6—SUMMARY OF REGRESSION ANALYSES FOR BEHAVIORAL CONCERNS VARIABLES WHEN CONTROLLING FOR PLACEMENT	38
TABLE 7—SUMMARY OF REGRESSION ANALYSES FOR HYPOTHESIS 2 DEPENDENT VARIABLES	39
TABLE 8—MEANS AND STANDARD DEVIATIONS FOR PERFORMANCE ON NEUROPSYCHOLOGICAL INSTRUMENTS	39

LIST OF FIGURES

FIGURE 1—MULTIVARIATE MODEL	22
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CHAPTER 1: INTRODUCTION

STATEMENT OF RESEARCH PROBLEM

Many researchers and practitioners have pushed for an expansion of the definition of trauma to include a wider range of experiences and to examine the cumulative effect of these early traumatic experiences on a child's mental health and functioning (D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012; McDonald, Borntrager, & Rostad, 2014; Wamser-Nanney & Vandenberg, 2013). These researchers have highlighted that there are a range of experiences, including physical and sexual abuse, neglect, psychological maltreatment, loss or disruption in primary attachment, dependency on an impaired caregiver, witness to violence, community violence, and serious injury, that can result in trauma-related symptoms and other sequelae and should thus be accounted for in research on childhood trauma (McDonald et al., 2014).

Studies which used this broader definition of traumatic experiences have found that children with histories of cumulative trauma have increased difficulty with emotion regulation and impulse control, have a lower self-image, are more likely to engage in high-risk behavior and are more likely to struggle socially and academically (Amatya & Barzman, 2012; Kalmakis & Chandler, 2014; McDonald et al., 2014; Wamser-Nanney & Vandenberg, 2013). Furthermore, it has been suggested that a dose-response relation exists, in that increases in the number, frequency, or duration of trauma correlates with increased difficulties and more complex symptomatology (Carrey et al., 1995; McDonald et al., 2014).

Cumulative trauma is associated with structural changes in the brain which affect its development. The child's interaction with the environment is limited to hypervigilance regarding safety; he or she is therefore not able to enjoy a curiosity about the world that lends itself to

learning and growth (Amatya & Barzman, 2012). This altered or stunted brain development can correspond to neuropsychological impairments across the cognitive, emotional, behavioral, and interpersonal domains (Carrion, Wong, & Kletter, 2013).

Research examining neuropsychological functioning and childhood trauma has found a range of associated deficits, including those involving memory and learning, executive function and attention, visual-spatial organization, and intelligence (Aas, 2012; Carrey, Butter, Persinger, & Bialik, 1995; Majer, Nater, Lin, Capuron, & Reeves, 2010; Nolin & Ethier, 2007; Spann et al., 2012; Zou et al., 2013). Gabowitz, Zucker, and Cook (2007) posited that because of the varying influences of factors such as the number and types of trauma experienced, the age of the individual, and the duration of trauma, as well as the impact of protective factors in the child's life, the neuropsychological domains affected by trauma are unique to the individual. However, from a neurodevelopmental perspective, it may be that trauma occurring at different points in a child's development would yield differential yet somewhat predictable neuropsychological deficits.

While much of the research in this area is focused on the negative outcomes linked to childhood trauma, the field of developmental psychopathology encourages a balanced perspective, proposing that children who live through and adapt during trauma reallocate resources that may result in underdevelopment of some abilities but also enhance the development of others. Through this perspective the study of resilience has emerged, and an increased amount of attention has been given to a child's protective factors and his or her positive adaptation despite adversity (Luthar, Cicchetti, & Becker, 2000).

OVERVIEW OF THE PROPOSED STUDY

Although there is growing evidence that cumulative trauma explains the relation between childhood maltreatment and negative outcomes, the field is dominated by studies which attempt to discern the contribution of one trauma type. Further, although theorists suggest that the degree

to which a child is impacted by trauma may relate to the developmental age at which the trauma occurs, there is a paucity of research exploring this relation, and even less which does so while accounting for the cumulative effects of trauma.

The current study aimed to add to the body of knowledge regarding cumulative trauma on psychological and behavioral wellbeing among system-involved adolescents, and to provide insight into the proposed connections between trauma and neurodevelopment via participants' performance on neuropsychological testing. To address gaps in the literature regarding mediators between trauma and functioning, this study introduced a multivariate model examining resilience and developmental age at onset as partial mediators between cumulative trauma and psychological, behavioral, and neuropsychological outcomes.

CHAPTER 2: LITERATURE REVIEW

CHILDHOOD TRAUMA

Prevalence and Impact

Childhood trauma has been found to be associated with a range of negative psychological outcomes, including emotion dysregulation, depression, dissociation, shame, guilt, and low self-esteem (Aspelmeier, Elliot, & Smith, 2007; Chapman, Whitfield, Felitti, Dube, Edwards, & Anda, 2004; Cook et al., 2005; D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012; McDonald, Borntrager, & Rostad, 2014; Valentino, Bridgett, Hayden, & Nuttall, 2012). Children who have experienced trauma also often exhibit interpersonal problems, potentially related to deficits in emotion regulation and in their ability to engage in relationships or relate to others in a healthy way (Amatya & Barzman, 2012; Cicchetti & Banny 2014; Cook et al., 2005; D'Andrea et al., 2012). Childhood trauma, perhaps mediated by this range of psychological sequelae, is in turn associated with an even wider range of problematic behaviors such as aggression, inattention or hyperactivity, non-suicidal self-injury, substance use, and delinquent behaviors (Auerbach et al., 2014; Dierkhising et al., 2013; Dube, Dong, Chapman, Giles, Anda, & Felitti, 2003; Gregorowski & Seedat, 2013; Krupnick et al., 2004; Robertson & Burton, 2010; Smith & Saldana, 2013). It has been suggested that many of the symptoms that are diagnosed as Attention-Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder, Conduct Disorder, or pediatric Bipolar Disorder have their etiology in, and are therefore better understood through, the lens of childhood trauma (Gregorowski & Seedat, 2013). The symptoms and behaviors exhibited by children with trauma histories interfere with their ability to be successful socially and academically, and these struggles can fuel negative views of themselves and others (Cicchetti & Banny 2014; Cook et al., 2005).

Adding to the concern regarding the extent to which trauma impacts the lives and well-being of child victims is the prevalence at which it occurs. Studies of prevalence rates in the general population show that between 32–80% of children have experienced maltreatment (Afifi, MacMillan, Boyle, Taillieu, Cheung, & Sareen, 2014; Turner, Finkelhor, & Ormrod, 2010; Wamser-Nanney & Vandenberg, 2013). The Fourth National Incidence Study of Child Abuse and Neglect (NIS-4) estimated over 1.2 million children in the U.S. were victims of abuse or neglect from 2005–2006, and this report indicates no significant changes in prevalence when compared to data gathered ten years prior (Sedlak et al., 2010).

Incidences of trauma are higher among children with child welfare involvement, with approximately 68–92% having experienced maltreatment (Cyr, Chamberland, Lessard, Clément, Wemmers, Collin-Vézina, Gagné, & Damant, 2012; Greeson, 2011). Less recognized, however, is the prevalence of childhood trauma among adolescents involved in the juvenile justice system. A comparable 70–93% of juvenile justice-involved adolescents have been exposed to trauma, (Dierkhising et al., 2013; Robertson & Burton, 2010), and it has been suggested that the dysregulation of emotion and behavior by children who have experienced trauma predisposes them for delinquency and juvenile justice involvement (Greeson et al., 2011). A report from 2012 on the fiscal impact of child abuse in the U.S. indicated that the annual costs associated with the service provision, both direct and indirect, for system-involved youth with histories of maltreatments was estimated at over 32 billion dollars (Gelles & Perlman, 2012). Considering the prevalence of trauma among system-involved youth and the scope of associated difficulties, it has been suggested that childhood trauma is the “most significant and costly issue facing public health,” and that effective treatment and prevention must begin with identification of those who have experienced trauma and assessments that inform providers on how they have been uniquely impacted by these experiences (McDonald et al., 2014, p. 199).

Cumulative Trauma

The variability in reported prevalence of traumatic exposure in children, particularly those in the general population, likely reflects the lack of consistency in the field as to what constitutes trauma (Toth & Cicchetti, 2013). Early studies on trauma primarily focused on physical abuse, sexual abuse, and neglect. As the understanding of the extent to which traumatic experiences can impact a child has expanded, so has the scope of experiences that are considered potentially traumatic. More recent studies have found a number of other exposures or adversities all share or are associated with similar emotional, social, and behavioral difficulties, leading researchers to conclude that experiences like witnessing domestic violence, frequent relocation or homelessness, parental substance use, loss of a caregiver or other significant relationship, and exposure to community violence are all potentially traumatic (Cook et al., 2005; D'Andrea et al., 2012; Dierkhising, et al., 2013; Krupnick et al., 2004). By in large, studies reporting lower rates of trauma exposure assessed fewer types of trauma in their analyses.

Far more consistent than the reported percentage of children who have experienced trauma is the rate at which they are found to have experienced more than one form of maltreatment. The National Comorbidity Survey indicated 25–35% of adults report having experienced three or more types of trauma as children (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Through the seminal work by Felitti and his colleagues, which accounted for a wide range of Adverse Childhood Experiences (ACEs), 86.5% of adult respondents recalled at least two ACEs before age 18, and 38.5% reported four or more (Chapman et al., 2004; Dong, Anda, Felitti, Dube, Williamson, Thompson, Loo, & Giles, 2003; Dube et al., 2003). Further examination by these researchers indicated that no adversity type was more likely to occur in isolation, and that they were all equally likely to be associated with each other (Dong et al., 2003).

In the general population, 66% of children aged 2–17 reportedly experienced two or more types of trauma, and 10% reported exposure to more than ten (Turner et al., 2010). Exposure to multiple types of abuse or maltreatment is common among children involved in the child welfare or juvenile justice systems. An estimated 29–54% experienced four or more types of trauma, and 25% experienced seven or more (Cyr et al., 2012; Greeson et al., 2011; Dierkhising et al., 2013). The average number of trauma types experienced in this population is between 4.7 and 4.9 (Dierkhising et al., 2013; Greeson et al., 2011). Researchers have emphasized that, among high-risk and system-involved adolescents, exposure to multiple types of trauma is the norm rather than the exception (Menard & Huizinga, 2001).

These findings have led researchers to coin the terms cumulative trauma and polyvictimization to flag the importance of accounting for the number of different potentially harmful experiences to which a child may be subjected (Finkelhor, Shattuck, Turner, Ormrod, & Hamby, 2011, Scott-Storey, 2011). Studies which have examined the psychological and behavioral correlates of cumulative trauma found that more trauma types experienced was associated with significantly increased levels of depression, anger, and PTSD symptoms (Greeson et al., 2011; McDonald et al., 2014; Turner, Finkelhor, & Ormrod, 2006; Turner et al., 2010; Wamser-Nanney & Vandenberg, 2013) as well as more delinquent behaviors and academic difficulties in children (Robertson & Burton, 2010), and higher rates of substance use, mental health diagnoses, health-risk behaviors, and medical conditions among adults (Chapman et al., 2004; Dong et al., 2003; Dube et al., 2003; Johnson, Pratt, Brems, & Neal, 2007; Krupnick et al., 2004).

The study of childhood trauma is thus quickly evolving as the recognition of the prevalence of and importance in accounting for cumulative trauma and other trauma characteristics grows. The consequence of this evolution is that different disciplines, and even those within the same discipline, are using different terms and definitions for what appear to be the same

concepts. For example, a review by Scott-Storey (2011) highlighted terms in the literature which are seemingly synonymous with cumulative trauma, including: accumulated trauma, polyvictimization, revictimization, cumulative exposure, and lifetime trauma. This author explained that these terms all seem to be describing the same phenomenon, in that more experiences of abuse result in outcomes that differ from those associated with only one experience or type of abuse.

Those who research cumulative trauma have asserted that a dose-response relationship appears to exist between childhood trauma and outcomes, in that as the number of abuse types increases so does the severity and expanse of the emotional, psychological, and behavioral struggles faced by the child (Choi & Oh, 2014; Greeson et al., 2014; Scott-Storey, 2011). In response to the markedly different presentations between children who have experienced cumulative trauma and those who have not, researchers have described this culmination of experiences as a condition, and have offered terms such as Complex Trauma and Developmental Trauma Disorder to help capture this condition and promote the recognition of these high-needs and high-risk children (Cook et al., 2005; D'Andrea et al., 2012; Wamser-Nanney & Vandenberg, 2013).

