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## An Empirically-Supported Model of Posttraumatic Stress Disorder in Maltreated Youth

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AN EMPIRICALLY-SUPPORTED MODEL OF  
POSTTRAUMATIC STRESS DISORDER  
IN MALTREATED YOUTH

by

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## THE GRADUATE COLLEGE

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ABSTRACT

**An Empirically-Supported Model of  
Posttraumatic Stress Disorder  
in Maltreated Youth**

by

Adrianna Rachel Wechsler

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Posttraumatic stress disorder in maltreated youth is a young and burgeoning field. Lemos-Miller and Kearney (2006) were among the first to propose and test a theoretically and empirically-based model of PTSD in maltreated youth. The present study replicated and evaluated the Lemos-Miller and Kearney model within a larger and more diverse sample of maltreated adolescents. First, the Lemos-Miller and Kearney model was tested via structural equation modeling (SEM). Second, the model was evaluated across age, gender, and ethnicity. Third, trauma history, family environment (i.e., cohesion and conflict), dissociation, and trauma-related cognitions were evaluated as potential mediating variables within the model.

The Lemos-Miller and Kearney model of PTSD met goodness-of-fit criteria for the overall sample. The model also met goodness-of-fit criteria for older (ages 14-17 years) and younger (ages 11-13 years), females, and European American and multiracial youth, but failed to meet goodness-of-fit criteria for males, African American and Hispanic groups. Trauma history, family conflict, dissociation, and trauma-related cognitions were each found to mediate the relationship between comorbid symptoms and PTSD within the Lemos-Miller and Kearney model. Findings are discussed in the

context of implications for assessment and treatment and further development of empirically-supported and theoretical models of PTSD in youth.

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My deepest gratitude goes to my husband, Jason, who has fully supported me in all my academic endeavors. His patience, care, and optimism are boundless. I am similarly grateful to my daughter Sedona for sharing her mommy's time. My parents, Steven and Elizabeth instilled in me a great passion and have inspired my educational pursuits and this research in particular. My siblings, Robert, Matthew, and Michelle have been a constant source of encouragement and inspiration and their faith in me is truly remarkable. Michelle, as always, continues to give me reason.

I would also like to thank the staff and youth at Child Haven and Desert Psychological Services for their cooperation, support, and astounding strength. Each of the adolescents I met demonstrated amazing courage. Without their generosity and bravery this project would not have been possible. I will remember their stories always.

DEDICATION

For E.A.K., S.M.C., L.I.W.,

and all the others.



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# CHAPTER 1

## INTRODUCTION

This study replicated and refined the empirically-based model of PTSD in maltreated adolescents constructed by Lemos-Miller and Kearney (2006) (Figure 1). First, the Lemos-Miller and Kearney model was tested within a large, diverse sample of maltreated adolescents via structural equation modeling (SEM). Second, the model was evaluated across age, gender, and ethnicity. Third, trauma history, family environment (i.e., cohesion and conflict), dissociation, and trauma-related cognitions were evaluated as potential mediating variables within the model.

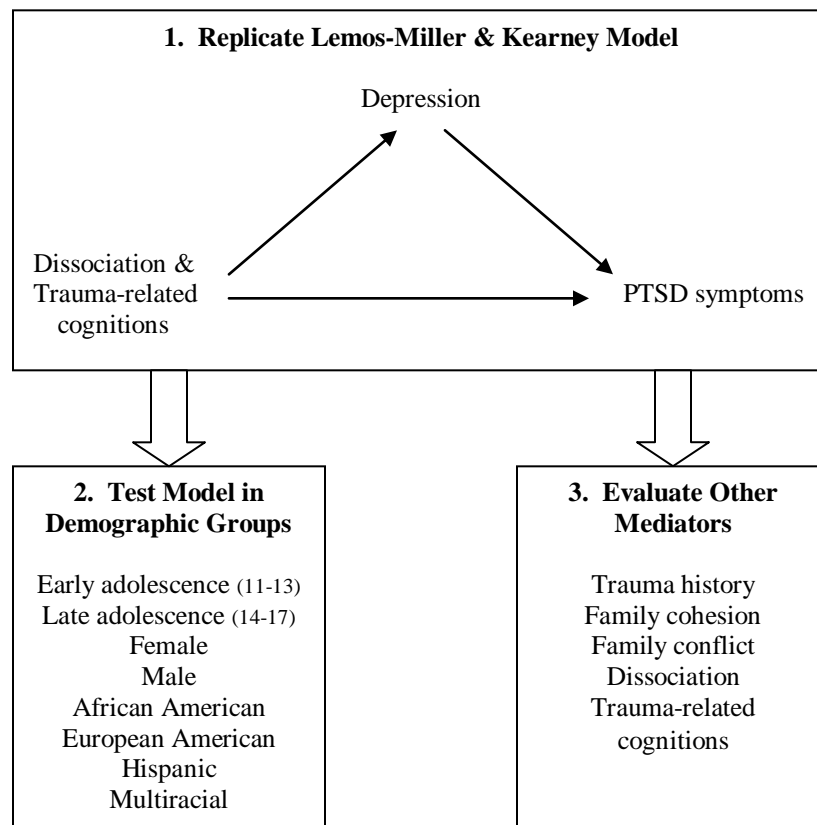


Figure 1. Proposed study.

Empirical research regarding the factors contributing to PTSD in maltreated youth is limited. Lemos-Miller and Kearney (2006) were among the first to propose and test a theoretically and empirically-based model of PTSD in maltreated youth. The researchers constructed a structural equation model with depression as a key mediating variable between (1) dissociation and trauma-related cognitions and (2) PTSD symptoms among maltreated adolescents. African American status weakened this relationship and multiracial status strengthened the relationship. Unfortunately, these findings were restricted by limited sample size and were not well tested across demographic groups (i.e., age, gender, and ethnicity). In addition, other potential mediators such as trauma history, family environment, dissociation, and trauma-related cognitions were not examined.

Lemos-Miller and Kearney assessed ethnically diverse maltreated adolescents with respect to depression, dissociation, and trauma-related cognitions. Depression, dissociation, and trauma-related cognitions are central aspects of PTSD symptomatology in youth (Becker-Lausen, Sanders, Chinsky, 1996; Brunner, Parzer, Schuld, & Resch, 2000; Ehlers, Mayou, & Bryant, 2003; Feeny, Zoellner, Fitzgibbons, & Foa, 2000; Fletcher, 2003; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Ginzburg et al., 2006; Pine et al., 2005; Salmon & Bryant, 2002). The researchers selected depression as the primary mediating variable based on theoretical and empirical literature indicating that depression helps explain PTSD symptom severity (Feeny et al., 2000; Lemos-Miller & Kearney, 2006; Linning & Kearney, 2004; Ruossos et al., 2005).

Participants included 90 (36 female, 54 male) maltreated adolescents aged 11-17 years in a county-run residential facility. Participants were European American (34.4%),

African American (27.8%), Hispanic (18.9%), multiracial (12.2%), Native American (4.4%), Asian American (1.1%), or other (1.1%). Participants reported high rates of exposure to community violence (60.0%), physical maltreatment (56.8%), domestic violence (36.6%), and/or sexual maltreatment (17.3%). Assessment included the Children's PTSD Inventory (CPTSD-I) (Saigh et al., 2000), Children's Depression Inventory (CDI) (Kovacs, 1992), Adolescent Dissociative Experiences Scale (A-DES) (Armstrong, Putnam, Carlson, Libero, & Smith, 1997) and Posttraumatic Cognitions Inventory (PTCI) (Foa et al., 1999).

The A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .959, IFI = .959, SRMR = .055;  $\chi^2 = 139.33$ ,  $p < 0.004$ ) (Figure 4). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .993, IFI = .993, SRMR = .040). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .956, IFI = .957, SRMR = .059;  $\chi^2 = 141.41$ ,  $p < 0.003$ ) and was not significantly different from the unconstrained model. Depression was thus assumed to mediate the relationship between (1) dissociation and trauma-related cognitions and (2) PTSD symptoms among maltreated adolescents.

The researchers also examined whether ethnicity moderated any primary path models via moderated multiple regression. No ethnicity moderated the path between dissociation and depression. Multiracial status nearly moderated the path between trauma-related cognitions and depression ( $p = 0.067$ ). Multiracial status significantly positively moderated the path between depression and PTSD ( $\Delta R^2 = .039$ ;  $F[1, 82] = 5.49$ ,  $p = 0.022$ ), such that multiracial status strengthened the relationship between

depression and PTSD. These results applied most to CDI subscales of negative mood, anhedonia, and negative self-esteem.

African American status nearly moderated the path between depression and PTSD symptoms ( $p = 0.069$ ) and did produce a practically significant variance change ( $\Delta R^2 = .024$ ). African American status weakened the relationship between negative mood and PTSD symptoms and negative self-esteem and PTSD symptoms. No moderating effects were found with respect to European American or Hispanic status.

Lemos-Miller and Kearney (2006) provided strong evidence that depression is a central variable in PTSD symptomatology in maltreated youth. Causal conclusions cannot be drawn from this study, but the presence of depression appears to be particularly important when considering the impact of dissociation and/or trauma-related cognitions. Dissociation and trauma-related cognitions are common responses to traumatic events and both may be viewed along a continuum. These psychological symptoms may become pathological and contribute to PTSD symptoms. The presence of comorbid depression appears to mediate this pathway.

Lemos-Miller and Kearney (2006) also found that ethnicity may be an important moderator in the relationship between depression and PTSD. African American status may be a protective factor in youth, possibly because African American community membership may be associated with substantial emotional support from family, extended family, and church members (McRae, Carey, & Anderson-Scott, 1998; Murry, Bynum, Brody, Willert, & Stephens, 2001). Multiracial status appears to place youth at increased risk for PTSD development, possibly because multiracial adolescents have less



community membership and social support (Bracey, Bamaca, & Umana-Taylor, 2004; Philips, 2004).

The Lemos-Miller and Kearney study had several limitations. First, age and gender were not fully considered. This is unfortunate given the significant amount of literature implicating age (De Bellis, 2005; De Bellis & Van Dillen, 2005; English, Upadhyaya, et al., 2005; Kolko et al., 2010; Pfefferbaum, 2005) and gender (Blain, Galovski, & Robinson, 2010; Lonigan, Phillips, & Richey, 2003; MacDonald, Danielson, Resnick, Saunders, & Kilpatrick, 2010) as central factors in child maltreatment and PTSD. Further work is necessary to determine if the model applies better to younger or older children or to males or females.

Second, practical and administrative restrictions resulted in a limited number of participants and measures. Between-group differences regarding ethnicity thus may not have been observable. For example, multiracial status may significantly moderate the relationship between trauma-related cognitions and depression in an expanded sample. Additionally, findings regarding African American status are preliminary and not well understood. Theoretical and empirical literature highlight the importance of racial, ethnic, and cultural factors in PTSD in maltreated youth (Clemmons, DiLillo, Martinez, DeGue, & Jeffcott, 2003; Ferrari, 2002; Triffleman & Pole, 2010), and most findings indicate that ethnic and racial minorities are at increased risk for child maltreatment, other trauma exposure, and posttraumatic symptoms (Triffleman & Pole, 2010).

Third, the Lemos-Miller and Kearney study evaluated only one potential model of PTSD in maltreated youth. Depression was the central mediating variable. Theoretical and empirical literature indicates that trauma history (Luthra et al., 2009; Suliman et al.,

2009), family environment (Davis & Siegel, 2000; Koenen, Moffitt, Poulton, Martin, & Caspi, 2007), dissociation (Fletcher, 2003; Putnam, 2003, 2006) and posttraumatic cognitions (Ehlers & Clark, 2000; Ehlers et al., 2003; Salmon & Bryant, 2002) also contribute to PTSD following child maltreatment. Lemos-Miller and Kearney did not examine these other potential mediators.

This study had three primary aims: (1) replicate the Lemos-Miller and Kearney model in a larger, more diverse sample of maltreated adolescents, (2) evaluate the fit of this model across demographic groups (i.e., age, gender, and ethnicity), and (3) evaluate the role of other potential mediators (i.e., trauma history, family environment, dissociation, and trauma-related cognitions). The present study thus endeavored to produce a refined, developmentally and ethnically sensitive, ecologically-based model of PTSD in maltreated youth.

The following chapter provides an overview of important findings in youth-based maltreatment and PTSD research. Current research regarding epidemiology, symptomatology, comorbidity, outcomes, and risk factors in maltreated youth with PTSD and PTSD-related symptoms is summarized. Influential theoretical models of child maltreatment effects and PTSD development are also reviewed. The literature review concludes with an integrated discussion of theoretical and empirically-supported risk factors for PTSD in maltreated youth. The methods section details study measures and procedures. The results section details the statistical findings of the present study. The discussion section reviews the present findings, their clinical implications for both assessment and treatment of maltreated youth, study limitations, and recommendations for future research in PTSD in maltreated youth.

## CHAPTER 2

### REVIEW OF RELATED LITERATURE

#### **Child Maltreatment**

##### **History**

Child maltreatment was first acknowledged in the United States in 1874 when young Mary Ellen Wilson was rescued from an abusive home (Brittain, 2006). The community was outraged by Mary Ellen's treatment but public policy and social awareness were slow to change. The first academic paper on child maltreatment was Kemp's 1962 article on battered child syndrome (Higgins, 2004). The first federal legislation regarding child maltreatment, the Child Abuse Prevention and Treatment Act (CAPTA), did not pass until 1974. CAPTA has been amended and expanded several times, most recently via the Keeping Children and Families Safe Act of 2003. CAPTA provides minimum federal definitions of physical and emotional harm and neglect.

##### **Definitions**

The Keeping Children and Families Safe Act defined child maltreatment as "any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse or exploitation; or an act or failure to act which presents an imminent risk of serious harm," (U.S. Department of Health and Human Services, Child Abuse Prevention and Treatment Act, 42 U.S.C.A. § 5106g). The American Psychological Association (APA) Committee on Professional Practice and Standards (1999) defined maltreatment as "actions that are abusive, neglectful, or otherwise threatening to a child's welfare" (p. 16).

The Committee defined neglect as an “act of omission, specifically the failure of a parent or other person legally responsible for a child's welfare to provide for the child's basic needs and proper level of care with respect to food, shelter, hygiene, medical attention or supervision” (p. 16). The Committee defined emotional neglect as “passive or passive-aggressive inattention to a child's emotional needs, nurturing or emotional well-being.” (p. 16). The Committee defined physical neglect as “a child suffering, or in substantial risk of imminently suffering, physical harm causing disfigurement, impairment of bodily functioning, or other serious physical injury as a result of conditions created by a parent or other person legally responsible for the child's welfare, or by the failure of a parent or person legally responsible for the child's welfare to adequately supervise or protect him/her” (p. 16).

The Committee defined physical maltreatment as “the suffering by a child, or substantial risk that a child will imminently suffer, a physical harm, inflicted non-accidentally upon him/her by his/her parents or caretaker” (p. 14). Physical maltreatment may include burning, scalding, beatings with an object, and severe physical punishment (U.S. Department of Health and Human Services, 2005).

The Committee defined sexual maltreatment as “contacts between a child and an adult or other person significantly older or in a position of power or control over the child, where the child is being used for sexual stimulation of the adult or other person,” (p. 14). Sexual maltreatment may include incest, sexual assault by a family member, friend, or stranger, genital fondling, child pornography, or exposure to sexual acts or rituals (U.S. Department of Health and Human Services, 2005).

The Committee defined psychological (or emotional) maltreatment as “a repeated pattern of behavior that conveys to children that they are worthless, unwanted or only of value in meeting another's needs; (this) may include serious threats of physical or psychological violence” (p. 14). Psychological maltreatment includes verbal abuse and belittlement, acts designed to terrorize a child, and emotional unavailability by caregivers (U.S. Department of Health and Human Services, 2005). In addition, exposure to intimate partner violence is frequently categorized as psychological maltreatment, failure to protect, or neglect (Kantor & Little, 2003).

### **Prevalence**

Over 3,300,000 reports of child maltreatment involving more than 6,000,000 children are made to authorities annually. Some (22.1%) reports are fully substantiated and 38.1% are never investigated (U.S. Department of Health and Human Services, 2010). Incidents of child maltreatment are significantly underreported (Azar & Wolfe, 2006; Edwards, Holden, Felitti, & Anda, 2003; Finkelhor, Ormrod, Turner & Hamby, 2005; Gilbert, Kemp, et al., 2009; May-Chahal, & Cawson, 2005) and 16-33% of youth experience some form of maltreatment by late adolescence (May-Chahal & Cawson, 2005; Wolfe, Scott, Wekerle, & Pittman, 2001). Adult retrospective studies reveal population prevalence rates for physical (4-16%), sexual (5-11%), and psychological maltreatment (10%) as well as neglect (1-15%) and exposure to intimate partner violence (10-20%) in the United States, United Kingdom, Canada, and Australia (Kearney, Wechsler, Kaur, & Lemos-Miller, 2010; May-Chahal & Cawson, 2005; Ronan, Canoy, & Burke, 2009).

Up to 90% of youth in protective services have experienced multiple forms of maltreatment (Belsky, 1993; Pears, Kim, & Fisher, 2008). Physical maltreatment often involves psychological maltreatment such as fear and degradation and is significantly correlated with psychological maltreatment and neglect (English, Thompson, et al., 2005). Sexual and psychological maltreatment are significantly correlated with neglect (English, Thompson, et al., 2005). Sexual maltreatment frequently includes psychological harm and physical pain. Neglect typically co-occurs with physical, psychological, and sexual maltreatment (Trickett & McBride-Chang, 1996). Maltreated youth are frequently exposed to intimate partner violence (Pears et al., 2008).

**Maltreatment type.** Child neglect accounts for the majority of maltreatment cases (National Research Council, 1993; U.S. Department of Health and Human Services, 2005, 2007, 2010). In the 2009 Federal Fiscal Year (FFY), 78.3% of substantiated child maltreatment victims suffered neglect (U.S. Department of Health and Human Services, 2010). Medical neglect accounted for 2.4% of child maltreatment reports. Physical maltreatment accounted for 17.8% of victims in FFY 2009. Sexual maltreatment accounted for 9.5% of victims. Psychological maltreatment accounted for 7.6% of child maltreatment reports (U.S. Department of Health and Human Services, 2010). Other types of maltreatment such as “abandonment,” “threats of harm to the child,” “congenital drug addiction,” or other forms of maltreatment accounted for 9.6% of child maltreatment reports (U.S. Department of Health and Human Services, 2010). An estimated 18.3% of child maltreatment victims were at risk for exposure to intimate partner violence (U.S. Department of Health and Human Services, 2010).

**Age.** Children from birth to age 1 year had the highest rate of victimization (20/1000). Children from birth to age 3 years accounted for over 80% of child maltreatment-related fatalities. More than 56% of all child maltreatment victims were under age 7 years (U.S. Department of Health and Human Services, 2010). Physical maltreatment rates peak at age 4-8 years and then decline with age. Psychological maltreatment rates peak at age 6-8 years and remain stable through adolescence (Kaplan, Pelcovitz, & Labruna, 1999).

**Gender.** Child maltreatment victims are equally female and male (U.S. Department of Health and Human Services, 2010) and minimal gender differences exist across most maltreatment types (Azar & Wolfe, 2006). Maltreated siblings reported similar types and levels of maltreatment, but male siblings reported slightly more neglect than their female siblings (Hines, Kantor, & Holt, 2006). Boys may also be at slightly increased risk for physical maltreatment (Faust, Chapman, & Stewart, 2008; Hines et al., 2006; U.S. Department of Health and Human Services, 2010). Girls are 1.5-5.0 times more likely than boys to be sexually maltreated (Faust et al., 2008; U.S. Department of Health and Human Services, 2010; Wolfe, 2006) and this gender difference may increase with age (Kaplan et al., 1999). Retrospective studies of child sexual maltreatment in the United States, however, indicate that sexual maltreatment is significantly underreported in boys and girls (Wolfe, 2006).

**Ethnicity.** Maltreatment victims were largely Caucasian or European American (44.0%), African American (22.3%), and Hispanic (20.7%). Population prevalence rates of maltreatment per 1,000 children differed for African American (15.1), multiracial (12.4), American Indian or Alaskan Native (11.6), Pacific Islander (11.3), Hispanic (8.7),

white (7.8), and Asian (2.0) youths (U.S. Department of Health and Human Services, 2010). African American, American Indian/Alaskan Native, and Hispanic children are disproportionately represented in protective services, welfare, and foster care systems. This overrepresentation may result from actual differences in maltreatment rates associated with poverty, family substance abuse or mental health problems, community violence, or racial biases in reporting and substantiating cases (Carter, 2010; Westby, 2007).

**Disability status.** Some child maltreatment victims (11%) reportedly had a disability. Disability status was defined as mental retardation, learning disability, emotional disturbance, behavioral problem, visual or hearing impairment, physical disability, or medical problem. Nearly 3% of victims had behavior problems, 2.1 % were emotionally disturbed, and 3.5% had a medical condition. Children with disability are likely undercounted, however, because not all children receive adequate clinical diagnostic assessment (U.S. Department of Health and Human Services, 2010).

**Family factors.** More than 20% of maltreated children lived with a single parent and 13% lived with both parents of unknown marital status. An additional 12% lived with married parents or a married parent and stepparent. Only 3% lived with unmarried parents (U.S. Department of Health and Human Services, 2007).

Substantiated child maltreatment varied as a function of multiple family characteristics, including parent employment, family socioeconomic status, family structure and living arrangement, grandparent caregivers, and family size (Sedlak et al., 2010). Children of unemployed parents were twice as likely to experience physical maltreatment and three times as likely to experience neglect. Children in low



socioeconomic status households experienced maltreatment at more than 5 times the rate of other children. These children were more than 3 times as likely to be physically maltreated and approximately 7 times as likely to be neglected.

Children living with their married biological parents had the lowest rate of maltreatment (U.S. Department of Health and Human Services, 2007). Children living with a single parent with a cohabiting partner experienced the highest rates of maltreatment (10 times the rate of physical maltreatment; 8 times the rate of neglect). Children whose grandparent(s) cared for them had lower rates of physical maltreatment than those with no identified grandparent caregiver. Child maltreatment incidence rates were highest in families with 4+ children, intermediate for “only” children, and lowest for children with only one sibling in the home. Parental trauma recovery, parental substance misuse, qualitative features of the parent-child relationship, and family stress also influence child maltreatment severity (Sprang, Clark, & Bass, 2005).

### **Child Maltreatment, Co-occurring Problems, and Short-Term Outcomes**

Maltreated children frequently display maladaptive behaviors and negative developmental outcomes. About 50% of children who experience maltreatment develop clinically significant cognitive, behavioral, and/or emotional problems (Azar & Wolfe, 2006; Zielinski & Bradshaw, 2006), and chronically maltreated children exhibit more emotional and behavioral problems than other maltreated children and non-maltreated children (Éthier, Lemelin, & Lacharite, 2004). Common psychological consequences of maltreatment are discussed next.

**Internalizing behaviors.** Child maltreatment has been linked to internalizing behaviors such as excessive anxiety, depression, dissociation, cognitive distortions, and

anger (Danielson, De Arellano, Kilpatrick, Saunders & Resnick, 2005; Kaplow & Widom, 2007; Putnam, 2003; van der Kolk, 2005). Internalizing behaviors are especially present in sexually and physically maltreated young children (Pears et al., 2008).

Clinically significant depression is approximately 10 times higher in maltreated than non-maltreated peers (Cohen, Brown, & Smailes, 2001). Elevated depression rates have been reported for maltreated female (19.3%) and male (20.8%) adolescents (Wolfe et al., 2001). Sexual maltreatment is associated with suicidality and feelings of hopelessness (Bergen, Marin, Richardson, Allison, & Roeger, 2003). Physical maltreatment history has also been found to moderate response to intervention for depression (Shamseddeen et al., 2011).

Pathological dissociation is common among maltreated youth (Becker-Lausen et al., 1996; Chu & Dill, 1990, Collin-Vézina & Hébert, 2005; Putnam, 2003; Putnam, Helmers, Horowitz & Trickett, 1995; Putnam, Horenstein, & Peterson, 1996; Ross, 1996; Silberg, 2000; Walker, 2009). Early childhood dissociation is normal and non-maltreated preschoolers become less dissociative over time, but maltreated children display consistent or increasing rates of dissociation over time (Macfie, Cicchetti, & Toth, 2001). A 19-year longitudinal study of dissociation in children of high-risk families revealed prevalence rates of 10-13% for clinically significant dissociation (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997). Problematic dissociation ranges from 15.2-20.4% in maltreated adolescents (Wolfe et al., 2001), with girls at greater risk for dissociative disorders than boys (Coons, 1996; Putnam et al., 1996).

Clinically significant anxiety disorders, including posttraumatic stress disorder, are common in maltreated youth. Child maltreatment before age 4 years significantly

predicts later childhood anxiety (Thompson & Tabone, 2010). The rate of anxiety disorders ranges from 2.4-18.6% in adolescents and young adults with maltreatment history (Kaplow & Widom, 2007; Scott, Smith, & Ellis, 2010; Wolfe et al., 2001). Anxiety disorder prevalence is as high as 18.6% among maltreated adolescent females and 11.8% among maltreated adolescent males (Wolfe et al., 2001).

Other internalizing problems in maltreated youth include maladaptive cognitions, anger, and hypervigilance. Child maltreatment, particularly physical maltreatment, may lead to hypervigilance, hostile attributional bias, and social processing deficits (Lee & Hoaken, 2007). Significant levels of internalized anger have been reported for maltreated female (7.1%) and male (6.2%) adolescents (Wolfe et al., 2001). Male victims of child sexual maltreatment may experience greater internalized anger than females (Tyler, 2002).

**Externalizing behaviors.** Externalizing problems such as oppositional defiant and conduct disorder may be most common and severe in youth who experience multiple forms of maltreatment (Pears et al., 2008). Commonly reported behavior problems include aggression, criminal activity, impulsivity, self-harming behaviors, substance abuse, and eating disorders (Bergen et al., 2003; Cohen, Brown, et al., 2001; Haugaard, 2003; 2004a; Johnson et al., 2002; Kaufman, 2008; Thompson et al., 2003; Veltman & Browne, 2001).

Physical maltreatment appears to be a consistent predictor of violent behaviors in children and adolescents (Maas, Herrenkohl & Sousa, 2008). Wolfe and colleagues (2001) reported rates of violent (16%) activity for maltreated adolescents. High rates of coercion as well as physical and sexual aggression and victimization occur in adolescent

dating relationships where one or both partners previously experienced maltreatment. Wolfe and colleagues (2001) found that 36.6% of males and 28.2% of females were violent toward dating partners.

Substance abuse is also common among sexually maltreated youth, who are approximately 5 times more likely than non-maltreated peers to abuse alcohol or other substances (Cohen, Gottlieb, & Underwood, 2001). Alcohol abuse/dependence (55.2%) and substance abuse/dependence (37.0%) are prevalent among previously maltreated youth (Kaplow & Widom, 2007).

**Cognitive and academic problems.** Victims of child maltreatment frequently exhibit delays or impairment in neuropsychological functioning, executive functioning, visuospatial functioning, language development, and memory (Goodman, Quas, & Ogle, 2010; Nolin & Éthier, 2007; Pears & Fisher, 2005). Cognitive difficulties across domains are positively associated with neglect, multiple forms of maltreatment, longer length of maltreatment, and younger age at time of maltreatment (Pears & Fisher, 2005). Maltreated children are overrepresented in special education programs (Burley & Halpern, 2001; Stone, 2007). One large scale study of children placed in foster care found that the average IQ for children aged 6+ years was 88, almost one standard deviation below the mean (Evans, 2001).

Child maltreatment and subsequent placement in foster care have been linked to academic variables such as lower grades and performance on standardized tests as well as increased rates of grade retention, absenteeism, and dropout (Evans, 2001, 2004; Kaplow & Widom, 2007; Stone, 2007; Trickett & McBride-Chang, 1996). Profound early or ongoing child neglect and/or multiple forms of maltreatment result in severe academic

and cognitive problems (De Bellis, Hooper, Woolley, & Shenk, 2010; Evans, 2001; Kendall-Tackett & Eckenrode, 1997). Physical maltreatment with or without neglect has also been linked to lower cognitive functioning (Pears et al., 2008), though sexual maltreatment is associated with less severe academic problems (Stone, 2007). Placement instability and frequent transitions regarding foster care are also associated with increased academic problems (Stone, 2007).

### **Child Maltreatment and Long-term Outcomes.**

Child maltreatment is linked to adult borderline and antisocial personality disorder (Allen, 2008; Cohen, Brown, et al., 2001; Fitzpatrick et al., 2010; MacMillan & Munn, 2001). Multiple maltreatment types, severe sexual maltreatment, psychological maltreatment, and earlier age of maltreatment, along with poor ego resiliency, ego control, and self-regulation may result in later personality disorder features and/or diagnosis (Allen, 2008; Kim, Cicchetti, Rogosch, & Manly, 2009). Childhood physical maltreatment, sexual maltreatment, and neglect are associated with a significantly increased risk of medical problems such as lung disease, peptic ulcer, arthritic disorders, cardiac disease, diabetes, autoimmune disorders, gastrointestinal health, gynecologic or reproductive health, pain, cardiopulmonary symptoms, and obesity (Goodwin & Stein, 2004; Irish, Kobayashi, & Delahanty, 2010; Palaszynski & Nemeroff, 2009).

Childhood maltreatment is closely associated with subsequent interpersonal and family violence. Men and women maltreated as children engage in more intimate partner violence in adolescence, young adulthood, and later adulthood (Huefner, Ringle, Chmelka, & Ingram, 2007; Wolfe et al., 2001; Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004). Women with a history of child maltreatment are at increased risk for re-

victimization via rape, intimate partner violence, and other interpersonal relationship difficulties (DiLillo, Lewis, & Di Loreto-Colgan, 2007; Messman-Moore, & Brown, 2004). Between 30-70% of child maltreatment victims later abuse their offspring (Berlin, Appleyard, & Dodge, 2011; Cort, Toth, Cerulli, & Rogosch, 2011; Green, 1998; Kaufman & Zigler, 1987; 1989; Kim, 2009; Moehler, Biringen, & Poustka, 2007; Oliver, 1993). Childhood maltreatment has also been linked to systematic problems, including increased rates of unemployment, poverty, homelessness, and reliance on Medicaid (Kaplow & Widom, 2007; Stein, Burden, Leslie, & Nyamathi, 2002; Zielinski, 2009).

