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# Dissociative Symptoms in Adolescent Girls: Contextual Determinants and Behavioral Outcomes

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Dissociative Symptoms in Adolescent Girls:  
Contextual Determinants and Behavioral Outcomes

Kate Zona, Ph.D.

University of Connecticut, 2014

Dissociative symptoms in adolescents have not been widely studied. Existing research suggests that dissociation is important in understanding vulnerability for psychopathology and high-risk behavior during adolescence, especially among girls exposed to potentially traumatic events. Using a diverse, low-income sample of 13- to 17-year-old girls (N=194), this study examined: 1) psychometric properties of the Adolescent Dissociative Experiences Scale (A-DES; Armstrong et al., 1997); 2) associations between dissociative symptoms and exposure to traumatic events, relational factors, and racial/ethnic/cultural factors, including potential moderating effects of contextual variables on the relationship between trauma exposure and dissociation; and 3) whether dissociation predicted risky behavior, above and beyond more common and frequently comorbid symptoms, and uniquely mediated associations between trauma exposure and destructive behaviors. Results showed that adolescent and mother A-DES scores were moderately correlated, and both were highly stable at eight-week follow-up. In EFA, there was a good fit for a two-factor A-DES structure that reflected response scale differences across items, with all items loading onto one factor and a second-order factor emerging consisting of items treated as dichotomous due to low endorsement. A significant relationship was found between dissociation and past year (but not lifetime) traumatic events, controlling for PTSD. Dissociative symptoms did not differ by race and were not uniquely associated with relational or cultural variables, other than relational style with mothers. Preoccupied and dismissing styles were significantly related to dissociation, controlling for

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traumatic events and PTSD. None of the relational or racial/ethnic/cultural factors moderated the relationship between trauma exposure and dissociation. However, age had both a main and interactive effect with trauma on dissociation; younger participants reported greater dissociation, in general and in response to trauma. Finally, dissociation was related to most risk behaviors (suicidal ideation, self-harm, disturbed eating, alcohol use), but not after controlling for PTSD and depression, with the exception of suicidality. Suicidal ideation significantly predicted dissociation above and beyond PTSD and depression, and dissociation mediated the relationship between trauma exposure and suicidal ideation. These findings highlight the importance of assessing and treating dissociation in adolescent girls, particularly younger girls with trauma histories.

Dissociative Symptoms in Adolescent Girls:  
Contextual Determinants and Behavioral Outcomes

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APPROVAL PAGE

Doctor of Philosophy Dissertation

Dissociative Symptoms in Adolescent Girls:  
Contextual Determinants and Behavioral Outcomes

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## **Introduction**

The concept of dissociation has a long history in the fields of psychology and psychiatry, dating back to the turn of the century with Janet (1889) and Freud (1896). Research over the past 25 years has greatly increased understanding of the development, nature, and correlates of dissociative symptoms. Despite this long history and a recent increase in empirical attention, dissociation in adolescents has not been widely studied. Existing research suggests that dissociation may be particularly important in understanding the development of psychopathology and high-risk behavior during adolescence, especially among girls (e.g., Hornstein & Putnam, 1992; Kiesel & Lyons, 2001; Zona & Milan, 2011). The goal of this study is to gain a better understanding of the contextual determinants and potential adverse outcomes associated with dissociation in a sample of racially diverse adolescent girls. This line of research is critical for developing interventions that are gender-responsive and culturally relevant.

## **Definitions of Dissociation and Related Diagnoses**

Dissociation is characterized by “a disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behavior” (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [DSM-5], 2013, p. 291). Core symptoms of dissociation include amnesia (an inability to recall autobiographical information), derealization (experiences of unreality or detachment from one’s surroundings), depersonalization (experiences of unreality or detachment from one’s mind, self, or body), and identity disruption (APA, 2013). According to Spiegel, Loewenstein, Lewis-Fernández, Sar, Simeon, Vermetten, and colleagues (2011), “dissociative symptoms invade and interfere with the person’s continuity of normal psychological functioning by intruding on and/or deleting aspects of conscious experience, thought, or action” (p. 826).

Pierre Janet (1889) was the earliest clinician to describe dissociation, which he termed “desagregation mentale” and defined as a lack of integration of mental elements. Janet viewed dissociation as a fundamental aspect of hysterical disorders, which have features of contemporary dissociative and conversion disorders. Dissociative disorders were introduced as a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III; American Psychiatric Association, 1980), and the classification has undergone changes in subsequent DSM editions.

In the current Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013), there are five dissociative disorder diagnoses: 1) Dissociative Identity Disorder (DID), involving disruption of identity characterized by two or more personality states (or an experience of possession) and recurrent episodes of amnesia; 2) Dissociative Amnesia, an inability to recall important autobiographical information (usually of a traumatic nature), with a possible specifier of Dissociative Fuge involving travel with associated amnesia for identity; 3) Depersonalization/Derealization Disorder, persistent or recurrent experiences of unreality or detachment with respect to one’s thoughts, feelings, sensations, body, or actions (in depersonalization), and/or surroundings (in derealization); 4) Other Specified Dissociative Disorder; and 5) Unspecified Dissociative Disorder. Individuals are diagnosed with Other Specified Dissociative Disorder when dissociative symptoms are present but do not meet full criteria for any of the dissociative disorder diagnoses. Four possible examples of such presentations are provided in the DSM-5: 1) chronic and recurrent episodes of mixed dissociative symptoms, including identity disturbance with no associated amnesia (i.e., “subclinical” DID); 2) identity disturbance due to prolonged and intense coercive persuasion; 3) acute dissociative reactions to stressful events (lasting a few hours to less than one month); and 4) dissociative

trance, characterized by an acute narrowing or loss of awareness of surroundings that is not part of a broadly accepted cultural or religious practice. Finally, Unspecified Dissociative Disorder is intended to be a temporary diagnosis for use when dissociative symptoms are observed but there is insufficient information to make a more specific diagnosis, such as in emergency room situations (APA, 2013).

Dissociative disorders are very rare in the general population. A small U.S. community study of adults found 12-month prevalence rates of 1.5% (1.6% males, 1.4% females) for DID and 1.8% (1% males, 2.6% females) for Dissociative Amnesia, based on the DSM-5 diagnostic criteria (APA, 2013). The estimated lifetime prevalence rate for Depersonalization/Derealization Disorder in U.S. as well as internationally is approximately 2% with a 1:1 gender ratio, although it is estimated that approximately 50% of all adults have experienced at least one lifetime episode of derealization and/or depersonalization (APA, 2013).

Several changes in the dissociative disorders diagnoses occurred from the DSM-IV (APA, 1994) to the DSM-5 (APA, 2013). In the DSM-5, derealization was included as a part of Depersonalization Disorder. Previously, those exhibiting symptoms of derealization without depersonalization would have been given a diagnosis of Dissociative Disorder, Not Otherwise Specified (DDNOS). Also, dissociative fugue (previously a separate diagnosis) was subsumed under Dissociative Amnesia as a specifier, given research findings indicating that this is an extremely rare phenomenon. In addition, the criteria for DID were revised to allow individuals reporting identity disturbances to receive the diagnosis, whereas in the DSM-IV, it was required that clinicians observe such disruptions. The DID criteria also now specify that gaps in the recall of events may occur for everyday, not solely traumatic, events. These criteria were also expanded to include individuals exhibiting pathological possession-form phenomena in order to

increase applicability across various cultural groups, as such presentations are tend to occur among individuals from African, Asian, and other non-Western cultures.

Notably, the clinical utility of DSM-IV dissociative disorder classifications was called into question by a number of researchers (Mezzich, Fabrega, & Coffman, 1989; Saxe, van der Kolk, & Berkowitz, 1993), based on findings that a large proportion of individuals exhibiting dissociative symptoms did not meet criteria for any specific diagnosis and thus received the “catch-all” diagnosis of DDNOS. The DSM-5 is still in its infancy, so it remains to be seen whether a significant number of individuals will receive the corresponding DSM-5 diagnosis of Other Specified Dissociative Disorder.

Dissociation often occurs in the presence of a number of other types of symptoms and diagnoses. Those experiencing dissociative symptoms frequently exhibit affective dysregulation, intrusions of traumatic memories, cognitive impairments, and behavioral disturbances (e.g., Hornstein & Putnam, 1992). Dissociative symptoms are frequently observed in several other psychiatric disorders, including Acute Stress Disorder (ASD), Posttraumatic Stress Disorder (PTSD), somatoform disorders (particularly Conversion Disorder), Borderline Personality Disorder, and eating disorders (Carlson, Dalenberg, & McDade-Montez, 2012; Gershuny & Thayer, 1999). Notably, dissociative symptoms are well established sequelae of trauma (discussed below), and a number of these frequently comorbid disorders are also related to trauma.

Given the documented relationship between trauma and dissociation, dissociative disorders were considered for inclusion in the new DSM-5 class of “trauma and stressor-related disorders,” but this was ultimately decided against because, unlike the other disorders in this class (e.g., PTSD, ASD), dissociative disorders do not require exposure to a traumatic or

stressful event as a diagnostic criterion (Spiegel et al., 2011). Dissociative disorders were placed immediately following the trauma and stress-related disorders in the DSM-5 to reflect the close relationship between these diagnostic classes (APA, 2013).

In the PTSD diagnostic criteria, there are several symptoms that are dissociative in nature, including Criterion B3 of the intrusion cluster (“Dissociative reactions [e.g., flashbacks] in which the individual feels or acts as if the traumatic event[s] were reoccurring”) and Criterion D1 of the negative alterations in cognitions and mood cluster (“Inability to remember an important aspect of the traumatic event[s], typically due to dissociative amnesia and not to other factors such as head injury, alcohol, or drugs”) (APA, 2013, p. 271).