The body of research on the psychological and behavioral correlates of childhood trauma is dominated by studies which account for only one type of traumatic experience. In light of the more recent evidence of the impact of cumulative trauma, the vast amount of research which measured only one type of abuse has potentially provided a distorted perspective on how childhood trauma relates to negative outcomes (Krupnick et al., 2004; Turner et al., 2006; Turner et al., 2010). On the one hand, these studies may have exaggerated the impact of trauma, in that results may actually reflect the cumulative effects of additional traumatic experiences that were not accounted for. On the other hand, the degree to which childhood trauma can negatively impact a child may have been minimized due to the potential that both polyvictims and those who were only victims of one trauma type were included in the same ostensibly homogenous

group. Future research endeavors seeking to further illuminate the relation between childhood trauma and negative outcomes therefore must assess for the number of victimizations experienced.

Other Characteristics of Childhood Trauma

Other limitations have been noted in the way traumatic experiences are identified and measured, as other characteristics beyond the number of types experienced seem to have an influence on outcomes. Frequency, severity, and chronicity (the length of time the child experiences the trauma) have individually been linked to worse outcomes (Nader, 2011; Wamser-Nanney & Vandenberg, 2013). While it appears as though those who have suffered cumulative trauma may still have more symptomology and behavioral struggles than those who experienced a single yet enduring or chronic trauma (Krupnick et al., 2004; Turner et al., 2010), these remain important characteristics of childhood trauma that seem to have some influence on the child's health and wellbeing. In addition, trauma types that are more interpersonal or intentional in nature, such as sexual abuse, physical abuse, neglect, witnessing domestic violence, homicide, and community violence, have been associated with worse outcomes than non-interpersonal traumas like natural disasters or serious illness (Cyr et al., 2012; Krupnick et al., 2004; Scott-Storey, 2011; Wamser-Nanney & Vandenberg, 2013).

Lastly, age at onset appears to be an important variable in understanding how trauma can impact a child, as it has been suggested that the way a child is influenced by his or her experiences will vary depending on their developmental age when the trauma occurs (Krupnick et al., 2004; Wamser-Nanney & Vandenberg, 2013). An estimated 79% of 2–5 year olds with Child Protective Services (CPS) involvement had at least one form of victimization, compared to 92% of those 12–17 years old (Cyr et al., 2012). However, research that examines the effect of trauma across the lifespan more often compares those who experienced victimization during childhood

to those who were victimized as adults, thus providing perhaps a macro-perspective on the impact of trauma by developmental level but obscures the differences that may relate to development through childhood (Scott-Storey, 2011).

IMPACT OF TRAUMA ON DEVELOPMENT

The proposition that the deficits faced by maltreated children relate to the age at which the maltreatment occurred is an assertion often made in the theoretical and neurodevelopmental literature (de Bellis, 2005; Carrion, Wong, & Kletter, 2013). However, few studies on trauma include the developmental age of the child when the trauma occurred in their examination of the relationship between trauma and negative outcome. Much of the understanding on how maltreatment may impact development comes from the field of developmental traumatology. Defined as the examination of the neurophysiological and biological impact of traumatic experiences on the developing child (de Bellis, Woolley, & Hooper, 2013), this line of research accentuates the neurobiological correlates of childhood trauma and offers hypotheses on how these may relate to the social, emotional, and behavioral struggles exhibited by traumatized children.

Developmental traumatologists emphasize the role of attachment in early development. Described as the interaction between exploratory and attachment behaviors through the confidence that the child develops in the caregiver as a “secure base,” attachment is the path through which children learn to regulate their emotions and develop social competencies (Ainsworth & Bell, 1970; Burgess, Marshall, Rubin, & Fox, 2003). It is believed that the nature of the relationship between child and caregiver is established, and therefore measurable, by the time a child is 12 to 18 months old (Ainsworth & Bell, 1970; Biringen, 2004). The gold standard for measuring attachment is Ainsworth’s Strange Situation, a structured test which determines the attachment relationship through behaviors observed by the infant at the point of reunification with his or her caregiver (Ainsworth & Bell, 1970; Biringen, 1994).

Developing healthy attachment in infancy has been linked to social and academic success and improved wellbeing as children and even into adulthood (Biringen, 2004). In turn, infants with unhealthy or insecure attachment with their caregivers were later significantly more likely to be emotionally dysregulated and to exhibit more problem behaviors (Burgess et al., 2003).

Trauma in the first few years of life—particularly experiences which may involve the primary caregiver, such as witnessing domestic violence, physical abuse, or sexual abuse perpetrated by the caregiver, caregiver impairment, neglect, or removal from the home—can have a significant negative influence on the attachment relationship between child and caregiver(s) (Cook et al., 2005). Because the difficulties expressed by victimized children, including troubles with emotion and behavior regulation and relating to others, echo the difficulties that relate to poor attachment relationships, developmental traumatologists hypothesize that the difficulties exhibited by traumatized children have their etiology in the development of the attachment relationship (de Bellis, Hooper, Spratt, & Woolley, 2009; de Bellis et al., 2013; Gregorowski & Seedat, 2013, Zilberstein, 2013). These researchers further propose that the interference caused by trauma in forming a healthy attachment interrupts the “developmental cascade” through which subsequent competencies would develop (Fry & Hale, 1996), thus compromising brain development and resulting in physiological and neurostructural deficiencies (Creeden, 2004; Gregorowski & Seedat, 2013; Teicher, 2003; Wilson, Hansen, & Li, 2011). This altered or stunted brain development can correspond to neuropsychological impairments across the cognitive, emotional, behavioral, and interpersonal domains (Carrion et al., 2013; de Bellis, 2005). As such, the age during which children develop attachment with their caregiver(s) has been called a ‘critical period’ of development during which trauma can have a particularly deleterious impact (Creeden, 2004; Zilberstein, 2014).

Trauma and Developmental Psychopathology

In contrast to this rather condemning perspective suggesting trauma causes developmental deficits and permanent alterations, some have proposed a theory of developmental adaptation, in which those who are experiencing trauma draw on some systems more heavily but at the cost or disuse of others (Howe, Cicchetti, Toth, & Cerrito, 2004; Teicher et al., 2003; Teicher et al., 2004; McWilliams et al., 2014; Paz-Alonso, Larson, Castelli, Alley, & Goodman, 2009). This proposal is based on the idea that a child in an unsafe environment needs to be aware of and attend to potentially threatening stimuli, which may lead to improved encoding of information related to these stimuli, but at the cost of that child's ability to attend to other "peripheral" or non-threatening information. For example, a study by McWilliams, Harris, and Goodman (2014) found that while victimized children struggled to recall details of a positive family interaction they observed when compared to the control group, they were better than their counterparts at remembering the details of a negative interaction that involved arguing among family members. Thus, children who have lived in threatening environments may have adapted in ways that helps ensure their safety through attending to information more relevant to their survival.

This interpretation of traumatized behavior as an adaptation rather than a deficit is one of the hallmarks of developmental psychopathology (Toth & Cicchetti, 2013). This field differs from many others, including developmental traumatology, in that it considers behavior as reflective of both adaptive and maladaptive processes, and thus examines both normal and abnormal development concurrently (Toth & Cicchetti, 2013). Developmental psychopathology adopts a more ecological view of individuals and development, recognizing that a child's experience of maltreatment and his or her development relates to the interplay between individual, familial, community and cultural characteristics (Cicchetti, 2013; Toth & Cicchetti, 2013).

Regarding the study of childhood trauma, developmental psychopathology iterates the need for accounting for the range of trauma types experienced and other characteristics of trauma (Cicchetti & Banny, 2014). This perspective stresses that, in order to understand how a child's development may be impacted by trauma, there must be a clear understanding of how children without traumatic experiences develop to serve as comparison (Toth & Cicchetti, 2013). By contrasting the development of trauma victims with non-victimized children, researchers can gain clarity on the kinds of environments, interactions, and other factors that seem to make the difference between healthy trajectories and the development of maladaptive behaviors (Cicchetti, 2013).

Resilience

The study of resilience has emerged through the recognition that not all children with trauma histories exhibit the range of social and emotional behaviors commonly associated with trauma (Gabowitz, et al., 2008). The idea of resilience is embraced by developmental psychopathology, as proponents of this perspective highlight that recognizing resilience “acknowledges that one is not doomed to a poor developmental outcome as a function of early adversity,” (Toth & Cicchetti, 2013, p. 136). Perhaps relating to the surge of interest in positive psychology and strengths-based perspectives, research on resilience proliferated over the last decade. As a consequence, many derivatives of the definition and operationalization of resilience were generated, muddying the literature base and spurring criticism for the lack of consistency in the research (Luthar, Cicchetti, & Becker, 2000; Yehuda, Flory, Southwick, & Charney, 2006).

From the developmental psychopathology perspective, resilience is characterized as a multidetermined process in which an individual adapts well and in positive ways despite exposure to adversity, trauma, or other significant sources of stress (Cicchetti, 2013). One aspect of resilience often examined in the research is the identification of factors within the individual,

family, and community that are common among children who experienced trauma but were found to be functioning in a health way (Afifi & MacMillan, 2011; Luthar et al., 2000). Called ‘protective factors,’ these characteristics can be useful in promoting hope and a sense of self-efficacy in children who are working to overcome or make sense of their histories (Afifi & MacMillan, 2011; Masten, Cutuli, Herbers, & Reed, 2009; Powell, 2010; Powell, 2011).

Another avenue of research in this area has explored how resilience develops over time (Werner, 2013). From results of longitudinal studies of resilience it appears as though this construct follows a developmental progression, propagated by ongoing interactions between individuals and their environment and a balance between events that increase their vulnerability and those which improve their resilience (Cicchetti, 2013; Werner, 2013). Considering this balance and the way a child responds to exposure to such events, it has been suggested that certain experiences at critical points in development—even those that may be deemed as traumatic or potentially traumatic by outside observers—may actually promote adaptation and the child’s ability to successfully navigate future difficulties (Yehuda et al., 2006).

Like the research on childhood trauma in general, many studies on trauma and resilience failed to account for cumulative trauma exposure. In addition, much of the research operationalized resilience as the absence of psychopathology or significant behavioral problems, thus acknowledging that not all children respond to trauma in the same way but missing the opportunity to help illuminate why (Afifi & MacMillan, 2011; Klasen et al., 2010). Lastly, many measures of resilience focus on factors that exist only within the individual system, thus negating family and community-based factors found to relate strongly to the development of resilience and which reflect the ecological vantage point of developmental psychopathology (Afifi & MacMillan, 2011; Cicchetti, 2013; Herrenkohl, Herrenkohl, & Egolf, 1994; Masten, 2009; Powell, 2011)

TRAUMA AND NEUROPSYCHOLOGICAL FUNCTION

Neuropsychological assessment compliments the developmental psychopathology perspective in a number of ways. Many measures used to determine symptoms or behaviors exhibited by children, such as the Trauma Symptom Checklist for Children (TSCC) and Behavioral Assessment System for Children, Second Edition (BASC-2), are typically validated broadly for use with children and/or adolescents (Briere, 1996; Reynolds & Kamphaus, 2004). In contrast, neuropsychological assessments are norm referenced by age. Performance by children who have experienced trauma can thus be compared to that of children presumably within the same developmental period. In the same vein, neuropsychological assessment measures lend results that are less influenced by contextual pressures and social desirability bias than self-report measures (Fisher, 1993).

Neuropsychological assessment for children who have experienced trauma can provide the bridge called for by developmental psychopathologists between neurodevelopment and observable behavior (Gabowitz et al., 2008; Vanderploeg, 2011). By providing information about deficits within domains, practitioners can link the range of behaviors and struggles observed yet often variant across contexts back to an etiology in the child's neuropsychological functioning. Lastly, although perhaps the most important in terms of the child's prognosis and engagement in treatment, is the understanding neuropsychological assessment provides of the limitations as well as the strengths of the child (Davis, Moss, Nogin, & Webb, 2015; Gabowitz et al., 2008). In this way, the value placed by developmental psychopathologists on providing a balanced perspective of an individual is upheld within a trauma-informed neuropsychological assessment.