Child maltreatment thus contributes to considerable psychological problems. Posttraumatic stress disorder is a psychological problem frequently associated with child maltreatment. The main focus of this paper is the relationship between maltreatment and posttraumatic stress disorder in youth. This disorder is thus briefly described next.

### **Posttraumatic Stress Disorder**

Posttraumatic Stress Disorder (PTSD) is an anxiety disorder featuring characteristic symptoms following exposure to a traumatic stressor (APA, 2000). The DSM-IV-TR outlines six main PTSD symptom categories (Table 1).

Table 1

*PTSD Diagnostic Criteria with Symptom Presentation in Children*

Criteria	Symptom Description	Symptom Presentation in Children
A. Trauma (Both)	Experience or witness event involving personal injury, threats to self-integrity, threatened injury or death  Feelings of uncontrollability and extreme fear during the event	
B. Re-experiencing (1+ symptoms)	Recurrent and intrusive distressing trauma recollections including images, thoughts, or perceptions  Recurrent distressing trauma-related dreams  Acting or feeling as if the trauma event were recurring (e.g., flashbacks)  Psychological distress when exposed to internal or external trauma cues  Physiological reactivity when exposed to trauma cues	Repetitive play expressing themes or aspects of the trauma  Recurrent frightening dreams with or without recognizable content  Trauma-specific reenactment
C. Avoidance & Numbing (3+ symptoms)	Avoidance of trauma-related thoughts, feelings, conversations  Avoidance of trauma-related activities/places/people  Forgetting all/entire trauma  Loss of interest in activities  Detachment from others  Affect restriction  Sense of a foreshortened future	Child loss of interest reported by parents/caregivers/teachers  Child affect restriction reported by parents/caregivers/teachers  Belief that he/she will never reach adulthood  Omen formation or belief in ability to see future untoward events
D. Arousal (2+ symptoms)	Sleep problems  Anger modulation problems  Concentration problems  Hypervigilance  Enhanced startle response	Somatic complaints (i.e. stomachaches, headaches)
E. Symptom Duration	1 month minimum	
F. Impairment	Impairment in social, family, and/or occupational functioning	

*Note.* From “*Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision*,” by American Psychiatric Association, 2000, p. 463-468.

One must experience or witness an event involving actual or threatened death, serious injury, or threat to physical integrity; or learn about the unexpected or violent death, serious injury, or threat of death or injury to a close relation (criterion A1), and must respond to the event with intense fear, helplessness, or horror (criterion A2). DSM definitions of criterion A have evolved over time. In 1980 and 1987, the event had to be “outside the range of usual human experience” (APA, 2000). The DSM-IV allowed for more common events to be considered but stated the events had to be extreme. The DSM-IV addition of criterion A2, the emotional response, has been empirically supported (Carrion, Weems, Ray, & Reiss, 2002; Pfefferbaum, 2005).

Criterion B symptoms of PTSD include persistent re-experiencing of the traumatic event. These re-experiencing and intrusive symptoms represent classically conditioned responses (De Bellis & Van Dillen, 2005). A traumatic reminder, or conditioned stimulus, activates distressing memories of the traumatic event. These memories may take the form of nightmares, dissociative flashback episodes, psychological distress, and physiological arousal or discomfort.

Criterion C symptoms are characterized by persistent avoidance of stimuli associated with trauma and numbing of general responsiveness. These symptoms include attempts to avoid thoughts, emotions, conversations, activities, places, people, and memories associated with trauma, and may include amnesia for trauma, diminished interest, detached feelings, restricted affect, and foreshortened future. Criterion C symptoms may be coping strategies to control distress caused by re-experiencing symptoms.



Criterion D includes symptoms of heightened physiological arousal. These symptoms may include difficulty falling asleep or staying asleep, irritability and anger, difficulty concentrating, hypervigilance, and exaggerated startle response. PTSD symptoms must be present for at least one month (Criterion E). PTSD symptoms must cause clinically significant distress or impairment in functioning (Criterion F) (APA, 2000).

### **Diagnostic Considerations in Children**

PTSD is more commonly diagnosed in older children and adolescents than in young children (Copeland, Keller, Angold, & Costello, 2007). Youth may express different types of posttraumatic symptoms depending on age (Table 1). Younger children tend to display more avoidance symptoms and older children tend to exhibit greater re-experiencing and hyperarousal (Lonigan et al., 2003; Terr, 1994). Younger children may exhibit more severe symptoms because older children have better coping skills, social support, and emotional regulation. Younger children may also be influenced by parent response to trauma (Lonigan et al., 2003). Young children whose parents respond adaptively may be more resilient, while children whose parents engage in maladaptive behaviors may be at greater risk for PTSD. PTSD-related symptoms in young children tend to be persistent (Scheeringa, 2006; Scheeringa, Zeanah, Myers, & Putnam, 2003, 2005; Yule, 2001). Meta-analyses indicate that older children and adults respond similarly to trauma (Fletcher, 1996; Fletcher, 2003; Meiser-Stedman, 2003).

The DSM-IV-TR specifies that children's intrusive criterion B symptoms may be part of repetitive play, trauma-specific reenactments, or compulsive rituals (APA, 2000). Children may also be unable to verbally express avoidant or numbing symptoms.

Children may instead show age-appropriate symptoms such as reduced interest in normal activities, detachment from others, and reduced expression of positive emotions such as happiness. Arousal symptoms may be expressed as somatic complaints such as headache and stomachache (APA, 2000).

### **Prevalence**

More than two-thirds of children experience at least one traumatic event by age 16 years (Copeland et al., 2007; MacDonald et al., 2010). Trauma events most frequently linked to PTSD in children and adolescents include violent death of a loved one, rape, coercion, and exposure to physical violence (Copeland et al., 2007; De Bellis & Van Dillen, 2005). Caregiver loss, war-related experiences and terrorist attacks, natural disasters, and torture also produce high rates of PTSD in youth (Daud, af Klinteberg, & Rydelius, 2008; Hasanovic, Sinanovic, Selimbasic, Pajevic, & Avdibegovic, 2006; Mullett-Hume, Anshel, Guevara, & Cloitre, 2008; Pina et al., 2008). Exposure to multiple traumatic events leads to more severe posttraumatic symptoms (MacDonald et al., 2010; Suliman et al., 2009), and higher rates of PTSD are generally associated with trauma exposure at a young age (Keane, Marshall, & Taft, 2006; Luthra et al., 2009; MacDonald et al., 2010).

The prevalence rate of PTSD in preschool children has not been adequately studied (Costello, Egger, & Angold, 2005) but has been reported as 0.1% (De Bellis & Van Dillen, 2005). This low rate may be due to difficulty detecting symptoms in children under age 4 years (De Bellis & Van Dillen, 2005) or because PTSD symptoms are misinterpreted as general anxiety symptoms (Costello et al., 2005). PTSD prevalence among children aged 9-12 years is 0.5-2.6% (Costello et al., 2005). PTSD prevalence

among older children and adolescents ranges from 0.7-6.0% and more closely reflects adult prevalence (Costello et al., 2005; Gabbay, Oatis, Silva, & Hirsch, 2004).

PTSD prevalence rates following non-maltreatment-related childhood trauma (e.g., automobile accidents, medical illness, natural disasters, war) range from 3-90% (Gabbay et al., 2004; Salmon & Bryant, 2002; Yehuda, Spertus, & Golier, 2001). PTSD prevalence rates in maltreated children range from 20-63% (Ackerman, Newton, McPherson, Jones, & Dykman, 1998; Gabbay et al., 2004; Merry & Andrews, 1994; Salmon & Bryant, 2002; Yehuda et al., 2001).

### **Gender Differences**

Girls consistently report greater PTSD symptoms following trauma exposure than boys, and this gender difference may increase with age. This may be explained by girls' heightened exposure to interpersonally traumatic events such as rape, sexual assault, and sexual maltreatment (Lonigan et al., 2003). Rates of PTSD were higher for girls (0.7%) than boys (0.1%) in a national longitudinal sample (Copeland et al., 2007). Adolescent PTSD prevalence rates for a national household probability sample were 3.7% for boys and 6.3% for girls (Kilpatrick et al., 2003). By adulthood, females are 2-5 times as likely as males to be diagnosed with PTSD (Davis & Siegel, 2000; Keane et al., 2006; Kessler, Berlund, Demler, Jin, & Walters, 2005; Kessler, Chiu, Demler, & Walters, 2005; Kessler, Sonnega, Bromet, & Hughes, 1995) even when controlling for differences in exposure (Kimerling, Ouimette, & Weitlauf, 2007; Pratchett, Pelcovitz, & Yehuda, 2010).

### **Ethnic Differences**

Relatively few studies have focused on traumatic exposure and/or posttraumatic symptoms among ethnic and racial minorities (Triffleman & Pole, 2010). Ethnic

minority youth in the U.S. are likely at increased risk for exposure to trauma events (Kilpatrick et al., 2003). Ethnic minority youth reportedly display higher rates of PTSD because of greater exposure to racism and community, racial, school, and other violence (Kearney et al., 2010; Khaylis, Waelde, & Bruce, 2007; Sanchez-Hucles, 1998; Zyromski, 2007). African Americans, Native Americans, and Hispanics report higher rates of ongoing trauma exposure such as child maltreatment and witnessing intimate partner violence than European Americans (Roberts, Gilman, Breslau, Breslau & Koenen, 2011; Stephens et al., 2010; Triffleman & Pole, 2010). Racism may place youth at risk for trauma exposure, may exacerbate the psychological impact of other traumas, or may be considered trauma itself. Ethnic minority youth may be at increased risk for PTSD following trauma exposure due to fewer resiliency factors or limited access to treatment (Ford, 2008). PTSD symptom presentation may also vary with ethnicity, race, and culture, and ethnic minority status may be closely correlated with re-experiencing and avoidance symptoms in maltreated youth (Rossman & Ho, 2000).

Reports are mixed regarding rates and severity of PTSD in youth across ethnic groups. Some suggest that ethnic minority children are at greater risk for developing PTSD symptoms following exposure, but other studies indicate that European American children are at higher risk (Lonigan et al., 2003). The few studies that examine ethnicity are limited by low sample size. Other studies include race or ethnicity but do not provide multiracial or other category options. The present study addressed this deficiency by assessing trauma exposure, PTSD, and PTSD-related symptoms in a large sample of ethnically diverse maltreated adolescents. The study also evaluated the applicability of

the Lemos-Miller and Kearney model of PTSD in maltreated youth among African American, European American, Hispanic, and multiracial youths.

### **Disability Status**

Individuals with cognitive and/or developmental disabilities may display PTSD at higher rates than peers without disabilities (Brackenridge & Morrissey, 2010; Mevissen & de Jongh, 2010). Interpretation of distressing experiences and expression of symptoms likely differ in individuals with disabilities compared to the general population (Mevissen & de Jongh, 2010). Preliminary work with adults and youth indicates that PTSD symptom presentation may be influenced by cognitive disability and communication skills (Mitchell & Clegg, 2005; Turk, Robbins, & Woodhead, 2005). Symptoms may be more exaggerated in individuals with cognitive disabilities (Mehtar & Mukaddes, 2011; Mitchell & Clegg, 2005). The paucity of research literature regarding this population, however, suggests that PTSD is frequently overlooked in individuals with cognitive and/or developmental disabilities (Turk et al., 2005). PTSD in youth with physical disabilities is similarly understudied, though emerging research indicates significantly increased risk for PTSD following traumatic brain injury (Iselin, Le Brocque, Kenardy, Anderson, & McKinlay, 2010).

### **Familial Factors and Intergenerational Trauma**

Low socioeconomic status, poverty, and homelessness are associated with higher rates of PTSD in youth (Read, Ouimette, White, Colder, & Farrow, 2011; Springer & Padgett, 2000). High levels of family conflict and poor parental support, in the presence or absence of maltreatment, may place youth at increased risk for PTSD following trauma (Bokszczanin, 2008). Youth exposure to intimate partner violence reflects elevated

family conflict and is highly correlated with posttraumatic symptoms (Carpenter & Stacks, 2009; Lehmann 2000; Margolin & Gordis, 2000).

Youth whose parents have experienced extreme and ongoing trauma have high rates of PTSD and emotionally reactive behavior (Nomura & Chemtob, 2009; Yehuda & Bierer, 2008; Yehuda et al., 2005; Yehuda, Halligan, & Bierer, 2002). Evidence supports the intergenerational transmission of PTSD in families of World War II, Vietnam, Iraq and Afghanistan war veterans (Dekel & Goldblatt, 2008; Pearrow & Cosgrove, 2009), in first, second, and third generation families of Holocaust survivors (Lev-Wiesel, 2007), and families of survivors of discrete and chronic interpersonal violence including child maltreatment (Frazier, West-Olatunji, Juste, & Goodman, 2009). Various mechanisms have been implicated in intergenerational or transgenerational trauma (Dass-Brailsford, 2007), including (auto)biographical narrative, biological heredity, difficulty with early attachment and bonding, general quality of the parent-child relationship, and negligent parenting (Dass-Brailsford, 2007; Frazier et al., 2009; Schwerdtfeger & Goff, 2007).

### **Comorbidity of PTSD in Youth**

PTSD in youth is highly comorbid with other anxiety disorders, mood disorders, and attention deficit hyperactivity disorder. In adolescents and young adults, PTSD comorbidity frequently includes psychotic disorders, substance abuse and dependence, other risk-related behaviors including HIV-risk behaviors, and suicidal ideation (Davis & Siegel, 2000; Reed, Anthony, & Breslau, 2007; Stevens, Murphy, & McKnight, 2003). Children and adolescents with posttraumatic symptoms show more general internalizing problems, anxiety, depression, social withdrawal, somatic complaints, delinquent and aggressive behavior, and social, thought, memory and attention problems than peers

without posttraumatic symptoms (Gellman & Delucia-Waack, 2006; Goodman et al., 2010; Kearney et al., 2010; Saigh, Yasik, Oberfield, Halamandaris, & McHugh, 2002).

### **PTSD and Child Maltreatment: Epidemiology**

The following section summarizes epidemiological findings regarding child maltreatment with PTSD. Child maltreatment is a particularly salient trauma for PTSD because it may involve physical violence, invasive contact such as sexual molestation and/or sexual penetration, coercion by caregivers, separation from family members, poor support from a non-abusive family member, early age of onset, and extended duration. These risk factors are exacerbated by disruptive family dynamics, parental mental health problems and substance abuse, and poverty (Davis & Siegel, 2000; Kearney et al., 2010; Koenen et al., 2007). The same factors that place a child at risk for maltreatment also influence risk and resiliency with respect to PTSD following maltreatment.

### **Trauma Type**

Rates of PTSD in maltreated children are substantially higher than rates of PTSD in the general population (Pecora, White, Jackson, & Wiggins, 2009). Many youth (11.7%) referred to child protective service agencies for maltreatment reported clinically significant posttraumatic symptoms regardless of maltreatment type. Youth later placed in out-of-home care reported notably higher (19.2%) posttraumatic stress rates (Kolko et al., 2010). PTSD rates among maltreated youth are above 20% and as high as 90% in clinical populations depending on maltreatment type (Ackerman et al., 1998; Carpenter & Stacks, 2009; Dykman et al., 1997; Gabbay et al., 2004; Kearney et al., 2010; Lehmann, 2000; Margolin & Gordis, 2000; Merry & Andrews, 1994; Salmon & Bryant, 2002; Yehuda et al., 2001).

**Neglect and PTSD.** Few studies directly examine PTSD in neglected children (De Bellis, 2001, 2005; De Bellis & Van Dillen, 2005; Dubowitz, 2007; McSherry, 2007; Wechsler-Zimring & Kearney, 2011; Wolock & Horowitz, 1985). Neglect itself may constitute a traumatic stressor through failure to fulfill basic needs that results in fear, helplessness, or horror or through traumatic separation from a parent or caregiver (De Bellis, 2001; Hoksbergen et al., 2003). Neglect may also lead to other trauma exposure because a neglected child may experience traumatic accidents and witness domestic, interpersonal, and community violence (Antle et al., 2007; De Bellis, 2001; McSherry, 2007).

Neglected preschoolers displayed more PTSD and dissociative symptoms than non-neglected preschoolers based on teacher report (Milot, St-Laurent, Éthier, & Provost, 2010). Mother-child communication quality also appeared to be lower in neglectful families and predicted teacher-reported child trauma symptomatology (Milot, St-Laurent, et al., 2010). Extreme physical and psychological neglect in infancy and early childhood was associated with persistent PTSD and comorbid internalizing and externalizing behaviors in some (20%) Romanian orphans adopted into Dutch families (Hoksbergen et al., 2003).

Wechsler-Zimring and Kearney (2011) compared PTSD symptoms in 84 ethnically diverse adolescents who experienced neglect only, physical and/or sexual maltreatment only, or neglect with physical and/or sexual maltreatment. Adolescents with a history of neglect reported similar rates of trauma event exposure, but lower PTSD and trauma-related symptoms, than adolescents who experienced other types of maltreatment. PTSD rates were significant across neglected only (81.9%), physically or



sexually maltreated (90.0%), and physically and/or sexually maltreated and neglected (96.8%) adolescents.

**Physical maltreatment and PTSD.** Kearney and colleagues (2010) reported that up to 50% of physically maltreated youth experience clinically significant levels of PTSD. Child physical maltreatment with or without other types of maltreatment is a strong predictor of child and adolescent PTSD as well as other trauma-related symptoms (Ackerman et al., 1998). The traumatic effects of physical maltreatment increase with additional maltreatment, particularly neglect and sexual maltreatment (Arata, Langhinrichsen-Rohling, Bowers, & O'Farrill-Swails, 2005).

**Sexual maltreatment and PTSD.** PTSD rates in sexually maltreated youth range from 21-50% in non-clinical populations and 42-90% in clinical populations (Kearney et al., 2010). A meta-analysis of 37 studies examining the effects of child sexual maltreatment revealed substantial effect sizes (.50 unweighted, .40 weighted) for PTSD (Oddone Paolucci, Genius, & Violato, 2001). PTSD appears to be the most commonly diagnosed disorder in child sexual maltreatment victims worldwide (Ozbaran et al., 2009).

Dykman and colleagues (1997) concluded that boys who experience sexual maltreatment exhibit more behavior and psychiatric problems, including higher rates of PTSD, than girls who experience sexual maltreatment. Evidence from a large longitudinal study, however, suggests that rates of PTSD in youth who have been sexually maltreated do not differ by gender (Maikovich, Koenen, & Jaffee, 2009). Sexually maltreated youth report greater frequency of and distress from re-experiencing, avoidance, and hyperarousal symptoms of PTSD than physically maltreated youth.

PTSD symptoms may also be more persistent in sexually maltreated than otherwise maltreated youth (Maikovich et al., 2009).

**Psychological maltreatment and PTSD.** Psychological maltreatment rarely occurs alone, and research regarding prevalence rates in this maltreatment group is lacking. Kaplan, Pelcovitz, and Labruna (1999) concluded that psychological maltreatment has a greater impact on child psychological functioning than physical and sexual maltreatment. Sullivan and colleagues (2006) examined adolescent inpatients and found that psychological maltreatment predicted all aspects of PTSD symptomatology.

**Exposure to intimate partner violence and PTSD.** Exposure to intimate partner violence is increasingly recognized by child protective service agencies, clinicians, and researchers as a discrete form of child maltreatment (Carpenter & Stacks, 2009).

Witnessing intimate partner violence may constitute a traumatic event and have significant negative effects on children's development and their relationships with caregivers (Carpenter & Stacks, 2009; Lang & Stover, 2008; Pepler, Catallo, & Moore, 2000). In a large-scale nationally representative sample of youth referred to child protective services, witnessing violence in the home was associated with elevated PTSD symptom severity (Kolko et al., 2010).

Infants as young as age 1 year may experience trauma symptoms from hearing or witnessing intimate partner violence (Bogat, De Jonghe, Levendosky, Davidson, & von Eye, 2006). Some (3-24%) children aged 3-5 years exposed to past or ongoing intimate partner violence met full diagnostic criteria for PTSD and all experienced at least one trauma-related symptom (Levendosky, Huth-Bocks, Semel, & Shapiro, 2002). Lang and Stover (2008) found that over 10% of children living in homes where police were

dispatched due to an intimate partner violence incident endorsed symptoms consistent with acute PTSD. International studies also indicate that exposure to violence in the home contributes to PTSD (Catani et al., 2009; Kinzie, Cheng, Tsai, & Riley, 2006).

Children residing in domestic violence shelters with their mothers may be at elevated risk for PTSD due to the severity of intimate partner violence and the subsequent disruption to the living environment. PTSD rates range from 15-60% with significant elevations in distressing thoughts, conscious avoidance, hypervigilance, and sleep difficulties related to PTSD (Jarvis, Gordon, & Novaco, 2005; McCloskey & Walker, 2000; Mertin & Mohr, 2002). Symptom severity is associated with frequency and duration of intimate partner violence exposure, but not with co-occurring child maltreatment (Jarvis et al., 2005; Kilpatrick & Williams, 1998). These findings indicate that child exposure to intimate partner violence may be a particularly traumatic event with a severe and long-term impact on child witnesses.

**Multiple-type child maltreatment and PTSD.** PTSD may be most prevalent in youth who experience multiple types and longer duration of maltreatment (Carrion et al., 2002; Kolko, Brown, & Berliner, 2002; Romero et al., 2009; Tyler, 2002). MacDonald and colleagues (2010) investigated the impact of multiple exposures to potentially traumatic events (i.e., sexual victimization, physical victimization, and witnessed violence) on PTSD, major depressive episodes, and substance use disorders in adolescents exposed to at least one potentially traumatic event. Participants included 4,023 youth aged 12-17 years from the National Survey of Adolescents. Risk for negative sequelae increased substantially with number of potentially traumatic events (MacDonald et al., 2010).

## **Individual Factors in Child Maltreatment and PTSD Epidemiology**

**Age.** Earlier age of onset of neglect or sexual, physical, or multiple-type maltreatment is significantly related to later PTSD symptoms (De Bellis, 2005; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Kolko et al., 2010; Pfefferbaum, 2005). The importance of age may be a function of trauma exposure frequency. When maltreatment begins at an early age, youth are exposed to a greater number of trauma events, and often a greater number of maltreatment types (Keane et al., 2006; Luthra et al., 2009; MacDonald et al., 2010; Suliman et al., 2009). Earlier age of maltreatment onset may lead to more severe disruption of psychobiological development (De Bellis, 2005; Lansford et al., 2002). Young maltreated and trauma exposed children may have fewer protective factors than older youth. By late adolescence, youth abused from an early age may exhibit greater psychopathology than youth abused later in life (Lansford et al., 2002). Adolescents also are more likely than young children to be diagnosed with PTSD (Costello et al., 2005; Gabbay et al., 2004).

In contrast, when maltreatment events are limited or occur later in life, older adolescents may have fewer PTSD symptoms than younger maltreated adolescents and children. McCutcheon and colleagues (2010) examined differences in risk as a function of age at trauma. Childhood sexual assault, physical abuse, and neglect were stronger predictors of PTSD onset than adolescent and early adult occurrence of these events. Early sexual assault was the strongest predictor of PTSD risk, but additional traumatic events increased risk beyond sexual assault.

**Gender.** PTSD is generally more common in females than males (Keane et al., 2006; Kessler, Chiu, et al., 2005) and many researchers believe this difference is due to

types of trauma exposure (Lonigan et al., 2003; Blain et al., 2010). Women and girls may experience trauma most closely related to PTSD symptoms, specifically interpersonal trauma (e.g. sexual assault or intimate partner violence). Men and boys, however, may be more likely to witness accidents, community violence, and war-related trauma associated with lower rates of PTSD. Boys who experience and report sexual maltreatment may be more likely to develop PTSD, depression, and other negative sequelae than girls who experience sexual maltreatment (Dykman et al., 1997; Elklit, 2002).

MacDonald and colleagues (2010) found that girls reportedly experienced 1–10 potentially traumatic events and that boys reportedly experienced 1–15 events. Girls were more likely than boys to be diagnosed with PTSD (11.3% and 6.3% respectively). PTSD and major depressive episode comorbidity was more common for girls (52%) than boys (36%), and PTSD and substance use disorder comorbidity was more common for boys (20%) than girls (6%). Twelve percent of boys and 22% of girls reported PTSD, major depressive episodes, and substance use disorder concurrently. Female gender was the most significant predictor of PTSD diagnosis and comorbid PTSD and depressive episodes.

PTSD symptom presentation may also differ by gender. Boys may exhibit more hyperarousal symptoms that resemble externalizing behaviors and may thus be diagnosed with oppositional defiant or attention deficit/hyperactivity disorder rather than, or in addition to, PTSD. Girls may be more open to seeking treatment and discussing symptoms and more likely to endorse PTSD-related intrusive thoughts, re-experiencing, and specific hyperarousal symptoms than boys. Boys and girls are thought to experience

similar levels of avoidance (Davis & Siegel, 2000; De Bellis & Van Dillen, 2005; Reebye, Moretti, Wiebe, & Lessard, 2000; Silva et al., 2000; Tolin & Foa, 2006; Walker, Carey, Mohr, Stein, & Seedat, 2004).

**Ethnicity.** As previously noted, rates of child maltreatment, traumatic event exposure, and PTSD are inconsistent across ethnic minority groups in the United States. Child maltreatment rates are disproportionately high for African American, Native American, and Hispanic children (Carter, 2010; Costello, Erkanli, Fairbank, & Angold, 2002; Westby, 2007). Ethnic minority youth may also be at greater risk for PTSD than European American youth (Kearney et al., 2010; Khaylis et al., 2007; Sanchez-Hucles, 1998; Zyromski, 2007). However, certain cultural and religious attitudes and beliefs commonly associated with minority ethnic groups may enhance resilience in youth and blunt some effects of maltreatment including PTSD (Bracey, Bamaca, & Umana-Taylor, 2004; Murry, Smith, & Hill, 2001; Phillips, 2004; Tummala-Narra, 2007). Research with adults indicates that PTSD and distress symptom expression may also vary according to ethnic and cultural norms (Roberts et al., 2011).

Sexually maltreated African American girls (8-13 years) reportedly have better psychological functioning than sexually maltreated Latino girls the same age (Phillips-Sanders, Moisan, Wadlington, Morgan, & English, 1995). However, Andres-Hyman and colleagues (2004) found that Hispanics reported less intrusive PTSD symptoms than African Americans and non-Hispanic Caucasians following sexual maltreatment. Higher rates of PTSD and depression have been reported in physically and sexually maltreated African American women than in Hispanic and Caucasian or European American women (Andres-Hyman, Cott, & Gold, 2004). Maltreated Latino children met criteria for

chronic PTSD (48.4%) and acute PTSD (34.5%). Spanish-speaking children were at greater risk for PTSD diagnosis than English-speaking children (Mennen, 2004).

Maltreated Native American adolescents reportedly have higher rates of PTSD diagnosis, but similar PTSD symptom patterns, than European American adolescents. Sexual violation or abuse was associated with the highest rates of PTSD (48.1%) regardless of ethnicity (Gnanadesikan, Novins, & Beals, 2005). Sexually maltreated Asian children may experience more suicidal ideation than African American or Hispanic children despite experiencing less intrusive types of sexual maltreatment (Rao, DiClemente, & Ponton, 1992).

Youth involved in the juvenile justice system report significant rates of child maltreatment, victimization, trauma, and PTSD. Incarcerated adolescents previously exposed to violence appear to have different PTSD rates by gender and ethnicity. PTSD rates have been reported for Hispanic males and females (19.6/16.9%), African Americans (9.2/14.7%), and non-Hispanic Whites (8.0/10.5%). Female adolescents report higher rates of PTSD and Hispanic females report the highest rates of PTSD (Abram et al., 2004).

Child maltreatment and PTSD is receiving increased attention internationally. Danish eighth-graders reported substantial direct and indirect exposure rates for physical abuse (3.6/7.7%), severe childhood neglect (3.1/5.6%), rape (1.8/4.9%), or sexual abuse (1.5/3.8%), among many other traumas. Consistent with the United States-based research previously discussed, PTSD rates were most substantial for those experiencing sexual maltreatment (female 60.0%; male 100.0%), physical maltreatment (female 37.5%; male 16.7%), severe childhood neglect (female 28.6%; male 0.0%), or rape (female 20.0%;

50.0% male). Males had higher rates of PTSD in the sexual abuse and rape group (Elklit, 2002).

Sebre and colleagues (2004) examined child maltreatment types and trauma symptoms in 1,145 youth (10-14 years) in several Eastern European countries. Rates of emotional and physical abuse were reported for Latvia (28.8/17.4%), Lithuania (33.3/26.0%), Macedonia (12.5/12.2%), and Moldova (32.1/29.7%). Trauma-related symptoms appear to be highest in countries where parental alcohol use is significantly related to child maltreatment.

Long-term outcomes of exposure to inter-parental violence and child physical maltreatment were examined in 1,924 college students in Taiwan. Inter-parental violence and child physical maltreatment were significantly associated, and 11.3% of participants reported both. Participants reported more trauma symptoms than peers who experienced only one form of violence or no violence. Subscribing to traditional Chinese views of fatalism and family harmony explained a substantial amount of variance regarding PTSD symptoms beyond violence and maltreatment (Shen, 2009).

A study of 1,110 Kenyan high school students (629 males, 481 females; aged 12-26 years) revealed a 50.5% prevalence rate for full PTSD and 34.8% for partial PTSD. Physical (23.2%) and sexual maltreatment (16.5%) rates were substantial. The majority of students (75%), regardless of PTSD diagnosis, experienced significant avoidance and re-experiencing symptoms, and over 50% of students reported hyperarousal symptoms. The number of reported traumatic events was positively correlated with PTSD (Ndeti et al., 2007).



Findings regarding child maltreatment and PTSD across ethnicity are limited and inconclusive. It remains unclear if certain ethnic groups are indeed at greater risk than others for PTSD. Some studies indicate no difference across ethnicities in PTSD symptoms following child maltreatment (Mennen, 1994; Mennen, 1995; Wyatt, 1990). This inconsistency likely results from limitations in the sample size and methods of previous studies. More research is needed to address the role of ethnicity in PTSD following child maltreatment. The present study addressed this deficiency by assessing trauma exposure, PTSD, and PTSD-related symptoms in a large sample of ethnically diverse maltreated adolescents.