In addition, a significant diagnostic change introduced in the DSM-5 is the inclusion of a dissociative subtype of PTSD to identify individuals who experience persistent and recurring depersonalization and derealization symptoms in addition to meeting criteria for PTSD (i.e., a specified number of symptoms from each of the four PTSD symptoms clusters of intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity). Three converging lines of research influenced the inclusion of a dissociative subtype of PTSD in the DSM-5 (Lanius, Vermetten, Loewenstein, Brand, Schmahl, Bremner, et al., 2010). First, several studies examining PTSD symptoms with latent class, taxometric, epidemiological, and confirmatory factor analyses showed that a subgroup of individuals with PTSD (approximately 15-30%) also reported symptoms of derealization and depersonalization (Stein, Koenen, Friedman, Hill, McLaughlin, Petukhova, et al., 2013; Steuwe, Lanius, & Frewen, 2012; Wolf, Lunney, Miller, Resick, Friedman & Schnurr, 2012; Wolf, Miller, Reardon, Ryabchenko, Castillo, & Freund, 2012). These studies suggested that not all individuals who meet criteria for PTSD have high levels of dissociation, whereas most people experiencing high dissociation have

PTSD (Lanius, Brand, Vermetten, Frewen, & Spiegel, 2012).

Studies have found that compared to individuals with only PTSD symptoms, those reporting both PTSD and dissociative symptoms are more likely to have flashbacks (Cloitre, Petkova, Wang, & Lu Lassell, 2012), severe PTSD symptoms (Waelde, Silvern, & Fairbank, 2005), other comorbid psychiatric diagnoses (Stein et al., 2013; Steuwe et al., 2011; Wolfe et al., 2012b) including Borderline and Avoidant Personality Disorders among women (Wolfe et al., 2012a), suicidality and functional impairment (Stein et al., 2013), and exposure to prior traumatic events and childhood abuse and adversity (Cloitre et al., 2012; Stein et al., 2013; Steuwe et al., 2011). There have been mixed findings regarding gender differences in those who fall within the dissociative subtype of PTSD. A large epidemiological study of over 25,000 respondents in 16 countries found that a greater number of males compared to females reported both PTSD and dissociative symptoms (Stein et al., 2013), but a study of veterans found that women were more likely than men to be classified into the dissociative subtype (30% versus 15%) (Wolfe et al., 2012a).

Next, treatment outcome studies have found that those with comorbid PTSD and dissociative symptoms do not respond well to the “gold standard,” empirically supported exposure-based cognitive-behavioral treatments for PTSD. For these individuals, exposure therapies have been found to lead to an increase in dissociation and affective inhibition, as opposed to their intended effect of desensitization to and processing of the traumatic event (Cloitre et al., 2012; Resicl, Suvak, Johnides, Mitchell, & Iverson, 2012). Patients with both PTSD and dissociative symptoms have been shown to respond better to sequenced, phase-oriented treatments that include cognitive restructuring and skills training in affective and interpersonal regulation, in addition to exposure-based approaches (Cloitre et al., 2012; Resick et

al., 2012).

Finally, functional neuroimaging studies suggest two different types of emotional dysregulation depending on trauma symptom profile (for reviews, see Lanius et al., 2010, 2012). This research indicated that when listening to their personal trauma scripts, those with predominantly reexperiencing and hyperarousal PTSD symptoms tend to show increased activity in limbic brain regions (e.g., the amygdala) and reduced activation in the areas of the brain associated with emotional control and regulation (e.g., medial prefrontal and rostral anterior cingulate cortex). In contrast, those with dissociative symptoms tend to exhibit heightened activation in prefrontal brain regions (e.g., rostral anterior cingulate cortex, medial prefrontal cortex) and relatively less activity in the limbic areas in response to trauma cues (Lanius et al., 2010, 2012). These neurobiological findings led Lanius and colleagues (2010) to posit a model in which reexperiencing and hyperarousal symptoms involve emotional undermodulation mediated by failure of prefrontal inhibition of activity in limbic regions, whereas dissociative responses involve emotional overmodulation mediated by midline prefrontal inhibition of the limbic areas. Given this empirical evidence of divergent trauma symptom profiles, patterns of brain activation underlying affect modulation, and treatment outcomes among those with PTSD, a dissociative subtype was added in the DSM-5 in order to improve assessment and treatment of those with trauma-related psychopathology.

Although not a DSM-5 diagnosis, dissociation also is a core feature of “complex PTSD,” which was first proposed by Herman (1992) to describe a syndrome observed in survivors of early, prolonged, repeated interpersonal trauma. In addition to the traditional PTSD symptoms, complex PTSD involves a range of disturbances in self-regulatory capacities in five broad domains: emotion regulation difficulties, disturbances in relational capacities, alterations in

attention and consciousness (i.e., dissociation), adversely affected belief systems, and somatic distress or disorganization (Curtois & Ford, 2009; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola., 2005). For DSM-IV field trials, this syndrome was referred to as Disorders of Extreme Stress, Not Otherwise Specified (DESNOS; Pelcovitz, Van Der Kolk, Roth, Mandel, Kaplan & Resick, 1997). A related diagnosis of Developmental Trauma Disorder has been proposed for children who have experienced chronic trauma (van der Kolk, 2005). Complex PTSD was considered for inclusion in both the DSM-IV and DSM-5, but was ultimately not included in either diagnostic manual due to insufficient evidence demonstrating its distinctness from PTSD, incremental validity, and clinical utility (Resick, Bovin, Calloway, Dick, King, Mitchell, et al., 2012).

Dissociative symptoms are also included in the criteria of another trauma and stress-related disorder, Acute Stress Disorder (ASD). In the DSM-5, individuals meet diagnostic criteria for ASD if they exhibit, within one month following exposure to a traumatic event, nine or more of 14 symptoms from the five categories of intrusion, negative mood, dissociation, avoidance, and arousal. Dissociative reactions during and immediately following a traumatic experience, called peritraumatic dissociation, are very common and may include emotional numbing, altered time sense, reduced awareness of surroundings, depersonalization, and amnesia (Cardena & Spiegel, 1993). A number of longitudinal studies have found peritraumatic dissociation to predict the development of subsequent PTSD, although others have not (for reviews, see Breh & Seidler, 2007; Ozer, Best, Lipsey, & Weiss, 2003). In the DSM-IV, individuals had to display at least three of five dissociative symptoms to be diagnosed with ASD, with the rationale that dissociation in the wake of trauma was predictive of poor long-term post-trauma adjustment. This requirement was eliminated in DSM-5 in light of contradictory findings

regarding the predictive value of peritraumatic dissociation in the development of PTSD, and evidence that acute posttraumatic reactions are heterogenous (Bryant, Friedman, Spiegel, Ursano, & Strain, 2011).

### **Conceptualization of Dissociation**

There has been much definitional and conceptual debate regarding dissociation. One issue concerns whether dissociation is a dimensional or categorical phenomenon. Historically, Janet (1889) viewed dissociation as a discontinuous phenomenon observed only in individuals with mental disorders. In contrast, his contemporaries William James (1890) and Morton Prince (1905) and later researchers (Putman, 1993; Putnam, Carlson, Ross, Anderson, Clark, Torem, Bowman, et al., 1996; Ross, 1996) conceptualized dissociation as a dimensional phenomenon existing along a continuum ranging from normal and relatively common dissociative experiences (e.g., absorption, daydreaming) to severe and pathological disturbances (e.g., dissociative disorders). In these dimensional conceptualizations, dissociation is viewed as a naturally occurring aspect of human experience that occurs to some degree in everyone. This dimensional view prevailed until recently, when several investigators proposed categorical conceptualizations in which pathological dissociation represents a qualitatively different phenomenon from normative dissociation, seen only in nonclinical samples and representing a marked deviation from normality (Simeon et al., 1998; Waller et al., 1996). A taxometric analysis of a commonly used dissociation measure for adults empirically validated the distinction between a dimensional, non-pathological type of dissociation and a discontinuous, pathological class of dissociation by identifying an underlying class-like (versus trait-like) factor that represented a distinct taxonic category to which participants either belonged or did not (Waller et al., 1996). Individuals in the dissociative taxon differed significantly from “normal” controls and individuals with other

psychiatric disorders, displaying higher rates of amnesia and extreme forms of depersonalization. A longitudinal study from infancy to young adulthood provided evidence that a pathological dissociation taxon likely also exists among youth; discriminant function analysis predicted with a reasonable degree of accuracy participants' membership in either a clinical group with very high levels of dissociation or a normal group with lower levels of dissociation (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997).