Intelligence

While neuropsychological deficits in adults who experienced childhood trauma are well-documented, fewer studies have examined this relationship with children (Majer, Nater, Lin,

Capuron, & Reeves, 2010; Wilson et al., 2011). Results from those that have drawn from a child population indicate general deficits in cognitive functioning, more specifically lower IQ scores, in children with histories of trauma (de Bellis et al., 2009; de Bellis et al., 2013). This coincides with the academic difficulties common among maltreated children, as neurocognitive barriers would understandably impede the child's ability to be successful in school. Deficits in general cognitive functioning among traumatized children support the proposition that early trauma interferes with the developmental cascade described by Fry and Hale (1996), as the widespread effects of that early disruption would be most clearly recognized through measures of intelligence (Aas et al., 2012).

It has also been indicated that relations exist between childhood trauma and more specific domains such as executive function, memory, language, attention, fine motor and visual-spatial skills (Carrey, Butter, Persinger, & Bialik, 1995; de Bellis et al., 2009; Zilberstein, 2014; Spann et al., 2012; Zou et al., 2013). However, there has not been as much consistency in the literature regarding the impact on these domains as there has been regarding the relation between childhood trauma and intelligence.

Memory

Of these domains, the area of functioning perhaps most important in terms of learning and academic success is memory, as it is considered by many to be a necessary precursor of cognitive development (Eysenck, 2009). However, the majority of researchers examining memory and trauma in children have been preoccupied with exploring accuracy in declarative memory, false memory, and suggestibility among children who have suffered abuse (e.g., Howe et al., 2004; McWilliams et al., 2014), and on a child's general ability to recall emotional events (Paz-Alonso et al., 2009). Comparatively few studies have examined the potential effects of trauma on the development of memory processes.

Consistent with the developmental psychopathology perspective, in order to best understand how memory processes are impacted by trauma it is first essential to have a clear understanding of how these processes develop in children without histories abuse. In general, memory capacity has been found to increase through childhood and into adolescence, even into early adulthood (Eysenck, 2009). In terms of specific memory mechanisms, evidence for the ability to form memory associations exists from infants as young as six months (Cuevas, Rovee-Collier, & Learmonth, 2006) and it is believed that semantic memory and the use of rehearsal develops through the first year of life (Schwartz, 2010). Further, by the age of 7 or 8 a child can spontaneously use (i.e., without coaching) memory strategies beyond rehearsal (Bauer, 2009; Schwartz, 2010).

It has been suggested that exposure to early trauma may either interfere with or alter the development of basic memory processes, perhaps through the sustained or chronic stress and associated cortisol levels (Cicchetti et al., 2010; Howe et al., 2004; Ritchie, et al., 2011; Painter & Scannapieco, 2013). Studies using neuroimaging with victims of childhood trauma have shed light on this hypothesis, revealing reductions in the amygdala and hippocampus, both structures implicated in memory, as well as reduced cerebral and prefrontal cortex volume and reduction in size of the corpus callosum, a component of the brain responsible for communication between hemispheres (de Bellis et al., 1999; Jackowski, de Araújo, de Lacerda, de Jesus Mari, & Kaufman, 2009; Ritchie et al., 2011; Teicher, et al., 2003; Teicher, et al., 2004).

While many memory processes appear to be vulnerable to external influences (i.e., parenting), working memory has been shown to follow a relatively consistent and predictable course of development (Bauer, 2009; Blair, Raver, & Berry, 2014; Conklin, Luciana, Hooper, & Yarger, 2007; Cowan & Alloway, 2009; Eysenck, 2009). Working memory is the term used to describe the ability to retain and mentally manipulate information and is drawn on heavily in

planning, reasoning, and problem-solving (Eysenck, 2009). In general, working memory span seems to gradually increase through childhood, from an average of two items at age 2, four items around ages 5 to 7, five items by age 9 or 10, until stabilizing at around six items by early adulthood (Cowan & Alloway, 2009; Eysenck, 2009). This makes working memory a particularly useful domain through which to explore the impact of cumulative trauma from a developmental perspective.

The few studies which have explored the relationship between early trauma and working memory showed deficits in performance due to difficulty in attention shifting in children (Cowell, Cicchetti, Rogosch, & Toth, 2015; Cromheeke et al., 2014) and adults (Plamondon et al., 2015) who had suffered trauma in their childhood, as well as in animals who had experienced maltreatment (Oitzel et al., 2000). However, these studies are not only limited in number but also limited by how broadly and nonspecifically they defined early trauma.

Executive Function

Executive functioning refers to the abilities involved in maintaining focus, inhibition, attention shifting, and self-monitoring (DePrince, Weinzierl, Combs, 2009). In addition, working memory is often considered an ability involved in executive function, as one's ability to discern interference from relevant peripheral information, so as to both sustain attention or switch attention appropriately, has a heavy influence on working memory performance (Cowan & Alloway, 2009; Paz-Alonso et al., 2009). Developmentally, improvements in executive functioning during childhood seem to coincide with those in working memory. This co-development is supported in neuroimaging studies, which have demonstrated changes in the hippocampus and prefrontal cortex, both thought to be strongly associated with memory and executive function, following the path of development (Bauer et al., 2009; Conklin, Luciana, Hooper, & Yarger, 2007; Wilson et al., 2011). These changes seem to occur across the same timeline as the development of

working memory, in that the maturation of the frontal lobe occurs steadily throughout childhood and adolescence, and appears to reach full development in early adulthood (de Bellis et al., 1999; Conklin et al., 2007).

Executive functioning has a role in emotion regulation and impulse control, and it is therefore believed by many to be the neuropsychological correlate of many of the struggles exhibited by children who have been traumatized (Wilson et al., 2011). Many studies which explored executive functioning performance in children with histories of trauma have found them to perform worse than nontraumatized children on tasks of inhibition and attention shifting (de Bellis et al., 2009; Nadeau & Nolin, 2013; Spann et al., 2012; Wilson et al., 2011). Further, a study by Wilson et al. (2011) which accounted for the age at which maltreatment occurred revealed that early age at onset significantly predicted poorer performance on tasks of inhibition and working memory. These researchers went on to show that children who had been traumatized during only one period in their development performed just as well as those in the control group. These results underscore the importance of accounting for characteristics of trauma, including developmental age at onset, duration, and number of trauma types experienced.

As was noted earlier, results from studies examining the relation between trauma and neuropsychological functioning may be obfuscated by the failure to account for multiple types of trauma. For example, Valentino et al. (2012) found no significant differences between children with a history of abuse when compared to those without on three tasks of executive function. However, these researchers combined participants with reported sexual abuse, physical abuse, or both into their Abuse History group, but omitted those with reported neglect. This group was compared to a No Abuse History group comprised of individuals without physical or sexual abuse histories. It is therefore possible that both groups contained individuals with comparable number of traumatic experiences with similar variations in duration and severity that went

unrecognized by the researchers, and that the lack of significant differences in performance reflects a lack of differences between the groups.

RATIONALE FOR CURRENT STUDY

The current study aimed to contribute to the understanding of how cumulative trauma relates to psychological, behavioral, and neuropsychological functioning among system-involved youth. Data was collected from trauma-informed assessments conducted with children between the ages of 3 and 18 with child welfare and/or juvenile justice involvement. Although previous studies have examined the relation between cumulative trauma and psychological symptoms and behaviors, few, if any, have explored the effects of multiple traumatic experiences on neuropsychological functioning. Thus, the current study sought to confirm previous studies on the link between cumulative trauma and psychological and behavioral outcomes, and expand the field's understanding of the impact of trauma through an examination of neuropsychological function among polyvictimized youth.

Previous research has called for a developmental perspective on the impact of trauma on function and wellbeing, and has stressed the need to better understand how trauma experienced at different points in development might yield different outcomes. This assertion is echoed in the research on the development of resilience in children with maltreatment histories, as both fields have indicated the potential that 'critical periods' exist in which trauma may yield either significant detriments or increased resilience. However, studies which accounted for developmental age along with cumulative experiences of trauma are scarce, and no known research has examined age at onset in relation to both resilience and neuropsychological function. This study aimed to elucidate the role of resilience in cumulative trauma as it relates to developmental age and potential psychological, behavioral, and neuropsychological deficits. Further, this study used a measure of resilience which accounts for protective factors across the individual, family, and

community systems, thus acknowledging the importance of an ecological perspective on the developing child, and specifically in regard to the development of resilience.

The current study hypothesized that cumulative trauma will predict more trauma symptoms, problematic behaviors, and neuropsychological deficits, and that these relations would be partially mediated by age at onset and resilience. Based on previous research regarding the impact of trauma on development, it was hypothesized that cumulative trauma occurring during infancy/toddlerhood will contribute to worse outcomes. Regarding resilience, it was predicted that less resilience will contribute to worse outcomes. Further, the relation between age at onset and resilience was explored. As per previous research, it may be that cumulative trauma which occurs over time and within different developmental periods would lead to the development of more resilience than trauma which occurred during only one developmental stage.

Hypotheses included:

Hypothesis 1: Consistent with previous research, hypothesis 1 posited that increased number of traumatic events would predict more trauma symptoms and more behavioral concerns.

Hypothesis 2: Hypothesis 2 proposed that increased number of traumatic events would predict larger deficits in neuropsychological functioning. Specifically, more traumatic experiences would predict deficits in cognition, executive function, and memory.

Hypothesis 3: Hypothesis 3 posited that the relations between cumulative trauma and symptoms, behaviors, and neuropsychological functioning would be partially mediated by age at onset, in that cumulative trauma experienced at earlier ages and stages of development would yield greater symptoms, behaviors, and deficits.

Hypothesis 4: Hypothesis 4 proposed that the relations between cumulative trauma and symptoms, behaviors, and neuropsychological functioning would be partially mediated by resilience. It was predicted that lower levels of resilience would contribute to worse symptomatic,

behavioral, and neuropsychological outcomes. The mediation model for Hypotheses 3 and 4 is presented in Figure 1.

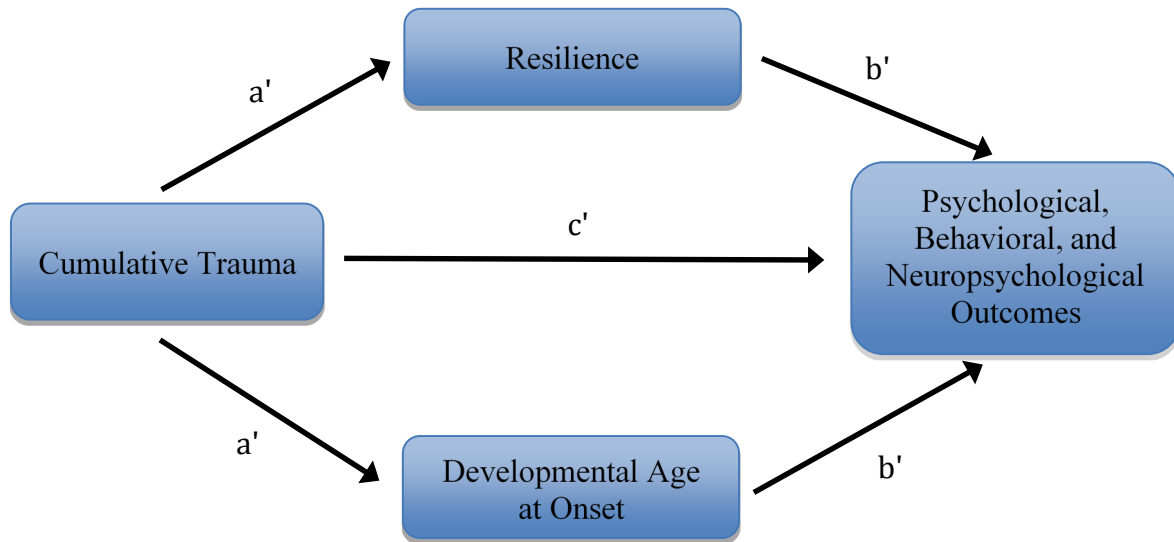


Figure 1. *This multivariate model includes resilience and age at onset as partial mediators between cumulative trauma and psychological, behavioral, and neuropsychological outcomes.*

CHAPTER 3: METHOD

PARTICIPANTS

Data were used from 74 participants (66% male, 34% female). The age of participants ranged between 3 and 18 ($M = 11.4$, $SD = 4.32$). Regarding ethnicity, the sample was predominantly White (66.2%), with 13.5% identifying as Hispanic or Latino, and 20.3% as Biracial or other ethnicity. The majority of participants (46.6%) lived with their biological parents, 26% lived with another biological family member, 9.6% resided with an adoptive family, and 17.8% were in either foster care or another temporary placement situation.