### **Family Factors and Intergenerational Transmission of Maltreatment and PTSD**

Multiple family characteristics such as low socioeconomic status, parent unemployment, single parent households, and households with 4+ children are associated with increased risk for child maltreatment (Sedlak et al., 2010). Family socioeconomic status (low), poverty, and homelessness are also associated with higher rates of youth PTSD (Read et al., 2011; Springer & Padgett, 2000). These factors have not been examined with respect to maltreatment and PTSD concurrently, however. The present study helped address this deficiency by evaluating the mediating effects of family factors on maltreatment and PTSD.

Family conflict, cohesion, and support may relate to PTSD symptom severity in maltreated youth (Bevan & Higgins, 2002; Boksztzanin, 2008; Higgins & McCabe, 2000). Intimate partner violence is highly correlated with youth posttraumatic symptoms and indicates elevated family conflict (Carpenter & Stacks, 2009; Lehmann 2000; Margolin & Gordis, 2000). Family factors such as parental trauma recovery, parental

substance misuse, qualitative features of the parent-child relationship, and level of family stress have also been implicated in the severity of child maltreatment (Sprang et al., 2005) and likely contribute to posttraumatic responses. Offspring of parents abused as children and/or diagnosed with PTSD are at increased risk for child maltreatment and PTSD. Children of families with a history of maltreatment or PTSD may be at 2-6 times the risk for PTSD as children in other families (Dixon, Browne, & Hamilton-Giachritsis, 2005; Kim, 2009).

### **Social Support and Community-related Factors in Maltreatment and PTSD**

Social support enhances resiliency following child adversity and protects against psychological problems (Belsky, 1993; Bronfenbrenner, 1980; Cicchetti, 2004; Cicchetti & Toth, 2005; Freisthler, Merritt, & LaScala, 2006; Schumm, Briggs-Phillips, & Hobfoll, 2006; Westby, 2007; Zielinski & Bradshaw, 2006). Individuals who report a strong sense of community, strong social support networks, and access to social services are at lower risk for child maltreatment, anxiety disorders, depression, and PTSD (Cohen, Gottlieb, et al., 2001; Cohen, Underwood, & Gottlieb, 2000; Demaray & Malecki, 2002; Ostrander, Weinfurt, & Nay, 1998; White, Bruce, Farrell, & Kliewer, 1998). However, specific community and social support factors have not been directly addressed with respect to maltreatment and PTSD concurrently, with the sole exception of exposure to community violence.

Exposure to community violence is a significant predictor of PTSD among adolescents, particularly adolescents who also experience violence in the home (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). Prevalence rates have been reported for witnessed parental violence (9%) and witnessed community violence (38%)

among adolescents. Both forms of witnessed violence predicted PTSD and major depressive episode beyond variance accounted for by age, gender, race/ethnicity, income, and other traumatic event history. Repeated exposure to violence, location of the violence, adolescent relationship to the victim, and adolescent perception of threat were also related to psychiatric symptoms (Zinzow et al., 2009).

### **Other Populations**

Child maltreatment and PTSD rates are elevated in forensic populations. High rates of maltreatment but modest rates of PTSD (5.3%) were reported for court-referred children. Girls reported more frequent symptoms than boys (Brosky & Lally, 2004). Incarcerated youth exposed to one or more violent acts often meet criteria for PTSD (28% of boys and 52% of girls) (Wood, Foy, Layne, Pynoos, & James, 2002).

Adolescent female juvenile offenders consistently report high rates of sexual maltreatment (55-77%) and subsequent PTSD (33-37%) (Ariga et al., 2008; Dixon, Howie, & Starling, 2005). Male juvenile sex offenders have reported trauma exposure rates as high as 95% and PTSD rates of 65%. Most reported trauma events involve sexual or physical maltreatment (McMackin, Leisen, Cusack, LaFratta, & Litwin, 2002).

Homeless youth also report elevated rates of physical or sexual victimization (82.7%) and PTSD (17.7%) with significant avoidance and emotional numbing symptoms (Stewart et al., 2004). Gwadz and colleagues (2007) found that almost 86% of youth (aged 15-23 years) who were homeless or at risk for homelessness experienced at least one traumatic event, most commonly sexual trauma or physical assault. PTSD rates were relatively low; only 8.3% of females and no males met full diagnostic criteria, though most youth endorsed some symptoms in each PTSD symptom cluster.

Adolescents receiving treatment for alcohol and other substance use disorders frequently report trauma exposure history and PTSD. Hawke and colleagues (2009) reported considerable rates of maltreatment including sexual abuse (19%) or assault (36%), witnessed domestic violence (33%), or witnessed community violence (25%) among adolescent outpatients. Rates of partial or full PTSD for each trauma type were 42%, 42%, 33%, and 33%, respectively. Sexual abuse and high comorbid symptom severity were most predictive of PTSD symptoms (Hawke, Ford, Kaminer, & Burke, 2009).

HIV-positive youth report high rates of maltreatment, victimization, and trauma symptoms. Martinez, Hosek, and Carleton (2009) screened 174 HIV-positive youth aged 13-24 years and found substantial rates of physical abuse/assault (24% in childhood; 19% in adolescence), sexual abuse/assault (28% in childhood; 15% in adolescence), dating violence (18%), and family violence (44%). The most commonly diagnosed psychological disorder was PTSD (28%), followed by generalized anxiety disorder (17%) and major depressive disorders (15%). All forms of maltreatment were highly correlated with PTSD. Youth also reported substantial rates of alcohol and substance abuse disorders.

### **Summary of Findings Regarding Epidemiology of Child Maltreatment and PTSD**

Maltreated youth report significantly higher rates of PTSD than the general population (Pecora et al., 2009). PTSD prevalence rates vary with trauma type and PTSD is most common among individuals who have experienced multiple-type maltreatment and/or sexual maltreatment, followed by physical maltreatment (Kearney et al., 2010; MacDonald et al., 2010; Ozbaran et al., 2009). Research regarding PTSD following child

neglect, psychological maltreatment, and exposure to intimate partner violence is in its infancy, but these lesser-studied forms of maltreatment also likely contribute to PTSD in young victims (Carpenter & Stacks, 2009; Kaplan et al., 1999; Wechsler-Zimring & Kearney, 2011). Community violence is associated with elevated rates of child maltreatment and PTSD (Pina et al., 2008; Wagner et al., 2009).

Maltreatment and PTSD prevalence and symptom presentation also vary based on individual factors. Earlier age of trauma exposure, particularly maltreatment, is significantly related to later PTSD (De Bellis, 2005; English, Graham, et al., 2005; Kolko et al., 2010; Pfefferbaum, 2005). Female gender is associated with higher rates of PTSD following maltreatment or other trauma (Blain et al., 2010; Keane et al., 2006; Kessler, Berglund, et al., 2005; Kessler, Chiu, et al., 2005; Lonigan et al., 2003), though males may be at greater risk for PTSD following sexual maltreatment than previously thought (Dykman et al., 1997; Elklit, 2002). Research regarding race, ethnicity, and culture with respect to maltreatment and PTSD is growing rapidly, but few studies examine rates and phenomenology of maltreatment and PTSD across multiple ethnic groups. Ethnic minorities may report higher rates of maltreatment and PTSD than non-minority groups (Kearney et al., 2010; Khaylis et al., 2007; Sanchez-Hucles, 1998; Zyromski, 2007).

Family factors other than the intergenerational transmission of maltreatment and PTSD are also understudied. However, lower socioeconomic status, poor family cohesion, and elevated conflict are likely associated with higher rates of maltreatment and PTSD (Bevan & Higgins, 2002; Boksztzanin, 2008; Higgins & McCabe, 2000; Read et al., 2011; Springer & Padgett, 2000). Rates of maltreatment and PTSD are also substantial among homeless, substance abusing, and forensic populations.

These epidemiological findings underscore the intimate and complex relationship between child maltreatment and PTSD. Specific trauma types, individual, family, and community factors are all associated with varied rates of child maltreatment and PTSD. These findings provide preliminary evidence for specific risk and resiliency factors in the onset, development, and maintenance of PTSD in maltreated youth. However further research is needed to understand the specific contributions and importance of these risk and resiliency factors to youth outcomes. The present study contributes further evidence for the specific influence of age, gender, and ethnicity in an empirically-supported model of PTSD in maltreated youth. The study also examined the mediating effects of trauma history and family environment on child maltreatment and PTSD.

#### **PTSD and Child Maltreatment: Symptomatology, Comorbidity, and Outcomes**

Maltreated children with PTSD present with complex symptomatology and substantial rates of comorbidity. Clinical manifestations of childhood trauma, particularly maltreatment, may share symptoms with, or even warrant diagnoses of, major depressive and mood, dissociative, general anxiety, phobic, panic, attention deficit/hyperactivity, learning, cognitive, oppositional defiant, conduct, substance abuse, psychotic, and personality disorder (Avery, Massat, & Lundy, 2000; Ford, 2005; Kearney et al., 2010; Terr, 1994). Many symptoms of PTSD in maltreated youth such as impulsivity, distractibility, restlessness, labile mood, dysphoria, social withdrawal, and irritability mimic these disorders (Kearney et al., 2010). Comorbid symptoms in maltreated children and adolescents may complicate diagnosis and treatment of all symptoms, including those specific to PTSD (Ariga et al., 2008; Dixon et al., 2005; Ford

et al., 2000; Schumacher, Coffey, & Stasiewicz, 2006; Stevens et al., 2003; Titus, Dennis, White, Scott, & Funk, 2003; Weinstein, Staffelbach, & Biaggio, 2000).

PTSD symptoms may persist among maltreated youth because of the repetitive and abusive nature of the stressor (Arias, 2004; Cook et al., 2005; Fletcher, 2003). A 12-year longitudinal study of maltreated kindergarteners revealed significantly greater PTSD symptomatology at grade 11 compared to non-maltreated peers (Lansford et al., 2002). PTSD symptoms may also increase over time, particularly when trauma exposure persists. However, Famularo and colleagues (1996) found that only 32.7% of severely maltreated children continued to meet criteria for PTSD over 2 years when family services were provided.

### **Depression and Mood Disorders**

Maltreatment in early childhood often leads to depression, withdrawal, and self-destructive behaviors, possibly as a result of poor self-concept, self-esteem, and self-efficacy (Kim & Cicchetti, 2003, 2006; Kinard, 1998, Widom, DuMont, & Czaja, 2007) as well as guilt and shame (Stuewig & McCloskey, 2005). High rates of comorbidity exist between PTSD and depression in children and adults who experienced maltreatment (Allen & Tarnowski, 1989; Boney-McCoy & Finkelhor, 1996; Finzi et al, 2001; Fletcher, 1996). Depressive factors are also implicated in the onset and maintenance of trauma-related symptoms (Becker-Lausen et al., 1996; Ehlers & Clark, 2000; Ehlers et al., 2003; Foa, Steketee, & Rothbaum, 1989; Salmon & Bryant, 2002), and depression is a key mediating variable between dissociation and posttraumatic cognitions and PTSD symptoms (Lemos-Miller & Kearney, 2006). Many theories have been proposed to

explain the link between maltreatment, trauma symptoms, and depression. These theories are described briefly before a review of empirical findings in the field.

**Theoretical models of depression.** Childhood maltreatment may lead to major depression via negative cognitive schemas, biological stress response, and increased stress sensitivity (Harkness & Lumley, 2008). Maltreated youth frequently endorse negative cognitions and display abuse-specific and general attributional styles. From a young age, maltreated children exhibit insecure and disorganized attachment to caregivers (Bowlby, 1977, 1980; Downey, Feldman, Khuri, & Friedman, 1994; Hankin, 2005). Poor attachment associated with childhood maltreatment leads to negative representational models, or cognitive schemas, of self (i.e., self-blame regarding maltreatment), attachment figures (parents), and self in relation to significant others (Downey et al., 1994; Toth & Cicchetti, 1996; Young, 1994). Maltreated children anxiously expect, readily perceive, and overreact to conflict, threat, and perceived rejection (Downey et al., 1994). These negative cognitive schemas (including self, world, and future) predispose children and adolescents to depression (Beck, 1976). Substantial differences between maltreated children with and without adequate patterns of attachment are well documented and suggest that healthy attachment mitigates adverse effects of maltreatment (Toth & Cicchetti, 1996). Negative cognitions and attributional styles mediate the development of depressive symptoms (Gibb et al., 2001; Glassman, Weierich, Hooley, Deliberto, & Nock, 2007; Hankin, 2005; Lumley & Harkness, 2007; Webb, Heisler, Call, Chickering, & Colburn, 2007).

Child maltreatment is also related to critical changes in hormones, neural structure, and neural functioning, particularly those changes associated with PTSD



symptoms (Flouri, 2005; Harkness & Lumley, 2008; Kloet & Rinne, 2007; Kowalik, 2004; Meiser-Stedman, 2003; Nemeroff et al., 2006). Maltreatment may lead to HPA axis dysregulation including glucocorticoid hypersecretion and neurotoxicity, hippocampal atrophy, reduced intracranial volumes, and altered cortisol functioning. These physiological patterns have been repeatedly found in adults with a history of maltreatment and current PTSD symptoms and major depression, but findings regarding children are less clear (De Bellis, 2001; Harkness & Lumley, 2008).

Negative cognitive schemas and neurological stress responses following child maltreatment combine to leave individuals more sensitive and vulnerable to later stress, resulting in recurrent or more severe depression (Harkness & Lumley, 2008; Monroe & Harkness, 2005; Post, 1992). Studies of children and late adolescent girls indicate that individuals exposed to a wide range of adversities require lower levels of stress to precipitate depression than nonaffected peers (Harkness & Lumley, 2008). Child maltreatment thus heightens sensitivity to future stress, making depression more likely to occur and to occur in the face of relatively lower levels of stress. Shared vulnerabilities associated with maltreatment, depression, and PTSD may trigger the development of PTSD and mood disorder among some youth following maltreatment (Linning & Kearney, 2004).

**Findings regarding child maltreatment, PTSD, and depression.** Rates of depression among maltreated youth range from 21-37% and depression is frequently comorbid with PTSD following all types of maltreatment (Allen & Tarnowski, 1989; Boney-McCoy & Finkelhor, 1996; Finzi et al, 2001; Fletcher, 1996, 2003). Maltreated youth are also at significantly increased risk for suicidality (Brown, Cohen, Johnson, &

Smailes, 1999) and as many as 70% of youth who report maltreatment also report suicidal thoughts (Danielson et al., 2005).

Neglected youth report significant levels of internalizing problems, specifically depression (Arata et al., 2005; Finzi et al., 2001). Wechsler-Zimring and Kearney (2011) examined severity of PTSD, depressive, and dissociative symptoms among maltreated adolescents who reported a history of traumatic experiences. Neglected adolescents endorsed significant depressive symptoms, including negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem, though physical and sexual maltreatment were associated with higher levels of anhedonia and negative mood. Arata and colleagues (2005) identified neglect and psychological maltreatment as significant predictors of depression. Widom, DuMont, and Czaja (2007) found a significant association between early childhood neglect and major depression in early adulthood. Other studies have connected neglect with intermediary factors that contribute to childhood depression such as maternal depression, impoverished social contexts, and individual risk factors (Casady & Lee, 2003; Gaudin, Polansky, Kilpatrick, & Shilton, 1994).

Physical maltreatment has been associated with the most severe depressive symptoms and suicidality compared to other maltreatment types (Danielson et al., 2005; Finzi et al., 2001; Silverman, Reimherz, & Giaconia, 1996). Rates of depression among physically maltreated youth are as high as 21% (Schraedley, Gotlib, & Hayward, 1999) and depressive symptoms may be particularly elevated among maltreated youth with comorbid PTSD (Boney-McCoy & Finkelhor, 1996; Kilpatrick et al., 2003). Girls and boys reportedly experience similar rates of depression following physical maltreatment

(Schraedley et al., 1999). Kazdin and colleagues (1985) found a strong relationship between physical maltreatment and depressive symptoms in 79 child psychiatric inpatients with trauma history. Physically maltreated children exhibited significantly lower self-esteem, more depression, and more negative expectations about the future than non-maltreated children. Results indicated a dose-response relationship between maltreatment history and symptom severity (Kazdin, Moser, Colbus, & Bell, 1985). These findings were replicated using a non-clinical sample (Allen & Tarnowski, 1989). A retrospective study of 253 female undergraduates from physically abusive, incestuous, and alcoholic homes found the number of childhood traumas was related to depression and self-esteem. Child physical maltreatment was associated with higher depression and lower self-esteem (Fox & Gilbert, 1994).

Others report that sexual maltreatment is most significantly associated with comorbid depression and PTSD in youth (Boney-McCoy & Finkelhor, 1996; Brown et al., 1999; Kilpatrick et al., 2003; Oddone Paolucci et al., 2001). Sexual maltreatment also significantly predicts suicidality (Oddone Paolucci et al., 2001). Fergusson and colleagues (1996) found that sexual maltreatment and rape significantly predicted depression, such that youth with a history of sexual maltreatment were 3.6 (no intercourse)-5.4 (intercourse) times more likely than non-maltreated peers to develop depression (Fergusson, Horwood, & Lynskey, 1996). Schraedley and colleagues (1999) reported that 27% of youth (grades 5-12) with a history of sexual maltreatment exhibited highly depressive symptoms, but only 6% of youth with no history of sexual maltreatment exhibited highly depressive symptoms. Sexual maltreatment was associated with more severe depression among boys in this large scale, nationally

representative sample. Depression was reported as frequently as PTSD, and depression and delinquent behavior were more common in adolescents with PTSD than those without PTSD among 269 adolescents with a history of childhood sexual maltreatment (Danielson et al., 2010).

Exposure to intimate partner and other violence is also associated with comorbid PTSD and depression (Kolko et al., 2010). Johnson and colleagues (2002) found that witnessed violence significantly predicted later depression in 167 children interviewed at ages 6 and 8 years. A study of 3,614 adolescents recruited from a national household probability sample revealed that witnessed parental violence (9% prevalence rate) and witnessed community violence (38% prevalence rate) predicted PTSD and major depressive episode beyond variance accounted for by age, gender, race/ethnicity, income, and other traumatic event history (Zinzow et al., 2009). Repeated exposure to violence, closer proximity to violence, adolescent's closer relationship to the victim, and adolescent elevated perception of threat were also related to increased psychiatric symptoms (Zinzow et al., 2009).

The impact of multiple maltreatment types and chronic maltreatment on depression and PTSD has also been examined. Danielson and colleagues (2005) examined differences in depression symptoms based on maltreatment histories among youths from the National Survey of Adolescents. Adolescents who experienced physical and sexual maltreatment were significantly more likely to be depressed than those who experienced only physical or neither type of maltreatment. Many youth with major depression met lifetime criteria for PTSD (15.3%). Adolescents with multiple maltreatment types had the highest rate of PTSD (34.1%) followed by physical

maltreatment alone (16.0%) and sexual maltreatment alone (11.1%). Éthier, Lemelin, and Lacharite (2004) found that victims of chronic maltreatment demonstrated significantly more anxiety and depression than victims of transitory maltreatment.

Linning and Kearney (2004) assessed 58 maltreated youths aged 8-17 years in a shelter care facility. Youths with PTSD displayed significantly greater diagnostic comorbidity than peers without PTSD and many youths with PTSD met criteria for dysthymia (43.2%) and major depressive disorder (35.1%). No youths without PTSD had comorbid mood disorders. PTSD symptoms were most predicted by dysthymia and difficulty with concentration or decision making. As previously discussed, Lemos-Miller and Kearney (2006) found that depression was a significant mediator between (1) dissociation and trauma-related cognitions and (2) PTSD symptoms in 90 youth from the same shelter.

Age and gender may influence the relationship between child maltreatment and depression and PTSD. Child depression and younger child age have been associated with higher trauma symptom severity (Kolko et al., 2010). Female gender is generally associated with higher diagnostic rates and greater symptom severity in maltreated youth with PTSD and depression (Danielson et al., 2005). However, male adolescents may be at greater risk for depression following sexual maltreatment (Schraedley et al., 1999).

Silverman, Reinherz, and Giaconia (1996) conducted a 17-year longitudinal study of 375 youth to examine the relationship between physical and sexual maltreatment and psychosocial functioning in mid-adolescence and early adulthood. At age 15 years, females who experienced physical or sexual maltreatment had significantly greater depression than non-maltreated peers. Maltreated and non-maltreated males did not

significantly differ. At age 21 years, 25% of females and 20% of males who experienced physical maltreatment met criteria for depression, but only 5.1% of females and 3.9% of males without a history of physical maltreatment met criteria for depression. Some (21.7%) females with sexual maltreatment histories were diagnosed with depression but only 4.3% of females with no history of sexual maltreatment were diagnosed with depression (Silverman et al., 1996).

Specific family factors have also been linked to the development of depression and PTSD among maltreated youth. Adolescents and young adults with a history of childhood maltreatment were three times more likely to be depressed or suicidal than individuals without such a history (Brown et al., 1999). Contextual risk factors such as family environment and parent characteristics accounted for much of the increased risk for depressive disorders and suicide attempts in adolescence but not in adulthood. Diaz and colleagues (2008) examined the relationship among child maltreatment, parental bonding, and a lifetime history of major depressive disorder among Latino college students. Many (37.8%) students reported a lifetime history of major depressive disorder. Psychological maltreatment and maternal overprotection were significantly associated with lifetime history of depression (Diaz, Lizardi, Qian, & Liu, 2008).

Bipolar disorder has also been linked to child maltreatment and trauma. Romero and colleagues (2009) examined 446 youths (age 7-17 years) with bipolar disorder. One-fifth experienced physical and/or sexual maltreatment. Maltreatment history was strongly correlated with lifetime history of PTSD, living in a non-intact family, comorbid conduct disorder, first-degree family member with a history of mood disorder, and psychosis. Participants with combined maltreatment were older and had longer illness

duration, non-intact families, and greater prevalence of PTSD and conduct disorder than non-maltreated participants. Physical maltreatment was associated with longer duration of bipolar illness, non-intact family, PTSD, psychosis, and first-degree family history of mood disorder, while sexual maltreatment was associated only with PTSD (Romero et al., 2009).

## **Dissociation**

Dissociative processes and disorders following maltreatment have received a great deal of attention with respect to PTSD. Dissociation is considered as a symptom of PTSD in current research endeavors. Significant overlap exists between PTSD re-experiencing and avoidance/numbing symptoms and dissociative symptoms (APA, 2000), and a dissociative subtype of PTSD following childhood sexual maltreatment has been proposed (Ginzburg et al., 2006). Chronic and acute traumas associated with child maltreatment may cause brief dissociative reactions (Carrion & Steiner, 2000; Coons, 1996; Pfefferbaum, 2005). Chronic maltreatment may lead to persistent dissociative symptoms which, in turn, may reinforce and perpetuate trauma-related symptoms and vice versa (Ayoub et al., 2006; Bidell & Fischer, 2000), but empirical evidence for this claim is limited. Dissociative symptoms have also been found to mediate the path between child maltreatment and negative life experiences in older adolescents and young adults (Becker-Lausen et al., 1996). Prominent theoretical models of dissociation following child maltreatment will be described briefly before a review of empirical findings regarding dissociation in child maltreatment and PTSD.

**Theoretical models of dissociation.** Developmental models of dissociative disorders illuminate an intricate relationship with child maltreatment and other trauma.

Dissociation in maltreated children may begin as an adaptive and occasional coping mechanism. Dissociation may then become chronic and increasingly automatic, complex, and maladaptive and lead to disruptive dissociative, depressive, and posttraumatic symptoms as well as failure to integrate memory for traumatic events (Ayoub et al., 2006; Bidell & Fischer, 2000; Macfie et al., 2001). The tendency to dissociate in traumatic or stressful circumstances may become increasingly pronounced with age, interrupting development across multiple domains (Haugaard, 2004b).

The autohypnosis model of dissociation proposes that children who experience repeated or prolonged trauma may dissociate on a recurring basis and eventually do so at inappropriate times (Haugaard, 2004b; Ross, 1997; Terr, 1990). The attachment (Ross, 1997) and betrayal trauma (Chu & DePrince, 2006; Freyd, 1996) theories posit that dissociation allows maltreated children to attach or remain attached to their abusers. The discrete behavioral states model proposes that infants and young children behave according to immediate physical needs and environmental stimuli (Chu & DePrince, 2006; Putnam, 1997, 1998; Wolff, 1987, 1993), and gradually acquire control over these behavioral states as their needs are met by caregivers (Putnam, 1997). Children with unmet needs may fail to develop control of behavioral states, resulting in pathological dissociation. This model is supported by case studies (Albini & Pease, 1989) and empirical evidence (Macfie et al., 2001).

Psychobiological models of dissociation arise from recent PTSD research. Genetic predisposition combined with early childhood stress and adversity may result in critical changes in hormones, neural structure, and neural functioning that impair self-regulation and memory formation (Flouri, 2005; Kloet & Rinne, 2007; Kowalik, 2004;



Meiser-Stedman, 2003; Nemeroff et al., 2006). Additional evidence for biological mechanisms comes from dissociative adults who reportedly have altered hormonal levels, blood flow patterns, hemispheric activation, and intracranial volume (Putnam, 1984, 1997, 2003, 2006).

**Findings regarding child maltreatment, PTSD, and dissociation.** Studies of dissociative disorders in youths reveal high rates of maltreatment. Dissociative participants experienced childhood sexual maltreatment (58-80%), physical maltreatment (65-73%), and neglect (29-80%) (Coons, 1996). Conversely, Fletcher's (1996) meta-analysis revealed a 100% incidence rate of dissociative responses among children who experienced chronic or abusive traumas (Fletcher, 1996, 2003). Approximately 5-10% of children and adolescents have a dissociative disorder, and disruptive dissociative symptoms in maltreated children range from 19-73% (Ross, 1996; Silberg, 2000).

Dissociative symptoms in traumatized youth are often accompanied by posttraumatic stress (64-88%), depression (64-88%), learning difficulties (45-82%), behavior problems (54-86%), aggression (38-82%), sexual promiscuity (15-45%), self-harming behaviors (6-46%), and regression (36-100%) (Coons, 1996; Haugaard, 2004b; Putnam et al., 1996). Comorbid diagnoses in children with dissociative disorders include mood disorder (56-64%), PTSD (45-48%), and conduct disorder (12-36%) (Coons, 1996; Putnam et al., 1996). Comorbidity increases with age and female adolescents and women demonstrate more comorbid symptoms and diagnoses.

Hulette and colleagues (2008) examined posttraumatic and dissociative symptoms in previously maltreated preschoolers in foster care. Children who experienced physical and sexual maltreatment and neglect had significantly higher levels of dissociation than

children who experienced (a) sexual maltreatment alone or with neglect, (b) physical maltreatment alone or with neglect, or (c) only neglect. Young children who experience multiple forms of maltreatment may be more prone to dissociation as a result of increased distress and underdeveloped coping mechanisms (Hulette, Fisher, Kim, Ganger, & Landsverk, 2008).

Wechsler-Zimring and Kearney (2011) found a similar pattern of dissociative symptoms among maltreated adolescents. PTSD, dissociative, and depressive symptoms were examined among 84 ethnically diverse adolescents who experienced neglect only, physical and/or sexual maltreatment only, or neglect with physical and/or sexual maltreatment. Each group had significant rates of PTSD, maladaptive dissociation, and depression. Adolescents who experienced physical and/or sexual maltreatment, whether neglected or not, reported significantly greater symptomatology than adolescents who experienced neglect only. This difference applied specifically to PTSD-related distress, dissociative amnesia, depersonalization/derealization, negative mood, and anhedonia. Brunner and colleagues (2000), however, found that emotional neglect strongly predicts dissociative symptoms in maltreated inpatient adolescents. Moderate but chronic emotional stress may thus be as important as severe physical trauma in the development of dissociation (Brunner et al., 2000).

Findings conflict regarding a dose-response relationship between maltreatment or trauma exposure and dissociative symptoms in youth. Some research indicates that severity of dissociative symptoms may relate to severity of maltreatment (Collin-Vézina & Hébert, 2005; Putnam et al., 1995). Others have found no dose-response relationship between extent of exposure to maltreatment and increased dissociative symptoms. This

finding raises the question of whether relationships between trauma and dissociation differ in young children, adolescents, and adults (Brunner et al., 2000).

Normal and maladaptive dissociation have been observed across all age and developmental levels (Ogawa et al., 1997). Some researchers conclude that normal dissociative experiences peak around age 10 years and decline rapidly, while others conclude that dissociation increases until early adolescence and then declines steadily (Haugaard, 2004b). Dissociative processes increase rather than decrease over time in maltreated children. As with PTSD, gender differences in prevalence seem to increase with age and developmental level. Reported prevalence rates are similar in male and female children, but women are nine times more likely to display trauma-related dissociative symptoms than men (Putnam et al., 1996; Silberg, 2000).

A longitudinal study of 168 adolescents considered high-risk for poor developmental outcomes due to poverty revealed that age of onset, chronicity, and severity of trauma were highly correlated with, and predictive of, dissociation. Insecure attachment patterns also strongly predicted dissociation (Ogawa et al., 1997). Another longitudinal study indicated that infant history of attachment disorganization correlated with variables related to mother-infant relationship quality, child behavior problems in preschool through high school, and psychopathology and dissociation in adolescence. Attachment disorganization may mediate relations between early experience and later psychopathology and dissociation (Carlson, 1998). Child dissociation has also been associated with parental dissociation and parenting behaviors during and following maltreatment (Collin-Vézina & Hébert, 2005; Deblinger, Steer, & Lippman, 1999; Dell & Eisenhower, 1990; Mann & Sanders, 1994; Putnam et al., 1995).

Among previously maltreated young adults, the relationship between physical maltreatment history and physical maltreatment potential was significantly mediated by level of dissociation. Dissociation thus may play a pivotal role in perpetuating the intergenerational cycle of maltreatment (Narang & Contreras, 2000, 2005). Walker (2009) argued that consideration of parental dissociative symptoms should play a key role in child protection assessment.

The significant symptom overlap and comorbidity of PTSD and dissociation in maltreated youth likely indicate that dissociative processes are key mediating factors in the development and maintenance of PTSD and related symptoms following maltreatment (Becker-Lausen et al., 1996; Haugaard, 2003). Evidence that PTSD and dissociative symptoms and comorbidity increase with age may also point to the mediating role of dissociation in PTSD symptomatology (Brunner et al., 2000; Ogawa et al., 1997). However, more empirical evidence is needed. The present study contributes important empirical data regarding the role of dissociation in PTSD symptoms in maltreated adolescents.