Current definitions of dissociation have been criticized for being loosely operationalized and overinclusive (Cardena, 1994; Holmes, Brown, Mansell, Fearon, Hunter, Frasquilho, & Oakley, 2005). Recent efforts to redefine and specify conceptualizations of dissociation by a number of researchers (Allen, 2001; Brown, 2002; Cardena, 1994; Putnam, 1997; van der Kolk & Fisler, 1995) converged in dividing the domain into two qualitatively distinct but related forms, which have been labeled detachment and compartmentalization (Holmes et al., 2005). Detachment is described as a relatively normative altered state of consciousness or "out-of-body experience" characterized by a sense of disconnection from oneself (i.e., depersonalization) and the external world (i.e., derealization). An absence or flattening of emotional experience is thought to occur during these altered states. Compartmentalization, on the other hand, involves an inability to control actions or cognitive processes that would normally be amenable to deliberate control. These compartmentalized processes remain intact and continue to operate normally despite being inaccessible to volitional control, and thus can continue to influence emotion, cognition, and behavior (Cardena, 1994). Compartmentalization is thought to be more pathological than detachment, and clinical manifestations include dissociative amnesia, DID, and conversion symptoms that are present in somatoform disorders. Although detachment and compartmentalization typically occur in isolation, these phenomena are posited to co-occur in

certain conditions such as PTSD (Holmes et al., 2005). A few factor analytic studies provide support for this proposed dichotomy of dissociation, yielding separate factors for depersonalization/derealization (i.e., detachment) and amnesia (i.e., compartmentalization) (Bernstein & Putnam, 1986; Carlson & Putnam, 1993), although other psychometric research has not replicated these results.

Somewhat similarly, dissociative symptoms are described as falling into two categories in the DSM-5 (APA, 2013): 1) “positive” symptoms consisting of unbidden intrusions into awareness and behavior, with accompanying losses of continuity in subjective experience (e.g., fragmentation of identity, depersonalization, and derealization), and 2) “negative” symptoms involving inability to access information or control mental functions that normally are readily amenable to access or control (e.g., amnesia).

Alternatively, Cardena and Carlson (2011) divided dissociative experiences into three domains: 1) loss of continuity in subjective experience accompanied by involuntary and unwanted intrusions into awareness and behavior; 2) inability to access information or control mental functions that are normally amenable to such access or control; and 3) a sense of experiential disconnectedness that may include distortions in perceptions about the self of the environment. These various subtypes of dissociation are helpful in understanding the nature and manifestations of dissociation, but existing measures have not been developed to reflect these domains, and consequently there is limited research to date that has utilized these conceptualizations in examining predictors and outcomes of dissociation.

### **Measurement of Dissociation**

The most commonly used measure of dissociation in adults is the 28-item, Likert-type Dissociative Experiences Scale, Second Edition (DES-II; Bernstein & Putnam, 1986; Carlson &

Putnam, 1993). The DES has demonstrated excellent internal consistency (Carlson & Putnam, 1993), temporal reliability (Carlson & Putnam; Holtgraves & Stockdale, 1997), and convergent and predictive validity (van IJzendoorn & Schuengel, 1996). However, factor analytic studies of the DES have yielded inconsistent results. The DES is composed of three subscales (dissociative amnesia, absorption and imaginative involvement, and derealization/depersonalization), and this three-factor model has been confirmed in a number of large general and student populations (e.g., Ross, Joshi, & Currie, 1991; Sanders & Green, 1994; Stockdale, Gridley, Balogh, & Holtgraves, 2002), as well as clinical samples (Darves-Bornoz, DeGiovanni, & Gaillard, 1999; Ross, Ellason, & Anderson, 1995). However, other studies have found separate factors for depersonalization/derealization and amnesia, as previously noted (Bernstein & Putnam, 1986; Carlson & Putnam, 1993). Other factor analyses have yielded one (Fisher & Elnitsky, 1990; Holtgraves & Stockdale, 1997), two (Olsen et al., 2013), four (Amdur & Liberzon, 1996; Dunn, Ryan, & Paolo, 1994; Ray & Faith, 1995), and even seven (Ray, June, Turaj, & Lundy, 1992) factor solutions. For instance, in a female undergraduate sample, Olsen and colleagues (2013) found good fit for a two factor DES structure with separate factors for absorption experiences thought to be more normative, and amnesia/depersonalization/derealization experiences that are hypothesized to represent more pathological symptoms.

The DES was adapted into the Adolescent Dissociative Experiences Scale (A-DES) by Armstrong, Putnam, Carlson, Libero, & Smith (1997) as a screening measure for pathological dissociation in 11- to 17-year-olds, and is the most widely used measure of adolescent dissociation. The A-DES is composed of four subscales intended to assess various aspects of adolescent dissociation: dissociative amnesia, absorption and imaginative involvement, passive influence, and derealization/depersonalization. However, all of the A-DES factor analysis

studies conducted to date have found a unidimensional structure among community samples (Farrington, Waller, Smerden, & Faupel, 2001; Muris, Merckelbach, & Peeters, 2003; Nilsson & Svedin, 2006; Tolmunon et al. 2007), with the exception of Yoshizumi and colleagues (2010), who found a three-factor solution (depersonalization, disintegration of conscious control, amnesia) in a Japanese community sample.

Given that some level of dissociation may be normative and qualitatively different from pathological dissociation, researchers have attempted to develop a pathological taxon from dissociation scales. As previously mentioned, Waller, Putnam, and Carlson (1996) developed the DES-T, which is composed of eight DES items tapping derealization, depersonalization, amnesia, and identity alteration. Similarly, Martinez-Taboas, Shrout, Canino, Chavez, and Ramirez (2004) developed the Adolescent Dissociative Experiences Scale-Eight (ADES-8), composed of a subset of eight A-DES items intended to measure pathological dissociation. There is demonstrated validity of the ADES-8 in Puerto Rican clinical (Martinez-Taboas et al., 2004) and community (Martinez-Taboas, Canino, Wang, Garcia, & Bravo, 2006) samples, but this measure has not yet been tested in other populations.

An additional measurement issue unique to child and adolescent research pertains to the use of observer- versus self-report in assessing dissociation. Many dissociative symptoms (e.g., alterations in memory and consciousness) are inherently subjective in nature and thus not readily amenable to behavioral observation. Some research supports this assumption; for instance, Ogawa et al. (1997) asserted that youth self-report of dissociative symptoms tapped a wider range of dissociative symptoms than observer-report, which did not seem to capture derealization/depersonalization symptoms. However, there are potential limitations inherent to using self-report measures in children and adolescents who may not be cognitively mature

enough to understand items or report on their own experiences. There is limited research examining consistency between child/adolescent report and parent or other observer report of dissociation. The only known study to date examining inter-rater agreement on dissociation measures reported a moderate correlation ( $r=.28$ ) between youth self-report and observer (mental health treatment provider) report (Kisiel & Lyons, 2001). This study utilized a sample of youth who had been removed from their homes and placed in Department of Children and Families (i.e., child welfare) custody, and were currently in residential psychiatric treatment. It remains unknown whether this finding can be generalized to other child/adolescent populations.

### **Dissociation in Children and Adolescents**

Dissociation in children and adolescents remains a vastly understudied topic, although dissociative symptoms may not have the same meaning or appearance at different developmental stages. A certain degree of dissociation is normative in childhood; for example, young children may refer to the self in the third person, engage in fantasy play, have imaginary playmates, or report hearing internal voices (Cole & Putnam, 1992; Fischer & Ayoub, 1994; Hornstein & Putnam, 1992). Pathological dissociation in children may be difficult to differentiate from normative experience, and thus it is essential that developmental stage be taken into consideration when determining and measuring what constitutes pathology in younger populations (Putnam, 1997).

As in adults, dissociation in children is reflected by disruptions in the domains of memory, perception, and identity; however, children may display unique manifestations of these disturbances. For instance, disturbances in memory may include children's continued "lying" or denying past actions when there is obvious evidence to the contrary (Putnam et al., 1993). Disruptions in perception may involve confusion between fantasy and reality (Bernstein &

Putnam, 1986) or spontaneous trance states or “spacing out” (Putnam et al. 1993). In addition, children experiencing disruptions in identity may exhibit inconsistent attributes and skills, have arguments with themselves, or blur boundaries between the self and fantasy characters (Putnam et al., 1993).

Rates of normative dissociation decrease from childhood into adolescence and adulthood (Steiner, Carrion, Plattner, & Koopman, 2003), while dissociative symptoms tend to remain stable or increase across development in individuals who go on to exhibit pathological dissociation (Putnam, Hornstein, & Peterson, 1996). By adolescence, dissociative symptoms become more recognizable and generally resemble those observed in adults (Putnam et al., 1996). In the only large-scale youth community prevalence study to date, the rate of pathological dissociation in adolescents was 4.9% (Martinez-Taboas et al., 2006). Dissociation rates in clinical and high-risk populations are considerably higher, with an estimated 19-73% of sexually abused or maltreated children and 23-45% of adolescent psychiatric inpatients experiencing high levels of dissociative symptoms (Silberg, 2000). In addition, 28% of delinquent adolescents in juvenile probation were found to meet criteria for a dissociative disorder (Carrion & Steiner, 2000).

Dissociative symptoms are strongly associated with overall symptomatology in adolescence (Farrington et al., 2001). They are often comorbid with a number of diagnoses and behavioral markers of psychopathology including depression, conduct problems, eating disturbances, substance abuse, self-injurious behaviors, and suicidal ideation and attempts (Silberg, 1998). Dissociative children and adolescents are frequently misdiagnosed with other disorders, commonly psychosis or schizophrenia, attention deficit/hyperactivity disorder (ADHD), and bipolar disorder (Putnam, 1997). Therefore, psychometrically sound assessment

tools are very important for the accurate identification of dissociative symptoms in youth.