PROCEDURE

Existing data from participant medical records were collected from trauma-informed assessments provided by two mental health agencies. Participants were involved with either the Department of Human Services (DHS), the Juvenile Probation Department (JPO), or both, and were typically referred for an assessment by either the DHS caseworker or the probation officer. Information on the number of systems, duration of involvement, or referral source could not be ascertained from the records.

The trauma-informed assessments used standardized instruments and provided information on an individual's functioning across domains. The domains assessed could include: Cognition, Executive Function, Memory, Language, Social/Emotional, Personality, Trauma, and Resilience. Functioning in these domains was assessed via one-on-one test administration, self-report measures, and other-report measures. Assessments were administered and scored by either a licensed psychologist or an advanced psychology doctoral student with extensive training on the trauma-informed assessment battery.

All procedures and methods employed in this study were reviewed by the Colorado State University Human Subjects Committee/Institutional Review Board (Approval #15-5842H, Appendix A).

INSTRUMENTS

The Children's Trauma Assessment Center (CTAC) Trauma Screening Checklist. The CTAC Trauma Screening Checklist (Henry, Black-Pond & Richardson, 2010) was used to measure known or suspected exposure to a number of potentially traumatic events or experiences and the age ranges at which the events or experiences occurred. The CTAC also measures a number of behavioral, emotional and relational concerns. The CTAC Trauma Screening Checklist, Caseworker Report version was completed by the child's probation officer or ongoing caseworker. The CTAC Trauma Screening Checklist, Self-Report version was completed by the participant. It provides information on the number of trauma types experienced, and includes information about the age at onset of each trauma type. Participants completed the self-report measure online via a secured survey website (See Appendix B).

Trauma/Loss Exposure History (TLEH). The Trauma/Loss Exposure History checklist was used to measure known or suspected exposure to a number of potentially traumatic events. The TLEH is part of the Child Welfare Trauma Referral Tool used by the National Child Traumatic Stress Network (NCTSN). The TLEH was completed by the participant's parent or caregiver, and separately as a self-report by participants old enough to do so. Fourteen potentially traumatic events or experiences, and the age(s) at which the experiences occurred, are measured (See Appendix C).

Trauma Symptoms Checklist for Children (TSCC) and Trauma Symptoms Checklist for Young Children (TSCYC). The Trauma Symptoms Checklist for Children (TSCC; Briere, 1996) is a 54-item self-report measure for individuals 8–16 years old, assessing the degree an individual may experience a range of psychological symptoms associated with trauma. The

Trauma Symptoms Checklist for Young Children (TSCYC; Briere, 2005) is a 90-item caregiver-report measure also assessing for the degree a child may experience psychological symptoms associated with trauma. The TSCYC is normed for individuals between the ages of 3 and 12. The TSCC and TSCYC have been found to have good reliability and validity in clinical samples and samples from the general population (Briere, 1996; Briere, 2005; Sadowski & Friedrich, 2000).

Behavior Assessment System for Children, 2nd Edition (BASC-2). The Behavior Assessment System for Children is a rating scale system that allows caregivers to provide a description of an individual's emotional and behavioral functioning (Reynolds & Kamphaus, 2004). Clinical scales on the BASC-2 include: Hyperactivity, Aggression, Conduct Problems, Anxiety, Depression, Somatization, Atypicality, Withdrawal, Externalizing Problems, Internalizing Problems, Attention Problems, and Learning Problems. The BASC-2 is for use with individuals 2 to 21 years old. The BASC-2 instrument has been found to have good psychometric properties (Reynolds & Kamphaus, 2004; Tan, 2007).

Child Behavior Checklist (CBCL). The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) measures a range of emotional and behavioral symptoms of children from ages 1½ to 18. For this study, the CBCL/1.5-5 and CBCL/6-18 parent/caregiver-report measures were used. The CBCL/1.5-5 consists of 99-items and is used for children between the ages of 1½ and 5. Clinical scales for the CBCL/1.5-5 include: Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn/Depressed, Attention Problems, Aggressive Behavior, and Sleep Problems. The CBCL/6-18 is a 120-item parent/caregiver-report form for children aged 6–18. Clinical scales for the CBCL/6-18 include: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior, as well as an Internalizing Behavior and Externalizing Behavior

composite scores. The CBCL has been widely used in both clinical and research applications, and has been found to have good psychometric properties (Achenbach & Rescorla, 2001).

Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II). The Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II) is a brief, individually administered measure of general intellectual abilities for individuals 6 to 90 years old (Wechsler, 2011). The WASI-II is comprised of four subtests (Block Design, Vocabulary, Matrix Reasoning, Similarities) which correspond to two index scores (Verbal Comprehension, VCI; and Perceptual Reasoning, PRI), and a Full Scale IQ (FSIQ) score. The WASI-II can be administered in either the two-subtest or four-subtest format, with an estimated administration time of 15 minutes and 30 minutes, respectively. The WASI-II has been found to have good psychometric properties (Wechsler, 2011).

Kaufman Brief Intelligence Test, Second Edition (KBIT-2). The Kaufman Brief Intelligence Test, Second Edition (KBIT-2) is a brief, individually administered measure of cognitive abilities for individuals between the ages of 4 and 90 (Kaufman & Kaufman, 2004). The KBIT-2 consists of three subtests yielding a verbal, nonverbal, and composite score. The KBIT-2 has been found to have good psychometric properties (Bain & Jaspers, 2010). Comparisons between the KBIT-2 and WASI yielded correlation coefficients between .80 and .86 for verbal components, .62 and .80 for nonverbal components, and from .81 to .90 when comparing the KBIT-2 composite score to the WASI Full Scale IQ score (Bain & Jaspers, 2010).

Delis-Kaplan Executive Function System (D-KEFS). The Delis-Kaplan Executive Function System (D-KEFS) is an individually administered neuropsychological measure assessing an individual's planning, flexibility, inhibition of impulses, and working memory (Delis, Kaplan, & Kramer, 2001). The D-KEFS is normed for administration to individuals between 8 and 89 years old, and is designed such that individual subtests can be selected based on the executive functioning components of interest. Scores on each of the subtests are converted to

scale scores with a mean of 10 and a standard deviation of 3. The Trail Making Test and Color-Word Interference Test were administered, as these two subtests employ a spatial modality and verbal modality, respectively. The Trail Making Test consists of a visual cancellation task and a series of connect-the-circles tasks. The primary executive functioning task is the Number-Letter Switching task, which is a means of assessing flexibility of thinking on a visual motor sequencing task. The Color-Word Interference Test is comprised of four testing conditions that include Color Naming, Word Reading, Inhibition, and Inhibition/Switching. The D-KEFS has been found to be both reliable and valid (Delis, Kaplan, & Kramer, 2001).

Wide Range Assessment of Memory and Learning, Second Edition (WRAML-2). The WRAML-2 is an individually-administered neuropsychological measurement which assesses an individual's memory functioning (Sheslow & Adams, 2003). It consists of 17 subtests and is appropriate for use with individuals aged 5 to 90 (Sheslow & Adams, 2003). The Finger Windows and Verbal Working Memory subtests were administered. The Finger Windows subtest measures nonverbal sequential recall, and draws not only on an individual's memory but also his or her attention and concentration. The Verbal Working Memory task draws on the participant's ability to reorganize information held in memory. The WRAML-2 has good psychometric properties (Sheslow & Adams, 2003).

Resiliency Scales for Children and Adolescents (RSCA). The Resiliency Scales for Children and Adolescents (RSCA) is comprised of three stand-alone scales measuring three aspects of resiliency: Mastery, Relatedness, and Emotional Reactivity (Prince-Embury, 2007). Each independent scale yields three to four subscales: Optimism, Self-efficacy, Adaptability (Mastery); Trust, Support, Comfort, Tolerance (Relatedness); Sensitivity, Recovery, Impairment (Emotional Reactivity). This measure has been found to have both good reliability and validity.

Resiliency Protective Factors Checklist (RPFC). The Resiliency Protective Factors Checklist (RPFC; Powell, 2011) was developed based on evidence that possessing even a few protective factors can have a positive impact on how well an individual manages challenges and hardships. It is similar to the Resiliency Scales for Children and Adolescents (RSCA; Prince-Embury, 2007), in that it provides information on resiliency in terms of self-efficacy, ability to relate with others, and ability to regulate emotionally. However, the RPFC expands on the construct of resiliency to include many more protective factors identified in the research (Masten & Coatsworth, 1998; Masten, Cutuli, Herbers, & Reed, 2009; Masten & Reed, 2002). The RPFC offers a wider perspective of resiliency by assessing the extent to which protective factors exist within the individual, family, and community systems. The RPFC is offered in both self-report and parent/caregiver-report formats (See Appendix D).

VARIABLES FOR ANALYSIS

Cumulative Trauma. Trauma types experienced were examined through composites derived from the TLEH Checklist, other-report and CTAC Trauma Screening Checklist, other-report instruments. The 13 trauma types included: Sexual abuse or exposure (SA); Neglect (Ng); Emotional Abuse (EA); Exposure to Domestic Violence (DV); Physical Abuse (PA); Exposure to Community Violence (CV), Exposure to School Violence (SV), Interpersonal Violence (IPV); Exposure to Other Violence (OV); Separation/Loss (SL); Frequent Moves or Homelessness (FMH); Forced Displacement (FDpl); Grief/Separation (Grf/Sp). A total count of the number of reported trauma types experienced was used as the variable representing cumulative trauma.

Trauma Symptoms. Trauma symptoms were examined by creating a composite of the T-scores from the TSCC and TSCYC on the following shared subscales: Anxiety, Anger, Depression, PTSD, Dissociation, and Sexual Concerns. For both the TSCC and TSCYC, higher

scores indicate more significant psychological symptoms, with scores above 65 considered in the clinically “at-risk” range, and scores at or above 70 are considered clinically significant.

Analyses examining Cronbach’s alpha confirmed the variables were unidimensional ($\alpha = .91$). The composite score for Trauma Symptoms was created by dividing the sum of subscales scores by the number of scores available for each participant. In addition, trauma symptomatology was explored by examining the relative number of subscales in the clinically significant range, and the likelihood of having any subscale in the clinically significant range. To compute the relative number of subscales in the clinically significant range, the total number of elevated scores for each participant was divided by the number of clinical scales for which the participant had data.

Behavioral Concerns. Behavioral concerns were examined by creating a composite of subscales T-scores from the BASC-2, CBCL/1.5-5, and CBCL/6-18. The following clinical subscales are shared across measures: Anxious, Withdrawn/Depressed, Aggression Problems, Conduct Problems/Rule Breaking, Somatic Complaints, and Attention Problems. These scales were found to be unidimensional ($\alpha = .89$), meaning that, although they were scales from different measures, they appeared to reflect the same construct. Additionally, factor analysis was conducted using principle axis factoring. All of the above clinical scales loaded onto the factor above .4. Variables were created by combining data from corresponding subscales into composite scales for: Anxious, Withdrawn/Depressed, Aggression Problems, Conduct Problems/Rule Breaking, Somatic Complaints, and Attention Problems.

The BASC and CBCL instruments also yield composite scores for Externalizing Behaviors and Internalizing Behaviors. There are clinical subscales that contribute to the Externalizing Behaviors and Internalizing Behaviors composites, but which are not shared across the BASC-2 and CBCL instruments. Scores on the Externalizing scale and Internalizing scale for

each measure were combined into one Externalizing and one Internalizing composite variable. These variables were included in the analyses to provide relevant information on participants' behavior without limiting the data to behavioral domains that are shared between the scales.

For the BASC-2 and CBCL instruments, higher scores indicate more significant behavioral problems, with scores above 65 considered in the clinically "at-risk" range, and scores at or above 70 considered clinically significant. The composite score for behavioral concerns was created by dividing the sum of clinical subscale T-scores by the number of scores available for each participant. The relative ratio of clinically elevated subscale scores, and the relative likelihood of having any clinically significant subscale score, were also calculated. Like with the trauma symptom subscales, the relative ratio of clinically elevated subscales scores was calculated for each participant by dividing the total count of elevated clinical scales by the number of scales for which the participant had data.

Neuropsychological Functioning. Specific domains examined included: cognition, memory, and executive function (inhibition, shifting, and working memory). Cognition was examined using data from the KBIT-2 and WASI-II brief intelligence measures. Data from the KBIT-2 and WASI-II were provided as Standard Scores, with an age-normed mean of 100 and standard deviation of 10. Scores falling between 90 and 110 are considered within the Average range. Both the WASI-II and KBIT-2 yield a verbal composite, nonverbal composite, and Full Scale IQ (FSIQ). An overall composite score (FSIQ), a verbal composite, and a nonverbal composite.