### **Anxiety Disorders**

Anxiety disorders other than PTSD are also common among traumatized maltreated youth (Johnson et al., 2002; Pynoos, Steinberg, & Piacentini, 1999). Pre-existing anxiety may place youth at risk for PTSD following exposure to interpersonal trauma (Suliman et al., 2009; White et al., 1998). However, anxiety may not be as closely linked to PTSD as depression and dissociation in maltreated youth (Suliman et al., 2009). Anxiety symptom severity may not change as a function of number of trauma

events or trauma severity, and anxiety does not appear to play a central role in the maintenance of PTSD (Pynoos et al., 1999; Suliman et al., 2009).

Carrion and colleagues (2002) found that 48% of children referred for services following exposure to interpersonal trauma met criteria for an anxiety disorder including specific phobia (9%), separation anxiety disorder (7%), and social phobia (7%). Linning and Kearney (2004) also reported significant rates of generalized anxiety disorder, panic disorder, panic disorder with agoraphobia, and specific phobia among maltreated youth. Youth with PTSD had a 92.3% anxiety disorder comorbidity rate (Linning & Kearney, 2004). High comorbidity of other anxiety disorders with PTSD in maltreated youth have also been reported in forensic, substance abusing, HIV-positive, sexual minority, international, and multicultural samples (Ariga et al., 2008; Balsam, Lehavot, Beadnell, & Circo, 2010; Davis & Siegel, 2000; Dixon, Howie, & Starling, 2005; Duran, et al., 2004; Dykman et al., 1997; Elklit, 2002; Elze, Auslander, McMillen, Edmond, & Thompson, 2001; Fletcher, 2003; Gibb, Chelminski, & Zimmerman, 2007; Martinez et al., 2009; Triffleman & Pole, 2010).

### **Externalizing Behavior Problems**

Posttraumatic reactions and symptoms may mimic, and even account for, many of the central features of oppositional defiant disorder and conduct disorder. Lack of empathy, impulsivity, anger, acting-out, and resistance to treatment are consistent with hyperarousal and hypervigilance as well as oppositional, conduct, and other externalizing behavior problems (Greenwald, 2002; Kearney et al., 2010). This symptom overlap may be a function of maladaptive trauma-related cognitions (e.g., anger related to lack of trust, negative world view), psychobiological processes following child maltreatment, or a

combination of factors. Externalizing behavior problems are most common among maltreated youth who experienced physical maltreatment, who are male (Vandenberg & Marsh, 2009), and who have a history of PTSD (Danielson et al., 2010).

Anger in particular is closely related to PTSD symptoms and may serve as a catalyst for oppositional defiant disorder, conduct disorder, and externalizing behavior problems in maltreated youth. Emotional and physical maltreatment are associated with significant anger-related PTSD symptoms (Sebre et al., 2004), and victimized youth with PTSD display significantly more state and trait anger symptoms and greater angry temperament than traumatized youth without PTSD (Saigh, Yasik, Oberfield, & Halamandaris, 2007). Witnessing and/or experiencing violent victimization, including child maltreatment, predicts later anger and aggression in children aged 6 and 8 years (Johnson et al., 2002). PTSD-related symptoms, including increased anger, mediate the relationship between child maltreatment and behavior problems (Milot, Éthier, St-Laurent, & Provost, 2010). Excessive anger in maltreated youth may increase over time, leading to or exacerbating externalizing behaviors (Johnson et al., 2002).

Ford and colleagues (2000) examined 165 psychiatric outpatients (aged 6–17 years) in treatment for disruptive behavior or adjustment disorders for trauma history, PTSD symptoms, and comorbid psychopathology. PTSD symptoms were most severe for children with ADHD who experienced maltreatment and for children with ODD who experienced trauma related to an accident or illness. A distinct association was identified between ADHD and PTSD hyperarousal symptoms (Ford et al., 2000).

Moretti and colleagues (2006) examined the relationship between exposure to intimate partner violence, PTSD, and aggressive behaviors among adolescents in a

correctional facility. Approximately 33% met criteria for PTSD. Girls who witnessed intimate partner violence by their mother and boys who witnessed intimate partner violence by their father were significantly more aggressive toward friends than youth who did not witness intimate partner violence. Girls and boys who observed intimate partner violence by mothers reported significantly higher levels of aggression toward their own romantic partners than peers who did not observe intimate partner violence. The relation between exposure to parental intimate partner violence and aggression was stronger for individuals with PTSD than individuals without PTSD (Moretti, Obsuth, Odgers, & Reebye, 2006).

Additional externalizing behaviors associated with child maltreatment and trauma symptoms include substance use and risky sexual behaviors. Physical maltreatment has been significantly associated with initiation of injection drug use (Kerr et al., 2009). Past sexual maltreatment is significantly associated with HIV risk behaviors (i.e., sexual risk taking behaviors and use of unclean needles for intravenous drug usage, piercing, or tattoos) (Elze et al., 2001). Black and colleagues (2009) found that child maltreatment significantly predicted sexual intercourse in youth and that emotional distress, specifically posttraumatic stress symptoms, mediated the relationship between maltreatment and intercourse by mid-adolescence.

### **Cognitive Functioning**

Trauma-induced alterations in information processing during critical periods of development disrupt and delay cognitive development (Watts-English, Fortson, Gibler, Hooper, & De Bellis, 2006; Wilson, Hansen, & Li, 2011). Delayed and disrupted development may reinforce pre-existing PTSD symptoms and worsen outcomes across

many cognitive domains, particularly those involving intellectual and executive functioning and memory (Wilson et al., 2011). PTSD is closely correlated with lower full scale IQ in adult survivors of child sexual maltreatment, rape victims, and combat veterans (Wilson et al., 2011). It is unclear, however, whether lower intellectual performance is a result of trauma exposure and/or PTSD symptoms, or if it is a risk factor for developing PTSD following trauma exposure (Wilson et al., 2011). Research with child and adolescent populations is similarly inconclusive. De Bellis (2005) concluded that neglect (which may occur with other types of maltreatment) likely leads to delayed cognitive development. PTSD diagnosis and trauma exposure history is associated with lower verbal, performance, and full scale IQ, but causal aspects of the relationship remain unknown (Saigh, Yasik, Oberfield, Halamandaris, & Bremner, 2006; Saltzman, Weems, & Carrion, 2006). Higher levels of verbal IQ may be a protective factor against re-experiencing symptoms, or performance on post-trauma verbal IQ measures may be negatively impacted by PTSD symptoms (Saltzman et al., 2006). Cognitive functioning and academic performance in maltreated children also may be mediated by specific PTSD-related behaviors. Dissociative and disruptive behaviors may negatively impact child ability to function in a typical school environment (Cicchetti & Toth, 2005).

Executive functioning deficits are a central feature of maltreatment effects and PTSD in youth (De Bellis, 2005). The biological stress response triggered by maltreatment changes a child's ability to efficiently and effectively respond to future information, particularly stress- and emotion-related information (Wilson et al., 2011). Children with maltreatment-related PTSD reportedly perform more poorly on measures of attention and executive functioning (i.e., Stroop Color and Word Test, Digit Vigilance



Test, Wisconsin Card Sorting Test, and Controlled Oral Word Association Test) (Beers & De Bellis, 2002). Sexually maltreated children have diminished performance on attention and concentration tasks (i.e., Test of Memory and Learning Attention/Concentration Index) than matched controls (Porter, Lawson, & Bigler, 2005). Impaired performance on executive functioning tasks related to working memory, inhibition, auditory attention, and processing speed is associated with exposure to familial-based traumas and dissociative symptoms (DePrince, Weinzieri, & Combs, 2008, 2009).

Researchers have hypothesized that declarative memory and learning may become impaired due to chronic trauma-related damage to the hippocampus and/or that hypervigilance associated with PTSD may heighten sensitivity to proactive and retroactive interference on initial learning tasks (Goodman et al., 2010; Wilson et al., 2011). Moradi, Neshat and colleagues (1999) and Yasik, Saigh, Oberfield, and Halamandaris (2007) reported that children with PTSD have an overall poorer performance on memory tasks than children without PTSD. Porter and colleagues (2005), however, found no differences in memory functioning (aside from attention and concentration tasks) between child sexual maltreatment victims and non-maltreated controls when socioeconomic status, IQ, and attention, and concentration were controlled. Beers and De Bellis (2002) also found no differences on memory test performance of children with and those without PTSD.

Samuelson and colleagues (2010) examined neuropsychological functioning in a primarily African American group of 62 children who witnessed intimate partner violence. Twenty-seven children met diagnostic criteria for PTSD and 35 did not. Children with PTSD exhibited slower, less effective learning, heightened sensitivity to

interference, and impaired effect of rehearsal on memory formation. Both groups performed in the below average range on measures of executive functioning, attention, and intellectual ability. The cross-sectional design of the study makes it unclear, however, whether the learning and memory impairment is a consequence of, or a pre-existing risk factor for, PTSD (Samuelson, Krueger, Burnett, & Wilson, 2010).

Becker-Weidman (2009) examined the effects of complex trauma (defined as chronic, early child maltreatment by caregivers) on the cognitive and functional development of 57 ethnically-diverse children aged 2-18 years. Adopted and foster children with reactive attachment disorder showed significant developmental delay in communication, daily living skills, and socialization. The average adaptive behavior composite score for the children yielded a developmental age equivalency of 4.4 years. Mean scores on the maladaptive behavioral composite reached the clinically significant range, with the externalizing behavior score in the clinically significant range and the internalizing behavior score in the elevated range. Older children had more severe adaptive disruption across domains than younger children, even when gender, ethnicity, and maltreatment history were controlled (Becker-Weidman, 2009).

### **Interpersonal Relationships**

Wolfe and colleagues (2001) found that child maltreatment increases adolescent emotional distress (including dissociation, depression, and posttraumatic symptoms) and significantly increases the risk of using threatening behaviors or physical abuse against dating partners. Wolfe and colleagues (2004) further found that trauma-related symptoms, attitudes justifying dating violence, and empathy and self-efficacy in dating relationships predicted dating violence perpetration by previously maltreated children

during mid-adolescence. Attitudes, empathy, and self-efficacy were correlated with dating violence at specific points in time, and only trauma-related symptoms significantly predicted dating violence across time. The researchers concluded that child maltreatment is a distal risk factor for adolescent dating violence and that trauma-related symptoms mediate this relationship.

Berzenski and Yates (2010) found that childhood emotional maltreatment was a stronger predictor of relationship violence in undergraduate students than any other form of child maltreatment and that emotion dysregulation and impulsivity partially mediated this relationship (Berzenski & Yates, 2010). Parental rejection, exposure to interparental violence, and child maltreatment increase the risk of intimate partner violence in adults with PTSD symptoms and social information processing deficits (Taft, Schumm, Marshall, Panuzio, & Holtzworth-Munroe, 2008).

Bevan and Higgins (2002) found that maltreatment in childhood, low family cohesion and adaptability, and current alcohol abuse were significantly associated with trauma symptoms and frequency of physical spouse abuse in treatment-seeking adult men. Childhood neglect uniquely predicted the level of physical spouse abuse. Witnessing family violence in childhood was associated with trauma symptomatology and psychological spouse abuse (Bevan & Higgins, 2002).

Dietrich (2007) explored posttraumatic stress disorder (PTSD) and related symptoms, affect dysregulation, and interpersonal problems as predictors of revictimization among individuals from a prison population sample, a treatment-seeking community sample, and an Internet sample. PTSD diagnosis significantly predicted sexual revictimization in women. Interpersonal relatedness problems also predicted most

types of revictimization in women and affect dysregulation predicted different types of revictimization (Dietrich, 2007).

The intergenerational transmission of child maltreatment and posttraumatic symptoms has been examined separately, but emerging research indicates that PTSD symptoms commonly occur in youth and parents simultaneously. Proposed explanations for both include behavioral, psychodynamic, attachment, genetic and neurobiological theories, and trauma-induced reenactments, pathological relationship styles and object-relationships (i.e., identification with the aggressor-victim dyad), maternal dissociation, depression, substance use, and other mental health problems, and avoidant or failed disclosure of prior maltreatment (Ariga et al., 2008; Cort et al., 2011; Green, 1998; Landolt, Vollrath, Ribl, Gnehm, & Sennhauser, 2003; McCloskey & Bailey, 2000; Noll, Trickett, Harris, & Putnam, 2009). Specific risk and protective factors such as financial solvency or instability, residential mobility and homelessness, social isolation or support, parental mental health, and interparental violence have also been implicated as partial predictors of the intergenerational transmission of maltreatment and trauma (Avery, Hutchinson & Whitaker, 2002; Dixon et al., 2005, 2009; McCloskey & Bailey, 2000).

### **Summary of Findings Regarding Child Maltreatment and PTSD Symptomatology, Comorbidity, and Outcomes**

PTSD in maltreated youth is associated with comorbid symptoms and poor outcomes across multiple domains of functioning (Carrion et al., 2002; Kinzie et al., 2006; Linning & Kearney, 2004; Oddone Paolucci et al., 2001). This complex symptom presentation is associated with significant daily impairment in functioning, including sleep and appetite disturbances, social withdrawal, sadness, avoidance, excessive worry,

somatic complaints, inattentiveness, and family and academic problems (Avery et al., 2000) and reflects the developmental psychopathology associated with multiple, ongoing trauma exposure in childhood (Kearney et al., 2010; Lonigan et al., 2003). PTSD and related symptoms appear remarkably persistent following child maltreatment, particularly when appropriate intervention is unavailable or when traumatic events continue (Arias, 2004; Cook et al., 2005; Famularo et al., 1996; Fletcher, 2003; Lansford et al., 2002).

Burgeoning evidence suggests that depression and dissociation symptoms may play an important role in the onset and maintenance of PTSD following maltreatment (Becker-Lausen et al., 1996; Ehlers et al., 2003; Harkness & Lumley, 2008; Lemos-Miller & Kearney, 2006). However, empirical evidence for the mediating role of dissociation in PTSD symptoms following maltreatment is lacking. Negative cognitions (regarding self, world, and future) associated with depression, anger, aggression, and other externalizing and internalizing behaviors are common comorbid features in traumatized and maltreated youth but have received less attention in the research literature (Ford et al., 2000; Vandenberg & Marsh, 2009). Growing evidence supports a dose-response relationship between maltreatment and trauma exposures and increased symptomatology (Allen & Tarnowski, 1989; Collin-Vézina & Hébert, 2005; Kolko et al., 2010; Zinzow et al., 2009), but the relative importance of this relationship is unclear. Family environment factors also contribute to PTSD symptomatology and outcomes (Brown et al., 1999; Collin-Vézina & Hébert, 2005; Diaz et al., 2008; Putnam et al., 1995), but little empirical data are available beyond the well-established importance of parent-child attachment. The present study addressed these gaps in the literature by

examining the mediating roles of depression, dissociation, trauma-related cognitions, trauma history, and family environment in PTSD symptoms in maltreated adolescents.

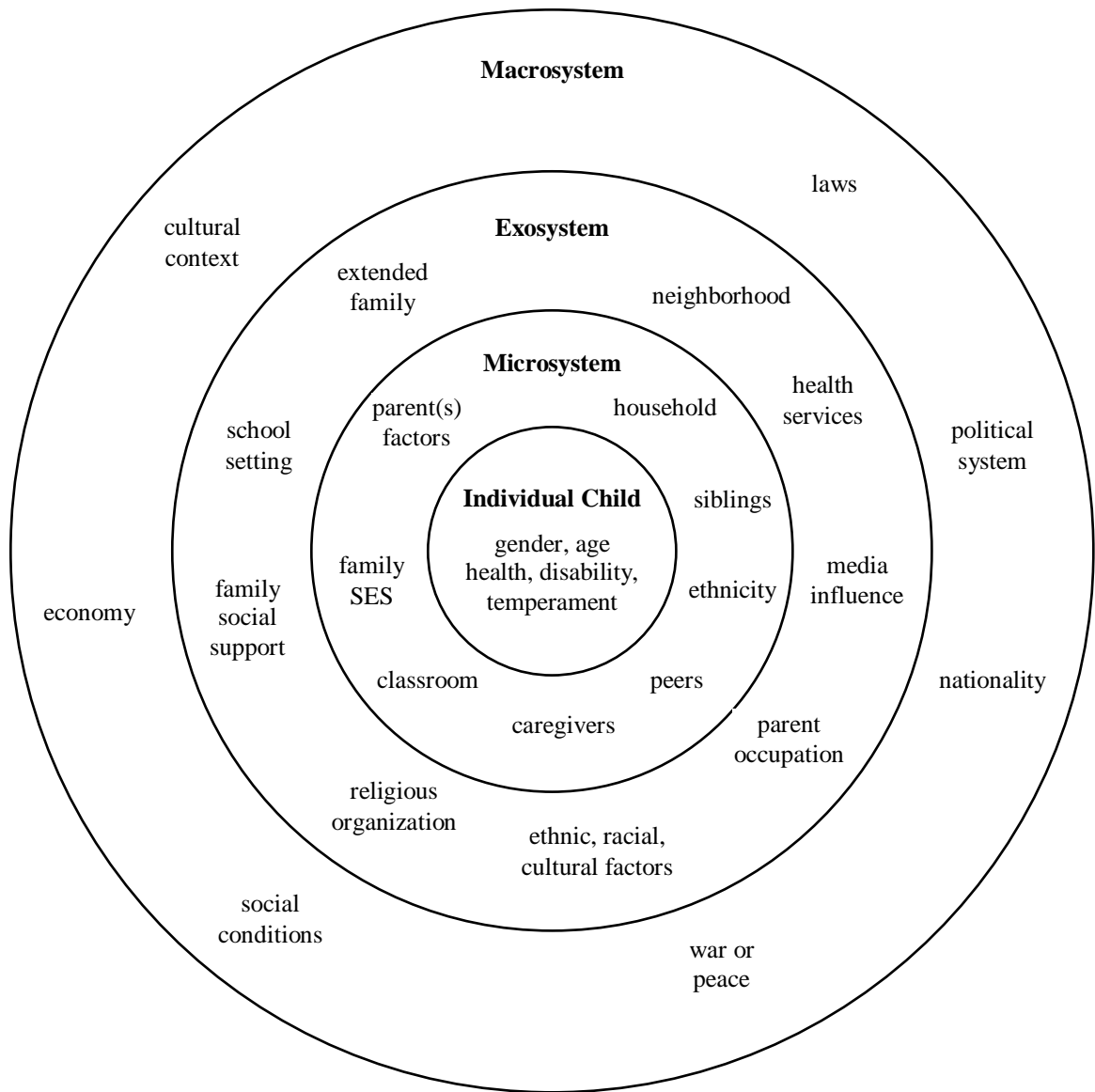
Individual factors such as age, gender, and ethnicity influence PTSD symptoms in maltreated youth. Younger child age at time of trauma has been associated with greater negative outcomes (Kolko et al., 2010), though older children and adolescents are more likely to be diagnosed with PTSD. Symptom severity and comorbidity may increase with age. Female gender is generally associated with more severe symptomatology (Danielson et al., 2005), though males may be at increased risk for depression following sexual maltreatment (Schraedley et al., 1999). Few studies address the influence of ethnicity on PTSD and maltreatment, though ethnic minority groups may be at risk for severe symptomatology, comorbidity, and negative outcomes (Colman, Kim, Mitchell-Herzfeld, & Shady, 2009; Moretti et al., 2006). This study contributes important information regarding individual risk and resiliency factors (i.e., age, gender, and ethnicity) by evaluating the fit of the Lemos-Miller and Kearney (2006) model across demographic groups.

### **Models of Child Maltreatment and PTSD**

The following sections review prominent theoretical models regarding risk and development of child maltreatment and PTSD. Extant models focus on either maltreatment or PTSD, and a unified, developmentally and ethnically sensitive, ecologically-based model of PTSD in maltreated youth has not been proposed. The models reviewed next, however, make important theoretical contributions to such an integrated model.

## **Ecological Models of Child Maltreatment**

The earliest theories of child maltreatment focused on single risk factors such as parental psychopathology, family history of maltreatment, poverty, and child temperament (Cicchetti, 2004). Contemporary work focuses on interactive etiological models to explain the multifaceted causes of child maltreatment (Cicchetti, 2004; Cicchetti & Toth, 2005; Zielinski & Bradshaw, 2006). These models are based on Bronfenbrenner's ecological systems theory (1977, 1980; Freisthler et al., 2006) that considers individual, family, environmental, societal, and other factors. Bronfenbrenner's ecological systems theory includes the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Figure 2). The microsystem consists of the child and his or her individual traits. The mesosystem involves the dynamic of the child and his or her immediate settings. A mesosystem might consist of the interaction between a child and her supportive extended family. The exosystem involves environmental settings that influence a child indirectly. Parental unemployment could lead to increased stress at home and elevated risk for maltreatment. The macrosystem includes cultural and societal factors that influence a child. A child residing in a cultural group where physical punishment is acceptable may be at increased risk for maltreatment. The chronosystem involves personal historical influences. A child with a history of chronic maltreatment and exposure to ongoing community violence may have more severe psychopathology than a child who experiences only brief or discrete trauma.



*Figure 2.* An Integrated Ecological Systems Model of Factors in Child Maltreatment. Based on Bronfenbrenner's model (1977).



Belsky's (1980, 1993) ecological paradigm applies Bronfenbrenner's theory to child maltreatment and the parent-child relationship. Child factors include temperament (i.e., difficult to sooth, hyperactive, or overly passive child) and physical factors (i.e., premature infants, medically high need children). Parental factors include family disorganization, single motherhood, lack of social support, parent history of childhood victimization, parental rejection, or limited knowledge regarding child care or self-care. Community factors include neighborhoods that lack social cohesion. Cultural agents include exposure to positive portrayals of violence and general social violence. These factors interact to place a family at increased (or decreased) risk for child maltreatment as well as poor outcomes following maltreatment.

Other ecological models of child maltreatment have been proposed. Garbarino (1979) specified that child maltreatment may result from a mismatch between the child and his or her family and between the family and the community. Bogenschneider (1996) proposed an ecological risk/protective theory that focuses primarily on the cumulative effects of various risk factors, including inconsistent parenting, on at-risk youth. Murry, Bynum, and colleagues (2001) and Murry, Smith, and Hill (2001) posited that ecological models are beneficial for examining risk and resilience in African American families. These researchers suggested examining individual, family, and community contexts to identify protective factors that contribute to healthy child functioning and resilience.

Spearly and Lauderdale (1983) used county statistics regarding family socioeconomic status, population mobility, single or working mothers, social services, and ethnicity/race to examine contextual factors with respect to child maltreatment.

Socioeconomic and maternal factors predicted maltreatment rates. In addition, urban neighborhood status predicted maltreatment rates among African Americans and Hispanics, suggesting that increased urbanization may pose distinct risks to these groups. The researchers speculated that access to family resources may influence child maltreatment rates.

According to ecological systems theories, the likelihood of child maltreatment increases when stressors and risk factors outweigh support and resiliency factors. Chronic child maltreatment and family violence may thus be the most influential factors on a child's developmental trajectory (Cicchetti, 2004; Cicchetti & Toth, 2005; Zielinski & Bradshaw, 2006). Ecological models also account for the heterogeneity of outcomes following child maltreatment and provide a basis for understanding why many children demonstrate remarkable resiliency and recover from traumatic experiences while others struggle with physical, cognitive, behavioral, and emotional difficulties. Unfortunately, no ecological model has addressed the development of PTSD specifically among maltreated youth. The present study begins to address this deficiency by evaluating the influence of key ecological factors on PTSD in maltreated youth.

The following sections discuss prominent models of PTSD. Unfortunately, many of these models fail to adequately account for ecological contributions to youth risk and resilience following traumatic events. These models also have not been empirically tested in maltreated youth. They do, however, make important theoretical contributions to an integrated, developmentally and ethnically sensitive, ecologically-based model of PTSD in maltreated youth.

## **Cognitive and Information-Processing Models of PTSD**

Cognitive and information-processing models of PTSD are based on the theory that cognitions, appraisals, and emotions related to traumatic events are stored in memory or fear networks (Chemtob, Roitblat, Hamada, & Carlson, 1988; Ehlers & Clark, 2000; Foa et al., 1989; Salmon & Bryant, 2002). These networks form at the time of traumatic events and store information about stimuli, responses, and meanings related to the traumas. The networks are thus closely interrelated and strongly associated with traumatic reminders, anxiety, and fear (Foa et al., 1989). When external and internal stimuli reminiscent of a trauma event appear, these memory networks are activated and the fear response occurs (Salmon & Bryant, 2002).

PTSD is thus characterized by a bias toward searching for and identifying threatening stimuli and a lower threshold for recognizing stimuli as threatening (Salmon & Bryant, 2002). This response bias may have served an adaptive purpose originally but later results in disruptive responses to low-threat situations (Chemtob et al., 1988). The response bias maintains the PTSD threat-response via a positive feedback loop in which an individual interprets a mild or ambiguous situation as threatening (Chemtob et al., 1988). This sense of threat is a consequence of excessively negative appraisals of the trauma and a disturbance of trauma memory (Ehlers & Clark, 2000; Meiser-Stedman, 2003).

Preliminary evidence suggests that cognitive and information-processing models may, in part, apply to children (Ehlers et al., 2003; Meiser-Stedman, 2003; Stallard, 2003). These theories do not currently account, however, for developmental differences in information processing and encoding, emotional regulation, and social factors specific

to children. Salmon and Bryant (2002) noted that younger children encode information at a slower rate than older children and adults so traumatic memories may be encoded differently. Prior knowledge also may influence a child's understanding and appraisal of trauma such that limited prior knowledge may lead to less detailed or lasting representations and gaps in memory (Terr, 1990, 1994). Language development also influences how well information can be encoded and recalled verbally (Salmon & Bryant, 2002). Salmon and Bryant also proposed that parents may serve as external support, helping a child make sense of the traumatic event by discussing the event to prevent forgetting, helping the child appraise and interpret the experience, correcting misconceptions, and helping the child regulate emotions (Salmon & Bryant, 2002).

The developmental considerations proposed by Salmon and Bryant (2002) may have a significant impact on trauma-related memories, cognitions, and posttraumatic recovery among maltreated youth. Maltreatment frequently begins at an early age when a child's prior knowledge, understanding of trauma events, and language skills are limited. Child age at maltreatment onset may thus significantly contribute to PTSD symptoms and trauma-related cognitions. However, younger children may also receive more external support from non-abusing parents and other adults following trauma than older children and adolescents.

In low-cohesion, high-conflict families or families in which both/all caregivers contribute to maltreatment, external parental support may be of poor quality or completely absent. Lack of familial/parental social support may leave maltreated youth at increased risk for PTSD as they struggle to interpret experiences and manage emotional responses. In certain situations, maltreating caregivers may even encourage

child misconceptions or forgetfulness that can exacerbate PTSD symptoms and impede recovery.

The cognitive and information-processing models have not been empirically validated in youth and their specific applicability to maltreated youth remains unclear. However, these models provide a strong theoretical framework in which to consider the contributions of cognitive, developmental, and family factors on PTSD in maltreated youth. The present study examines specific aspects of this framework, including the role of trauma-related cognitions, child age, and family cohesion and conflict among maltreated adolescents.

### **Fletcher's Model of PTSD Development in Youth**

Fletcher's (2003) model accounts for various factors involved in the development and maintenance of PTSD in youth, including (1) nature of the traumatic event itself, (2) cognitive, emotional, psychobiological, and behavioral responses to the event, (3) characteristics of the individual, (4) characteristics of the family, and (5) social ecology (Figure 3). A particular strength of this model is its foundation on previous research (Costello et al., 2002; Fletcher, 1996; Fletcher, 2003; La Greca, Silverman, Vernberg, & Prinstein, 1996; Pynoos et al., 1999; Udwin, Boyle, Yule, Bolton, & O'Ryan, 2000) and its incorporation of ecological systems and cognitive models. The onset and course of PTSD in each individual is determined by a complex network of contributing factors (Fletcher, 2003).

Different types of trauma events may be associated with different PTSD symptom profiles (Fletcher, 2003). Type I trauma, also called discrete or single-event trauma, refers to a single acute trauma and is associated with detailed memories, cognitive

reappraisals, and misperceptions (Fletcher, 1996; Terr, 1994). Type I traumas do not produce as much denial, dissociation, or personality problems as type II traumas. Type II trauma, also called complex trauma, refers to chronic trauma exposure and is associated with denial, repression, dissociation, self-hypnosis, identification with the aggressor, and aggression against self (Briere & Spinazzola, 2006; Lonigan et al., 2003; Terr, 1994; van der Kolk, 2005). Compared to victims of type I traumas, victims of type II traumas experience higher rates of avoidance/numbing symptoms (54% versus 30%) and hyperarousal (71% versus 55%). Rates of re-experiencing symptoms do not significantly differ following type I and type II trauma events (Fletcher, 1996).

Emotional, cognitive, psychobiological, and behavioral responses to the trauma event are also expected to influence PTSD. Children who experience sadness, worry, fear, isolation, anger, shame, guilt, emotional numbing, and panic have more severe and persistent PTSD symptoms over time (Bernat, Ronfeldt, Calhoun, & Arias, 1998; Fletcher, 2003; Shannon, Lonigan, Finch, & Taylor, 1994; Udwin et al., 2000). Severe emotional responses following trauma exposure appear to be mediated by one's assessment, appraisal, beliefs, or attributions regarding the event (Pynoos et al., 1999). Numerous theorists suggest that posttraumatic responses represent an individual's attempt to accommodate to and assimilate traumatic experiences that threaten or alter one's previous worldview (Chemtob et al., 1988; Foa et al., 1989; van der Kolk, Brown, & Van der Hart, 1989). Conditioned responses, based on learning, information-processing, and cognitive theories are also included in Fletcher's model (Foa et al., 1989). Conditioned responses account for the anxiety, apprehension, and re-experiencing exhibited in PTSD. Neurological changes and the severity of psychobiological stress

responses are also expected to influence PTSD symptom severity and outcomes (Fletcher, 2003).