There are mixed findings regarding gender differences in dissociation in both child/adolescent and adult populations. Community studies of children and adolescents (Farrington et al., 2001; Martinez-Taboas et al., 2006) as well as adults (Simeon, Knutelska, Nelson, Guralnik, & Schmeidler, 2003; Spitzer, Klauer, Grabe, Lucht, Stieglitz, Schneider, & Freyberger, 2003; Waller & Ross, 1997) have not generally found gender differences in dissociative symptoms, with a few exceptions. In a Puerto Rican clinical sample of 11- to 17-year-olds, girls reported higher pathological dissociative symptoms than boys (Martinez-Taboas et al., 2004). However, pathological dissociation rates were higher among adult men compared to women from a community sample (Seedat, Stein, & Forde, 2003). Regarding dissociative disorder diagnosis, a small U.S. community study did not find significant gender differences in prevalence rates of DSM-5 dissociative disorders, although females with dissociative disorders predominate in adult clinical settings (APA, 2013), with an estimated 9:1 ratio (Spitzer & Freyberger, 2008). Proposed reasons for this gender discrepancy in community versus clinical samples include a tendency among men to deny and not seek treatment for dissociative symptoms, or to exhibit more criminal and violent behavior and thus be more likely to present in the legal (versus mental health) system (APA, 2013; Lewis, Yeager, Swica, Pincus, & Lewis, 1997). Notably, disorders in which dissociative symptoms are frequently observed (e.g., PTSD, eating disorders, somatoform disorders, Borderline Personality Disorder) are more common among adolescent and adult females compared to their male counterparts.

Preliminary research suggests that dissociation may be a gendered response to trauma. In a longitudinal community study of racially diverse urban adolescents, the PI found that although boys and girls reported similar mean levels of dissociation, girls were more likely to experience

dissociative symptoms in response to exposure to violence (Zona & Milan, 2011). Moreover, dissociative symptoms mediated the relationship between violence exposure and suicidal ideation for adolescent girls only (Zona & Milan, 2012). Dissociation was also found to mediate the relationship between trauma and suicidality for adolescent girls (but not boys) in a sexually abused youth sample (Kiesel & Lyons, 2001). These findings indicate that although adolescent boys and girls may report similar levels of dissociation, these symptoms may be more maladaptive and lead to more deleterious outcomes for girls.

This greater dissociative response to trauma among girls is consistent with promising neurobiological frameworks of gender-specific stress responses and pathways to trauma-related psychopathology. Early trauma has been linked to two different psychobiological response patterns: hyperarousal and dissociation (Perry, Pollard, Blakley, Baker, & Vigilante, 1995; Schore, 1997). Perry and colleagues (Perry, 2001; Perry and Pollard, 1998; Perry et al., 1995) posited that exposure to traumatic stress in children causes hypothalamic–pituitary–adrenal (HPA) axis dysregulation, which leads to chronic hyperarousal (resembling the classic “fight-or-flight” pattern) and associated externalizing symptoms in boys, and a dissociative pattern of decreased HPA responsiveness and corresponding internalizing symptoms (anxiety, depression, dissociation) in girls. Along those lines, Taylor et al. (2000) proposed that the female stress response is characterized by an adaptive nurturing and affiliative “tend-and-befriend” pattern involving suppressed HPA response and sympathetic arousal, which is in direct contrast to the “fight-or-flight” hyperaroused response. In support of these theories, empirical studies have reported an association between dissociation and suppression of autonomic physiological stress response suggestive of HPA downregulation (Griffin, Resick, & Mechanic, 1997; Koopman, Carrion, Butler, Sudhakar, Palmer, & Steiner, 2004). It is also possible that observed gender

differences in symptom profiles may be related to previously described underlying neurobiological differences in modulation of affect, which have recently been shown to differentiate between trauma responses characterized by dissociative versus reexperiencing and hyperarousal symptoms (Lanius et al., 2010). However, no known neurobiological imaging studies to date have examined potential gender differences in prefrontal inhibition of limbic regions implicated in affect modulation.

### **Contextual Determinants of Dissociation**

Three contextual domains have been linked to dissociation in existing literature: trauma, relational factors, and racial and cultural factors. In general, however, these factors have been studied in isolation rather than simultaneously.

**Trauma.** From the beginning of the study of dissociation by Janet (1889) and Freud (1896), dissociation has been conceptualized as a trauma response. Janet (1889) viewed dissociation as the primary psychological process used by individuals coping with overwhelming trauma. He believed that continued dissociation put individuals at risk for various forms of psychopathology, and that trauma must be brought into conscious awareness in order for healing to occur. Freud adopted Janet's ideas in his treatment of "hysterical" female patients, and further postulated that helplessness experienced during trauma determines the use of dissociation as a defense mechanism to manage anxiety. However, Freud later rejected the concept of dissociation and put forth a model of repression as the defense mechanism at the root of psychopathology. Despite clinical reports of dissociation ("traumatic neuroses") in World War I veterans (Kardiner, 1941), the study of dissociation did not resume until the 1970s, when dissociative symptoms were described in World War II veterans as "war sailor syndrome" (Askevold, 1976). The importance of trauma in the etiology of dissociation was reestablished,

and researchers began to focus on the specific influence of childhood maltreatment (e.g., Terr, 1979). Subsequently, the experience of childhood maltreatment has been advanced as a key etiological factor of dissociation, and is the focus of the majority of dissociation literature.

Contemporary trauma theories are based on Janet (1889) and Freud's (1896) early views of dissociation as an intrapsychic defense against overwhelming trauma. Dissociation is thought to be employed in order to "mentally escape" a reality that is unbearable yet impossible to flee, thereby allowing individuals to emotionally distance themselves from overwhelming psychological and/or physical pain during and immediately after a traumatic event (Spiegel, 1991). Following trauma exposure, dissociation is hypothesized to help individuals to dampen down the experience of psychological distress and avoid unpleasant memories of the event by compartmentalizing trauma-related perceptions (van der Kolk et al., 1996; Putnam, 1997). Thus, dissociation can be viewed as adaptive in the context of acute or chronic trauma, as it is thought to reduce distress and protect the individual from full awareness of traumatic information both during and following trauma exposure (Spiegel, 1986). Among chronically traumatized individuals in circumstances of inescapable threat or captivity, dissociation is thought to facilitate "psychological survival" in the context of constant fear and helplessness (Spiegel, 1986). For traumatized children, dissociation is posited to permit the development of social, cognitive, and self-observational capacities, and allow for attachment to abusive and/or neglectful caregivers (Freyd, 1996; Freyd, DePrince, & Zurbriggen, 2001). Dissociation may be particularly adaptive in "betrayal trauma" by allowing for conflicting roles in relation to a caregiver who is both protective and traumatizing (Freyd, 1996; Freyd, DePrince, & Zurbriggen, 2001).

However, there are a host of psychological “costs” associated with dissociation.

Peritraumatic dissociation is thought to result in altered encoding and storage of trauma-related memories, leading to fragmented and compartmentalized memories and impairment in memory retrieval that prevents cognitive and affective processing of trauma (Spiegel, 1997; Spiegel & Cardena, 1991). Memories are thought to remain in nonverbal, emotionally overwhelming, often visual and sensory form (Lanius, Bluhm, Lanius, & Pain, 2006; Spiegel et al., 2011).

Furthermore, breakdowns of dissociation may result in flashbacks and other intrusions of traumatic memories (Lanius et al., 2006). These intrusions may overwhelm the individual’s psychological processes and lead to impaired executive functioning (Spiegel et al., 2011).

For some who experience acute dissociative reactions, a chronic pattern of dissociation in response to reminders of the original trauma and even minor stressors subsequently develops (Butler, Duran, Jasiukaitis, Koopman, & Spiegel, 1996). Repeated traumatization and subsequent anticipation of trauma repetition also lead to the entrenchment of dissociation as a generalized coping strategy. Thus, dissociation can become an automatic and uncontrollable response triggered by stress, anxiety, or fear (Perry et al., 1995; Putnam, 1997; Ludwig, 1983; Terr, 1991; van der Kolk & van der Hart, 1986; van der Kolk, van der Hart, & Marmar, 1996).

Consistent with trauma theory, there is a large body of literature documenting an association between chronic childhood maltreatment and dissociation (for a review, see Gershuny & Thayer, 1999). Numerous studies of adults have reported a relationship between retrospectively reported childhood maltreatment and dissociation in nonclinical (e.g., Briere & Runtz, 1988; Irwin, 1996), clinical (e.g., Briere & Zaidi, 1989; Chu & Dill, 1990; Draijer & Langeland, 1999; Kirby, Chu, & Dil, 1993; Putnam et al., 1996), and dissociative disordered clinical (e.g., Putnam et al., 1986; Ross, Miller, Bjornson, Reagor, Fraser, & Anderson, 1991)

samples. More recent research has also documented a significant association between concurrent child maltreatment and dissociative symptoms (Brunner, Parzer, Schuld, & Resch, 2000; Coons, 1996; Hornstein & Putnam, 1992; Kisiel & Lyons, 2001; Macfie et al., 2001; Malinosky-Rummel & Hoier, 1991; Ogawa et al., 1997; Putnam et al., 1993). A meta-analysis of 26 studies reported a medium combined effect size (Cohen's  $d=.52$ ) for the relation between dissociation and abuse (van IJzendoorn & Schuengel, 1996).

Earlier age of onset, greater severity, and chronicity of abuse have been associated with higher levels of dissociation (Chu & Dill, 1990; Kirby, Chu & Dill, 1993; Waldinger, Swett, Frank, & Miller, 1994; Zlotnick, Shea, Zakriski, Costello, Begin, Pearlstein, & Simpson, 1995; Macfie et al., 2001; Ogawa et al., 1997), although it is difficult to isolate specific aspects of trauma that are related to increased risk because these factors are often confounded (Ogawa et al., 1997). Findings are unclear regarding whether any specific type of child maltreatment is more strongly associated with dissociation. Some studies have found childhood sexual abuse to have a stronger relationship with dissociative symptoms than physical abuse (Waldinger et al., 1994), while others have reported greater effects for physical compared to sexual abuse (Chu & Dill, 1990; Kirby, Chu, & Dill, 1993). Other investigators found that the less frequently studied experiences of emotional neglect (Brunner et al., 2000) and verbal abuse (Dutra Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2009) most powerfully predicted dissociation, compared to physical and sexual abuse. A meta-analysis found identical effect sizes ( $d=.42$ ) for the impact of physical and sexual abuse on dissociation, but did not assess the influence of emotional maltreatment (van IJzendoorn & Schuengel, 1996).