Memory was examined using scaled scores from the WRAML-2 Finger Windows task. This task draws on an individual's ability to remember rote, sequential, nonverbal information. Regarding *Executive Function*, three facets of executive functioning were examined. Working Memory was examined using scaled scores from the WRAML-2 Verbal Working Memory task. Shifting was examined using scaled scores from the fourth and fifth conditions of the D-KEFS

Trail Making Test. To control for processing speed, scores from the fourth condition (Number-Letter Switching) were subtracted from scores from the fifth condition (Motor Speed). Inhibition was explored by using the difference in scaled scores from the Color Naming and Inhibition tasks of the D-KEFS Color Word Interference Test. Data from the WRAML-2 and D-KEFS were provided as Scaled Scores, with an age-normed mean of 10 and standard deviation of 2. Scores between 8 and 12 are considered within the Average range.

Age at Onset. The age at which participants reported experiencing their first trauma type was drawn from the TLEH other-report and CTAC self-report instruments. The CTAC self-report instrument assessed age that a trauma type was experienced using the following age ranges: 0–2, 3–5, 6–11, 12–15, and 16–19. As such, the data from the TLEH on age at onset were coded to correlate with these age ranges. To maintain consistency between the cumulative trauma and age at onset variables, data on the age at onset from the CTAC self-report checklist were used only for the corresponding trauma types reported on the CTAC other-report checklist.

Resilience. The role of resilience was examined using the sum of scores from the RSCA sense of Mastery scale, the RSCA Sense of Relatedness scale, and the total resiliency score from the RPFC. Higher scores on this composite reflected increased resiliency.

ANALYSES

Data were analyzed using SPSS Version 24.0 (IBM, 2016). Many of the measures used in this study were created by converting test subscale T-scores into composite scores based on scale constructs, as per the test developer. Confirmatory factor analysis and Cronbach's alpha were used when the sample size allowed to determine whether different subscales could be used to indicate the same domain and to confirm unidimensionality among variables. When dependent variables were continuous, linear regression was used to test hypotheses by regressing trauma symptom composite scores, behavioral concerns composite scores, and measures of

neuropsychological functioning onto the independent variable for cumulative trauma. Logistic regression was used for dependent variables that were categorical. Mediation was examined by using the Process macro available in SPSS (Hayes, 2013) wherein mediation of the relation between cumulative trauma, trauma symptoms, and behavioral concerns by both age at onset of trauma and resiliency. Missing values were addressed by excluding cases listwise, and scatterplots were used to identify outliers. Given that directional a priori set hypotheses were being tested, alpha was set to 0.05 for all analyses. To explore the possibility of confounding variables on null findings, post hoc analyses of the regression models controlling for sex, age, ethnicity, and placement/current care were conducted. Demographic variables found to significantly influence the predictive relationship were centered at the mean, and interaction effects were examined.

CHAPTER 4: RESULTS

The mean number of trauma types reported was 4.6 ($N = 74$, $SD = 2.11$), with 14.9% of participants having reportedly experienced 7 or more traumatic experiences. The most frequently reported trauma type was emotional abuse (68.8%), followed by neglect (66.2%) and exposure to domestic violence (64.9%). Frequencies for all trauma types reported are provided in Table 1.

Table 1

Percent of Participants Reporting each Trauma Type by Instrument

<i>CTAC Trauma Screening Instrument (%)</i>	<i>Shared Items (%)</i>	<i>Trauma/Loss Exposure History Checklist (%)</i>
	Emotional Abuse (68.8)	
	Neglect (66.2)	
	Domestic Violence (64.9)	
	Physical Abuse (55.8)	
	Sexual Abuse (35.1)	
Frequent Moves/Homelessness (6.5)		Forced Displacement (39.9)
Separation/Loss (14.3)		Grief/Separation (39.0)
Other Violence Exposure (3.9)		Community Violence (7.8)
		School Violence (18.2)
		Interpersonal Violence (20.8)

HYPOTHESIS 1

Hypothesis 1 posited that cumulative trauma would significantly predict trauma symptoms and behavioral concerns, with increased number of trauma types experienced associated with more trauma-related and behavioral symptomatology.

Of the 74 participants in this study, 38 had data on trauma symptoms from the TSCC or TSCYC. The highest mean subscale score was for PTSD symptoms ($N = 38$, $M = 66.68$, $SD = 21.20$), and the smallest mean subscale score was for Sexual Concerns ($M = 56.14$, $SD = 18.35$). The mean of the trauma symptom composite was 61.62 ($N = 37$, $SD = 15.81$), and 55.3% of participants had at least one clinically elevated score. Means for all trauma symptom variables are provided in Table 2.

Table 2*Means and Standard Deviations for Trauma Symptoms Subscale and Composite Variables*

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Clinical Subscales			
Anxiety	59.16	17.88	38
Depression	62.16	20.67	38
Anger	62.45	17.37	38
PTSD	66.68	21.20	38
Dissociation	60.11	19.79	38
Sexual Concerns	56.14	18.35	37
Composite Variable			
Trauma Symptoms Composite	61.62	15.81	37
Trauma Symptoms Avg. ≥ 70	0.25	0.29	38

The result from the linear regression analyses for cumulative trauma on trauma symptoms was significant, $F(1, 35) = 4.51, p < .05$. A significant effect was also found for the likelihood of having a clinically elevated subscale, in that for every one unit increase in cumulative trauma, the log odds of having an elevated subscale score increased by .50 ($p < .01$), and for the number of clinically elevated subscales ($F(1, 36) = 5.14, p < .05$). Correlations for all independent and dependent variables are provided in Table 3. Results from the regression analyses can be found in Table 5.

For behavioral concerns, the mean of the behavioral concerns composite was 64.11 ($N = 64, SD = 8.60$). Means for Internalizing Behaviors and Externalizing Behaviors was 62.94 ($N = 63, SD = 10.56$), and 66.41 ($N = 64, SD = 11.54$), respectively. Of the 64 participants with behavioral health data, 66.1% had at least one clinically elevated score. Means for each of the behavioral concerns clinical subscale scores and composite variables are provided in Table 4.

Table 3*Correlation Matrix for All Independent and Dependent Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Cumulative Trauma																	
2. Age at Onset	-.42*																
3. Resiliency	-.06	-.10															
4. Symptoms Composite	.34 [^]	.01	-.39														
5. Trauma Sxs Avg. ≥ 70	.35 [^]	.17	-.33	.91**													
6. Trauma Sxs Any ≥ 70	.42*	.02	-.26	.66**	.75**												
7. Behavioral Composite	.10	-.09	-.17	.41 [^]	.52*	.47*											
8. Behaviors Avg. ≥ 70	.04	-.12	-.13	.35	.48*	.33	.90**										
9. Behaviors Any ≥ 70	-.02	.12	-.01	.23	.35	.26	.68**	.73**									
10. Internalizing	.09	.02	-.09	.45 [^]	.58**	.50*	.88**	.75**	.56**								
11. Externalizing	.07	-.05	-.01	.30	.41	.40	.90**	.84**	.76**	.61**							
12. Verbal IQ	-.11	.01	-.41 [^]	.13	.04	-.10	-.07	-.06	-.10	-.06	-.07						
13. Nonverbal IQ	.09	-.11	-.17	.23	.07	-.04	-.08	-.10	-.22	-.08	-.14	.55**					
14. FSIQ	-.01	-.04	-.34 [^]	.23	.13	-.03	-.09	-.10	-.17	-.08	-.13	.93**	.95**				
15. Memory	-.17	.19	.25	.46	.01	.01	-.36	-.23	-.38	-.26	-.51	-.02	.27	.14			
16. Working Memory	-.20	-.13	.34	.52	-.41	-.41	-.26	-.30	-.12	-.31	-.06	.30	.10	.18	.09		
17. Shifting	.55*	-.36	-.10	.57 [^]	.69*	.67*	.24	.05	-.05	.05	.34	-.06	.06	.00	-.17	-.01	
18. Inhibition	-.16	-.19	-.17	.61 [^]	.38	.38	-.06	-.10	.23	-.06	-.02	.27	.36	.34	.42	.29	.09

[^] p < .05 * p < .01 ** p < .001

Table 4*Means and Standard Deviations for Behavioral Concerns Subscale and Composite Variables*

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Clinical Subscales			
Anxious	60.84	9.93	63
Depressed/Withdrawn	65.98	12.53	63
Aggression Problems	66.79	13.51	63
Conduct/Rule Breaking	66.53	11.36	51
Somatic Complaints	58.40	10.47	63
Attention Problems	64.75	12.53	63
Composite Variables			
Behavioral Concerns Composite	64.11	8.60	64
Behavioral Concerns Avg. ≥ 70	0.28	0.29	65
Internalizing Behaviors	62.94	10.56	63
Externalizing Behaviors	66.41	11.54	64

Results from the regression analyses were not significant for Internalizing Behaviors ($F(1, 61) = .533, p = .47$) or Externalizing Behaviors ($F(1, 49) = .211, p = .65$). Results were also not significant for the behavioral concerns composite ($F(1, 62) = .658, p = .42$), the number of elevated subscale scores ($F(1, 63) = .092, p = .76$), or the likelihood of having any subscale score above clinical threshold ($p = .892$). Regression results for the trauma symptom and behavioral concerns composite variables are provided in Table 5.

Table 5*Summary of Regression Analyses for Hypothesis 1 Dependent Variables*

<i>Variable</i>	<i>Beta</i>	<i>SE</i>	<i>R</i> ²	<i>t</i>	<i>p</i>
Trauma Symptoms					
Trauma Symptoms Composite	.34	1.16	.114	2.12	.041 [^]
Trauma Symptoms Avg. ≥ 70	.35	.02	.125	2.27	.029 [^]
Trauma Symptoms Any ≥ 70	.50	.21	.181		.017 [^]
Behavioral Concerns					
Internalizing Behaviors	.09	.52	.009	.73	.468
Externalizing Behaviors	.07	.70	.004	.46	.648
Behavioral Composite	.10	.49	.011	.81	.420
Behaviors Avg. ≥ 70	.04	.02	.001	.30	.763
Behaviors Any ≥ 70	-.02	.12	.000		.892

[^] $p < .05$ * $p < .01$

Given that the results did not support the hypothesis that cumulative trauma would predict behavioral concerns, post hoc analyses were conducted to explore for possible confounding variables. No significant effects were found when controlling for age, sex, or ethnicity. However, when controlling for placement/current care, regression analyses yielded significant results. After centering the placement/current care variable around participants who lived with their biological parents, a significant effect was found for the behavioral concerns composite ($F(2, 60) = 4.25$, $p < .05$) and number of elevated clinical subscales scores ($F(2, 61) = 4.83$, $p < .05$), but not for likelihood of any elevated subscale score ($p = .582$). In addition, a significant effect was found for Externalizing Behaviors ($F(2, 48) = 6.85$, $p < .01$), but not for Internalizing Behaviors ($F(2, 59) = 1.05$, $p = .36$). Table 6 provides results from these regression analyses.

Table 6

Summary of Regression Analyses for Behavioral Concerns Variables when Controlling for Placement

<i>Variable</i>	<i>Beta</i>	<i>SE</i>	<i>R</i> ²	<i>t</i>	<i>p</i>
Behavioral Concerns					
Internalizing Behaviors	.18	.58	.034	1.25	.358
Externalizing Behaviors	.33	.72	.222	2.27	.002*
Behavioral Concerns Composite	.27	.52	.124	2.04	.019^
Behaviors Avg. ≥ 70	.22	.02	.137	1.70	.011^
Behaviors Any ≥ 70	-.12	.21	.010		.582

^ $p < .05$ * $p < .01$

HYPOTHESIS 2

Hypothesis 2 posited that cumulative trauma would significantly predict deficits in neuropsychological functioning across the cognitive, memory, and executive function domains. The mean for the FSIQ composite was 97.73 ($N = 66$, $SD = 13.76$), with comparable mean scores for both the Verbal ($N = 72$, $M = 96.96$, $SD = 12.92$) and Nonverbal composites ($N = 71$, $M = 98.42$, $SD = 14.47$). Results for the regression analysis for cumulative trauma predicting cognitive functioning were not significant.