Fletcher next considers individual characteristics thought to influence the development and maintenance of PTSD, including biological vulnerability, psychological strengths and vulnerabilities (e.g., self-efficacy and internal/external locus of control), experiential vulnerability (i.e., history of stressful life events), gender differences, ethnic and cultural variables, developmental differences such as age, and coping behaviors. Limited empirical evidence or predictions are offered regarding biological vulnerability, psychological strengths and vulnerabilities, experiential vulnerability, and ethnic and cultural variables. Substantial research, however, indicates that females are at greater risk for PTSD following trauma, though the explanation for this gender difference remains unknown. Age at time of trauma significantly contributes to PTSD severity as a result of developmentally-related coping behaviors (Fletcher, 2003).

Social characteristics in Fletcher's model include social supports, parenting skills and style, family discord and cohesion, and socioeconomic status. Unfortunately, few studies have directly addressed the influence of such factors. Close, supportive relationships with parents may protect against PTSD following trauma, but much of the supporting evidence for this claim relies on early childhood attachment research. Flexible and warm parenting styles can buffer against PTSD onset and severity, but empirical evidence for this claim is limited (Fletcher, 2003).

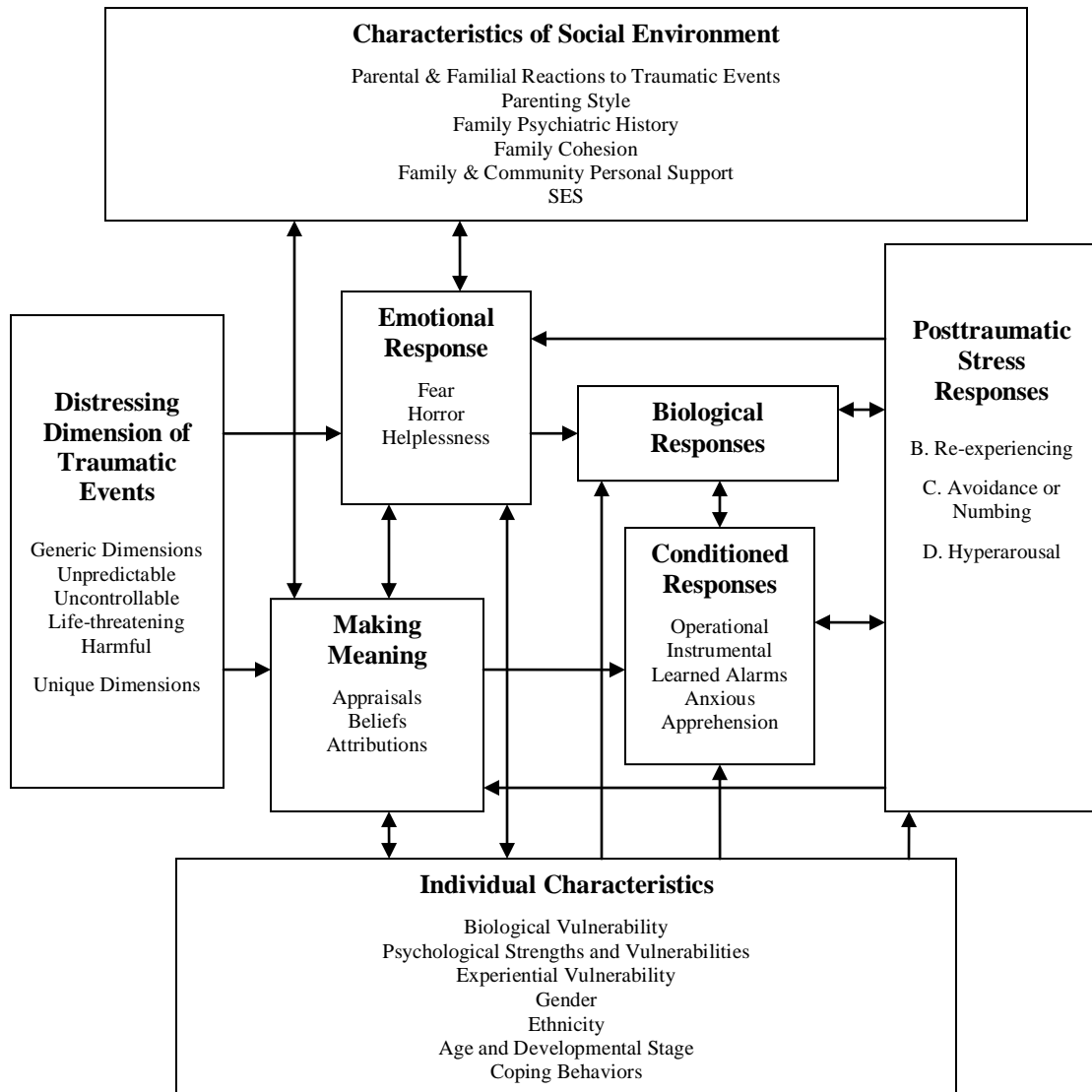


Figure 3. Fletcher's Working Model for the Development of Childhood PTSD. Adapted from Fletcher, K. E. (2003).

Models that include all relevant factors such as this one may prove most useful for research and clinical case conceptualization and treatment planning. Unfortunately, this model has not yet been well tested in the general youth population and has not been tested at all in maltreated youth. The present study appears to be the first to evaluate a model of this type in maltreated youth. Many of the specific factors identified by



Fletcher, such as trauma history, psychological symptoms, family functioning, age, gender, and ethnicity, were evaluated.

### **Complex Trauma and Developmental Trauma Disorder**

Different types of traumatic events may result in different posttraumatic symptoms. Ongoing, chronic, and abusive events (i.e., type II or complex traumas) are associated with the most severe outcomes (Famularo et al., 1996). Terr (1994), Fletcher (1996, 20003), Putnam (2006) and others have advocated for the use of a dual (e.g., type I vs. type II) or tripartite classification of traumatic events. Others have proposed the terms complex or developmental trauma to describe chronic early maltreatment and its effects (Cicchetti, 2004; Cicchetti & Toth, 2005; Cook et al., 2005; Downey et al., 1994; Freyd, 1996; Spinazzola et al., 2005; van der Kolk, 2005).

Complex trauma exposure includes multiple and/or chronic traumatic interpersonal events (i.e., ongoing maltreatment or war or community violence) that adversely affect development (Cook et al., 2005; Spinazzola et al., 2005; van der Kolk, 2005). Most often these events occur within a child's family or caregiving system and include physical, sexual, or psychological maltreatment and profound neglect. When trauma is perpetrated by those charged with protecting and supporting child development (i.e., parents), the child is at risk for profound psychopathology (Cicchetti, 2004; Cicchetti & Toth, 2005; Downey et al., 1994; Freyd, 1996). Complex trauma also refers to a child's coping and adaptation to an abusive, traumatizing environment (Cook et al., 2005; Spinazzola et al., 2005; van der Kolk, 2005). The Complex Trauma Workgroup of the National Child Traumatic Stress Network (Spinazzola et al., 2005) surveyed clinicians regarding the impact of complex trauma exposure on clients. Findings support

the notion that complex trauma results in self-regulatory impairment in posttraumatic adaptation.

van der Kolk (2005) contended that pervasive behavioral dysregulation in response to ongoing traumatic stimuli requires a broader conceptualization of PTSD in youth. Developmental trauma disorder is based on the idea that multiple exposures to various interpersonal stressors, including ongoing maltreatment, necessarily lead to broad, maladaptive subjective experiences and self-regulation deficits (Table 2). Dysregulation of affective, somatic, behavioral, cognitive, relational, and self-attribution domains are central to the disorder, as are altered expectancies and widespread impairment that reflect the emotional processing and executive functioning deficits previously discussed (Table 3). Such dysregulation may lead to PTSD and other disorders such as depression, substance abuse, or personality or eating disorder (Brunello et al., 2001; Burns, Jackson, & Harding, 2010; Cook et al., 2005; Kemp et al., 2007).

Table 2

*Proposed Criteria of Developmental Trauma Disorder*

Criteria	Symptom Description
A. Exposure	<p>Multiple or chronic exposure to one or more forms of developmentally adverse interpersonal trauma such as:</p> <ul style="list-style-type: none"> <li>abandonment, betrayal, physical assaults, sexual assaults, threats to bodily integrity, coercive practices, emotional abuse, witnessing violence and death</li> </ul> <p>Subjective experience</p> <ul style="list-style-type: none"> <li>rage, betrayal, fear, resignation, defeat, shame</li> </ul>
B. Triggered pattern of repeated dysregulation in response to trauma cues	<p>Affective</p> <p>Somatic - physiological, motoric, medical</p> <p>Behavioral - re-enactment, cutting</p> <p>Cognitive - thinking that it is happening again, confusion, dissociation, depersonalization</p> <p>Relational - clinging, oppositional, distrustful, compliant</p> <p>Self-attribution - self-hate, blame</p>
C. Persistently altered attributions or expectancies	<p>Negative self-attribution.</p> <p>Distrust of protective caretaker.</p> <p>Loss of expectancy of protection by others.</p> <p>Loss of trust in social agencies to protect.</p> <p>Lack of recourse to social justice/retribution.</p> <p>Inevitability of future victimization.</p>
D. Functional Impairment	<p>Educational</p> <p>Familial</p> <p>Peer</p> <p>Legal</p> <p>Vocational</p>

Source: van der Kolk (2005).

Table 3

*Domains of Impairment in Children Exposed to Complex Trauma*

<b>I. Attachment</b>	<b>IV. Dissociation</b>	<b>VI. Cognition</b>
Problems with boundaries	Distinct alterations in states of consciousness	Difficulties in attention regulation and executive functioning
Distrust and suspiciousness	Amnesia	Lack of sustained curiosity
Social isolation	Depersonalization and derealization	Problems with processing novel information
Interpersonal difficulties	Two or more distinct states of consciousness	Problems focusing on and completing tasks
Difficulty attuning to other people's emotional states	Impaired memory for state-based events	Problems with object constancy
Difficulty with perspective taking		Difficulty planning and anticipating
<b>II. Biology</b>	<b>V. Behavioral control</b>	Problems understanding responsibility
Sensorimotor developmental problems	Poor modulation of impulses	Learning difficulties
Analgesia	Self-destructive behavior	Problems with language development
Problems with coordination, balance, body tone	Aggression toward others	Problems with orientation in time and space
Somatization	Pathological self-soothing behaviors	
Increased medical problems across a wide span (e.g., pelvic pain, asthma, skin problems, autoimmune disorders, pseudoseizures)	Sleep disturbances	
	Eating disorders	
	Substance abuse	
	Excessive compliance	
	Oppositional behavior	
<b>III. Affect regulation</b>	Difficulty understanding and complying with rules	<b>VII. Self-concept</b>
Difficulty with emotional self-regulation	Reenactment of trauma in behavior or play (e.g., sexual, aggressive)	Lack of a continuous, predictable sense of self
Difficulty labeling and expressing feelings		Poor sense of separateness
Problems knowing and describing internal states		Disturbances of body image
Difficulty communicating wishes and needs		Low self-esteem
		Shame and guilt

Source: Cook et al. (2005).

## **Psychobiological Models**

Psychobiological models have been proposed to explain the development of PTSD in adults and to explain negative outcomes following child maltreatment (Kearney et al., 2010). Current psychobiological models of PTSD in adults emphasize interactions between key biological and environmental vulnerabilities. Hippocampal changes and persistent rumination may relate to re-experiencing symptoms, disrupted recall, and other memory distortions in PTSD. Genetic vulnerabilities toward depression and increased negative affect may relate to avoidance and numbing symptoms in PTSD. Disruptions in the HPA axis and elevated anxiety sensitivity may relate to hyperarousal symptoms in PTSD (Elwood, Hahn, Olatunji, & Williams, 2008). Gene-environment interaction studies reveal promising outcomes for understanding the relationship between biological and environmental vulnerability (Kearney et al., 2010). Kilpatrick and colleagues (2003) identified a low-expression variant of the serotonin transporter gene that may relate to increased risk for PTSD and depression in individuals exposed to discrete traumatic events.

Psychobiological models of PTSD in youth build upon research with adults and consider important developmental factors. The neurochemical cascade of the traumatic stress response during sensitive periods can alter the trajectory of emotional, behavioral, and cognitive development (De Bellis, 2001; 2002; De Bellis & Van Dillen, 2005; Wilson et al., 2011). Severe disruptions in early childhood (i.e., child maltreatment) may lead to neuronal impairment via dysregulation of key brain areas such as the amygdala, HPA axis, hippocampus, and prefrontal cortex (De Bellis, 2002; Koenen, 2006; van der Kolk, 2005). This dysregulation impairs emotion processing and executive functioning,

which in turn may lead to increased exposure to trauma (through increased risk taking or coercive child-caregiver interactions), inability to manage trauma-related emotions, and comorbid symptoms (Koenen, 2006; Koenen et al., 2008; Martorell et al., 2009). The subsequent effects include disrupted motor, emotional, behavioral, language, social, psychosexual, moral, and cognitive development (Cook et al., 2005). Deficits in emotion processing contribute to reactions of intense fear, horror, or helplessness to a stressor, which is a criterion for PTSD (Cloitre, Miranda, Stovall-McClough, & Han, 2005). Emotion processing deficits may also interfere with adult-parent attachment and peer-child social relations and contribute to decreased resiliency and increased interpersonal problems.

This psychobiological model segues with developmental trauma model discussed above (Cook et al., 2005; van der Kolk, 2005). These models are promising but do not fully account for the specific individual, family, and other environmental risk factors highlighted in the ecological models. A transactional approach to considering risk factors for PTSD development in youth is recommended but not yet well-established. Community, social, family, parent, and individual child factors should be considered in any research or clinical approach (Fletcher, 2003; Flouri, 2005; Kearney et al., 2010; Koenen, 2006; van der Kolk, 2005).

### **Summary of Findings Regarding Models of Child Maltreatment and PTSD**

Numerous models have been proposed explaining how and why child maltreatment and other traumatic events result in negative outcomes in youth. Ecological systems theories underscore the importance of individual, family, community, and historical influences, and their interaction, on child development following trauma

exposure (Belsky, 1980, 1993; Bogenschneider; 1996; Bronfenbrenner, 1977, 1980; Cicchetti, 2004; Cicchetti & Toth, 2005; Freisthler et al., 2006; Garbarino, 1979; Murry, Bynum, et al., 2001, Murry, Smith, et al., 2001; Spearly & Lauderdale, 1983; Zielinski & Bradshaw, 2006), but do not directly address posttraumatic responses. Cognitive and information processing models have greatly contributed to understanding and treatment of PTSD in adults (Chemtob et al., 1988; Ehlers & Clark, 2001; Foa et al., 1989) but may not fully account for factors contributing to PTSD in youth, particularly maltreated youth (Meiser-Stedman, 2003; Salmon & Bryant, 2002; Stallard, 2003).

Fletcher's model of PTSD development (2003) accounts for the influence of numerous individual, familial, and environmental influences on PTSD in youth but does not fully address the contributions of ethnicity, disability status, specific familial factors, or maltreatment history, nor has this model been empirically validated in maltreated youth. Developmental trauma disorder emphasizes the profound traumatic and disruptive effects of child maltreatment (Cook et al., 2005; Spinazzola et al., 2005; van der Kolk, 2005) but does not directly address the role of risk and protective factors. Recent psychobiological models also emphasize the disruptive effects of trauma on development (De Bellis, 2001; 2002; De Bellis & Van Dillen, 2005; Wilson et al., 2011) but fail to account for the specific individual, family, and other environmental risk factors highlighted in the ecological models. The present study identified a developmentally and ethnically sensitive, ecologically-based model of PTSD in maltreated youth by incorporating and evaluating key theoretical factors from each of these models.

## **Risk Factors of Maltreated Youth with PTSD**

Previous research has identified numerous correlates and hypothetical risk factors of child maltreatment and PTSD, but few factors have been empirically tested.

Established risk factors will be reviewed next with discussion of outstanding research questions. The primary goals of this section will be to identify factors that place youth at risk for maltreatment and PTSD and related symptoms.

### **Trauma**

Trauma exposure is the primary risk factor for PTSD, and this section will concentrate on maltreatment and removal from home. All types of child maltreatment have been linked to PTSD, with different types relating to different outcomes (English, Upadhyaya, et al., 2005). Neglect has been implicated in the development of PTSD, though empirical findings are limited (Milot, Éthier, et al., 2010, Milot, St-Laurent, 2010; Schneider, Ross, Graham, & Zielinski, 2005; Wechsler-Zimring & Kearney, 2011). Neglected children frequently lack interpersonal relationships with adults that foster emotional regulation and processing (Milot, St-Laurent, et al., 2010). Neglected children tend to demonstrate poorer cognitive functioning and academic achievement than non-neglected peers, and such variables have been associated with greater PTSD symptoms (De Bellis, Hooper, Spratt & Wooley, 2009).

Physical maltreatment is also associated with high risk for PTSD (Kearney et al., 2010) and has been linked to complex PTSD in adults (Spitzer, Chevalier, Gillner, Freyberger, & Barnow, 2006). Sexual maltreatment may be the most likely to result in PTSD, depressive, and dissociative symptoms (Oddone Paolucci et al., 2001; Ozbaran et al., 2009; Silberg, 2000), possibly due to elevated levels of shame, guilt, and secrecy.



Exposure to intimate partner violence also places youth at significant risk for PTSD. Intimate partner violence constitutes a traumatic event and reflects family functioning risk factors (i.e., low cohesion and high conflict). Multiple studies have found similar levels of PTSD and related symptoms in youth who experience direct child maltreatment and youth who are exposed to intimate partner violence, suggesting that intimate partner violence may be a particularly traumatic event (Bogat et al., 2006; Carpenter & Stacks, 2009; Jarvis et al., 2005; Kilpatrick & Williams, 1998; Lang & Stover, 2008; Lehmann & Elliston, 2001; Levendosky et al., 2002; Mertin & Mohr, 2002). Exposure to intimate partner violence may be more predictive of PTSD symptoms than any other family factor in maltreated youth (Kilpatrick & Williams, 1998).

Exposure to multiple trauma events, multiple types of maltreatment, and ongoing maltreatment significantly elevate risk for PTSD. Reid and Sullivan (2009) noted the importance of considering multiple types of victimization, including child maltreatment, inadequate parental supervision, school violence, bullying, and family adversity on child outcomes. MacDonald and colleagues (2010) found that number of traumatic events, including traumatic maltreatment events, related to higher rates of PTSD, depression, and substance use disorder. English, Graham, and colleagues (2005) posed that chronicity may be the most important factor predicting child psychological functioning following maltreatment. Clemmons and colleagues (2007) found that multiple types of maltreatment were associated with more severe maltreatment and greater trauma symptoms in undergraduate students.

Separation from parents or caregivers and placement in foster care may constitute a discrete traumatic event for maltreated youth. Bruska (2008) concluded that most

children in foster care experience significant negative effects following removal from parent care and placement in foster care. Kolko and colleagues (2010) found significantly higher rates of PTSD in youth placed in out-of-home care (19.2%) than those maintained at home (10.7%). McMahon and Clay-Warner (2002) found that removing a child from a maltreating home increased the likelihood of arrest in adulthood, except in children who experienced multiple family moves and/or separations in the maltreating home. Placement in foster care may also increase child risk for PTSD via exposure to additional maltreatment (Overcamp-Martini & Nutton, 2009). Others, however, report that children placed in foster care may have better outcomes following maltreatment (Johnson, Yoken, & Voss, 1995).

### **Age**

Developmental traumatology and psychobiological models of PTSD and child maltreatment outcomes suggest that younger maltreated children will experience more severe developmental disruptions than older peers (English, Graham, et al., 2005; Fletcher, 1996, 2003; McCutcheon et al., 2010). Younger children may also be at increased risk for depression and dissociative symptoms related to maltreatment, and these symptoms may worsen as a child ages (Brunner et al., 2000; Harkness & Lumley, 2008; Haugaard, 2004b; Monroe & Harkness, 2005; Ogawa et al., 1997).

Younger age at onset of maltreatment frequently equates to additional risk factors for PTSD. When maltreatment occurs early in life, youth experience more maltreatment types and incidences, as well as other trauma events over time (Keane et al., 2006; Luthra et al., 2009; MacDonald et al., 2010; Suliman et al., 2009). Younger age at maltreatment onset may also relate to deficits in attachment, parenting skills and functioning, and

disrupted family environment. Older children and adolescents who experienced ongoing maltreatment from a young age may thus exhibit more PTSD and related symptoms than same-aged peers with less maltreatment history (Lansford et al., 2002). Conversely, older age at onset of maltreatment may be associated with increased resilience due to healthier parent and family functioning early in life.

Young children thus are expected to suffer the most severe PTSD and related symptoms following maltreatment. Older children and adolescents who experienced chronic or recurring maltreatment from a young age are also expected to experience severe PTSD and related symptoms. PTSD is more frequently diagnosed in adolescents than children regardless of trauma history (Copeland et al., 2007). Studies of PTSD symptomatology by age rarely control for trauma history or family environment, both of which are important considerations in child maltreatment and PTSD. The present study addressed this oversight by examining the contributions of age group, trauma history, and family factors within an empirically-supported model of PTSD in maltreated youth.

### **Gender**

Boys and girls are at equal risk for most types of maltreatment, though girls are at greater risk for sexual maltreatment (U.S. Department of Health and Human Services, 2010). Females are also at increased risk for PTSD following all types of trauma (Blain et al., 2010), though the reasons for this gender difference are unclear (Kimerling et al., 2007; Lonigan et al., 2003; Pratchett et al., 2010). MacDonald and colleagues (2010) found that girls experienced slightly more potentially traumatic events than boys but were significantly more likely than boys to have PTSD. In addition, girls experienced

significantly more comorbidity. Boys, however, reported greater rates of substance use disorder.

Boys and girls may differ in symptom expression following maltreatment. Boys are more likely to engage in externalizing behaviors consistent with hyperarousal symptoms, whereas girls are more likely to experience internalizing symptoms consistent with re-experiencing and avoidance (Davis & Siegel, 2000; De Bellis & Van Dillen, 2005; Reebye et al., 2000; Silva et al., 2000; Tolin & Foa, 2006; Walker et al., 2004). Girls may also be more willing to seek and receive social and therapeutic support following maltreatment. PTSD symptoms may also vary by gender depending on trauma type. Some studies (e.g., Dykman et al., 1997; Elklit et al., 2002; Schraedley et al., 1999), but not all (e.g., Maikovich et al., 2009) indicate higher rates of PTSD and depression in male than female victims of sexual maltreatment. More research is needed to determine whether boys are at risk for different or more severe psychopathology than girls following sexual maltreatment.

Consistent gender differences in PTSD prevalence rates and symptomatology indicate that different factors may contribute to PTSD in maltreated boys and girls. No mediating variables between genders have been examined. For example, depression may play a stronger mediating role in PTSD symptoms in girls than boys. This study will therefore examine the applicability of the Lemos-Miller and Kearney (2006) model to boys and girls separately.

### **Race, Ethnicity, and Cultural Factors**

Racial, ethnic, and cultural factors may play an integral role in PTSD development, symptom expression, and outcomes in maltreated youth (Ferrari, 2002;

Triffleman & Pole, 2010). Some cultural and religious beliefs and practices may increase risk for maltreatment and PTSD in ethnic minority groups. Beliefs regarding appropriate child rearing practices and maltreatment, poverty, lack of social services, neighborhood deterioration, stressful effects of migration, harmful health care and disciplinary practices, and other practices such as ritual circumcision may lead directly to child maltreatment trauma (Goodman, Bottoms, Redlich, Shaver, & Diviak, 1998; Ramos & Boyle, 2001; Westby, 2007). Other cultural and religious attitudes and beliefs commonly associated with minority ethnic groups may enhance resilience in youth and blunt some effects of maltreatment including PTSD (Bracey et al., 2004; Murry, Bynum, et al., 2001; Phillips, 2004; Tummala-Narra, 2007). Furthermore, concepts of “normal” and “abnormal” experiences, reactions to trauma, symptom expression, and help-seeking behaviors vary across ethnicity and culture. A child’s cultural background may thus influence maltreatment risk and symptom expression following maltreatment-related trauma (Triffleman & Pole, 2010; Tummala-Nara, 2007).

Few studies have focused on child maltreatment and PTSD among ethnic minorities or considered the influence of ethnic or cultural background on maltreatment-related trauma (Triffleman & Pole, 2010). Extant findings are inconsistent but suggest that ethnic and racial minorities may be at increased risk for child maltreatment, other trauma exposure, and posttraumatic symptoms than European Americans (Kearney et al., 2010; Khaylis, Waelde, & Bruce, 2007; Sanchez-Hucles, 1998; Triffleman & Pole, 2010; Zyromski, 2007). Symptom expression may differ across ethnic groups. However, some ethnic groups may actually be at decreased risk for child maltreatment and PTSD (Bracey et al., 2004; Murry, Smith, et al., 2001; Phillips, 2004; Tummala-Narra, 2007).

Hispanic youths, particularly females, demonstrate greater psychopathology following maltreatment than European American or African American youth (Abram et al., 2004; Mennen, 2004; Phillips-Sanders et al., 1995). Hispanic youth may be at increased risk for psychopathology following maltreatment for various reasons. Cultural ideals regarding family unity may prevent youth from revealing abuse or seeking help. Hispanic mothers may also focus on family preservation or support a perpetrator who is the financial provider (Fluke, Yuan, Hedderson, & Curtis, 2003; Moisan, Sanders-Phillips, & Moisan, 1997). Cultural and religious ideals about premarital sex may prevent youth from disclosing sexual maltreatment (Fluke et al., 1995). These factors may contribute to a child's feelings of guilt, helplessness, and lack of control that contribute to elevated levels of depression and PTSD (Fluke et al., 1995; Moisan et al., 1997).

Others report that African American youths are at greater risk for PTSD and negative outcomes following maltreatment than European American or Hispanic youths (Andres-Hyman et al., 2004; Paxton, Robinson, Shah, & Schoeny, 2004). Lemos-Miller and Kearney (2006), however, found that African American status weakened the relationship between trauma-related cognitions and dissociation and PTSD symptoms, implicating African American status as a potential resiliency factor. Emotional support, church membership, and extended family networks may have buffered against psychopathology for maltreated African American youth (Lemos-Miller & Kearney, 2006; McRae et al., 1998; Murry et al., 2001). Additionally, African American families are often headed by single females and maltreatment is usually perpetrated by someone outside the home. A child may thus find it easier to disclose maltreatment to family

members and receive maternal support (Rao et al., 1992). Other research, however, has not found social support to protect against PTSD symptoms among African American adolescent males exposed to community violence and victimization (Paxton et al., 2004). African American children are more likely to have witnessed several other traumatic events in their lives, which may explain why some find high levels of anger and aggression in this population (Shakoor & Chalmers, 1991).

A study of trauma-related outcomes in 131 refugee children revealed high rates of psychopathology such as adjustment disorders, major depressive disorder, PTSD, attention deficit hyperactivity disorder, disruptive behavior, learning disability, cognitive disability, or mental retardation. One-quarter of children exposed to domestic violence (28% of total sample) also had PTSD (Kinzie et al., 2006). Clemmons and colleagues (2003) noted that child maltreatment, PTSD, and other negative outcomes among recent immigrants and refugees likely relate to prior trauma exposure (i.e., war in country of origin), cultural differences in child rearing practices, disruption of social support systems, individual and family acculturation level, and ability to cope with cultural conflicts (Clemmons et al., 2003; Ima & Hohm, 1991). However, the exact nature of these contributions remains unclear (Clemmons et al., 2003).

Research regarding ethnicity in child maltreatment and PTSD has several drawbacks. Small samples have been used, thus limiting generalizability of findings and possibly accounting for inconsistent findings. Researchers have also failed to report the additional unique stressors minorities face, including exposure to more discrimination, racism, and violence than majority groups (Triffleman & Pole, 2010). No data have been reported on unique or additional stressors or trauma events in maltreated youth. The

present study addressed these limitations by providing empirical data regarding trauma history and PTSD in a large, ethnically diverse sample of maltreated adolescents.

### **Family Factors**

Family demographic characteristics associated with increased risk for child maltreatment or PTSD include low socioeconomic status, poverty, homelessness, parent unemployment, single parent households, and households with 4+ children (Read et al., 2011; Sedlak et al., 2010; Springer & Padgett, 2000). However, these factors have not been examined with respect to maltreatment with PTSD. Family functioning and psychological characteristics also associated with increased risk for child maltreatment and/or PTSD include parent-child attachment, family stress (Read et al., 2011; Sedlak et al., 2010), spousal verbal and physical aggression, intimate partner and family violence (Carpenter & Stacks, 2009; Lehmann 2000; Margolin & Gordis, 2000; Jarvis et al., 2005; Kilpatrick & Williams, 1998; McCloskey & Walker, 2000; Mertin & Mohr 2002), maternal depression, adjustment, and parenting style (Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009; Rossman & Ho, 2000; Sprang et al., 2005), parental mental disorder (Dixon et al., 2005), parental alcohol and substance use (Hanson et al., 2006; Kolko et al., 2010), primary caregiver's intellectual and physical impairment, impaired parenting skills, young parental age (Dixon et al., 2005), and history of maltreatment of parent (Kolko et al., 2010; Noll et al., 2009). Unfortunately, little empirical research examines these risk factors in child maltreatment and PTSD concurrently. The few available studies focus primarily on young children (e.g., attachment) or adults (e.g., intimate partner violence/relationships), overlooking the role of family functioning in adolescent psychopathology.



Strong family cohesion and parental support may protect against PTSD symptom severity in maltreated youth and poor family cohesion may be associated with negative outcomes (Bevan & Higgins, 2002; Bokszczanin, 2008; Higgins & McCabe, 2000; Rossman & Ho, 2000). Family conflict may exacerbate PTSD symptom severity in maltreated youth (Bevan & Higgins, 2002; Bokszczanin, 2008; Higgins & McCabe, 2000). Intimate partner violence is highly correlated with youth posttraumatic symptoms and indicates elevated family conflict (Carpenter & Stacks, 2009; Lehmann 2000; Margolin & Gordis, 2000).