Although childhood maltreatment is by far the most studied form of trauma in the dissociation literature, a growing body of research investigating outcomes of a variety of

traumatic experiences provides evidence that dissociation is associated with other forms of trauma, as well (for a review, see Carlson, Dalenberg, & McDade-Montez, 2012). As previously discussed, peritraumatic dissociation is a relatively common experience that has been reported by adults experiencing a wide range of traumatic events including combat exposure, vehicular accidents, natural disasters, assault, serious injury, cancer diagnosis, and terrorist attacks (for a review, see Lensvelt-Mulders, van Der Hart, van Ochten, van Son, Steele, & Breeman, 2008). In a meta-analysis of 17 adult clinical and community studies utilizing a variety of trauma exposed groups, Carlson, Dalenberg, and McDade-Montez (2012) reported a moderate effect size (Cohen's  $d=0.67$ ) for the relationship between trauma exposure and dissociative symptoms. A number of studies have also examined the impact of other traumatic events on dissociation in childhood. Significant associations have been reported between childhood and adolescent dissociation and invasive medical procedures (Diseth, 2006), family-related losses (Irwin, 1994), and exposure to community violence (Foster, Kuperminc, & Price, 2004; Rosenthal, 2000; Singer, Anglin, Song, & Lunghofer, 1995; Zona & Milan, 2011).

The few prospective studies that have been conducted with adults who experienced traumatic events (sexual/physical assault and an earthquake) found that the frequency of dissociative experiences tended to gradually decline in the weeks and months following the traumatic event (Cardena & Spiegel, 1993; Dancu, Riggs, Hearst-Ikeda, Foa, & Shoyer, 1996). Thus, dissociation appears to be at its highest level immediately after trauma exposure and then declines gradually for most, although a minority of individuals continues to experience elevated dissociation for months or years (Carlson, Dalenberg, & McDade-Montez, 2012).

The general reliance on retrospective, self-report methods of assessing trauma history is a significant weakness of the majority of studies exploring the role of trauma in the etiology of

dissociation. This methodological limitation has prompted researchers to question the presumed causal relationship between trauma and dissociation (Giesbrecht, Lynn, Lilienfeld, & Merckelbach, 2008; Kihlstrom, 2005; Lilienfeld et al., 1999; Merckelbach & Muris, 2001). For instance, Giesbrecht and colleagues (2008) argued that research showing associations between dissociation and various cognitive processes (e.g., fantasy proneness, interrogative suggestibility, susceptibility to cognitive failures) suggests that individuals with high levels of dissociation confabulate traumatic experiences. They noted that research based on more objective indices of trauma (e.g., medical records) fails to substantiate a relationship between trauma and dissociation. Indeed, Sanders and Giolas (1991) found that in a small clinical adolescent sample, the relationship between self-reported child maltreatment and dissociation was no longer significant when taking into account hospital records of abuse history. However, more methodologically sound prospective studies using hospital and/or state child protection records to verify trauma have reported significant associations between childhood trauma and dissociation (Diseth, 2006; Dutra et al., 2009; Ogawa et al., 1997), although these studies also showed that additional factors were involved in the development of dissociation.

Importantly, research suggests that other factors play a role in the etiology of dissociation and relationship between trauma and dissociation. The observed relation between trauma and dissociation is only modest; trauma-dissociation correlations are typically moderate in strength ( $r=.20-.45$ ) and trauma tends to explain approximately 4-20% of the variance in dissociation scores (Putnam, 1997). Furthermore, trauma alone is neither necessary nor sufficient for the development of dissociative symptoms; nontraumatized individuals sometimes exhibit dissociation (Putnam, 1996), and only a small proportion of those who have experienced trauma go on to develop dissociative disorders (Waller et al., 1996). Thus, it is important to investigate

other factors that may directly confer risk for dissociation or moderate the association between exposure to trauma and the development of dissociative symptoms. In recent years, research has begun to shed light on non-traumatic risk factors for dissociation, as well as developmental processes underlying the relationship between trauma and dissociation. Empirical findings suggest that relational and cultural factors play a role in the etiology of dissociation.

**Relational factors.** There is evidence that interpersonal factors such as insecure attachment and disturbed parent-child communication may be particularly important in the development of dissociation. Recent theoretical and empirical work indicates that infant disorganized attachment represents the earliest form of a dissociative mental process that increases risk for the development of dissociative pathology later in life. According to attachment theory, infants internalize memories of interactions with caregivers into internal working models of the caregiver and the self in relation to the caregiver, which shape expectations regarding attachment figures' future responses to attachment needs (Bowlby, 1973). The internal working models of insecure attachments confer generic vulnerability to poor outcomes by conveying expectations that the attachment figure will not be available or will respond negatively to requests of help and comfort. Due to simultaneous, incompatible emotional information conveyed by the parent (e.g., frightened/frightening behavior), the internal working model of disorganized attachment includes multiple, nonintegrated, contradictory expectations (Main & Morgan, 1996) that are too complex and contradictory to be synthesized into a unitary, cohesive sense of self and other (Liotti, 1999, 2004). According to Liotti's diathesis-stress vulnerability model (Liotti, 1992), disorganized attachment adds specificity to the generic vulnerability conferred from insecure attachment by increasing vulnerability for dissociative reactions to later stressful or traumatic experiences. Longitudinal findings that

infant disorganized attachment significantly predicted later dissociation (Carlson, 1998; MacDonald, Beeghley, Grant-Knight, & Agustyn, 2008; Ogawa et al., 1997; Dutra, Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2009) have provided preliminary support for Liotti's theory.

Although Liotti's model posits that the parent-child relationship beyond infancy and subsequent exposure to trauma are crucial in determining dissociative outcomes, few studies have examined the associations between dissociation and attachment beyond infancy, or how trauma interacts with attachment style in producing dissociation. These studies have produced mixed results, potentially due to differing methods of assessing attachment and dissociation. In adolescent and adult samples, dissociation has been associated with fearful attachment style (among women) and unresolved attachment (Sandberg, 2011; West, Adam, Spreng, & Rose, 2001). However, other studies have not found relationships between adult attachment style and dissociation (e.g., Stovall-McClough & Cloitre, 2006). Furthermore, adult attachment was not found to mediate or moderate the relationship between maltreatment in childhood, adolescence, or adulthood and dissociation (Sandberg, 2011).

Recently, developmental theorists have argued that the pathways from early attachment to dissociation are more dynamic and complex than accounted for by current attachment models, and that other interpersonal factors beyond disorganized attachment predispose children to develop dissociation (Dutra et al., 2009; Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006). It has been proposed that the parent-child dialogue, which encompasses all meaningful communications between child and parent, provides a more nuanced understanding of the relationship between attachment and dissociation. Dutra et al. (2009) postulated that dissociation arises when children internalize a lack of integrated affective or interactive dialogue with a parent. By failing to acknowledge a child's needs or experiences, the caregiver essentially "shuts

out” the child from the dialogue, which is hypothesized to result in the child’s failure to understand and integrate self-experiences, thereby leading to the development of dissociation (Dutra et al., 2009; Lyons-Ruth et al., 2006). The well-documented relationship between child maltreatment and dissociation may even be accounted for by sustained disturbances in the parent-child relationship in which such abuse occurs, as existing studies have not controlled for the impact of family environment and therefore the effects of specific abuse incidents cannot be disentangled from the impact of chronic relational disturbances (Dutra et al., 2009). Consistent with this view, Nash, Hulsey, Sexton, Harralson, and Lambert (1993) found that the association between childhood sexual abuse and dissociation was no longer significant after controlling for family pathology in a nonclinical adult female sample.

Several cross-sectional studies have found associations between dissociation in adulthood and retrospectively reported childhood family contextual factors, including inconsistent parenting or discipline (Braun & Sachs, 1985; Mann & Sanders, 1994), level of family risk (e.g., removal of child from home, absence of biological mother) (Malinosky-Rummel & Hoier, 1991), lack of parental care and warmth (Mann & Sanders, 1994; Modestin, Lotscher, & Erni, 2002), high maternal control (Modestin et al., 2002), and poor relationships between parents (Maaranen, Tanskanen, Haatainen, Koivumaa-Honkanen, Hintikka, & Viinamaki, 2004). An important limitation of these studies is their use of retrospective recall measures of childhood family environment and relationships, which are inherently subject to bias, particularly in the presence of dissociative symptoms. In the only two prospective studies of family environment and dissociation, Dutra et al. (2009) found that quality of maternal communication in the first 18 months of life predicted dissociative symptoms at age 19 over and above infant disorganized attachment. In addition, psychological unavailability of caregivers during infancy, along with

infant disorganized attachment, were found to be the strongest predictors of pathological dissociation in adolescence (Ogawa et al., 1997). Both studies converge in demonstrating that early relational experiences beyond attachment are influential the development of later dissociation. Dutra and colleagues (2009) posited that potentially enduring disrupted forms of parent-child communication may be more important than early attachment in the development of dissociative symptoms because such long-term processes continually reinforce the child's segregated and contradictory mental processes.