Similarly, results from the regression analyses for cumulative trauma on memory using scores from the WRAML-2 Finger Windows task were also not significant. Regarding executive functioning, regression results were not significant, with the exception of the association between cumulative trauma and shifting, which was significant at $p < .01$ ($F(1, 22) = 9.53$). Table 7 provides a summary of the linear regression results for neuropsychological function. Mean and standard deviation for the IQ composite scores, and for the standard scores for tests used for memory and executive function, are provided in Table 8.

Due to the potential for sex differences in neurodevelopment affecting results, regressions with all neuropsychological variables were conducted while controlling for sex. Non-significant results remained non-significant when controlling for sex, and the association between shifting and cumulative trauma remained significant ($F(1, 18) = 9.12, p < .01$).

Table 7

Summary of Regression Analyses for Hypothesis 2 Dependent Variables

<i>Variable</i>	<i>Beta</i>	<i>SE</i>	<i>R²</i>	<i>t</i>	<i>p</i>
Verbal IQ	-.11	.73	.011	-.89	.374
Nonverbal IQ	.09	.82	.008	.73	.469
FSIQ	-.01	.82	.000	-.07	.942
Memory	-.17	.41	.029	-.77	.449
Working Memory	-.20	.37	.041	-.75	.469
Shifting	.55	.33	.302	3.09	.005*
Inhibition	-.16	.27	.026	-.75	.464

^ $p < .05$ * $p < .01$

Table 8

Means and Standard Deviations for Performance on Neuropsychological Instruments

<i>Domain and Scale</i>	<i>M</i>	<i>SD</i>	<i>Range (Min – Max)</i>	<i>n</i>
Cognition				
Verbal IQ	96.96	12.92	59 – 128	72
Nonverbal IQ	98.42	14.47	54 – 123	71
FSIQ	97.73	13.76	54 – 126	64
Memory				
WRAML-2 Finger Windows	9.32	3.37	5 – 16	22
Executive Function				
WRAML-2 Verbal Working Memory	7.73	2.49	5 – 13	15
TMT Number-Letter Switching	7.63	3.47	1 – 13	24
TMT Motor Speed	9.76	2.73	1 – 14	25
CWI Inhibition	8.83	3.58	1 – 14	23
CWI Color Naming	8.13	2.67	1 – 13	23

TMT = D-KEFS Trail Making Test; CWI = D-KEFS Color Word Interference Test

HYPOTHESIS 3

Examination of the role of age at onset as a significant mediator was conducted with for trauma symptom variables and the shifting variable. Of the 60 participants with age at onset data, 59.3% reported the first experience of trauma occurred between the ages of 0 and 2. As such, the data was converted into a categorical variable, with 59.3% of participants with trauma occurring from the span between birth through age 2, and 40.7% reporting their first experience of trauma occurred after age 2.

Results from the a' path logistic regression analysis, which regressed age at onset onto cumulative trauma, were significant ($p < .01$). For every one unit increase in cumulative trauma, the log odds of an age at onset in the 0–2 range increased by .503.

The b' path analyses regressing trauma symptom variables onto cumulative trauma were not significant for the trauma symptom composite ($F(1, 28) = .000, p = .987$), number of elevated clinical subscales ($F(1, 28) = .824, p = .372$), or likelihood of having any elevated trauma symptom score ($F(1, 28) = .010, p = .923$). The b' path analysis for executive functioning, regressing shifting onto cumulative trauma, was also not significant ($F(1, 19) = 2.87, p = .11$).

HYPOTHESIS 4

Regarding the hypothesis that resiliency would play a mediating role between cumulative trauma and functioning, the a' path regression analysis was conducted for resiliency on cumulative trauma. Results of this analysis were not significant ($F(1, 36) = .109, p = .74$). Because this path was not significant, no further testing of the mediation hypothesis was possible.

CHAPTER 5: DISCUSSION

Overall, the results from this study were consistent with previous research regarding the association between cumulative trauma and trauma symptoms among victims of childhood abuse. Results from the current study found that the number of trauma types experienced predicted the extent and severity of behavioral concerns for participants living with their biological parents, but not for those in other care settings. For the role of cumulative trauma on neuropsychological functioning, number of trauma types experienced was found to significantly predict difficulty with shifting, an ability considered a facet of executive function. Regarding the exploration of mediating factors on the association between cumulative trauma and functioning, the more trauma types experienced by participants, the more likely they were to have had their first experience of trauma at or before age 2. However, neither age at onset nor resiliency were found to have a significant influence on the predictive relations between cumulative trauma and functioning.

In terms of prevalence rates of cumulative trauma and age at onset, the mean number of trauma types reported was 4.6, and 59% of participants indicated that the first exposure to trauma occurred before age 3. These rates are comparable to results from other studies with system-involved children, which report an average of between 4.7 to 4.9 trauma types experienced (Dirkshing et al., 2013; Greeson et al., 2011), and comparable with studies estimating approximately 79% of children with Child Protective Service (CPS) involvement have experienced their first trauma before age 5 (Cyr et al., 2012). Greeson et al. (2014) found an average of 3.6 trauma types in their examination of data from agencies that provide trauma-informed services to children and who are contributors to the dataset used by the National Trauma Stress Network (NCTSN). Results from the current study therefore support previous research, in that system-involved youth

were found to have experienced more kinds of trauma than has been reported by youth in a clinical population, even those who were ostensibly receiving trauma-informed treatment.

TRAUMA SYMPTOMS AND BEHAVIORAL CONCERNS

Results from this study showed that the more kinds of trauma participants had experienced, the more likely they were to report experiencing trauma symptoms, and the more severe those symptoms were likely to be. Increased cumulative trauma was associated with more trauma symptomatology, and it appears as though a dose-response relationship exists between number of trauma types and the extent to which participants were affected psychologically. This is aligned with findings from previous studies which suggest the symptomatology and psychological struggles are related more to the cumulative effect of trauma than to a specific type (Dierkhising et al., 2013).

Results from the linear regression analyses found a significant predictive relation between cumulative trauma and reported behavioral concerns only when controlling for participants' placement/care. For children living with their biological parents, those who had experienced more kinds of trauma had more significant behavioral concerns. However, the same dose-response relationship between trauma and behavior was not found for children living in other care settings. While much of the previous research focused on behavior regulation as an internal function of the child (i.e. Choi & Oh, 2014; Greeson et al., 2014), results from this study suggest that the behavior exhibited may vary as a function of the child's home environment.

It is important to underscore that the non-significant results for children living somewhere other than in their parents' care does not mean they did not have reported behavioral concerns. These results only indicate that the extent or severity of behaviors of children in other placement settings did not vary with, or were not contingent on, the number of trauma types experienced. In other words, children living with their parents may have had more, fewer, or as many behavioral concerns as those living in other settings.

This indication that placement or current care has an influence on the relation between cumulative trauma and behavior raises questions about between group differences, and has potential implications for practice and policy of Child Protective Services (CPS) agencies. Previous research has indicated children who are placed in foster care or another placement setting exhibit more behavioral problems (Lawrence, Carlos, & Egeland, 2006). However, as Berger, Bruch, Johnson, James, and Rubin (2009) highlight, many of these studies are affected by selection bias, in that children who are removed from their home differ in myriad ways from those who remain in the care of their primary provider. These authors caution against causal inferences made from such studies.

For instance, compared to children who continue living with their parents, children who are removed from the home may exhibit more behavior problems which could, in part, fuel the decision by CPS to remove the child from the home. On the other hand, it has been asserted by some that separation from a primary caregiver is a significant trauma, with deleterious effects on well-being comparable to other forms of maltreatment (Howard, Martin, Berlin, & Brooks-Gunn, 2011; Karen, 1998). It is possible that it is the removal from the home, and the traumatic separation experienced by the child, that corresponds with the increase in emotional and behavioral dysregulation demonstrated by those in out-of-home placement. This possibility is indirectly supported by research demonstrating less severe behaviors by children who are placed in kinship care, as the familiarity and bond with that provider, increased likelihood of placement with siblings, and potential of remaining in the same neighborhood may reduce the behavioral dysregulation associated with separation from a primary caregiver (Karr-Morse & Wiley, 2012; Kira, Somers, Lewandowski, & Chiodo, 2012; Rubin, Downes, O-Reilly, Mekonnen, Luan, & Localio, 2009). While a full investigation of the topic of out-of-home placement and outcomes is beyond the scope of this paper, results from this study support those who emphasize the need to

better understand the effects of system-induced separation from primary caregivers on a child's well-being.

NEUROPSYCHOLOGICAL FUNCTIONING

A significant effect was found between cumulative trauma and shifting, in that participants who had been exposed to more types of trauma took longer to complete the task when controlling for motor speed. Shifting tasks such as the one in the D-KEFS Trail Making Test (TMT) require individuals to change between two cognitive tasks with competing expectations or rules. Such tasks call on participants to vacillate their attention between the rules through the inhibition of one cognitive path and engagement in the other.

It should be noted that, although the difference between the TMT motor task and the shifting task has been found to be a valid indicator of executive function (Arbuthnott & Frank, 2000; Sánchez-Cubillo et al., 2009), the TMT is often considered more of a screening measure for executive dysfunction rather than as a principal measure of set shifting ability. While previous research using other neuropsychological measures has found set shifting deficits associated with childhood maltreatment (Davis & Pierson, 2012; Flaks et al., 2014; Polak et al., 2012; Viesel, Freer, Lowell, & Castillo, 2015), results from the present study regarding performance on the TMT should be interpreted with caution.

Shifting is subsumed under cognitive flexibility, a higher order executive function defined as one's ability to change perspectives or approaches to a problem or situation (Diamond, 2013). Individuals who have poor cognitive flexibility tend to have difficulty seeing matters from another's point of view, have trouble coming up with unique solutions to problems, and often struggle to adapt their behavior in response to new demands or opportunities (Aupperle, Melrose, Stein, & Paulus, 2012; Diamond, 2013). The ability to switch between conflicting and cognitively demanding tasks has been linked to the medial Prefrontal Cortex

(mPFC) and the Anterior Cingulate Cortex (ACC; Bissonette, Powell, & Roesch, 2013; Butts, Floresco, & Phillips, 2013).

In terms of the relation between cognitive flexibility and trauma, animal studies have indicated that both chronic and acute stress relate to deficits in set shifting in rats (Bissonette et al., 2013; Bondi, Rodriguez, Gould, Frazer, & Morilak, 2008). Previous research with human populations, however, is mixed, with some studies revealing a correlation between trauma and cognitive inflexibility, and others finding no such relation (Flaks et al., 2014; Majer et al., 2010; Olff, Polak, Witteveen, & Denys, 2014; Polak, Witteveen, Reitsma, & Olff, 2012; Spann et al., 2012). More consistent are the results from studies that involved emotionally-laden stimuli in the set shifting tasks. On these tasks, individuals who have experienced trauma exhibit differences in shifting or disengaging from emotional or threatening stimuli compared to controls (Constans, Vasterling, McCloskey, & Brailey, 2004; Bryant & Harvey, 1997; Pine et al., 2005). Those who have been traumatized may have an “attentional bias” toward trauma-related stimuli, and it may be in the trauma victim’s best interest to be disproportionately watchful for, and attentive to, trauma-relevant cues (Aupperle et al., 2012).

Aupperle et al. (2012) proposed a model for the connection between attentional bias, shifting deficits, and trauma symptoms experienced by victims of maltreatment. In this model, the individual’s tendency to direct attention toward potentially threatening stimuli, done at the expense of their ability to attend to conflicting or less relevant stimuli, is evident in their poor performance on tasks of set shifting. In turn, these authors suggest that the criteria for Post-Traumatic Stress Disorder (PTSD) may be explained in light of these attentional biases. For instance, intrusive thoughts or memories and hypervigilance may be the subjective experiences of a trauma victim’s tendency to be over attentive toward threats—either those previously experienced or those anticipated. Similarly, the numbness, dissociation, and avoidance symptoms

commonly described by individuals with PTSD are thought to be maladaptive strategies in response to emotional stimuli, because their ability to otherwise inhibit or disengage from them is reduced.

While traumatologists would likely refer to this as a deficit in executive functioning, we might expect a developmental psychopathologist to explain how the allocation of resources toward potentially-threatening stimuli is, in fact, an adaptive behavior that promotes survival. As such, poorer performance by children with trauma histories would reflect an adaptive biological response, not an insufficiency. Perhaps the best vindication for this perspective comes from outcomes-oriented research on changes in functioning following treatment for PTSD (El Khoury-Malhame et al., 2011; Walter, Palmieri, & Gunstad, 2010). These studies have found performance on tasks of executive function, including set shifting, to improve with treatment, thus reinforcing the possibility that poor performance on executive function measures reflects an individual's state and symptoms, rather than permanent alterations in neurobiology.