One dimension of family cohesion is parent-child attachment. Poor early attachment is an established outcome of early childhood maltreatment (Baer & Martinez, 2006; Bowlby, 1977, 1980) and a risk factor for subsequent maltreatment (Briere & Jordan, 2009). The poor early and ongoing attachment patterns seen in maltreated youth interfere with development of emotional processing and responsiveness as well as consolidation of self-concept and identity. These developmental deficits lead to reliance on extreme survival-based behaviors, poor behavioral and emotional regulation, affect dysregulation, inappropriate fear processing, persistent guilt and self-blame, depression, maladaptive dissociation, mistrust, aggression, hostility, executive functioning deficits, inattention, poor coping ability, poor attachment in adulthood, revictimization, and PTSD symptoms, among other problems (Ayoub, Fischer, & O'Connor, 2003; Ayoub et al., 2006; Bailey, Moran, & Pederson, 2007; Bowlby, 1977,1980; Briere & Jordan, 2009; Cook et al., 2005; Reyome, 2010; Stein, 2006; Webster, Hackett, & Joubert, 2009).

Deblinger, Steer, and Lippman (1999) examined maternal adjustment and parenting style on children's psychological adjustment following sexual maltreatment.

Sexually maltreated children aged 7-13 years and their non-offending mothers completed a battery of standardized parent and child self-reports. Maternal self-reported depression significantly contributed to child PTSD symptom expression and mother-reported child internalizing behavior problems. Child perception of a rejecting maternal parenting style contributed to child depression levels. Child perception of maternal use of guilt and anxiety-provoking parenting methods also contributed to increased levels of PTSD symptoms and parent-reported externalizing behavior problems.

Bal and colleagues (2004) investigated maltreatment-related symptoms and family functioning among sexually maltreated adolescents. Many (53%) participants reported clinically significant trauma-related symptoms. Intrafamilial sexually maltreated adolescents did not report more symptoms than extrafamilial sexually maltreated adolescents. Maltreatment type did not account differences in symptom presentation. Family cohesion, however, independently contributed to internalizing posttraumatic symptoms (Bal, De Bourdeaudhuij, Crombez, & Van Oost, 2004).

Broman-Fulks and colleagues (2007) examined the relationship between mental health outcomes and sexual assault disclosure among adolescent sexual assault victims. Adolescents who disclosed the assault to another person within one month of the event were at lower risk of current major depressive episode and delinquency. No relationship was identified between time to disclosure and risk for PTSD, but those adolescents who did disclose the assault to mothers were at significantly reduced risk for current PTSD and delinquency. These findings reflect the protective nature of parental support.

Higgins and McCabe (2000) explored interrelationships among maltreatment type, childhood family environment characteristics, and current psychological adjustment

in adulthood including trauma symptoms and self-deprecation. Low family cohesion and adaptiveness, high parental punitiveness, and poor quality inter-parental relationships predicted child maltreatment, childhood trauma, and adult adjustment problems (Higgins & McCabe, 2000).

Low family support may place already anxious children at increased risk for trauma-related anxiety following exposure to community violence (White et al., 1998). Prior poor family cohesion and parental supervision patterns were similarly associated with elevated risk for PTSD in adolescents following Hurricane Katrina (Rowe, La Greca, & Alexandersson, 2010). Problems in family functioning such as low cohesion are also associated with posttraumatic stress symptoms and dissociation in runaway adolescents exposed to interpersonal violence and victimization (McCarthy & Thompson, 2010). Narang and Contreras (2005) found that family environments high in conflict and low in cohesion and expressiveness contributed to greater dissociative symptoms following maltreatment. The dissociative symptoms, in turn, significantly mediated history of childhood physical maltreatment and current potential for physically abusing one's child (Narang & Contreras, 2005).

### **Depression**

Family factors such as cohesion and conflict contribute significantly to child maltreatment and subsequent depression and PTSD (Brown et al., 1999; Harkness & Lumley, 2008). Depression has been repeatedly identified as a comorbid disorder, is associated with higher PTSD and other symptom severity, and may predict PTSD in child and adult maltreatment victims (Allen & Tarnowski, 1989; Ariga et al., 2008; Boney-McCoy & Finkelhor, 1996; Finzi et al., 2001; Fletcher, 1996; Kolko et al., 2010; Lemos-

Miller & Kearney, 2006; Linning & Kearney, 2004; Storr, Lalongo, Anthony, & Breslau, 2007). Maltreated children with PTSD and depression report greater levels of intrusive PTSD-related symptoms than those with PTSD only. This is especially true for flashbacks, amnesia, and sleep problems (Runyon, Faust, & Orvaschel, 2002).

Depression and PTSD likely develop in tandem in maltreated youth, but depression may also contribute to risk for PTSD by increasing vulnerability to traumatic symptoms following trauma (Kearney et al., 2010; Lemos-Miller & Kearney, 2006). Specifically, the mechanisms that contribute to depression in maltreated youth (i.e., negative cognitive schemas, biological stress response, and increased stress sensitivity) (Harkness & Lumley, 2008) also contribute to youth vulnerability for PTSD and other psychopathology. Depression may also prevent maltreated youth and their families from seeking and/or benefiting from treatment for trauma-related symptoms.

Depression clearly plays an integral role in the development and maintenance of PTSD in maltreated youth. However, few studies have examined the role of depression in PTSD across demographic groups (i.e., age, gender, and ethnicity). Additionally, the role of depression has not been examined within a model that also includes other mediating variables such as dissociation and trauma-related cognitions. The present study addressed these limitations by evaluating the mediating role of depression within a developmentally and ethnically sensitive, ecologically-based model of PTSD in maltreated youth.

### **Dissociation**

Child maltreatment frequently leads to acute and chronic dissociation and is closely associated with PTSD symptoms (Carrion & Steiner, 2000; Coons, 1996;

Ginzburg et al., 2006; Pfefferbaum, 2005). Acute dissociation during a trauma event is associated with increased risk for subsequent PTSD (Carrion et al., 2002; Pfefferbaum, 2005). Chronic, repetitive, or persistent dissociation is common in maltreated children who face recurring trauma. Chronic dissociation may interfere with the use and development of positive social skills with caregiver, teachers, and peers, and result in poor attention and memory integration in school and other learning environments (Ayoub et al., 2006; Bidell & Fischer, 2000; Haugaard, 2004b). Ongoing use of dissociation likely leads to social isolation and ineffectiveness, anhedonia, poor self-esteem, and problematic cognitive and memory processes that enhance a child's risk for PTSD (Lemos-Miller & Kearney, 2006).

Maladaptive dissociation is also associated with behavioral and emotional dysregulation problems in many people with complex PTSD (Briere & Spinazzola, 2006). Affect dysregulation may result from extended periods of dissociation that prevent a child from moderating emotions or may result from problematic methods of thinking, remembering, or perceiving (Ford, 2005). Emotional and behavioral dysregulation consistent with dissociation play a key role in PTSD symptom development and maintenance following family violence (El-Sheikh, Cummings, Kuoros, Elmore-Staton, & Buckhalt, 2008). Problems with affect regulation interfere with remediation of traumatic, depressive, and dissociative emotions and cognitions (Ford, 2005). Affect dysregulation also contributes to revictimization of maltreatment victims later in life (Dietrich, 2007).

Dissociation thus plays a significant role in PTSD onset, maintenance, and outcomes following child maltreatment. However, few studies have examined the role of

dissociation in PTSD across demographic groups (i.e., age, gender, and ethnicity). This is particularly unfortunate because dissociation is strongly associated with age and developmental level. Dissociation may thus play a more central role in PTSD symptom expression in older children and adolescents. Additionally, the role of dissociation has not been examined within a model that also includes other mediating variables. The present study addressed these limitations by evaluating the mediating role of dissociation in an empirically-supported model of PTSD in maltreated youth.

### **Cognitive Factors**

Studies of family functioning, depression, dissociation, and models of PTSD development highlight the importance of cognitive factors in PTSD symptomatology. Maltreated youth frequently endorse negative cognitions and display cognitive disruption that increases over time. Cognitive factors important to PTSD in maltreated youth include cognitive schemas, cognitive distortions, attentional bias, impaired executive functioning, and disrupted emotional regulation. The present study was primarily concerned with cognitive distortions (i.e., maladaptive posttraumatic cognitions), though types of cognitive disruptions related to child maltreatment frequently overlap and contribute to PTSD.

Runyon and Kenny (2002) compared physically and sexually maltreated youths aged 8-17 years and found that maltreatment type and negative explanatory style best predicted posttraumatic distress and depression. Physically maltreated youth displayed less trauma-related distress but were more prone to a negative explanatory style than sexually maltreated youth. The researchers speculated that sexually maltreated youth are more likely than physically maltreated youth to have a supportive non-offending parent.

Lower emotional competence and self-efficacy, or the belief that one is in control of one's emotional experiences, are linked to child sexual maltreatment and PTSD. This finding highlights the importance of cognitions and emotional regulation in PTSD. Researchers hypothesize that this link may help explain the frequency of depression in maltreated children (Diehl & Prout, 2002).

Lemos-Miller and Kearney (2006) found specific trauma-related cognitions to be significantly correlated with PTSD symptoms in maltreated adolescents. Negative thoughts about self, negative thoughts about the world, and self-blame significantly correlated with re-experiencing, avoidance/numbing, increased arousal, and distress aspects of PTSD. The relationship between trauma-related cognitions and PTSD symptoms was mediated and strengthened, however, by depression.

Child sexual maltreatment history, cognitive coping strategies, and PTSD symptoms were examined in Spanish college students. The sample included 138 victims of child sexual maltreatment and 138 participants with no maltreatment history. The victim group displayed significantly higher PTSD scores and lower coping strategy scores. Higher avoidance coping strategies scores related to higher PTSD scores. Furthermore, the effects of avoidance coping strategies were stronger in cases of chronic maltreatment than acute maltreatment, in intrafamilial than in extrafamilial maltreatment, and in victims than in non-victims. These findings confirm the notion that child sexual maltreatment affects a victim's coping strategies and subsequent PTSD. In addition, specific maltreatment characteristics (acute/chronic, perpetrator) impacted subsequent psychological functioning (Cantón-Cortés & Cantón, 2010).

Cognitive distortions play a significant role in PTSD onset, maintenance, and outcomes following child maltreatment (Muller & Lemieux, 2000, Muller, Lemieux, & Sicoli 2001, Muller, Sicoli, & Lemieux, 2000). In addition, specific cognitions and beliefs may place maltreated youth at risk for additional psychopathology, including depression. Specific family factors shape a child's sense of self and world view, and may lead to disrupted cognitive processes central to the developmental trauma model of PTSD (Downey, 1994; Harkness & Lumley, 2008). Unfortunately, however, little empirical evidence exists to support this notion. Additionally, few studies directly examine the role of trauma-related cognitions in child maltreatment, PTSD, and related symptoms. The literature is similarly scarce regarding the role of cognition across age, gender, and ethnic groups. The present study addressed these limitations by evaluating the mediating role of trauma-related cognitions within an empirically-supported model of PTSD in maltreated youth.

### **Summary of Findings Regarding Risk Factors of Maltreated Youth with PTSD**

Risk factors of maltreated youth with PTSD include trauma history, age, gender, ethnicity, family cohesion or conflict, and specific psychopathology. These risk factors interact and contribute to diverse outcomes for maltreated youth. The nature and effects of these interactions are largely unknown, but preliminary evidence suggests a complex model of PTSD in maltreated youth.

Type, severity, and frequency of trauma history relates to PTSD severity, symptom expression, comorbidity, and outcomes (Clemmons et al., 2007; English, Graham, et al., 2005; Kearney et al., 2010; MacDonald et al., 2010). Exposure to multiple trauma events, multiple types of maltreatment, and chronic maltreatment is



associated with the most severe PTSD and related problems (English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; MacDonald, 2010; Reid & Sullivan, 2009). Physical and sexual maltreatment also strongly predict PTSD (Kearney et al., 2010), and sexual maltreatment in particular may contribute to comorbid depression and dissociation due to avoidance coping strategies and trauma-related cognitions of guilt and shame. Neglect, exposure to intimate partner violence, and removal from home following maltreatment are under researched but may precipitate or exacerbate PTSD (Carpenter & Stacks, 2009; Kilpatrick & Williams, 1998; Wechsler-Zimring & Kearney, 2011).

Individual factors such as child age, gender, and ethnicity may moderate PTSD development and symptom expression in maltreated youth. Younger age of maltreatment onset likely places a child at greater risk for negative outcomes following maltreatment due to maltreatment severity and frequency, family risk factors, and limited individual protective factors (De Bellis, 2005; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Kolko et al., 2010; Pfefferbaum, 2005). Female gender may also be associated with more negative outcomes (Blain et al., 2010), though the relationship between gender and outcomes is less clear for sexual maltreatment (Dykman et al., 1997; Elklit et al., 2002; Schraedley et al., 1999). Many questions remain regarding the role of ethnicity as a potential risk or resiliency factor (Lemos-Miller & Kearney, 2006; Triffleman & Pole, 2010).

Family factors also contribute to trauma-related outcomes in maltreated youth. Poor early attachment may indicate presence of or risk for child maltreatment and may contribute to poor outcomes following trauma events (Muller, & Lemieux, 2000; Muller et al., 2001; Twaite & Rodriguez-Srednicki, 2004). Parental history of maltreatment,

interparental and intimate partner violence, and other parent mental health problems increase risk for child maltreatment and PTSD (Dixon et al., 2005; Duggan et al., 2009; Hanson et al., 2006; Kolko et al., 2010). Family environment factors have not received much attention in the research literature, but family conflict and cohesion appear to influence child mental health outcomes (Burton & Jarrett, 2000; Carlson et al., 2001; Higgins & McCabe, 2000; Usta & Farver, 2010). The importance of family cohesion and conflict may vary as a function of youth age, but there is no empirical evidence regarding this notion.

Depression, dissociation, and disrupted cognitive functioning may predate, co-occur with, or follow PTSD in maltreated youth. These symptoms likely exacerbate negative outcomes in maltreated youth and may interfere with treatment of PTSD (Kearney et al., 2010). Depression and dissociation directly contribute to PTSD in maltreated youth (Carrion et al., 2002; Harkness & Lumley, 2008; Lemos-Miller & Kearney, 2006; Pfefferbaum, 2005). Additionally, depression, dissociation, and trauma-related cognitions are closely related and the presence of one influences another. Unfortunately, the influence of these symptoms on PTSD has not yet been evaluated in an integrated, ecologically-based model. Additionally, no studies have examined the relationships of these psychological factors across demographic groups such as age, gender, and ethnicity.

## **Purpose of the Present Study**

Developmental traumatology and psychobiological models of PTSD in maltreated youth involve a cascading sequence of events wherein child maltreatment alters psychological and neurological functioning. These alterations disrupt normal development and lead to deficits in executive functioning, self-regulation, and emotional processing. Deficits further interfere with cognitive, behavioral, psychological, and physical development. Other theoretical models of child maltreatment and PTSD emphasize the importance of specific child, family, and environmental factors in the development and maintenance of PTSD and other trauma-related symptoms in maltreated children. Unfortunately, little empirical research has directly tested these models (Cicchetti, 2004; Costello et al., 2002; Fletcher, 2003; La Greca et al., 1996; Pynoos et al., 1999; Salmon & Bryant, 2002; Udwin et al., 2000).

The model proposed by Lemos-Miller and Kearney (2006) appears to be the first empirically supported model of PTSD in maltreated youth. However, this study was limited by small sample size and few variables. The first aim of the present study was to replicate the original findings. In accordance with the Lemos-Miller and Kearney model, depression was expected to mediate the relationship between (1) dissociation and trauma-related cognitions and (2) PTSD symptoms.

The second aim of the present study was to evaluate the applicability of the Lemos-Miller and Kearney model across key demographic groups (i.e., age, gender, and ethnicity). Child age, gender, and ethnicity are associated with varied risk for maltreatment, PTSD, and related symptomatology and these factors may influence PTSD development and symptom expression in maltreated youth. Unfortunately, the

contributions of these factors have not been evaluated within the Lemos-Miller and Kearney model or any other integrated, ecologically based, and developmentally and culturally sensitive model of PTSD in maltreated youth (Lemos-Miller & Kearney, 2006; Triffleman & Pole, 2010). The present study addressed this gap by evaluating the applicability of the Lemos-Miller and Kearney model across key variables. The model was expected to have better fit for older youths, females, and certain ethnic groups.

Younger age at time of the first trauma and earlier onset of maltreatment are associated with greater PTSD related symptom severity and developmental disruption (De Bellis, 2005; English, Upadhyaya, et al., 2005; Fletcher, 2003; Keane et al., 2006; Kolko et al., 2010; Luthra et al., 2009; MacDonald et al., 2010; McCutcheon et al., 2010; Pfefferbaum, 2005). Trauma-related symptoms become more disruptive as children age. This may explain why PTSD is more commonly diagnosed in older children and adolescents than in young children (Copeland et al., 2007). The Lemos-Miller and Kearney model was thus expected to have better fit for older (14-17 years) than younger (11-13 years) youth.

Girls and young women are more susceptible to trauma-related symptoms than boys and young men (Greenwald, 2002; Johnson et al., 2002; Wolfe et al., 2001). Consistent gender differences in PTSD prevalence rates and symptomatology indicate that different factors may contribute to PTSD in maltreated boys and girls. No mediating variables regarding gender have been examined, but depression may play a stronger mediating role in PTSD symptoms in girls than boys. The Lemos-Miller and Kearney model was thus expected to have better fit for females than males. .

Boys who identify sexual maltreatment as a traumatic event may exhibit PTSD, depression, and dissociation symptoms and maladaptive cognitions similar to sexually maltreated girls, but findings are inconsistent (Dykman et al., 1997; Elklit et al., 2002; McMackin et al., 2002; Schraedley et al., 1999). A secondary aspect of this hypothesis was that the Lemos-Miller and Kearney model would have better fit for sexually maltreated males than non-sexually maltreated males. However, this hypothesis could not be tested via SEM due to small sample size of sexually maltreated males ( $n = 12$ ).

Model fit may also vary across ethnic groups and many questions remain regarding the role of ethnicity as a potential risk or resiliency factor (Lemos-Miller & Kearney, 2006; Triffleman & Pole, 2010). The original findings by Lemos-Miller and Kearney indicate that the model may be a better fit for multiracial individuals than African Americans. Minority ethnic group membership is likely associated with greater PTSD symptom severity following trauma (Duran, 2004; Triffleman & Pole, 2010). Multiracial (Lemos-Miller & Kearney, 2006), Native American (Gnanadesikan et al., 2005), and Hispanic (Abram et al., 2004; Mennen, 2004) youth appear to be at greatest risk for negative sequelae. In addition, some researchers report racial/ethnic differences in trauma symptoms after maltreatment (Bracey et al., 2004; Murry, Bynum, et al., 2001; Phillips, 2004; Shen, 2009; Triffleman & Pole, 2010; Tummala-Narra, 2007). However, as Triffleman and Pole (2010) report, few researchers have examined ethnicity within this population. The present study addressed this limitation by testing the Lemos-Miller and Kearney model across African American, Hispanic, European American, and multiracial groups.

The third aim of the present study was to evaluate potential mediating roles of other psychological risk factors for PTSD. The mediating roles of trauma history, family cohesion and conflict, depression, dissociation, and trauma-related cognitions are well supported in the literature but have not been simultaneously evaluated within a single, integrated model of PTSD in maltreated youth. Type and frequency of maltreatment significantly influence the severity of PTSD symptoms (Copeland et al., 2007; De Bellis & Van Dillen, 2005; Keane et al., 2006; Luthra et al., 2009). The presence of additional trauma in conjunction with child maltreatment also exacerbates trauma symptoms (MacDonald et al., 2010; Reid & Sullivan, 2009). Trauma history, including maltreatment, was thus expected to mediate the relationship between (1) depression, dissociation, and trauma-related cognitions and (2) PTSD symptoms.

Low family cohesion and high family conflict in particular may also increase risk for posttraumatic stress and contribute to symptom severity in maltreated youth. This notion is based on several studies indicating that low family cohesion and more conflict may relate to child maltreatment and greater psychological symptoms following trauma exposure (Higgins & McCabe, 2000; Higgins, McCabe, & Ricciardelli, 2003; Rowe et al., 2010; White et al., 1998). Family cohesion and conflict were thus expected to mediate the relationship between (1) depression, dissociation, and trauma-related cognitions and (2) PTSD symptoms.

Dissociation also plays an essential role in PTSD following maltreatment. Dissociative and posttraumatic symptoms share many features and exacerbate one another. Chronic dissociation leads to depressive and posttraumatic symptoms as well as failure to integrate memory for traumatic events (Ayoub et al., 2006; Bidell & Fischer, 2000; Macfie

et al., 2001). Persistent dissociation may impact emotional regulation, social skills, and attention and memory integration (Haugaard, 2004b). Dissociation was thus expected to mediate the relationship between (1) depression and trauma-related cognitions and (2) PTSD symptoms.

Maladaptive trauma-related cognitions also play a central role in PTSD following maltreatment. Negative view of self strongly predicts PTSD following maltreatment (Muller & Lemieux, 2000; Muller et al., 2001; Muller et al., 2000; Runyon & Kenny, 2002). Negative thoughts about self, negative thoughts about the world, and self-blame are associated with re-experiencing, avoidance/numbing, increased arousal, and distress aspects of PTSD (Lemos-Miller & Kearney, 2006; Linning & Kearney, 2004).

Maladaptive trauma-related cognitions were thus expected to mediate the relationship between (1) depression and dissociation and (2) PTSD symptoms.

### **Hypotheses**

The first hypothesis was that the Lemos-Miller and Kearney (2006) model of PTSD in maltreated adolescents would demonstrate adequate fit in a larger, more ethnically diverse sample of maltreated adolescents. Depression as measured by the Children's Depression Inventory (CDI) was expected to mediate the relationship between (1) dissociation as measured by the Adolescent Dissociative Experiences Scales (A-DES) and trauma-related cognitions as measured by the Posttraumatic Cognitions Inventory (PTCI) and (2) PTSD symptoms as measured by the Children's PTSD Inventory (CPTSD-I). This hypothesis was supported by the original study (Lemos-Miller & Kearney, 2006) and additional research highlighting the integral role of depression in

PTSD and related symptoms (Harkness & Lumley, 2008; Runyon et al., 2002, Storr et al., 2007).

The second hypothesis was that the Lemos-Miller and Kearney model would have better fit for older (aged 14-17 years) than younger (aged 11-13 years) youth. This hypothesis was based on evidence that PTSD is more often diagnosed in older children and adolescents (Copeland, 2007). Adolescents may be at increased risk for PTSD and negative outcomes due to long-term maltreatment and persistent family and individual risk factors (De Bellis, 2005; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Kolko et al., 2010; Pfefferbaum, 2005).

The third hypothesis was that the Lemos-Miller and Kearney model would have better fit for females than males. Females are at greater risk for maltreatment and PTSD, and PTSD in females is associated with greater comorbidity and more negative outcomes (Blain et al., 2010). Consistent gender differences in PTSD prevalence rates and symptomatology indicate that different factors may contribute to PTSD in maltreated boys and girls.

The fourth hypothesis was that the Lemos-Miller and Kearney model would have different fit among ethnic groups. The Lemos-Miller and Kearney model was expected to have better fit for Hispanic and multiracial youth than European American and African American youth. The original study lends some support for this hypothesis. Other findings, however, regarding the role of ethnicity in PTSD and maltreatment are mixed (Bracey et al., 2004; Ferrari, 2002; Khaylis et al., 2007; Murry, Bynum, et al., 2001; Phillips, 2004; Sanchez-Hucles, 1998; Triffleman & Pole, 2010; Tummala-Narra, 2007;



Zyromski, 2007). Ethnic groups in the present study (African American, European American, Hispanic, and multiracial) were examined independently.

The fifth hypothesis was that trauma history would mediate the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I). This hypothesis was based on extensive empirical evidence implicating frequency and severity of trauma history in psychopathology (Clemmons et al., 2007; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Kearney et al., 2010; MacDonald et al., 2010). A trauma history score was derived from the CPTSD-I.

The sixth hypothesis was that family cohesion as measured by the Family Environment Scale (FES) would mediate the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I). The seventh hypothesis was that family conflict (FES) would mediate the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I). These hypotheses were based on extensive research on attachment (Muller, & Lemieux, 2000; Muller et al., 2001; Twaite & Rodriguez-Srednicki, 2004), parent factors (Dixon et al., 2005; Duggan et al., 2009; Hanson et al., 2006; Kolko et al., 2010), and preliminary research indicating that family cohesion and conflict are associated with PTSD symptomatology following traumatic events, including maltreatment (Burton & Jarrett, 2000; Carlson et al., 2001; Higgins & McCabe, 2000; Usta & Farver, 2010).

The eighth hypothesis was that dissociation (A-DES) would mediate the relationship between (1) depression (CDI) and trauma-related cognitions (PTCI) and (2)

PTSD symptoms (CPTSD-I). The ninth hypothesis was that trauma-related cognitions (PTCI) would mediate the relationship between (1) depression (CDI) and dissociation (A-DES) and (2) PTSD symptoms (CPTSD-I). Like depression, dissociation and trauma-related cognitions are thought to play a central role in the onset, development, and maintenance of PTSD (Carrion et al., 2002; Harkness & Lumley, 2008; Lemos-Miller & Kearney, 2006; Pfefferbaum, 2005).

CHAPTER 3  
METHODOLOGY

**Participants**

Participants included 350 adolescents referred from Department of Family Services (DFS)-related sites in Las Vegas, Nevada. Participants were 189 females, 159 males, and 2 transgender (male to female) persons. Participants were aged 11-17 years ( $M = 14.06$ ,  $SD = 1.75$ ). Most (60.9%) were aged 14-17 years. Many (74.3%) lived with a single parent before entering DFS care. Many (48.8%) had 4+ siblings ( $M = 4.05$ ;  $R = 0-20$ ). Fourteen participants (4%) had children of their own or were currently pregnant. An additional 3 females (0.8%) reported prior miscarriages. Youth were African American (28.6%), multiracial (25.4%), European American (24.9%), Hispanic (14.3%), Native American (2.0%), Asian American (1.7%), or other (3.1%).

**Measures**

**Demographic/Information Sheet**

A demographic/information sheet was used to solicit information on age, gender, race/ethnicity, country of origin, biological parent race/ethnicity, parental marital status, family size, religion, languages spoken in the home, and youth experience with drugs and alcohol (Appendix I). Addendum questions were administered verbally to adolescents during the clinical interview. These questions assessed type, frequency, and perpetrators of maltreatment, reasons for placement in DFS care, and exposure to violence within and outside of the family. Adolescents were also asked about previous personal and familial mental health issues.

### **Children's PTSD Inventory (CPTSD-I)**

The Children's PTSD Inventory is a semi-structured interview to assess DSM-IV PTSD symptoms in youths aged 7-18 years (Saigh et al., 2000). Interview administration lasted 15-20 minutes in youths who report a traumatic event. Interview questions assess individual PTSD symptoms via 5 subscales: exposure to trauma, re-experiencing symptoms, avoidance and numbing symptoms, increased arousal, and significant distress. The CPTSD-I also assesses duration of distress for each symptom. The CPTSD-I yields a total score and diagnoses of negative, acute PTSD, chronic PTSD, delayed onset PTSD, and no diagnosis. A CPTSD-I total score of 4 or 5 (out of 6 possible) indicates the presence of significant posttraumatic symptoms in at least 2 of the 3 PTSD symptom clusters and indicates clinically significant PTSD. The present study used the re-experiencing symptoms, avoidance and numbing symptoms, increased arousal, and significant distress (i.e., B, C, D, and E) subscales.

The trauma history score (i.e., number of traumatic events) was derived from the exposure to trauma subscale. Each adolescent was provided with the prompt "Sometimes very scary things can happen to young people. Some of them have been badly beaten or taken away from their parents. Others have been hurt in accidents or fires. Sometimes people have done bad things to the private parts of young people. Children and teenagers have also been hurt in wars. Others have seen people who were badly injured or killed in their homes or neighborhoods. Has a very scary thing happened to you?" If the adolescent responded "yes," then she or he was prompted to "Tell me about it." The graduate student or clinician recorded the adolescent's description and then asked "Has another very scary thing happened to you?" This process continued until the adolescent

answered "no." The adolescent was then asked "Have you ever seen a very scary thing happen to someone else?" If the adolescent responded "yes," then she or he was prompted to "Tell me about it." The graduate student or clinician recorded the adolescent's description and then asked "Have you seen another very scary thing happen?" This process was continued until the adolescent answered "no." The total number of distinct trauma events reported was recorded as the trauma history score (for Hypothesis 5).

The CPTSD-I has good diagnostic internal consistency, interrater reliability, and test-retest reliability in traumatized and non-traumatized youth (Saigh et al., 2000; Yasik et al., 2001). Diagnostic internal consistency is high (Cronbach's alpha = .95) and the 5 subscales have good internal consistency (.53-.89). The present study found good internal consistency overall (.87) and for re-experiencing symptoms (.80), avoidance and numbing symptoms (.73), increased arousal (.74), and significant distress (.60). Interrater agreement for diagnosis is excellent (Cohen's kappa = .96) (Saigh et al., 2000). Interrater reliability for four subscales is also excellent (.84-1.00), though the situational reactivity subscale has lower reliability (.66). Test-retest reliability is excellent for diagnosis (.91) and good to excellent for the subscales (.78-1.00) (Saigh et al., 2000).

Content validity of the CPTSD-I is excellent with high levels of correspondence between the CPTSD-I and DSM-IV PTSD diagnostic criteria (Saigh et al., 2000). The CPTSD-I displays high concurrent validity with clinician-derived diagnoses as well as the Diagnostic Interview for Children and Adolescents-Revised PTSD module and Structured Clinical Interview for DSM (correlation coefficients = .93-.95). Moderate to high levels of sensitivity and specificity, as well as positive and negative predictive

power, were noted (Yasik et al., 2001). Convergent validity was reported as strong based on comparison with Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1985) and Children's Depression Inventory (CDI) (Kovacs, 1992). Good discriminant validity was established against the Junior Eysenck Personality Inventory (JEPI; Eysenck, 1963) (Yasik et al., 2001).

### **Children's Depression Inventory (CDI)**

The CDI is a 27-item self-report questionnaire that assesses severity of depressive symptoms over the past 2 weeks for youths aged 7-17 years (Kovacs, 1992). Each item is based on a 3-point response format from 0 (absence of the symptom) to 2 (definite symptom). The CDI yields a total depression score and subscale scores for negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem (Kovacs, 1992). The present study used all 5 subscale scores.