This early relational theory of dissociation offers a framework for understanding why individuals vary in the development of dissociation in response to trauma, and can provide insight into why some non-disorganized and non-traumatized individuals dissociate (Dutra et al., 2009; Lyons-Ruth et al., 2006). However, additional research is necessary to expand understanding of the role of relational factors in the etiology of dissociation throughout the lifespan. Although Dutra et al. (2009) presumed that disturbed parent-infant dialogues persist into childhood and adolescence, thereby increasing vulnerability for dissociation, they did not assess parent-child communication after 18 months and therefore could not explore the effects of timing and chronicity of disturbed communication. It is essential that the impact of family relational context be investigated at other stages of development. Just as parental "shutting out" looks different at various developmental stages, its presence during particular periods of childhood and adolescence may have different implications for dissociative outcomes. The only known study examining the association between family environment and dissociation at a later stage of development found that high family cohesiveness predicted lower levels of dissociation at six weeks post-injury in a sample of 8-18 year old pediatric injury patients (Nugent, Sledjeski, & Delahanty, 2011).

**Racial, ethnic, and cultural factors.** Research on dissociation suffers from the same weakness plaguing psychology research in general: the majority of samples lack racial and ethnic diversity. There are no data available on the prevalence of pathological dissociation in racial and ethnic minority groups in the U.S., although some research has indicated that rates are not uniform among groups. Several studies have reported higher levels of dissociation among African American adolescents (Nugent et al., 2011) and adults (Douglas, 2009; Dunn, Paolo, Ryan, Dunn, & Van Fleet, 1994; Seedat, Stein, & Forde, 2003), although no racial/ethnic differences in dissociation were found among male Vietnam veterans (Zatzick, Marmar, Weiss, & Metzler, 1994). Unpublished findings by the author using data from the Project on Human Development in Chicago Neighborhoods also found higher dissociative symptoms among African American adolescent girls compared to Caucasian and Latina girls, and among Latina compared to Caucasian girls. Interestingly, Douglas (2009) proposed that racial differences exist in the meaning of high dissociation; although African American undergraduates in their sample reported higher levels of dissociation, high dissociative symptoms were related to less psychological distress for African Americans compared to Whites.

Racial differences in peritraumatic dissociation have also been found. In a study of police officers of both genders, Latinos retrospectively reported higher levels of dissociation during traumatic events than African American and White officers (Pole, Best, Metzler, & Marmar, 2005), which was one factor accounting for higher rates of PTSD among Latinos in this sample. Level of acculturation has been posited to moderate the association between Latino race and peritraumatic dissociation. Research has produced mixed findings regarding this hypothesis; Marshall and Orlando (2002) reported that low acculturation was associated with higher levels of peritraumatic dissociation among young adult Latinos exposed to community violence, but

Greenwell and Cosden (2009) failed to find a relation between acculturation and peritraumatic dissociation in a Mexican-American clinical sample.

Vasquez, de Arellano, Reid-Quiñones, Bridges, Rheingold, Stocker, and Danielson (2012) argued for the importance of investigating the influence of Latino cultural factors in the development of trauma symptoms, including *familismo* (the preeminence given to family needs over individual needs), *machismo* (a man's responsibility to protect and provide for his family and the expectation of deference from women and children), *marianismo* (the expectation that women and girls maintain sexual purity and self-sacrificial attitudes), and *fatalismo* (the belief that adversity is sent by God and should be endured). Evidence that Latino adults are more likely to use passive coping approaches (e.g., self-blame) (Perilla, Norris, & Lavizzo, 2002; Pole, Gone, & Kulkarni, 2008) and lower overall coping effort (Perilla et al., 2002) may be reflective of the influence of *fatalismo* on coping style. Greenwall and Cosden (2009) postulated that peritraumatic dissociation may also be related to a fatalistic mindset, but did not find a relationship between *fatalismo* and peritraumatic dissociation among Latino adults.

Cross-cultural variations in the form and expression of mental health symptoms, including dissociation, are documented throughout the DSM-5 (APA, 2013) in "Culture-Related Diagnostic Issues" sections for each individual diagnosis, as well as in the "Glossary of Cultural Concepts of Distress" located in the appendix. As previously mentioned, the dissociative disorders description includes information about pathological possession-form phenomena observed most frequently in African and Asian cultures. In addition, dissociative symptoms are prominent in *ataque de nervios* ("attack of the nerves"), one of the nine cultural concepts of distress described in the glossary. *Ataque de nervios* is observed in Spanish-speaking Caribbean cultures and is characterized by "intense emotional upset, including acute anxiety, anger, or

grief; screaming and shouting uncontrollably; attacks of crying; trembling; heat in the chest rising into the head; and becoming verbally and physically aggressive” (p. 833) or otherwise feeling out of control, often following trauma exposure. Associated dissociative symptoms include depersonalization, amnesia, identity alteration, and a trance-like state (Lewis-Fernandez, Guarnaccia, Martínez, Salmán, Schmidt, & Liebowitz, 2002). Research suggests that this syndrome is relatively common among Latinos, with 14% of Puerto Ricans (and a greater proportion of females) reporting the experience of *ataque de nervios* following a natural disaster (Guarnaccia, Canino, Ribio-Stipek, & Bravo, 1993). Cuevas et al. (2010) postulated that the strong relationship they found between multiple victimization and dissociation among Latina women was related to this culturally defined syndrome.

Notably, at least 11 of the DSM-IV’s 25 “Culture-Bound Syndromes” describing “recurrent, locality-specific patterns of aberrant behavior and troubling experiences” (p. 898) involved dissociative symptomatology (Rhodes, 2003), including *running amok* (physical violence towards others following loss, seen in Malasia), *susto* (“fright” stemming from trauma, seen in Latin America), and *zar* (spirit possession, seen in Northern Africa and the Middle East).

### **Dissociative Symptoms and Adolescent Risky Behavior**

As previously described, dissociative symptoms have been linked to a number of different types of psychopathology, as well as high-risk behaviors that emerge during adolescence and are clinically salient, including disturbed eating, suicidality, self-harm, sexual risk behavior, and substance use. A number of theories have been put forth to explain the links between dissociation and these risk behaviors, which will be discussed. In general, these theories are based on the premise that individuals experiencing dissociative symptoms may be more likely to engage in risk behavior in attempts to self-regulate or ground themselves due to a

sense of dysregulation or disconnection. In contrast, central to other theories is the assumption that individuals who are prone to using dissociation as a coping strategy may also be likely to engage in risky behaviors as coping attempts to enter, maintain, or increase a dissociative state. Behavioral disinhibition resulting from dissociation-related impaired cognitive processing is another potential explanation for the relationship between dissociation and risky behavior. These risky behaviors are also associated with exposure to trauma, and it has been hypothesized that the well-established dissociative response to trauma accounts for (i.e., mediates) the association between trauma and self-destructive behavior.

**Eating disturbance.** There is evidence of an association between dissociative symptoms and disturbed eating in nonclinical (Lyubomirsky, Casper, & Sousa, 2001; Meyer & Waller, 1998; Valdiserri & Kihlstron, 1995) and clinical (Carlson, McDade-Montez, Armstrong, Dalenberg, & Loewenstein, 2013) samples. Moreover, eating disorder patients have been found to display high levels of dissociation (Vanderlinden, Vandereycken, van Dyck, & Vertommen, 1993; Waller, Ohanian, Meyer, Everill, & Rouse, 2001), in comparison with both normal (Demitrack, Putnam, Brewerton, Brandt, & Gold, 1990; Waller, Babbs, Wright, Potterton, Meyer, & Leung, 2003) and psychiatric (La Mela, Maglietta, Castellini, Amoroso, & Lucarelli, 2010) controls. Among eating disorder patients, reported rates of probable dissociative disorders (i.e., dissociation scores above an established clinical cut-off) have been 7% (La Mela et al., 2010) and 12% (Vanderlinden et al., 1993). A particularly strong relationship has been found between dissociation and bulimia nervosa and binge eating (Fuller-Tyszkiewicz & Mussap, 2008; La Mela et al., 2010; Retro, Dalenberg, & Coe, 1993), with several studies reporting a positive correlation between dissociative symptoms and number of binge episodes (Everill, Waller, & McDonald, 1995; La Mela et al., 2010; Vanderlinden et al., 1993; Waller et al., 2001).

Dissociative symptoms have been found to precede binge episodes in retrospective studies (Lyubomirsky, Casper, & Sousa, 2001), as well as a study using “real time” electronic self-monitoring diaries (Endelberg et al., 2007). Anecdotally, commonly reported experiences during binge episodes closely resemble dissociative symptoms (e.g., depersonalization, derealization, lack of control, loss of time, amnesia) (Abraham & Beumont, 1982; Demitrack et al., 1990).

Several causal theories have been proposed to explain the link between dissociation and binge eating behavior. According to Heatherton and Baumeister’s (1991) “escape theory,” binge eaters tend to have low self-esteem and negative self-perceptions accompanied by negative affect, which they try to escape from by narrowing their awareness from self-evaluation to immediate stimuli in their environment (e.g., food), while impeding higher level cognitive functions that would normally inhibit uncontrolled eating. This narrowed state of awareness, along with a loss of cognitive inhibition of previously suppressed behavior, is thought to resemble a dissociative state and trigger binge eating (McManus & Waller, 1995).