Considering that this is the only known study to have examined executive function in respect to cumulative trauma among children, it is recommended that future studies use a more robust neuropsychological battery assessing for convergence across set shifting tasks. Adding measures which assess for certain aspects of personality, such as flexibility or rigidity, could also provide key insights into this finding.

Just as valuable as the indication that cumulative trauma predicted set shifting deficits is the lack of significant relation between cumulative trauma on all other measures of neuropsychological functioning. This was particularly surprising in regard to cognitive ability, as previous literature has suggested that childhood trauma is unequivocally associated with cognitive deficits, and with some indication that more trauma types related specifically to lower verbal IQ (Kira,

Lewandowski, Somers, Yoon, & Chiodo, 2012; Saltzman, Weems, & Carrion, 2006; Viesel et al., 2015).

The research regarding specific deficits in verbal IQ is interesting when thinking of the instruments used in the current study. The WASI-II and KBIT-2, although both valid instruments, are brief measures of intelligence comprised of only four and three subtests, respectively. By comparison, a standard administration of the WISC-IV (Wechsler, 2003) typically involves 10 subtests that contribute to four index scores and a full scale IQ (FSIQ). By using the WISC-IV, Viesel et al. (2012) were better able to parse out correlations between trauma and performance on specific subtests. They found that maltreated children had significantly lower index scores for Verbal Comprehension (VCI) and Processing Speed (PSI). Regarding VCI, children with trauma histories scored significantly lower on the Vocabulary and Comprehension subtests, but not on Similarities. The Verbal Composite of the WASI-II, on the other hand, is comprised only of the Vocabulary and Similarities subtests, and there is no component of the brief measure that examines Processing Speed. So, although the measures of IQ used in this study provide accurate and reliable results, they may not have been sensitive enough to the unique aspects of cognition that are affected in children who have experienced trauma.

Upon closer examination, it appears that many of the studies that found cognitive deficits related to trauma selected participants based on a diagnosis of PTSD, and it could be that this selection criteria served as a confound. To illuminate this possibility, one study compared cognitive deficits between groups of maltreated children with and without a diagnosis of PTSD, and found lower verbal IQ correlated with trauma only for the PTSD group (Saigh, Yasik, Oberfield, Halamandaris, & Bremner, 2006). Furthermore, longitudinal studies with adults exposed to combat trauma have suggested lower IQ before trauma is a risk factor for later PTSD symptomatology (Aupperle et al., 2012; Enlow, Egeland, Blood, Wright, & Wright,

2012). It may be that, rather than trauma predicting cognitive deficits, individuals with lower IQs who experience trauma are at greater risk of suffering from psychiatric diagnoses, and that the use of diagnosis as an inclusionary criterion influenced the results of many of the relevant previous studies.

Along with the possibility that a diagnosis of PTSD moderates the relation between trauma and lower IQ, it has been proposed that differences in cognitive ability are at least partly explained by factors such as socioeconomic status, malnutrition, or traumatic brain injury. In a similar vein, there is disagreement among the research on whether certain types of trauma are more predictive of cognitive deficits than others, with some suggesting that physical abuse and neglect are more likely to impact cognition than other forms of trauma (Pears, Kim, & Fisher, 2008). An understanding of the degree to which participants' trauma symptoms met criteria for a diagnosis of PTSD, and of other demographic characteristics of this population, could have elucidated the lack of significant predictive relationship between cumulative trauma and neuropsychological functioning.

AGE AT ONSET

Age at onset was found to be significantly related to cumulative trauma, in that the more trauma types participants experienced, the more likely they were to have first experienced trauma before age 3. However, results from hypothesis testing that age at onset would have a mediating impact on the way cumulative trauma predicted functioning were not significant. Specifically, the extent of trauma symptomatology and deficits in set shifting were not significantly different between participants who first experienced trauma early and those whose first experience of trauma occurred between the ages of 3 and 18.

Because well over half of the participants (59%) reported first experiencing trauma from birth through age 2, and with 90% reporting their first trauma before age 12, it is difficult

to determine whether this null result reflects a lack of variability in onset within the sample, or reflects a lack of discernible concerns by age at onset. In other words, it may be that victims of trauma at very early stages in their development may be as affected by psychological and behavioral symptoms, and to the same degree, as those who first experienced trauma later in their childhood. Or it may be that the distribution of age at onset within the sample was not large enough to detect differences.

It is important to note that the current study accounted only for the age at onset of trauma, and did not account for some of the characteristics other researchers have found to be important, like severity or chronicity (Nader, 2011; Wamser-Nanney & Vandenberg, 2013). Because participants who experienced trauma before age 3 were also found to have experienced significantly more trauma types, it may be that those with an earlier age at onset were also more likely to have chronic and/or extended experiences of trauma. Previous studies have noted that the duration of trauma exposure is often confounded by age at onset (Enlow et al., 2012). That increased trauma symptoms and severity were predicted by increased number of trauma types, but without mediation by the age at onset, may reflect participants' psychological struggles with recently experienced trauma, or may relate more to extended durations of time in traumatic situations, rather than to the age at which trauma began.

In contrast to the present study, research by Choi and Oh (2014) examined cumulative trauma and accounted for duration and severity but not age at onset. These researchers concluded that trauma severity and duration significantly contributed to increased symptomatology, but noted that not accounting for the timing of the trauma was a limitation in their study.

As was previously discussed, it is also important to gain information regarding the nature of trauma as it relates to a victim's relationship with his or her primary caregiver. Previous research which made a distinction between interpersonal trauma, defined as trauma

which involves the primary caregiver, and other forms of trauma found increased cognitive deficits, trauma symptoms, and behavioral concerns among victims of interpersonal trauma (Enlow et al., 2012). Conversely, proponents from the field of developmental psychopathology would call attention to resilience and the role of protective factors within a child's natural ecology during the developmental period between birth and age 2 (Afifi & MacMillan, 2011; Masten et al., 2009). Based on this line of research, children who experience significant trauma before age 2, yet have the presence of a healthy, consistent, and emotionally available caregiver, would likely have protection from some of the deleterious effects of that trauma and would not experience the disrupted or stymied neurodevelopment cited by traumatologists.

So, just as accounting for one trauma type is insufficient in understanding the impact of traumatic experiences, so is accounting for only one characteristic of the trauma experienced. Future researchers accounting for the number trauma types experienced, age at onset, duration, and interpersonal nature of the trauma may find it is the interaction of these factors that is most influential on a child's psychological functioning. In addition, future researchers are encouraged to account for protective factors, including the presence of a healthy and stable relationship with a primary caregiver, and to examine the influence of both trauma and protective factors concurrently.

LIMITATIONS

In addition to the aforementioned limitations pertinent to specific variables, a few more general limitations must be acknowledged. Perhaps most notable is the relatively small sample size, particularly the small number of participants with data on neuropsychological function. Power analysis results indicated a sample size of 25 was needed for a small effect size. This raises the possibility that some differences were not detected, and so caution should be used

regarding the generalizability particularly of the neuropsychological results. As was mentioned earlier, future studies honing in on set shifting ability and incorporating other relevant test data would be beneficial, and should also aim to involve a larger sample.

Secondly, many have raised concern about relying on parent-report measures to ascertain information about trauma experiences. Prior research has found significant discrepancies between reports from parents compared to their child's self-report among system-involved families (Holmes, Hussey, Kobulsky, & Kepple, 2017), as well as general population (Chan, 2015). Reasons for these discrepancies could range from intentional efforts to minimize or obfuscate the trauma, to low awareness of their child's experiences outside of the home, differences in subjective definitions of experiences and what constitutes trauma, or differences between caregivers and children in what they recall from past experiences. Even though data on trauma experiences for some participants came from the report of their CPS caseworker or probation officer, rather than from primary caregivers, these reports may have been subjected to many of the same factors that could affect reliability, as stakeholders likely made their report based, at least in part, on information provided by the parents.

Furthermore, this population may have differed even from other populations with CPS or juvenile justice involvement, in that referrals for the trauma-informed assessments from which the data came were often made when a CPS case was opened and services with the family began. The underlying implication for many families, then, was likely that the information included in the assessments would have bearing on decisions regarding out-of-home placement. An external factor of that much weight and emotional importance could have been a strong influence not only on the approach parents or caregivers took when completing assessment questionnaires, but also on the performance of the child during testing. Here again, caution should be used in generalizing results from this study, even to other groups of system-involved children.

Fourth, the absence of a thorough understanding of the demographic characteristics for this population was highlighted at relevant points throughout the discussion, and warrants mention as a limitation of this study overall. Given how influential psychosocial factors are on a child's health and functioning in general, and how often they are implicated in studies on childhood trauma and outcomes, accounting for variables such as socioeconomic status, length of stay in current placement, and number of prior placements could have provided a more robust picture of this population.

Lastly, combining data gathered on similar domains yet from different assessment measures, while not uncommon in studies from clinical populations, is also not ideal. This methodology likely would have had the greatest impact on the resilience measure, as the RSCA measures internal constructs related to resilience, while the RPFC assesses for the existence and importance of external, psychosocial factors. Although tests of dimensionality and correlation between combined scales, along with the scale construct offered by the test creators, all indicated good consistency, nuance differences may have related to some differences in responses or performance and, therefore, outcomes.

CONCLUSIONS AND CLINICAL IMPLICATIONS

The results from this study further support the existence of dose-response relationship between cumulative trauma and a child's psychiatric and behavioral wellbeing, and underscore the importance of accounting for the number of types of trauma experienced when conducting research on childhood maltreatment. This is important not only for researchers hoping to clear up discrepancies in the literature on childhood trauma and its correlates, but also for practitioners, who are encouraged to heed the relationships between trauma symptoms, behavior problems, and cumulative trauma. Whereas psychological symptoms and disruptive or unhealthy behaviors are more readily apparent in treatment, factors such as stigma, avoidance, fear of the provider

or system's response, or subjective definitions of maltreatment can prevent clients and families from talking to their provider about trauma. In addition, many treatment modalities are designed to address symptoms and behaviors, and do not involve an account of trauma, let alone incorporate these experiences in treatment. Therefore, the undercurrent of the cumulative trauma beneath so many presenting problems has an increased risk of being either un- or under-reported by the client, or altogether unassessed by the provider. Just as scientists should account for cumulative trauma and trauma characteristics in their analyses, so should mental health providers in their individual assessments of children in treatment.

Results from this study point to the need for providers to assess for a range of potentially traumatic experiences, and highlight the possibility that children who present with more significant behavioral concerns or symptoms may have experienced more types of trauma. Opening the scope in treatment on the types of trauma experienced by clients would not only provide clinicians with a better conceptualization, but could also help clients feel validated and could elucidate for families and referring agencies the connection between the child's experiences and their more observable concerns. In addition, assessing for a range of potentially traumatic experiences would improve the identification of children who would likely benefit from evidence-based treatments specific for children who have experienced trauma.

That an increase in trauma types experienced related to more reported behavior problems only for children living with their biological parent or parents highlights a key area for future research and practice. Even though systems serving youth are becoming increasingly aware of the connection between trauma and adverse symptoms and behaviors (Ai, Foster, Pecora, Delaney, & Rodriguez, 2013), there are continued questions about best practice for CPS agencies in their effort to protect children and minimize the adverse effects of maltreatment. There is a need for a better understanding of the risks and benefits of out-of-home placement compared to

continued residence with primary caregivers, and future researchers might consider separation from caregivers by CPS or other systems as a potentially unique type of traumatic experience.

Implications for practice also come from the possibility that children who have experienced more kinds of trauma are more likely to struggle with cognitive flexibility, and may have more difficulty with perspective taking and in disengaging from emotional or threatening stimuli. The most promising aspect of this is the concurrent research which has found these particular difficulties, and performance on the corresponding executive function tasks, to improve as trauma symptoms are alleviated. That executive function can be dynamic rather than static aligns with the perspective of developmental psychopathology, and it provides neurobehavioral evidence that treatment of trauma can be effective.