Good face validity (Helsel & Matson, 1984) and discriminant validity have been reported for the CDI (Liss, Phares, & Liljequist, 2001). The CDI also has good internal consistency (.83-.89) (Nelson, Politano, Finch, & Wendel, 1987; Smucker, Craighead, Craighead, & Green, 1986). The present study found good internal consistency overall (.58) and for negative mood (.76), interpersonal problems (.91), ineffectiveness (.61), anhedonia (.71), and negative self-esteem (.75). Test-retest reliability is good across 2, 4, and 6 weeks in non-clinical populations (.66-.82) (Finch, Saylor, Edwards, & McIntosh, 1987). Findings are similar in inpatient youth (Nelson & Politano, 1990).

Non-clinical normative data reveal a CDI total score mean of 9.09 (SD = 7.04) and a clinical cutoff score of 19 for males and females (Smucker et al., 1986). Carle and colleagues (2008) used confirmatory factor analysis to support the use of the CDI in

cross-gender comparisons. No statistically significant differences were found between boys and girls on the CDI total score and four scores created as a function of the factor model. However, girls endorsed statistically significant elevated levels on a dysphoria score (Carle, Millsap, & Cole, 2008). Few socioeconomic status and ethnic differences have been reported, though Twenge and Nolen-Hoeksema (2002) reported significantly higher CDI scores among Hispanic samples than other ethnic groups.

### **Adolescent Dissociative Experiences Scale (A-DES)**

The A-DES is a 30-item self-report questionnaire that assesses normal to pathological dissociation in youths aged 11-18 years (Armstrong, Putnam, Carlson, Libero, & Smith, 1997). A-DES scoring is based on a Likert-type scale where “0 = never” and “10 = always.” Adolescents were asked to indicate how often a particular experience happens to them when not under the influence of drugs or alcohol.

The A-DES contains 4 subscales of dissociation: dissociative amnesia, absorption and imaginative involvement, passive influence, and depersonalization/derealization (Armstrong et al., 1997). Dissociative amnesia refers to dissociative memory lapses and difficulty with recall. Absorption and imaginative involvement refers to excessive engagement in fantasy activities and difficulty distinguishing between reality and fantasy. Passive influence refers to disconnect between mental and physical actions and sensations. Depersonalization/derealization refers to feelings of mind-body separation and personal separation from the world. The present study used the 4 subscale scores.

Excellent internal consistency has been reported (Cronbach’s alpha of .92-.94; subscale alphas from .64-.85) (Armstrong et al., 1997; Seeley, Perosa, & Perosa, 2004; Smith & Carlson, 1996). The present study found good internal consistency overall (.95),

and for dissociative amnesia (.85), absorption and imaginative involvement (.79), passive influence (.79), and depersonalization/derealization (.86). A-DES scores do not appear to differ as a function of demographics such as age, gender, race, or grade (Armstrong et al., 1997; Farrington, Waller, Smerden, & Faupel, 2001; Muris, Merckelbach, & Peeters, 2003). Two-week test-retest reliability of .77 was reported (Smith & Carlson, 1996).

The A-DES displays good concurrent validity with clinician-derived diagnoses (Seeley et al., 2004). Concurrent validity was good (.77) with the Dissociative Experiences Scale (Carlson & Putnam, 1993) among young adults (Smith & Carlson, 1996). Normative data from non-clinical populations reveal a mean score of 2.24-2.66 for high school and .78 for college students (Farrington et al., 2001; Smith & Carlson, 1996). A-DES scores adequately differentiate maltreatment status; physically and sexually maltreated participants earned higher scores than controls (Armstrong et al., 1997; Seeley et al., 2004). Youths previously diagnosed with dissociative disorders also scored higher on the A-DES than controls (Armstrong et al., 1997).

### **Posttraumatic Cognitions Inventory (PTCI)**

The PTCI is a 36-item self-report measure that assesses trauma-related thoughts and beliefs (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). Each item is rated on a 7-point Likert-type scale where 1 = “totally disagree” and 7 = “totally agree.” The PTCI yields a total negative cognitions score and subscale scores for negative cognitions about self, negative cognitions about the world, and self-blame. The present study used all 3 subscale scores.

The PTCI demonstrates high sensitivity and specificity, can differentiate individuals with PTSD from individuals without PTSD, and predicts PTSD severity



(Beck et al., 2004; Foa et al., 1999). PTCI convergent validity is good based on comparison to the Personal Beliefs and Reactions Scale (PBRs) (Resick et al., 1991) (Foa et al., 1999), State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and Beck Depression Inventory (BDI) (Beck & Steer, 1993) (Beck et al., 2004). Internal consistency is good for PTCI total and subscale scores (alpha of .97 for total score; .86-.97 for subscale scores) (Beck et al., 2004; Foa et al., 1999). The present study found good internal consistency overall (.96) and for negative cognitions about self (.94), negative cognitions about world (.87), and self-blame (.75). Test-retest reliability is also good. Spearman Rho coefficients for 1 week ranged from .74-.89. Three-week test-retest reliability was similarly strong (.80-.86) (Foa et al., 1999).

### **Family Environment Scale, Form-R (FES)**

The FES is a 90-item true-false self-report questionnaire that assesses family-of-origin characteristics across 3 dimensions: Relationship, Personal Growth, and System Maintenance (Moos & Moos, 1986). The Relationship dimension features 3 subscales: cohesion, expressiveness, and conflict. The Personal Growth dimension features 5 subscales: independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, and moral-religious orientation. The System Maintenance dimension features 2 subscales: organization and control. The present study used the cohesion and conflict subscales. The cohesion subscale measures the degree of commitment, help, and support family members provide for one another. The conflict subscale measures the amount of openly expressed anger and conflict among family members.

Reliability estimates of FES subscales vary widely (.43-.77) (Waldron, Sabatelli, & Anderson, 1990). Convergent validity is acceptable to strong for the cohesion, conflict, intellectual-cultural, active-recreational, moral-religious, and organization subscales (Perosa & Perosa, 1990; Sanford, Bingham, & Zucker, 1999). Acceptable internal consistency alpha levels have been reported for the cohesion (.69-.77), conflict (.70-.74), and moral-religious emphasis (.67-.74) subscales. Moderate to low subscale alphas have been reported for intellectual-cultural orientation (.47-.65), organization (.60-.72), and active-recreational orientation (.62-.65). Internal consistency alpha levels are less strong for independence (.28-.43), expressiveness (.39-.46), achievement (.44-.51), and control (.41-.59) (Boyd, Gullone, Needleman, & Burt, 1997; Sanford et al., 1999; Waldron et al., 1990). Sanford and colleagues (1999) advocated for the use of the cohesion, conflict, intellectual-cultural, active-recreational, moral-religious, and organization subscales for research. In this study, the Cronbach alpha coefficient was .64, indicating acceptable overall internal consistency. Reliability for subscales in the present study could not be calculated due to the hand scoring procedures for this measure.

### **Procedures**

Procedures followed University of Nevada, Las Vegas (UNLV) and Clark County Department of Family Services (DFS) policies regarding research with human participants. The UNLV Office for the Protection of Research Subjects, Institutional Review Board (IRB), Social and Behavioral Sciences committee approved # 0705-2351 on September 17, 2007 and protocol # 0801-2586 on June 6, 2008. Both protocols were renewed and approved annually by the UNLV Office for the Protection of Research Subjects, Institutional Review Board (IRB), Social and Behavioral Sciences committee

before being consolidated into the current protocol # 1005-3485M. The UNLV Office for the Protection of Research Subjects, Institutional Review Board (IRB), Social and Behavioral Sciences committee approved the current protocol # 1005-3485M on December 5, 2010. An approved interlocal contract by UNLV and DFS was developed in accordance with county and state laws regarding children in protective custody for protocols # 0705-2351 and # 0801-2586. Data collection during 2009-2011 was conducted through Desert Psychological Services in partnership with Clark County DFS. As such, an interlocal contract was not requested by DFS. A Confidentiality Certificate from Department of Health and Human Services, National Institutes of Health applied to study participants (August 1, 2007).

Participant data were included from previous and ongoing data collection efforts in conjunction with Clark County Department of Family Services (DFS). Participants were in DFS protective custody at the time of assessment. Eligibility criteria included youths aged 11-17 years who reported experiencing one or more traumatic events. Adolescents who do not comprehend interview questions or self-report forms were not included. No racial/ethnic or gender exclusions applied during data collection, though transgender individuals were excluded from data analyses of gender effects. Adolescents were excluded from the present study if they did not affirm the experience of trauma or if they had a thought disorder (per self-report/history or observed by clinicians or researchers).

Data collection in 2009-2011 occurred at the offices of Desert Psychological Services, DFS Community Service Centers, Child Haven, and group and foster homes in the Las Vegas area. Study assessment measures were included as part of Department of

Family Services' standard mental health assessment protocol (Uniformed Psychological Psychoeducation Assessments – UPPA). According to Nevada state statutes regarding Early Periodic Screening and Diagnosis and Treatment/Healthy Child Screening (42 CFR 441.56, NRS 432B.190, NAC 432B.400), and in accordance with Dillon's Rule, all minors in DFS care must receive mental health assessments. The office of Dr. Stephanie Holland, Desert Psychological Services, is under contract with DFS to conduct all UPPAs for all DFS affiliated youth.

UPPAs were administered by Dr. Stephanie Holland or a qualified staff member, including trained University of Nevada, Las Vegas (UNLV) clinical psychology graduate students. UPPA assessment measures included, but were not limited to, the demographic/information form, Children's PTSD Inventory, Children's Depression Inventory, Posttraumatic Cognitions Inventory, Adolescent-Dissociative Experiences Scale, State-Trait Anger Expression Inventory, Family Environment Scale, and Multigroup Ethnic Identity Measure. The assessment was part of DFS's standard mental health evaluation, so the clinician or graduate student conducting the assessment produced a report outlining diagnostic findings, clinical impressions, and further assessment/treatment recommendations. These reports were kept confidential by DFS staff and used only to assist in placement, treatment, and further assessment of DFS-affiliated youth.

The assessment process did not require parental permission given the adolescent's status in DFS custody following child maltreatment. Similarly, youth assent was not required because the study involved secondary analysis of assessments performed as a routine agency procedure. Furthermore, the dataset was de-identified by a DFS

contractor (Dr. Holland/Desert Psychological Services) prior to transfer to the researcher for analysis. However, adolescents were provided with information about the study. Graduate student researchers reviewed the IRB approved assent form with each adolescent when possible.

Participant data were de-identified at Dr. Holland's offices and replaced with a code number to keep documentation organized. Research team members abided by the guidelines outlined in the CITI training course. Research team members also received additional training concerning guidelines to maintain confidentiality and privacy of participants and research data. Data were stored in locked file cabinets in Dr. Christopher Kearney's office or research facility.

Assessments occurred in a confidential environment without DFS staff present. A trained graduate student or trained clinical psychologist interviewed each adolescent via the CPTSD-I. Completion of the demographic/information form and CPTSD-I typically lasted 20-25 minutes. Participants then completed self-report measures with the assistance of a graduate student researcher. Self-report measures were read aloud to those adolescents with suspected limited literacy skills. Completion of self-report measures typically lasted 45-60 minutes.

Participants were encouraged to take breaks during the assessment process. If researchers or clinicians observed fatigue, then the assessment was terminated and a follow-up session was scheduled. If a participant expressed significant distress during the assessment, then a licensed clinical psychologist was available for support. Participants were encouraged to process their feelings and ask questions throughout the assessment process. Adolescents were encouraged to share distressing feelings with their

parent/guardian, caregiver, counselor, or social worker. DFS-affiliated youth were routinely referred for individual, family, or group therapy or other therapeutic services following the UPPA report.

### **Data Analysis**

Continuous variables were subjected to Pearson correlational analysis (Table 4). To examine multicollinearity, the two variables that correlated most strongly (A-DES dissociative amnesia and A-DES depersonalization/derealization) were subjected to linear regression analyses with each as the dependent variable. The variance inflation factor for each analysis was 1, well within the tolerable limit of 10 (Stevens, 1996). Therefore, multicollinearity among the variables was not considered to be problematic.

Hypotheses were tested via structural equation modeling (SEM) using EQS. SEM is preferable to more conventional regression approaches because it provides overall goodness-of-fit estimates, allows analysis of multiple variables, and minimizes measurement error (Bentler & Wu, 2005). Multiple indices of fit are typically recommended when conducting SEM (Kline, 2005). The present study employed 3 goodness-of-fit indices for each model: comparative fit index (CFI), Bollen incremental fit index (IFI), and standardized root mean square residual (SRMR). Acceptable goodness-of-fit in this study was defined as CFI and IFI values of .90+ and SRMR values of <.10 (Kline, 2005). Chi-square values are not advocated as a strong goodness-of-fit measure but are commonly reported in SEM studies and are thus reported in the results section.

The present study used Holmbeck's (1997) multistep approach to testing mediation via SEM. First, the predictor-mediator-outcome (A→B→C) path was

examined for adequate fit. If the A→B→C path displayed adequate fit, then the predictor-outcome (A→C) path was examined for goodness-of-fit. If the A→C path displayed adequate fit, then the A→B→C path was examined under two conditions: (1) when the A→C path was constrained to zero and (2) when the A→C path was not constrained to zero. For mediation to occur, the unconstrained model should not provide better fit than the constrained model. In other words, the addition of the A→C path should not improve the fit of the model. If these criteria were met, then mediation was assumed to occur.

The first hypothesis tested the Lemos-Miller and Kearney model via SEM as described above. Specifically, a model was tested wherein depression as measured by the Children's Depression Inventory (CDI) was expected to mediate the relationship between (1) dissociation as measured by the Adolescent Dissociative Experiences Scales (A-DES) subscales and trauma-related cognitions as measured by the Posttraumatic Cognitions Inventory (PTCI) subscales and (2) PTSD symptoms as measured by the Children's PTSD Inventory (CPTSD-I) re-experiencing symptoms, avoidance and numbing symptoms, increased arousal, and significant distress subscales.

The second, third, and fourth hypotheses involved testing the Lemos-Miller and Kearney model in different demographic groups. For each hypothesis, specific groups were identified and the model was independently evaluated for goodness-of-fit via SEM as described above. The second hypothesis involved model fit for younger (age 11-13 years) and older (age 14-17 years) youth. The third hypothesis involved model fit for males and females. The fourth hypothesis involved model fit for (1) African American (2) European American (3) Hispanic and (4) multiracial adolescents.

The fifth, sixth, seventh, eighth, and ninth hypotheses tested alternative models to the Lemos-Miller and Kearney model. Each hypothesized alternative model was tested via SEM as previously described. The fifth hypothesis involved a model in which trauma history mediated the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I). A trauma history score was derived from the CPTSD-I as described above. The sixth hypothesis involved a model in which family cohesion (FES) mediated the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I).

The seventh hypothesis involved a model in which family conflict (FES) mediated the relationship between (1) depression (CDI), dissociation (A-DES), trauma-related cognitions (PTCI), and (2) PTSD symptoms (CPTSD-I). The eighth hypothesis involved a model in which dissociation (A-DES) mediated the relationship between (1) depression (CDI) and trauma-related cognitions (PTCI) and (2) PTSD symptoms (CPTSD-I). The ninth hypothesis involved a model in which trauma-related cognitions (PTCI) mediated the relationship between (1) depression (CDI) and dissociation (A-DES) and (2) PTSD symptoms (CPTSD-I).



CHAPTER 4  
FINDINGS OF THE STUDY

**General Comparisons**

A chi-square test for independence indicated no significant difference regarding age group (i.e., 11-13 versus 14-17 years) and clinically significant PTSD (i.e., subclinical versus clinical symptoms),  $\chi^2 (1, n = 350) = 3.79, p = .052, \phi = -.11$ . A chi-square test for independence indicated that females were significantly more likely than males to have clinically significant PTSD (i.e., subclinical versus clinical symptoms),  $\chi^2 (1, n = 348) = 12.88, p = .000, \phi = .19$ . A chi-square test for independence indicated no significant difference regarding ethnic group (i.e., African American, European American, Hispanic, multiracial) and clinically significant PTSD,  $\chi^2 (3, n = 326) = 3.14, p = .371, \phi = .10$ .

**Hypothesis Testing**

**Hypothesis One**

The first hypothesis was that the Lemos-Miller and Kearney (2006) model of PTSD in maltreated adolescents would demonstrate adequate fit in a larger, ethnically diverse sample of maltreated adolescents. Depression was expected to mediate (1) dissociation and trauma-related cognitions and (2) PTSD symptoms. The A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28, p < 0.001$ ) (Figure 4). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .982, IFI = .982, SRMR = .038;  $\chi^2 = 77.10, p < 0.001$ ). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .953, IFI = .953, SRMR = .064;  $\chi^2 = 229.97, p < 0.001$ ) and was not significantly different from the unconstrained model. Hypothesis 1 was supported.

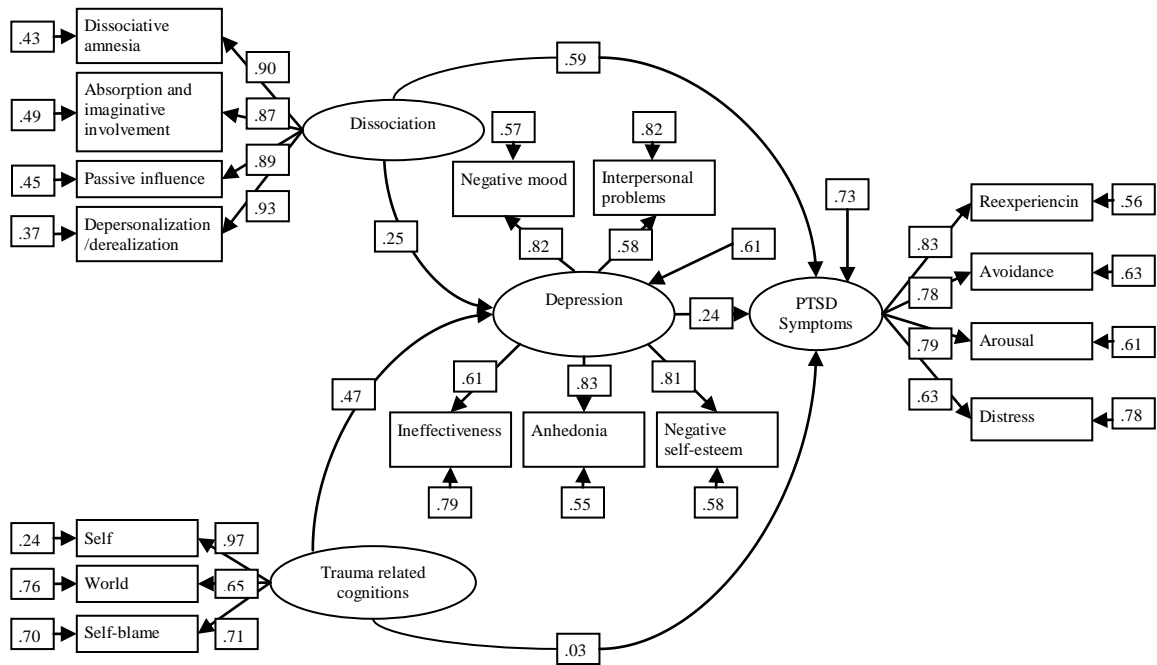


Figure 4. Structural Equation Model with Path Coefficients for Depression, Dissociation and Trauma-related Cognitions, and PTSD Symptoms.

## Hypothesis Two

The second hypothesis was that the Lemos-Miller and Kearney model would have better goodness-of-fit among older (age 14-17 years) than younger (age 11-13 years) youth. For younger youth, the A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .924, IFI = .926, SRMR = .082;  $\chi^2 = 171.63, p < 0.001$ ). For older youth, the A→B→C path of the hypothesized model also met goodness-of-fit criteria and was slightly stronger (CFI = .965, IFI = .965, SRMR = .051;  $\chi^2 = 163.15, p < 0.001$ ). Hypothesis 2 was weakly supported.

### **Hypothesis Three**

The third hypothesis was that the Lemos-Miller and Kearney model would have better goodness-of-fit among females than males. The Lemos-Miller and Kearney model met goodness-of-fit criteria for females (CFI = .948, IFI = .949, SRMR = .056;  $\chi^2 = 185.39$ ,  $p < 0.001$ ) but not for males (CFI = .965, IFI = .965, SRMR = .165;  $\chi^2 = 154.18$ ,  $p < 0.001$ ). Hypothesis 3 was supported.

### **Hypothesis Four**

The fourth hypothesis was that the Lemos-Miller and Kearney model would have better goodness-of-fit for Hispanic and multiracial youth than for European American and African American youth. The Lemos-Miller and Kearney model met goodness-of-fit criteria for European American (CFI = .919, IFI = .922, SRMR = .091;  $\chi^2 = 160.45$ ,  $p < 0.001$ ) and multiracial (CFI = .900, IFI = .903, SRMR = .093;  $\chi^2 = 169.81$ ,  $p < 0.001$ ) youth but not for African American (CFI = .885, IFI = .889, SRMR = .072;  $\chi^2 = 183.57$ ,  $p < 0.001$ ) or Hispanic (CFI = .775, IFI = .785, SRMR = .138;  $\chi^2 = 201.08$ ,  $p < 0.001$ ) youth. Hypothesis 4 was partially supported.

### **Hypothesis Five**

The fifth hypothesis was that trauma history would mediate the relationship between (1) depression, dissociation, trauma-related cognitions, and (2) PTSD symptoms. The A→B→C path of this hypothesized model met goodness-of-fit criteria (CFI = .954, IFI = .955, SRMR = .055;  $\chi^2 = 238.53$ ,  $p = 0.004$ ). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28$ ,  $p < 0.001$ ). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .957, IFI = .957, SRMR = .052;  $\chi^2 = 230.92$ ,  $p < 0.001$ ).

and was not significantly different from the unconstrained model. Hypothesis 5 was supported.

### **Hypothesis Six**

The sixth hypothesis was that family cohesion would mediate the relationship between (1) depression, dissociation, trauma-related cognitions, and (2) PTSD symptoms. The A→B→C path of this hypothesized model met goodness-of-fit criteria (CFI = .927, IFI = .929, SRMR = .067;  $\chi^2 = 214.61$ ,  $p < 0.001$ ). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28$ ,  $p < 0.001$ ). However, the constrained A→B→C path of the hypothesized model did not meet goodness-of-fit criteria (CFI = .847, IFI = .849, SRMR = .155;  $\chi^2 = 331.97$ ,  $p < 0.001$ ). Hypothesis 6 was not supported.

### **Hypothesis Seven**

The seventh hypothesis was that family conflict would mediate the relationship between (1) depression, dissociation, trauma-related cognitions, and (2) PTSD symptoms. The A→B→C path of this hypothesized model met goodness-of-fit criteria (CFI = .928, IFI = .930, SRMR = .074;  $\chi^2 = 210.92$ ,  $p < 0.001$ ). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28$ ,  $p < 0.001$ ). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .923, IFI = .925, SRMR = .075;  $\chi^2 = 218.27$ ,  $p < 0.001$ ) and was not significantly different from the unconstrained model. Hypothesis 7 was supported.

### **Hypothesis Eight**

The eighth hypothesis was that dissociation would mediate the relationship between (1) depression and trauma-related cognitions and (2) PTSD symptoms. The A→B→C path of this hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28$ ,  $p < 0.001$ ). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .967, IFI = .967, SRMR = .056;  $\chi^2 = 104.60$ ,  $p < 0.001$ ). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .942, IFI = .942, SRMR = .087;  $\chi^2 = 260.48$ ,  $p < 0.001$ ) and was not significantly different from the unconstrained model. Hypothesis 8 was supported.

### **Hypothesis Nine**

The ninth hypothesis was that trauma-related cognitions would mediate the relationship between (1) depression and dissociation and (2) PTSD symptoms. The A→B→C path of this hypothesized model met goodness-of-fit criteria (CFI = .961, IFI = .961, SRMR = .052;  $\chi^2 = 207.28$ ,  $p < 0.001$ ). The A→C path of the hypothesized model met goodness-of-fit criteria (CFI = .964, IFI = .964, SRMR = .055;  $\chi^2 = 143.67$ ,  $p < 0.001$ ). In addition, the constrained A→B→C path of the hypothesized model met goodness-of-fit criteria (CFI = .959, IFI = .959, SRMR = .054;  $\chi^2 = 212.76$ ,  $p < 0.001$ ) and was not significantly different from the unconstrained model. Hypothesis 9 was supported.

## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

#### **Discussion of Results**

This study had three primary aims. First, the empirically-based model of PTSD in maltreated adolescents constructed by Lemos-Miller and Kearney (2006) was evaluated in a much larger, more diverse sample of maltreated adolescents. Second, the model was evaluated across age, gender, and ethnicity. Third, trauma history, family environment (i.e., cohesion and conflict), dissociation, and trauma-related cognitions were evaluated as potential mediating variables. Each aim is discussed in turn next.

#### **Lemos-Miller and Kearney Model**

The first aim of the present study was to evaluate the Lemos-Miller and Kearney model in a larger and more diverse sample. Depression was expected to mediate the relationship between (1) dissociation and trauma-related cognitions and (2) PTSD symptoms. Results supported this hypothesis. These results provide important evidence for this empirically-based model of PTSD. Additionally, these results highlight the important role of depression in posttraumatic symptoms following maltreatment.

Depression and PTSD likely develop in tandem in maltreated youth. However, depressive symptoms may also increase vulnerability to traumatic symptoms following maltreatment and other trauma events (Kearney et al., 2010; Lemos-Miller & Kearney, 2006). Some mechanisms that contribute to depression in maltreated youth (e.g., negative cognitive schemas, biological stress response, increased stress sensitivity) (Harkness & Lumley, 2008) may also contribute to vulnerability for PTSD following maltreatment (Allen & Tarnowski, 1989; Ariga et al., 2008; Boney-McCoy & Finkelhor,

1996; Finzi et al, 2001; Fletcher, 1996; Kolko et al., 2010; Lemos-Miller & Kearney, 2006; Linning & Kearney, 2004; Storr et al., 2007).

PTSD symptom severity may also increase in the presence of depressive symptoms. Maltreated children with comorbid PTSD and depression report higher levels of intrusive PTSD-related symptoms (e.g., flashbacks and sleep disturbance) than those with PTSD only (Runyon et al., 2002). Depression may also contribute to PTSD persistence by preventing maltreated youth and their families from seeking and/or benefiting from treatment for trauma-related symptoms. The present study thus provides further evidence of the integral role of depression with respect to PTSD in maltreated youth.

### **Demographic Groups**

The second aim of the present study was to evaluate the applicability of the Lemos-Miller and Kearney model across key demographic groups (i.e., age, gender, and ethnicity). Age, gender, and ethnicity are associated with varied risk for maltreatment, PTSD, and related symptomatology and these factors may contribute to PTSD symptom expression in maltreated youth. The influence of these factors had not been previously evaluated within integrated, ecologically based, and developmentally and culturally sensitive models of PTSD in maltreated youth (Lemos-Miller & Kearney, 2006; Triffleman & Pole, 2010).

**Age.** The Lemos-Miller and Kearney model was expected to have better fit for older (14-17 years) than younger (11-13 years) youth. Results weakly supported this hypothesis as the model met goodness-of-fit criteria for both age groups. This finding could reflect elevated rates of PTSD and comorbid symptoms in older adolescents

compared to younger youth (Copeland et al., 2007). Three factors may contribute to this age difference. First, PTSD and related symptoms may be easier to detect in older adolescents as self-reporting becomes more reliable with age. Second, older children may endorse more severe symptomatology due to increased trauma exposure over time. Third, older age may be associated with greater developmental disruption (De Bellis, 2005; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Fletcher, 2003; Keane et al., 2006; Kolko et al., 2010; Luthra et al., 2009; MacDonald et al., 2010; McCutcheon et al., 2010; Pfefferbaum, 2005).

The present findings may lend support to developmental and psychobiological models of PTSD. Developmental traumatology and psychobiological models of PTSD in maltreated youth involve a cascading sequence of events wherein child maltreatment alters psychological and neurological functioning. These alterations include deficits in executive functioning, self-regulation, and emotional processing. These deficits subsequently impair general cognitive, behavioral, and physical development. Older adolescents may endorse or exhibit more severe psychopathology due to greater developmental disruption.

**Gender.** The Lemos-Miller and Kearney model was expected to have better fit for females than males. Results supported this hypothesis as the model met goodness-of-fit criteria for females but not males. Girls and young women consistently report more trauma-related symptoms than boys and young men (Greenwald, 2002; Johnson et al., 2002; Tolin & Foa, 2006; Wolfe et al., 2001). Females may be more open to discussing symptoms and more likely to endorse PTSD-related intrusive thoughts, re-experiencing, and specific hyperarousal symptoms than males. Boys, however, may exhibit, but not



discuss, hyperarousal symptoms that resemble externalizing behaviors and thus may be diagnosed with oppositional defiant or attention deficit/hyperactivity disorder rather than, or in addition to, PTSD (Davis & Siegel, 2000; De Bellis & Van Dillen, 2005; Reebye et al., 2000; Silva et al., 2000; Tolin & Foa, 2006; Walker et al., 2004). The Lemos-Miller and Kearney model may be more sensitive to the trauma symptoms expressed by females than males. Boys, however, likely suffer from similar levels of distress following maltreatment and their trauma symptoms should not be overlooked (Davis & Siegel, 2000; Reebye et al., 2000; Silva et al., 2000; Walker et al., 2004).

A secondary question within the third hypothesis was whether the model would fit for boys who identify sexual maltreatment as a traumatic event. The model could not be tested for this group due to limited sample size. However, all but one boy who reported sexual maltreatment endorsed clinically significant levels of PTSD. Boys who report sexual maltreatment may exhibit PTSD, depression, dissociation symptoms and maladaptive cognitions similar to sexually maltreated girls, though studies differ (Dykman et al., 1997; Elklit et al., 2002; McMackin et al., 2003; Schraedley et al., 1999; Tyler, 2002). The traumatic nature of sexual maltreatment is one possible explanation for this difference. However, males frequently decline to report sexual maltreatment due to social stigma (Wolfe, 2006). Males who do report sexual maltreatment may do so primarily because of the severity of their symptoms.