According to “affect regulation” or “mood modulation” theories, negative mood states precipitate binge episodes (e.g., by causing inability to maintain dietary restraint) and are alleviated through uncontrolled eating. There is no specific role of dissociation in this model; it is thought to coexist with binge eating as a separate phenomenon with the common function of decreasing negative affect (Hawkins & Clement, 1994; Herman & Polivy, 1998; McManus & Waller, 1995). Engelberg and colleagues’ (2007) study using real time assessment of symptoms and eating behavior showed that dissociation and negative affect each independently predicted binge episodes, providing support for both of these theories.

There is preliminary evidence that dissociation explains the link between childhood sexual abuse and disturbed eating. Dissociation has been found to mediate the relationship

between childhood sexual abuse history and frequency of bingeing (Everill et al., 1995b) and abnormal eating (Lyubomirsky, Casper, & Sousa, 2001) in eating disordered and nonclinical female samples, respectively.

**Suicidality and self-injurious behavior.** Both community (Maaranen, Tanskanen, Honkalampi, Haatainen, Hintikka, & Viinamäki, 2005; Zoroglu, Tuzun, Sar, Tutkun, Savas, Ozturk, Alyanak, et al., 2003) and clinical (Carlson, McDade-Montez, Armstrong, Dalenberg, & Loewenstein, 2013; Foote, Smolin, Neft, Lipschitz, & 2008; Low, Jones, MacLeod, Power, & Dugan, 2000; Martinez-Taboas et al., 2004; Saxe, Chawla, & van der Kolk, 2002) studies have found associations between dissociation and suicidal ideation and attempts, as well as self-harming behavior. In an adult outpatient psychiatric sample, a dissociative disorder diagnosis significantly predicted a history of multiple suicide attempts, controlling for PTSD, borderline personality disorder, and alcohol abuse/dependence (Foote et al., 2008).

Extant theories of the etiology of self-injurious behavior implicate various roles for dissociation. In the “affect regulation” model, self-harm is conceptualized as a coping strategy intended to alleviate negative affect (for reviews, see Gratz, 2003, and Haines, Williams, Brain, & Wilson, 1995). Thus, dissociation can be viewed as a coexisting coping approach with the same desired effect. Conversely, the “anti-dissociation” model posits that self-injurious behavior represents an effort to terminate an unwanted dissociative episode by “shocking the system” (Klonsky, 2007; van der Kolk, Perry, & Herman, 1991). Existing research has provided some support for both the affect regulation model (Nock & Prinstein, 2004; Penn, Esposito Shaeffer, Fritz, & Spirito, 2003) and the anti-dissociation model (Brown, Comtois, & Linehan, 2002; Favazza & Conterio, 1989; van der Kolk et al., 1991), but a significant weakness of these studies is their reliance on retrospective self-report of antecedents and motivations for self-harm.

There is a growing body of literature suggesting that suicidality is a common and specific outcome of trauma in adolescents (e.g., Borges, Benjet, Medina-Mora, Orozco, Molnar, & Nock, 2008; Mazza, 2000) and adults (e.g., Belik, Cox, Stein, Asmundson, & Sareen, 2007; Cogle, Resnick, & Kilpatrick, 2009), and it has been proposed that dissociation serves as a mediator between trauma exposure and suicidality (Kisiel & Lyons, 2001; Putnam, 1997). Dissociation was found to mediate the relationship between childhood sexual abuse history and suicide risk (and self-harm) in children and adolescents in residential treatment (Kisiel & Lyons, 2001), and also between childhood sexual abuse and self-harm in psychiatrically hospitalized adult women (Low et al., 2000). In a previous study by the author, dissociation mediated the association between violence exposure and suicidal ideation in adolescent girls (Zona & Milan, 2012). Importantly, other possible psychopathology mediators (internalizing, externalizing, PTSD symptoms) were tested but not significant.

**Sexual risk behavior.** Far less attention has been afforded to studying the relationship between dissociation and sexual risk behavior. The literature in this area focuses on the influence of dissociation on the well-established relationship between childhood sexual abuse and risky sexual behavior. Dissociation has been proposed as a mediator of this association (e.g., Kendall-Tackett & Klest, 2009; Koenig Doll, O'Leary, & Pequegnat, 2004; Malow, Devieux, & Lucenko, 2006; Zurbriggen & Freyd, 2004), and there is preliminary support for this view. Dissociation was found to partially mediate the relationship between sexual abuse history and sexually aggressive behavior in 10- to 18-year-olds in residential treatment (Kisiel & Lyons, 2001). In a study of women in a healthcare setting, dissociation was also a mediator of the association between childhood sexual abuse history and sexually transmitted infection diagnosis (Sutherland, 2011).

Proposed causal explanations of the dissociation-risky sexual behavior link include impaired ability to assess risk and make thoughtful decisions about sexual behavior (e.g., provide consent, select safe partners, use protection) due to dissociative symptoms (Zurbriggen & Freyd, 2004). Individuals experiencing dissociation may also be more likely to abuse substances, thereby further impairing sexual decision-making (Zurbriggen & Freyd, 2004). It has also been suggested that those who have a tendency to dissociate may be unable to fully process and store educational information regarding safe sex practices and risk prevention skills, resulting in difficulty accessing and using this information during sexual situations (Malow, Devieux, & Lucenko, 2006; Zurbriggen & Freyd, 2004).

**Substance use.** There is a small but growing literature examining the associations between trauma, dissociation, and substance use. An association between pathological dissociation and alcohol use was found in a community sample (Maaranen et al., 2005). There have been mixed findings regarding the presence of dissociation among substance use disorder samples, with some studies finding high levels of dissociative symptoms (e.g., Karadag, Sar, Tamar-Gurol, Evren, Karagoz, & Erkiran, 2005; Schafer, Langeland, Hissbach, Luedecke, Ohlmeier, & Chodzinski, 2010; Seedat, Stein, & Forde, 2003). For instance, Karagg and colleagues (2005) found that 37% of inpatients with alcohol or drug dependence had significant dissociative symptoms. However, other studies have reported lower rates of dissociation among substance abusers (Langeland, Draijer, & van den Brink, 2002; Schafer, Reininghaus, Langeland, Voss, Zieger, Haasen, & Karow, 2007; van den Bosch, Verheul, Langelund, & Van Den Brink, 2003). In general, higher levels of dissociation in this population have been observed more frequently in females, drug (versus alcohol) users, and those with childhood (versus adult) trauma histories (Najavitis & Walsh, 2012).

A “chemical dissociation” hypothesis was proposed to account for the inconsistent findings regarding dissociation, substance abuse, and trauma (Langeland, Draijer, & van den Brink, 2002; Roesler & Dafler, 1993). This hypothesis is based on the “self-medication” view that substances are abused in efforts to alleviate symptoms and distress. It posits that despite being at high risk due to trauma history, some substance abusers may not exhibit high levels of dissociation because they achieve dissociation-like states through their chemical use. According to this hypothesis, substance abuse patients with increased likelihood of dissociation due to trauma exposure would be expected to have lower rates of dissociative symptoms than non-abusers with trauma histories because the substances serve the same function as dissociation (e.g., emotional numbing), and thus psychological dissociation is not needed.

There is preliminary support for the chemical dissociation hypothesis from a study of patients in a heroin recovery program that found higher levels of dissociation among detoxified patients (i.e., no current substance use) compared to patients on methadone maintenance treatment (i.e., continued substance use), despite similar childhood maltreatment histories and previous addiction severity levels across groups (Somer, 2005). However, Najavitis and Walsh (2012) called for additional research to provide a more nuanced and multi-determined understanding of how substances relate to dissociation in the context of trauma, given inconsistent findings regarding rates of dissociation in substance abuse samples and contradictory evidence that substances are sometimes used to access (versus decrease) trauma-related emotions and memories. It is also important to note that there are challenges inherent to assessing dissociation among substance users, as substance use and withdrawal, as well as substance-related cognitive impairment, may resemble and influence reporting of dissociation (Langeland, Draijer, & van den Brink, 2002).

In sum, these studies suggest that dissociation may be associated with a number of risk behaviors, and may explain the link between trauma and these dangerous behaviors. However, there is a lack of research focusing on adolescence, a period in which these risk behaviors emerge and can have deleterious outcomes for current and future adjustment. Initial findings suggest that dissociation may have particular clinical relevance for teenage girls, but studies have not examined whether dissociation and dissociative responses to trauma in adolescence are associated with clinically important outcomes beyond other more common internalizing and externalizing symptoms that tend to co-occur with dissociation. It is possible that higher dissociative symptoms may be part of a pattern of general elevated maladjustment, rather than a specific risk for destructive behaviors. To establish the clinical utility of assessing dissociative symptoms in adolescent girls beyond other more common types of symptoms (e.g., depression, PTSD), it is important to demonstrate that dissociative symptoms incrementally predict clinically concerning risk behaviors, either in the general population or as a response to traumatic events.

### **The Present Study**

Given evidence that dissociation may be a gender-specific response to trauma and have more deleterious consequences for adolescent girls, it is important that research on dissociation focus specifically on girls. This study examined the context of dissociative symptoms in a diverse urban sample of 13- to 17-year-old girls. As described above, research on dissociation in adolescents is limited in three ways. First, potential measurement issues have not been adequately addressed. The A-DES's (Armstrong et al., 1997) factor structure and test-retest reliability were investigated, along with cross-informant agreement between adolescent and mother reports. Second, most studies of dissociation have been guided primarily by trauma theory, with limited attention to relational and cultural contextual factors. It is also important to

explore how these factors may interact with trauma-related processes to influence the development of dissociation. This study examined whether adolescents' relational context (relational style with mothers, maternal communication, affective tone of maternal relationship, attitudes towards family obligation), and race/ethnicity and cultural factors (homogeneity of friend group, ethnic identity, language) contributed to dissociative symptoms and moderated the relation between exposure to traumatic events and dissociative symptoms. Finally, there is still a need to demonstrate the clinical relevance of assessing dissociation by demonstrating that it is associated with adverse outcomes beyond more common types of symptoms. This study examined whether dissociative symptoms predicted risky behavior (eating pathology, suicidal ideation, self-injurious behavior, sexual risk behavior, substance use) above and beyond other more common forms of psychopathology (depression, PTSD), and whether dissociative symptoms uniquely mediated links between trauma exposure and behavioral outcomes. By addressing these questions, this study adds to the literature by providing insight into how adolescent dissociation should be conceptualized, what characteristics confer risk for experiencing dissociative symptoms, and how dissociative symptoms increase the likelihood for particularly deleterious risk behaviors observed among adolescent girls.