Because victims of cumulative trauma are so often emotionally dysregulated and behaviorally challenging, it can be difficult for those around them to stay engaged in their well-being and to maintain optimism for their future. While the differences in perspective and nomenclature between traumatology and developmental psychopathology may seem slight and inconsequential, the influence they can each have on the perception and treatment of children who have been maltreated is profound. One of the many rewards from developmental psychopathology and research on resilience is the production of evidence that hope and high expectations for children who have been victimized is not only appropriate, but therapeutic. Both scientists and practitioners are encouraged to work to better understand maltreated children through this perspective, and to each contribute to the other's endeavors.

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APPENDIX A

Consent to Participate in a Research Study Colorado State University

TITLE OF STUDY: Neuropsychological Correlates of Developmental Trauma: The Role of Resiliency

PRINCIPAL INVESTIGATOR: Bradley T. Conner, Ph.D., Psychology Department.
(970) 491-6197, Brad.Conner@colostate.edu

CO-PRINCIPAL INVESTIGATOR: Deborah Pratt, M.S., L.P.C. Psychology Department.
(970) 682-3191, Deborah.Pratt@colostate.edu

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH? You and your child are invited to take part in this research because you are already participating as a client with the Neuropsychological Trauma-Informed (NPTI) Assessment Clinic. You won't be asked to do anything more for this study than you are already going to do for the assessment.

WHO IS DOING THE STUDY? This study is being conducted by Deborah Pratt, M.S., L.P.C., who is a student in the Counseling Psychology Ph.D. program, and by Bradley T. Conner, an Assistant Professor in the Psychology program and Deborah's academic advisor.

WHAT IS THE PURPOSE OF THIS STUDY? Children and teenagers who have had difficult or traumatic experiences can have academic, social and emotional difficulties that relate to or stem from that trauma. In addition, these children often have many strengths – called resiliency factors – that make them stronger and better able to handle tough times in the future. The purpose of this study is to learn how the characteristics of past experiences relate to the difficulties children have and to the resiliency factors they possess. We hope this information will help treatment providers better support children with trauma histories and their families.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? The NPTI Assessment takes place in the Psychological Services Center, a therapy and assessment clinic within the CSU Counseling Psychology program. The assessment will likely take between 2 and 4 hours. The assessment that you and your child will be going through is part of the normal process through the NPTI Assessment Clinic at the Psychological Services Center.

WHAT WILL I BE ASKED TO DO? Your child will be asked to engage in a series of neuropsychological tasks that will provide information on their cognitive, visual-motor, language, memory, and executive functioning skills as part of normal activities of the Psychological Services Center. In addition, you and your child will be asked to complete a series of surveys that will ask about how your child behaves and how he or she manages emotions. We will also ask your child to report on the types of experiences they may have had, and the ages at which they experienced them. All of these activities are standard procedures for the Psychological Services Center. In consenting to participate in the research, we are requesting the release of you and your child's collected assessments for research use. Prior to releasing this information for research, your identities will be removed. The researchers will not know who you are and not be able to link any assessments to you or your child. More information on this is in the Confidentiality section of this consent form.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY? If your child is under the age of 12 or over age 18, he or she should not participate in this study.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS? Because the assessment relates to traumatic events, there is a risk that talking about these experiences will be uncomfortable for you

Page 1 of 3 Participant's initials _____ Date _____

CSU#: 15-5842H
APPROVED: 6/18/2015 * EXPIRES: 6/3/2016

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APPENDIX B

R652

Colorado Department of Human Services Trails System Report



NCTSN

The National Child
Traumatic Stress Network

**Trauma
Informed
System
Initiative**

Screening Checklist: Identifying Children at Risk Ages 6 - 18

Please check each area where the item is known or suspected. If history is positive for exposure and concerns are present in one or more areas, a comprehensive assessment may be helpful in understanding the child's functioning and needs.

1. Are you aware of or do you suspect the child has experienced any of the following:

- ☐ Physical abuse
- ☐ Suspected neglectful home environment
- ☐ Emotional abuse
- ☐ Exposure to domestic violence
- ☐ Known or suspected exposure to drug activity *aside from parental use*
- ☐ Known or suspected exposure to any other violence *not already identified*
- ☐ Parental drug use/substance abuse
- ☐ Multiple separations from parent or caregiver
- ☐ Frequent and multiple moves or homelessness
- ☐ Sexual abuse or exposure
- ☐ Other

Comments:

If you are not aware of a trauma history, but multiple concerns are present in questions 2, 3, and 4, then there may be a trauma history that has not come to your attention.

Note: Concerns in the following areas do not necessarily indicate trauma; however, there is a strong relationship.

2. Does the child show any of these behaviors:

- ☐ Excessive aggression or violence towards self
- ☐ Excessive aggression or violence towards others
- ☐ Explosive behavior (Going from 0-100 instantly)
- ☐ Hyperactivity, distractibility, inattention
- ☐ Very withdrawn or excessively shy
- ☐ Oppositional and/or defiant behavior
- ☐ Sexual behaviors not typical for child's age
- ☐ Peculiar patterns of forgetfulness
- ☐ Inconsistency in skills
- ☐ Other

Comments:

CTAC Trauma Screen

Below are a number of experiences which can be considered by some as traumatic. Please indicate which, if any, of these you feel you have experienced in your lifetime.

	Please indicate which, if any, of these you feel you have experienced	How old were you when you had these experiences? Please check all that apply				
		0-3	3-6	6-12	12-16	16-19
Physical abuse		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neglect - a neglectful home environment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emotional abuse		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to domestic violence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to any other violence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parental drug use/substance use		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to other drug activities		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separated many times from your parent(s) or caregivers		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frequent, multiple moves or homelessness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sexual abuse or exposure		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of a parent, caregiver or other significant loved one		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you marked "other," please describe below

^
v

APPENDIX C

A. Trauma/Loss Exposure History

Trauma Type (Definitions attached)	Yes Suspected No Unknown		Age(s) Experienced (Check each box as appropriate – example sexual abuse from ages 6–9 would check 6, 7, 8, and 9)																					
	Yes	Suspected	No	Unknown	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Sexual Abuse or Assault/Rape	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Physical Abuse or Assault	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Emotional Abuse/Psychological Maltreatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Neglect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Serious Accident or Illness/Medical Procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Witness to Domestic Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Victim/Witness to Community Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Victim/Witness to School Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Natural or Manmade Disasters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Forced Displacement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. War/Terrorism/Political Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Victim/Witness to Extreme Personal/Interpersonal Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Traumatic Grief/Separation (does not include placement in foster care)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Systems-Induced Trauma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX D

Resiliency Protective Factors Checklist

YOUTH Version-PRE

Some youth react to hard times (abuse; loss; or other stressors) by becoming chronically withdrawn, insecure, depressed, and even negative, non-caring, and sometimes abusive to self and/or others. These reactions can lead to lots of negative outcomes in life. However, *others cope with life's struggles by becoming stronger and growing up to have successful lives. These youth are called "resilient"*. Researchers have discovered that everyone has the ability to be resilient if they have enough protective factors. 'Protective factors' help buffer the hard times we experience in life. **Listed below are protective factors commonly found in resilient youth (and adults). Even having a couple of these factors can have a positive impact on your ability to cope and live a happy, well-adjusted life.**

Instructions for Youth: Read each statement below and check the box that best describes how true it is in your life. There are no right or wrong answers, just what is true for you.

INDIVIDUAL Protective Factors: Factors *within myself* that can make me more 'resilient' when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
1) I am good at <i>thinking about my problems</i> and figuring out how to make it better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) I am good at <i>calming myself down</i> and thinking before I act	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I <i>feel good about myself</i> for the <i>positive things</i> I do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) I have <i>talents</i> that I value and society values (i.e., computer skills; writing; music; athletics; cooking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) I believe I can <i>influence what happens in my life</i> with my decisions and actions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) I have <i>religious beliefs/ spirituality</i> that give me support and help me make decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) I keep a <i>positive attitude</i> about life even when faced with hard times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I have a <i>likable personality</i> that people want to be around	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) I believe I am a <i>strong person</i> because of the <i>hard times</i> I have faced in life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) I am <i>personally motivated</i> to make <i>positive changes</i> in my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FAMILY Protective Factors: Factors *within my family* that can make me more 'resilient' when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
11) I have a <i>positive family member</i> who gives me support in good and bad times (i.e., parent, grandparent, aunt, uncle, older sibling)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) I live in a <i>home that is safe</i> and everyone gets along well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) I have a <i>parent/ caregiver</i> who helps me out with schoolwork and goes to my activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) I have a <i>parent/ caregiver</i> who thinks education is important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) I have a <i>parent/ caregiver</i> who provides structure/ rules and monitors what I do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) I have a <i>parent/ caregiver</i> who regularly talks with me and explains the reasons for rules and limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) I have a <i>parent/ caregiver</i> who believes in me and expects me to do well in life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COMMUNITY Protective Factors: Factors *within my community* (neighborhood, peer group, school) that can make me more ‘resilient’ when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
18) I have a <i>positive adult</i> from outside my family who gives me support (i.e., teacher; coach; minister; family friend; counselor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) I have a <i>positive friend</i> who supports me and who stays out of trouble	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20) I have a <i>positive boyfriend or girlfriend</i> who supports me and stays out of trouble.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21) I have <i>positive activities</i> I like to do (i.e., sports; band; clubs; after-school programs; jobs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) I <i>feel safe at school</i> and have teachers who care about me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) I have <i>neighbors</i> who care and look out for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24) I live in a <i>neighborhood</i> where I feel safe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Resiliency Protective Factors Checklist

PARENT/CAREGIVER Version-PRE

Some youth react to hard times (abuse; loss; or other stressors) by becoming chronically withdrawn, insecure, depressed, and even negative, non-caring, and sometimes abusive to self and/or others. These reactions can lead to lots of negative outcomes in life. However, *others cope with life's struggles by becoming stronger and growing up to have successful lives. These youth are called "resilient"*. Researchers have discovered that everyone has the ability to be resilient if they have enough protective factors. 'Protective factors' help buffer the hard times we experience in life. **Listed below are protective factors commonly found in resilient youth (and adults). Even having a couple of these factors can have a positive impact on your ability to cope and live a happy, well-adjusted life.**

Instructions for Parent/ Caregiver: Read each statement below and check the box that best describes how true it is in your child's life. There are no right or wrong answers, just what is true as it relates to your child.

INDIVIDUAL Protective Factors: Factors *within your child* that can make them more 'resilient' when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
1) My child is good at <i>thinking about their problems</i> and figuring out how to make it better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) My child is good at <i>calming themselves down</i> and thinking before they act	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) My child <i>feels good about themselves</i> for the positive things they do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) My child has <i>talents</i> that they value and society values (i.e., computer skills; writing; music; athletics; cooking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) My child believes they can influence what happens in their life with their decisions and actions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) My child has <i>religious beliefs/ spirituality</i> that give them support and helps them make decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) My child has a <i>positive attitude</i> about life even when faced with hard times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) My child has a <i>likable personality</i> that people want to be around	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) My child believes they are a <i>strong person</i> because of the <i>hard times</i> they have faced in life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) My child is <i>personally motivated</i> to make positive changes in their life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FAMILY Protective Factors: Factors *within the family* that can make your child more ‘resilient’ when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
11) My child has a <i>positive family member</i> who gives them support in good and bad times (i.e., parent, grandparent, aunt, uncle, older sibling)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) My child lives in a <i>home that is safe</i> and everyone gets along well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) My child has a <i>parent/ caregiver</i> who helps out with schoolwork and goes to their activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) My child has a <i>parent/ caregiver</i> who thinks education is important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) My child has a <i>parent/ caregiver</i> who provides structure/ rules and monitors what they do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) My child has a <i>parent/ caregiver</i> who regularly talks with them and explains the reasons for rules and limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) My child has a <i>parent/ caregiver</i> who believes in them and expects them to do well in life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COMMUNITY Protective Factors: Factors *within the community* (neighborhood, peer group, school) that can make your child more ‘resilient’ when faced with hard times.

	Not True	Sometimes True	Often True	Almost Always True
18) My child has a <i>positive adult</i> from outside the family who gives them support (i.e., teacher; coach; minister; family friend; counselor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) My child has a <i>positive friend</i> who supports them and who stays out of trouble	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20) My child has a <i>positive boyfriend or girlfriend</i> who supports them and stays out of trouble.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21) My child has <i>positive activities</i> they like to do (i.e., sports; band; clubs; after-school programs; jobs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) My child <i>feels safe</i> at school and has teachers who care about them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) My child has <i>neighbors</i> who care and look out for them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24) My child lives in a <i>neighborhood</i> where they feel safe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>