**Ethnicity.** The Lemos-Miller and Kearney model was expected to have different fit across ethnic groups. Specifically, the model was expected to have better fit for Hispanic and multiracial youth than European American and African American youth. Results partially supported this hypothesis: the model met goodness-of-fit criteria for

European American and multiracial youth but not African American and Hispanic youth. These findings may be a result of small sample size across ethnic groups. Anecdotally, many youth seemed to have difficulty describing or selecting their ethnicity, which may have impacted the group membership selection.

Present findings neither support nor contradict previous research indicating that minority ethnic group membership is associated with greater PTSD symptom severity following trauma (Duran, 2004; Triffleman & Pole, 2010). African Americans, Native Americans, and Hispanic individuals report higher rates of chronic and recurring trauma exposure, including maltreatment, than European American individuals (Roberts et al., 2010; Stephens et al., 2010). Multiracial (Lemos-Miller & Kearney, 2006), Native American (Gnanadesikan et al., 2005), and Hispanic (Abram et al., 2004; Mennen, 2004) youth appear to be at greatest risk for negative sequelae. In addition, some researchers report racial/ethnic differences in specific trauma symptoms after maltreatment (Bracey et al., 2004; Murry, Bynum, et al., 2001; Phillips, 2004; Shen, 2009; Triffleman & Pole, 2010; Tummala-Narra, 2007). Many questions remain regarding the role of ethnicity as a potential risk or resiliency factor (Lemos-Miller & Kearney, 2006; Triffleman & Pole, 2010).

### **Additional Mediating Factors**

The third aim of the present study was to evaluate potential mediating roles of other psychological risk factors for PTSD. The importance of trauma history, family cohesion and conflict, depression, dissociation, and trauma-related cognitions are well supported in the literature but have not been simultaneously evaluated within a single,

integrated model of PTSD in maltreated youth. The present study addressed this gap in the literature by evaluating these alternative mediating variables.

**Trauma history.** Trauma history was expected to mediate the relationship between (1) depression, dissociation, and trauma-related cognitions and (2) PTSD symptoms. Results supported this hypothesis. This finding supports extensive empirical evidence implicating the frequency and severity of trauma history in psychopathology (Clemmons et al., 2007; English, Graham, et al., 2005; English, Upadhyaya, et al., 2005; Kearney et al., 2010; MacDonald et al., 2010; Reid & Sullivan, 2009). Furthermore, the strength of these findings indicates the central importance of trauma exposure history in a theoretical model of PTSD in maltreated children.

**Family environment.** Family cohesion was expected to mediate the relationship between (1) depression, dissociation, and trauma-related cognitions and (2) PTSD symptoms. Results did not support this hypothesis. Family conflict was also expected to mediate the relationship between (1) depression, dissociation, and trauma-related cognitions and (2) PTSD symptoms. Results did support this hypothesis. These findings lend mixed support to previous studies indicating that low family cohesion and high family conflict may relate to child maltreatment and greater psychological symptoms following trauma exposure (Higgins & McCabe, 2000; Higgins et al., 2003; Rowe et al., 2010; White et al., 1998).

The present mixed findings regarding family cohesion and conflict may reflect issues regarding the utility, validity, and reliability of the FES. Some participants had difficulty understanding and completing the 90-item measure, resulting in limited sample size for this analysis. Additionally, the family conflict subscale directly inquires about

family discord and aggression, but the family cohesion subscale indirectly inquires about family activities and time spent together. Present results underscore the importance of family conflict, but may underestimate the importance of family cohesion in a model of PTSD in maltreated children.

**Dissociation.** Dissociation was expected to mediate the relationship between (1) depression and trauma-related cognitions and (2) PTSD symptoms. Results supported this hypothesis. This finding underscores previous empirical and theoretical literature regarding the importance of dissociative processes with respect to PTSD symptomatology (Armstrong et al., 1997). Dissociative and posttraumatic symptoms share many features and exacerbate one another, particularly following chronic trauma such as child maltreatment (Carrion & Steiner, 2000; Coons, 1996; Ginzburg et al., 2006; Pfefferbaum, 2005).

Chronic dissociation involves active avoidance, emotional numbing, and failure to integrate memory for traumatic events, all of which contribute to posttraumatic and depressive symptoms (Ayoub et al., 2006; Bidell & Fischer, 2000; Macfie et al., 2001). Persistent maladaptive dissociation is also associated with behavioral and emotional dysregulation problems that interfere with remediation of traumatic, depressive, and dissociative emotions (Briere & Spinazzola, 2006; El-Sheikh et al., 2008; Ford, 2005). Chronic dissociation also interferes with the development of positive social skills and likely leads to social isolation, anhedonia, and poor self-esteem, thus increasing a child's risk for PTSD and comorbid symptoms (Ayoub et al., 2006; Bidell & Fischer, 2000; Haugaard, 2004b; Lemos-Miller & Kearney, 2006). Dissociation-related symptoms such as emotional dysregulation, poor social skills, and difficulties with attention and memory

integration likely contribute to PTSD persistence by preventing maltreated youth and their families from seeking and/or benefiting from treatment for trauma-related symptoms (Haugaard, 2004a, 2004b). The strength of present findings supports the notion that dissociation is a key mediating variable in PTSD symptomatology in adolescents following maltreatment.

**Trauma-related cognitions.** Negative trauma-related cognitions were also expected to mediate the relationship between (1) depression and dissociation and (2) PTSD symptoms. Results supported this hypothesis. This finding lends support to previous limited empirical evidence and theoretical literature regarding the importance of negative cognitive processes with respect to PTSD following child maltreatment.

Cognitive distortions play a significant role in PTSD symptomatology and outcomes following child maltreatment (Muller & Lemieux, 2000, Muller et al., 2001, Muller et al., 2000). Negative thoughts about self, negative thoughts about the world, and self-blame have been previously associated with re-experiencing, avoidance/numbing, increased arousal, and distress aspects of PTSD (Lemos-Miller & Kearney, 2006; Linning & Kearney, 2004). Negative view of self, in particular, strongly predicts PTSD and depression following maltreatment (Diehl & Prout, 2002; Muller & Lemieux, 2000; Muller et al., 2001; Runyon & Kenny, 2002).

Negative cognitions may place youth at increased risk for trauma-related distress by effectively reducing self-esteem and self-efficacy. Poor self-esteem and self-efficacy may in turn lead to poor sense of control over emotions and emotional dysregulation. Additionally, specific negative cognitions about self and world may contribute to feelings of anger consistent with hyperarousal symptoms. Youth with negative trauma-related

cognitions may be less likely to engage in positive cognitive coping strategies and positive social interactions, and to seek help from family members and other adults. Negative cognitions also clearly contribute to depression and dissociation in addition to PTSD. As previously discussed, depressive and dissociative symptoms may exacerbate and reinforce PTSD. The strength of current findings supports the notion that trauma-related cognitions are a key mediating variable in PTSD symptomatology in adolescents following maltreatment.

### **Clinical Implications**

This study may have important clinical implications for assessment and intervention for PTSD and trauma-related symptoms in maltreated adolescents. Child maltreatment and exposure to other traumatic events impacts each individual differently. However, this study highlights several relevant factors to consider when assessing and treating maltreated, trauma-exposed, and DFS-affiliated youth.

### **Assessment**

The present findings have important implications for assessment. Maltreated children and adolescents are at exceptionally high risk for PTSD and other comorbid symptoms. Clinicians who assess maltreated youth should routinely screen for posttraumatic symptoms. When an adolescent endorses traumatic events, or if trauma exposure is suspected, clinicians should carefully evaluate trauma-related symptoms such as depression, dissociation, and negative trauma-related cognitions. The following measures are excellent tools for assessing trauma-related symptoms in maltreated youth.

**Clinical interviews.** Child interviews offer an effective venue to understand a child's trauma history, trauma-related coping and symptoms, and overall functioning

(Azar & Wolfe, 2006; Crooks & Wolfe, 2007; Silverman & Ollendick, 2005). Clinical interviews with trauma-exposed youth should occur in a safe and private location (Crooks & Wolfe, 2007). A clinician must establish rapport and build trust with the adolescent, particularly given the nature of child maltreatment trauma and the difficulties of the foster care system. Clinicians can build rapport and help youth become comfortable by asking about positive experiences associated with friends and recent enjoyable events. Clinicians should ask about specific maltreatment events in a direct, genuine, and empathic manner (Becker-Blease & Freyd, 2006; Black & Black, 2007). Youths should have the opportunity to speak about their trauma experiences in their own words. A semi-structured interview provides the components necessary for diagnosing PTSD but allows for flexibility. The CPTSD-I (Saigh, 1998), Clinician-Administered PTSD Scale for Children and Adolescents (Newman et al. 2004), and the PTSD section of the Anxiety Disorders Interview Schedule (ADIS) (Silverman & Albano, 2004) allow for open-ended discussion and follow-up questions regarding trauma symptoms such as re-experiencing, avoidance and numbing, and hyperarousal.

Present findings also underscore the importance of interview questions that address trauma frequency and specific trauma-related symptoms. One of the most robust findings of this study was the importance of trauma history in PTSD symptom severity and persistence. Youth with many trauma exposures may have persistent, severe, and treatment-resistant trauma symptoms. The CPTSD-I and the PTSD section of the ADIS allow for open-ended discussion and follow-up questions regarding trauma history.

As assessment progresses, a clinician should monitor a youth's nonverbal behaviors in addition to his or her verbal responses. For example, an adolescent may say

he was not scared following a certain event but may appear agitated and avoid eye contact. The clinician may wish to ask follow-up questions about mood and behaviors. Many adolescents in the present study initially denied being "scared" but admitted to being "upset" or "angry." Follow-up questions allowed youths to explain their experiences and emotions and revealed important information about the youths' symptoms and functioning.

**Self-report measures.** Self-report measures also provide important information regarding child maltreatment trauma symptoms. The present study did not rely on self-report measures of PTSD, but such measures may be useful with youth who are reluctant to speak about their emotions or when clinicians need additional information. Self-report measures often provide important collateral and supplemental information, may be perceived as more "private" and thus safer venues to disclose sensitive experiences, and allow more time to reflect upon experiences and emotions. Numerous trauma self-report scales are available, and clinicians are encouraged to select specific measures relevant to a youth's particular history and needs (Hawkins & Radcliffe, 2006; Silverman & Ollendick, 2005; Strand, Sarmiento & Pasquale, 2005). Examples are provided next.

The UCLA PTSD Reaction Index (Rodriguez, Steinberg, & Pynoos, 1999) includes child, adolescent, and parent versions to provide preliminary PTSD diagnoses using DSM-IV criteria. The Child PTSD Symptom Scale (Foa, Johnson, Feeny, & Treadwell, 2001) assesses severity of PTSD, as outlined in DSM-IV, in children and adolescents. The Trauma Symptom Checklist for Children (TSCC) (Briere, 1996) assesses exposure to various trauma events, including maltreatment, as well as posttraumatic stress and comorbid symptoms such as anxiety, depression, sexual



concerns, dissociation, and anger. The Traumatic Events Questionnaire-Adolescents (Lipschitz, Bernstein, Winegar, & Southwick, 1999) assesses 6 forms of maltreatment as well as duration, identity of perpetrator, use of force, and details about the traumatic event. However, self-report measures do not account for all trauma events or allow for open-ended follow-up questions and should not be the sole diagnostic tool for PTSD in maltreated youth.

Self-report measures may also provide important information about other trauma-related symptoms such as depression, dissociation, and trauma-related cognitions. The present study underscores the importance of assessing depression because negative mood, interpersonal problems, anhedonia, and negative self-esteem are particularly salient aspects of PTSD and depression. The CDI (Kovacs, 1992) includes subscales for each of these symptoms and is a well-accepted measure. Clinicians should review youth responses and subscale scores carefully. Low levels of depression may indicate resilience and lower risk for PTSD. Conversely, high levels of depression may indicate severe and persistent PTSD. Specific subscale elevations and item responses also provide important information about trauma symptoms. For example, a boy with an elevated interpersonal problems score may be fighting frequently as a result of hyperarousal symptoms. Similarly, a girl with an elevated negative self-esteem score may be experiencing heightened self-blame related to maltreatment. Specific items may also help clinicians understand certain trauma-related symptoms. Youths who endorse sleeping problems may be experiencing hyperarousal symptoms.

The present study similarly underscores the importance of assessing dissociation in PTSD symptomatology. Dissociative amnesia, absorption and imaginative

involvement, passive influence, and depersonalization/derealization relate to PTSD and depression in youth (Lemos-Miller & Kearney, 2006; Linning & Kearney, 2004) and are measured by the A-DES (Armstrong et al., 1997). The A-DES may be the best available self-report measure of dissociation in adolescents. As with the CDI, clinicians should review youth responses and subscale scores carefully. Low levels of dissociation may be linked to lower risk for PTSD and long-term difficulties following trauma exposure. High levels of dissociation have been linked to chronic trauma exposure and continued reliance on dissociation as a coping mechanism, which may complicate treatment (Haugaard, 2004b). Elevations on the dissociative amnesia subscale may indicate difficulty with memory for trauma events. Elevations on the absorption and imaginative involvement subscale may indicate significant avoidance and numbing symptoms and a strong reliance on avoidance coping strategies. Elevations on the passive influence and depersonalization/derealization subscales may reveal significant problems with emotional dysregulation and poor attention and memory integration. Clinicians should carefully consider such dissociative patterns when planning treatment.

The present study also highlights the important role of negative trauma-related cognitions in PTSD symptomatology. The PTCI (Foa et al., 1999) evaluates negative trauma-related cognitions such as negative views of self and world and self-blame. Clinicians should review youth responses and subscale scores carefully. Lower scores on the PTCI may indicate more positive cognitive coping and lower risk for PTSD (Foa et al., 1999). Conversely, higher scores are consistent with more severe and persistent PTSD. Specific subscale elevations and item responses also provide important information about posttraumatic functioning. Elevations on the negative cognition about

self and self-blame subscales may indicate that an adolescent blames herself for traumatic events but also feels powerless to stop them. Elevations in the negative cognitions about the world subscale may indicate that an adolescent does not trust others or is angry with others.

The present study and preceding literature review also highlight the potential negative effects of child maltreatment trauma across multiple domains. Clinicians may consider integrated multi-informant assessments for major domains of child functioning. The Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2000) is one of the most widely used measures of emotional, social, and behavioral functioning. This measure includes parent, teacher, and youth self-report forms. The CBCL provides information about anxiety, withdrawal, depression, somatic complaints, social problems, thought problems, attention problems, rule-breaking behaviors, and aggressive behaviors. The Behavior Assessment System for Children (BASC-2) (Reynolds & Kamphaus, 2004) assesses emotional and behavioral functioning and includes teacher, parent, and self-report rating scales. The BASC-2 includes internalizing, externalizing, learning, behavioral symptoms, adaptive functioning, and validity scales.

Present findings also indicate that family environment may influence PTSD symptoms. Heightened levels of family conflict contribute to risk for maltreatment and its negative sequelae. Conversely, family cohesion may be important for preventing psychopathology following trauma (Fletcher, 1996, 2003). Clinicians are thus urged to consider specific family factors that may impact child risk and resiliency following trauma exposure. The FES (Moos & Moos, 1986) is a comprehensive measure of family environment domains that includes conflict and cohesion subscales. FES items may also

reveal key areas for follow-up questions and treatment targets (e.g., "family members sometimes hit each other," "family members often criticize each other").

## **Treatment**

The present study supported the notion that depression, dissociation, and negative trauma-related cognitions play critical roles in PTSD symptomatology. Intervention for trauma symptoms should thus include attention to these comorbid symptoms.

Psychoeducation, boundary setting, anxiety management, emotional expression, cognitive coping skills, cognitive restructuring, mindfulness, and exposure therapy target these symptoms and can benefit child maltreatment and trauma victims (Cohen, Deblinger, Mannarino, & Steer, 2004; Cohen, Mannarino, & Deblinger, 2006; Deblinger & Heflin, 1996; Deblinger, et al., 1999, Feeny, Foa, Treadwell, & March, 2004; Kearney, et al., 2010). Some treatment protocols have been developed to target child trauma symptoms and child maltreatment. Trauma-Focused Cognitive Behavior Therapy (TF-CBT) (Cohen & Mannarino, 1993) has emerged as the gold standard empirically-supported treatment for trauma in youth.

TF-CBT was originally developed for sexually maltreated youth and non-offending parents or caregivers (Cohen & Mannarino, 1993) and is now recognized as an effective treatment for many trauma victims (Cohen, Mannarino, & Deblinger, 2006; Cohen, Mannarino & Murray, 2011). TF-CBT is a conjoint child and parent/caregiver psychotherapy approach for youth aged 3-18 years that is effective for reducing symptoms and improving functioning among diverse samples, including minority youth (Weiner, Schneider & Lyons, 2009). TF-CBT combines cognitive behavior therapy techniques with interpersonal and family therapy. Non-offending parents/caregivers

participate to reduce their distress, build positive parenting practices, and receive support (Cohen, Deblinger, Mannarino, Steer, 2004; Cohen & Mannarino, 1993).

TF-CBT is designed for 12-16 sessions and has been shown to decrease PTSD, other anxiety symptoms, depression, and negative trauma-related cognitions in maltreated children (Cohen et al., 2006; Deblinger & Heflin, 1996; Deblinger et al., 1999). In addition, youth in TF-CBT experience a greater reduction in symptoms than youth in non-directive supportive therapy and child-centered therapy (Cohen et al., 2006). TF-CBT has also been shown to reduce family conflict and possibly parent/caregiver distress and depression.

Findings from the present study indicate that family conflict may contribute to trauma symptoms and negative outcomes for maltreated youth. Family therapy to lessen conflict should be conducted if family reunification is planned. Important components of family therapy include parent education regarding normal child development and safety, couple's therapy to reduce conflict in the home, communication skills building, and emotional support for parents and children. Multisystemic Therapy (MST) is a family and community-based therapy for violence-exposed youth (Brunk, Henggeler, & Whelan, 1987; Henggeler, 2011; Swenson & Schaeffer, 2012). MST shows promising outcomes and has demonstrated effectiveness with ethnically diverse youth and families following trauma (Henggeler, 2011).

Findings of the present study also highlight the importance of individual variables such as age on symptom severity and presentation. Very young children may benefit from treatments that focus on attachment and parent variables, such as Child-Parent Psychotherapy (CPP) (Lieberman, Ippen & Van Horn, 2006). CPP is an intervention for

ethnically diverse young children who have experienced traumatic events such as maltreatment, exposure to domestic violence, or loss or separation from a close loved one. The primary goal of CPP is to support and strengthen the parent-child relationship to restore a child's sense of safety, attachment, and appropriate affect and improve the child's cognitive, behavioral, and social functioning (Ippen, Harris, Van Horn & Lieberman, 2011).

Older adolescents and young adults may similarly benefit from developmentally appropriate intervention, particularly those youth with complex, persistent trauma-related symptoms. Many adolescents and young adults with extensive maltreatment histories and trauma symptoms benefit from Dialectic Behavior Therapy (Fleischhaker, Böhme, Sixt, Brück, Schneider, & Schulz, 2011; Linehan, Armstrong, Suarez & Allmon, 1991; Linehan, Tutek, Heard, & Armstrong, 1994; Perepletchikova, 2011), though research in this area is in its infancy (James, Winmill, Anderson, & Alfoadari, 2011).

### **Limitations**

The findings of this study should be considered with caution due to various limitations. First, this study relied solely on DFS records and adolescent interviews and self-reports. Parents and previous caregivers were not available for interview. Participants were frequently unable to report important family factors such as parent education, employment, and income, and parent ethnicity. Confounding effects of socioeconomic status beyond ethnicity thus could not be evaluated. Similarly, participant ratings may have been subject to bias. This study also relied on adolescent self-report for trauma and maltreatment history and these self-reports may have been affected by a failure to remember or articulate trauma history. Findings may thus have been limited

with respect to accuracy of trauma history. However, the interview (CPTSD-I) used to solicit this information was specifically designed to collect this information and has excellent reliability and validity. In addition, strong internal consistency was found for the CPTSD-I in the present sample. This study was also limited by dependence on the youth self-report version of the FES to assess family cohesion and conflict. This instrument did not capture individual parent and family factors previously identified in the maltreatment literature such as parental psychopathology, parental substance use, and intergenerational trauma such as maltreatment.

Second, types of maltreatment were not differentiated, with the exception of male sexual maltreatment. An attempt was made to examine male sexual maltreatment independently but data analysis could not be completed as planned due to limited sample size. Neglect, sexual maltreatment, physical maltreatment, and witnessing intimate partner violence were included in the analyses as one group. A recent study, however, revealed that physical and sexual maltreatment victims experience more PTSD-related symptoms than neglected children (Wechsler-Zimring & Kearney, 2011). The present study did not examine model fit across maltreatment types.

Third, the cross-sectional design and restricted age range (11-17 years) of study participants limit the findings. The present findings cannot be applied to younger children. Findings regarding the impact of ethnicity on trauma symptomatology should be considered with caution as well given the importance of age in ethnic identity achievement. Ethnic identity achievement typically occurs in late adolescence (age 16-19 years) (Phinney, 1992, 1995), and many of the present study participants were much younger. Limited ethnic identity formation and achievement may have masked some

findings that are evident in studies with adults (Kiang et al., 2008; Sellers & Sheldon, 2005).

Fourth, this study utilized a convenience sample and so generalizability to other settings is unclear. Adolescents experienced a level of maltreatment sufficiently significant to be removed from the home and placed in the foster care system. Youth who experienced less severe maltreatment remained in the home or were placed in the care of other family members or fictive kin. Such youth may have experienced different PTSD-related symptoms but were not available for this study.

### **Recommendations for Further Study**

Future research regarding the Lemos-Miller and Kearney model should address the above limitations. Researchers should gather information from multiple informants regarding demographics, maltreatment history, and youth behavior and functioning. Collateral information in the form of interviews and self-reports from parents or caregivers would augment the validity of the information provided by the youth. This is particularly important for family environment, socioeconomic status, trauma exposure, and maltreatment type. Evaluating the Lemos-Miller and Kearney model among maltreated youth in the process of reunification with their families might be one possibility.

The Lemos-Miller and Kearney model should also be evaluated for different primary trauma types. Specific PTSD symptom presentations may differ depending on the primary, or most frightening, trauma event, such as physical, sexual, and emotional maltreatment, neglect, removal from home, witnessing community violence, witnessing intimate partner violence, or other event (De Bellis, 2001; Kearney et al., 2010;



MacDonald et al., 2010; Wechsler-Zimring & Kearney, 2011). Researchers might also examine whether the type of trauma (intra-familial or extra-familial) impacts the relationship between family conflict and cohesion and PTSD-related symptoms. Researchers could determine whether high levels of family conflict predict more PTSD symptoms in intra-familial than extra-familial trauma cases.

Researchers should also examine the applicability of the Lemos-Miller and Kearney model to younger children. Many researchers emphasize developmental traumatology within the field. The Lemos-Miller and Kearney model may prove an excellent theoretical framework for evaluating the developmental impact of early child maltreatment trauma. A longitudinal study of youth from the time they first enter DFS care through adolescence could reveal important changes in the relationships between PTSD, depression, dissociation, and trauma-related cognitions.

Researchers should also examine the characteristics of maltreated youth without PTSD and related symptoms to identify resiliency factors. Maltreatment type, frequency, and severity (Carrion et al., 2002; MacDonald, et al., 2010; Romero et al., 2009; Tyler, 2002), therapeutic treatment history, and foster care placement history (Stone, 2007) may inform researchers about patterns of resilience. Extensive family information may also provide clues about successful parenting strategies associated with fewer PTSD symptoms. Youth cognitive functioning, cognitive schemas, social supports, religious affiliation and group involvement, and other factors may influence symptom severity. Identification of these factors will lead to valuable information for PTSD prevention and treatment in maltreated youth.

Developmental and psychobiological models of trauma also reveal other areas for further study. These models emphasize a complex biological process wherein the traumatic stress response during sensitive periods can alter the trajectory of emotional, behavioral, and cognitive development (De Bellis, 2001; 2002; De Bellis & Van Dillen, 2005; Wilson et al., 2011). Further research in this area is needed to identify the exact biological processes of youth who have experienced maltreatment and other chronic trauma (Goodman et al., 2010). For example, recent neuropsychological research has revealed increased rates of memory impairment and learning disability in trauma-exposed and maltreated youth (De Bellis, 2005; Nolin & Étheir, 2007; Pears & Fisher, 2005; Saigh et al., 2006; Saltzman et al., 2006).

Developmental and psychobiological models also posit that early and chronic trauma is most disruptive to child development. Effective prevention and early intervention programs are thus essential for improving child outcomes. Few effective child maltreatment prevention programs exist and further research and development of such programs must be prioritized. CPP has recently been modified for use with expectant mothers and the outcomes are promising but preliminary (Ippen et al., 2011). Effective and widely available interventions for families with maltreatment histories are also lacking. Aside from CPP and TF-CBT, few treatments directly address the complex trauma-related problems of families and children with maltreatment history. The development of prevention and early intervention programs must be prioritized in research and social policy.

APPENDIX I

DEMOGRAPHIC/INFORMATION SHEET FOR CHILDREN

### Information Sheet-C

Please fill this sheet out completely. The information you provide will be given a number so your name will not be on any papers you fill out. Please feel free to skip an item if you don't feel comfortable answering, but please try to honestly answer all questions the best you can.

1. Your Initials: \_\_\_\_\_
2. Your age: \_\_\_\_\_
3. Are you: (circle one) Male Female Other
4. Your Race: (circle one)  
Asian African-American Caucasian Hispanic Multiracial Native American  
Other \_\_\_\_\_
5. Place of birth (state, and country): \_\_\_\_\_
- 5a. If you were not born in the United States, what country were you born in?  
\_\_\_\_\_
6. Biological mother's race/ethnicity \_\_\_\_\_
7. Biological mother's place of birth: \_\_\_\_\_
8. Biological father's race/ethnicity \_\_\_\_\_
9. Biological father's place of birth: \_\_\_\_\_
10. Did mother/guardian graduate from high school? Yes No  
How many years did mother/guardian go to college or trade school after high school?  
\_\_\_\_\_
11. Did father/guardian graduate from high school? Yes No  
How many years did father/guardian go to college or trade school after high school?  
\_\_\_\_\_
12. What kind of work does mother/guardian do?  
\_\_\_\_\_
13. What kind of work does father/guardian do?  
\_\_\_\_\_
14. How many brothers and sisters do you have? \_\_\_\_\_
15. Are your parents/guardians married now? (circle one)  
married never married separated divorced

16. If your parents/guardians are separated or divorced, who has custody of you? (circle one)

joint custody (both parents)      mother      father      other      DFS

17. Have you ever used alcohol or drugs?      Yes      No

18. Does your family participate in religion on a regular basis?      Yes      No

19. Are you religious?      Yes      No

20. Is English the first language you learned?      Yes      No

20a. If English is not the first language you learned, what language did you first learn? \_\_\_\_\_

21. Please list all the languages you are fluent in (e.g., English, Spanish, etc.) \_\_\_\_\_

22. What language do you primarily speak in your home? \_\_\_\_\_

**THANK YOU**

APPENDIX II

TABLES

Table 4

*Pearson Correlation Coefficients Among All Subscales*

Subscale	CPTSD-I A	CPTSD-I B	CPTSD-I C	CPTSD-I D	CPTSD-I E	A-DES A
CPTSD-I A	-					
CPTSD-I B	.38**					
CPTSD-I C	.22**	.67**				
CPTSD-I D	.20**	.70**	.64**			
CPTSD-I E	.26**	.49**	.48**	.52**		
A-DES A	.14*	.35**	.33**	.34**	.37**	
A-DES B	.15*	.38**	.37**	.35**	.34**	.83**
A-DES C	.11	.37**	.38**	.38**	.34**	.80**
A-DES D	.12*	.42**	.42**	.43**	.45**	.83**
CDI A	.21**	.46**	.41**	.41*	.44**	.50**
CDI B	.03	.16**	.13*	.13*	.30**	.41*
CDI C	.08	.22**	.15*	.18*	.31**	.37**
CDI D	.20**	.46**	.46**	.42**	.43**	.52**
CDI E	.15*	.41**	.37**	.39**	.35**	.45**
PTCI A	.17**	.49**	.51**	.50**	.49**	.61**
PTCI B	.18**	.42**	.42**	.41**	.33**	.39**
PTCI C	.08	.37**	.34**	.30**	.36	.45**

*Note.* CPTSD-I A2 = Situational Reactivity, CPTSD-I B = Reexperiencing, CPTSD-I C = Avoidance/Numbing, CPTSD-I D = Increased Arousal, CPTSD-I E = Significant Distress, A-DES A = Dissociative Amnesia, A-DES B = Absorption/Imaginative Involvement, A-DES C = Passive Influence, A-DES D = Depersonalization/Derealization, CDI A = Negative Mood, CDI B = Interpersonal Problems, CDI C = Ineffectiveness, CDI D = Anhedonia, CDI E = Negative Self-Esteem, PTCI A = Negative Cognitions about Self, PTCI B = Negative Cognitions about the World, PTCI C = Self-blame. \* =  $p < .05$ , \*\* =  $p < .01$

Subscale	A-DES B	A-DES C	A-DES D	CDI A	CDI B	CDI C
CPTSD-I A				-		
CPTSD-I B						
CPTSD-I C						
CPTSD-I D						
CPTSD-I E						
A-DES A						
A-DES B						
A-DES C	.79**					
A-DES D	.79**	.83**				
CDI A	.46**	.53**	.55**			
CDI B	.38**	.40**	.50**	.48**		
CDI C	.25**	.36**	.38**	.45**	.52**	
CDI D	.49**	.55**	.61**	.68**	.49**	.51**
CDI E	.37**	.48**	.49**	.69**	.45**	.51**
PTCI A	.56**	.67**	.70**	.62**	.39**	.47**
PTCI B	.36**	.44**	.43**	.46**	.27**	.29**
PTCI C	.44**	.50**	.50**	.43**	.26**	.33**

Subscale	CDI D	CDI E	PTCI A	PTCI B	PTCI C
CPTSD-I A					
CPTSD-I B					
CPTSD-I C					
CPTSD-I D					
CPTSD-I E					
A-DES A					
A-DES B					
A-DES C					
A-DES D					
CDI A					
CDI B					
CDI C					
CDI D					
CDI E	.68**				
PTCI A	.62**	.65**			
PTCI B	.40**	.41**	.62**		
PTCI C	.38**	.39**	.70**	.51**	-



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### Publications:

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