## **Methods**

### **Participants and Procedures**

Study participants were drawn from a National Institutes of Health-funded study titled *The Cultural Context of Health Disparities in Adolescent Girls*. The sample was composed of 194 adolescent girls and their mothers from the mid-sized, low-income city of New Britain, CT. The racial composition of the adolescent sample was 56% (n=109) Latina (primarily Puerto Rican), 27% (n=52) African American, and 17% (n=33) White. The average age of adolescent

participants was 15.40 years (SD=1.05, range=13-17).

Indicators of socioeconomic status (SES) for this sample included maternal education level, parents' marital status, receiving Section 8 government subsidized housing, and adolescent's eligibility for free or reduced lunch. Educationally, 22% of mothers had not completed high school, 67% had a high school degree, and 11% had a bachelor's degree. Thirty percent of homes included the biological father at the time of participation. Twenty-nine percent of families received Section 8 government subsidized housing assistance. The majority of adolescents (87%) qualified for free (65%) or reduced (22%) lunch. These sample characteristics are consistent with city demographics.

Methods of data collection were adolescent self-report and parent-report surveys administered using audio computer-assisted self-interviews (ACASI) and personal follow-up phone call interviews. Families were recruited from schools, health centers, and community agencies. The interviews took approximately two hours, and mothers and daughters were each paid \$40 for their time. Families who participated in the follow-up telephone interview were mailed a \$10 gift card to a retail store. The majority of adolescent interviews were conducted in English (n=178, 92%), while 8% (n=16) of interviews were in Spanish.

## Measures

**Mental health symptoms.** Adolescents' dissociative symptoms were assessed with the 30-item Adolescent Dissociative Experiences Scale (A-DES; Armstrong et al., 1997). (See the Measures section of the Appendix for the A-DES measure.) The A-DES is composed of four subscales: Dissociative Amnesia (7 items), Absorption and Imaginative Involvement (6 items), Depersonalization/Derealization (12 items), and Passive Influence (5 items). Adolescents rated the frequency with which they experience various dissociative experiences on an 11-point Likert

scale (0=*never*, 10=*all the time*). The A-DES has demonstrated good internal consistency (Chronbach's  $\alpha=0.92-0.94$  for the total scale) and two-week test-retest reliability (Pearson's  $r=0.77$ ) in both normative (Farrington et al., 2001) and clinically referred (Armstrong et al., 1997) adolescent samples. The Chronbach's alpha for the present study was 0.95.

In the present study, seven A-DES items determined to be most amenable to observer report were adapted from self- to observer-report format and administered to mothers in order to examine consistency between adolescent self-report and maternal observer-report of dissociation (these items are listed in the Appendix). The Chronbach's alpha for the mother-reported A-DES items was 0.76. In addition, a subset ( $n=54$ ; 28% of total sample) of adolescents and mothers were verbally administered an abbreviated A-DES in follow-up telephone interviews to examine test-retest reliabilities of this measure; adolescents were asked 14 of the 30 A-DES items (also listed in the Appendix) and mothers were asked the same seven adapted items they responded to during the initial interview. The mean length of time between the initial administration of the A-DES and the follow-up telephone interview was 9.18 weeks ( $SD = 5.25$  weeks) for adolescent follow-up and 8.15 weeks ( $SD = 4.60$ ) for mother follow-up.

The 23-item Child PTSD Symptom Scale (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001) was used to measure adolescents' PTSD symptoms. Adolescents were asked to respond to questions about post-trauma symptoms in relation to the most distressing or stressful experience they have ever experienced. They indicated the type of event from a list of 11 potentially traumatizing events. The CPSS consists of 17 items for which participants indicated on a four-point Likert scale the frequency with which they had experienced over the previous two weeks various DSM-IV PTSD symptoms from four symptom domains: reexperiencing (e.g., "How often have you had dreams or nightmares about the event?"), avoidance (e.g., How often have

you tried to avoid activities, people, or places that remind you of the traumatic event?”), hyperarousal (e.g., “How often have you felt jumpy or easily startled?”), and numbing (e.g., “How often have you felt like you were not able to have strong feelings?”). This scale yields symptom counts for each domain and a total symptom severity score, with a clinically significant cut-off score of 20. The Chronbach’s alpha for the CPSS was 0.93. An additional 6 items on the CPSS ask about whether symptoms have impacted functioning in specific areas (e.g., school, prayer); these items were not included in the present study.

Depressive symptoms were assessed using the 14-item Major Depression subscale of the Adolescent Psychopathology Scale- Short Form (APS-SF; Reynolds, 1998). Adolescents were asked to indicate how often they experienced various depressive symptoms (e.g., psychomotor retardation, insomnia, fatigue, suicidal ideation, guilt, difficulty concentrating, crying, anhedonia) over the past two weeks on a four-point Likert scale. The APS-SF Major Depression subscale Chronbach’s alpha was 0.90.

**Contextual determinants.** Adolescent girls completed several self-report measures assessing potential contextual determinants of dissociation, including exposure to PTEs, relational context, and racial, ethnic, and cultural factors.

*Exposure to potentially traumatizing events (PTEs).* An Exposure to Potentially Traumatizing Events measure was created for this study by initially compiling a list of 16 potentially traumatizing events assessed in existing PTE measures by Bernstein et al. (1997), Ford et al. (2000), Greenwald and Rubin (1999), and Nijenhuis et al. (2002). Items deemed to be very unlikely in this adolescent community population (e.g., exposure to war, imprisonment, torture) were not included. The final list included nine potentially traumatizing events that are most commonly asked about on existing trauma exposure measures; three items inquired about

whether potentially traumatizing events (e.g., natural disaster, serious accident, physical assault) had happened to the adolescents themselves, and six items concerned whether adolescents had witnessed physical assault or serious injury or death of others with different relations to them in various settings. (These items are included in the Appendix.) For each PTE, adolescents were asked if each event had ever occurred. If they responded *yes*, they were then asked whether the event had occurred within the past year. Scores on this measure represent the sum of events that adolescents endorsed experiencing, with separate scores for lifetime and past year exposure.

***Relational context.*** Adolescents' relational styles with their mothers were assessed using an adapted version of the Behavioral Systems Questionnaire (BSQ; Furman & Wehner, 1999), which measures adolescents' perceived relational styles with mothers. Ten Likert-type items from the BSQ assessed behavior, cognitions, and feelings in relationships with mothers. This measure consists of two subscales (5 items each) that measure the degree to which adolescents endorse using Preoccupied (e.g., "I am afraid that I turn to my mother more often than she wants me to," "I want to be closer to my mother than she wants to be to me") and Dismissing (e.g., "I rarely turn to my mother when upset," "Truthfully, my relationship with my mother is just not that important to me") relational styles with their mothers. Studies using the BSQ have reported adequate internal consistencies for the relational style scales, with a mean Chronbach's alpha of 0.85 for parental relationships (Furman & Simon, 2004). The Preoccupied and Dismissing scales for parental relationships were found to be moderately to highly correlated with parallel scales on Hazan and Shaver's (1987) measure of attachment styles with parents (Furman & Simon, 2004). In the present study, the Chronbach's alphas were 0.69 for the Preoccupied subscale and 0.67 for the Dismissing subscale.

The affective tone of the maternal relationship was measured with 17 items from the

Parental Warmth, Support, and Hostility measure used in the NICHD's Study of Early Health Care and Youth Development (NICHD Early Child Care Research Network). Nine items assessed frequency of maternal Warmth and Support (e.g., "How often does your mother let you know she really cares about you?") and eight items measured frequency of maternal Hostility ("How often does your mother criticize you or your ideas?"). Adolescents were asked to indicate on a Likert scale the frequency of these behaviors over the past year. The Chronbach's alphas were 0.92 for the Warmth subscale and 0.83 for the Hostility subscale.

Maternal Communication was assessed with a measure that was adapted from the Mother-Daughter Communication about Sexuality and Substance Use measure used by Forehand and colleagues (Whyckoff et al., 2008). In addition to asking about the frequency of communication about sex, dating, birth control, and substance use over the past year, items were added that asked about food, future education and occupational plans, and school/grades in order to assess communication about a broader range of topics. Given that the frequency of communication does not provide information about the nature or valence of these conversations, participants were asked to rate for each topic the typical tone (from negative to positive) of these conversations (i.e., "When you talk about [topic], what are these conversations like?"). The Communication Frequency Chronbach's alpha was 0.76, and the Communication Tone Chronbach's alpha was 0.70.

Adolescents' Attitudes and Behavior regarding Family Obligation were assessed with 15 items from three subscales developed by Hardway and Fulgini (2006) that displayed good psychometric properties among youth of various races/ethnicities and immigrant generations. This measure is composed of subscales assessing attitudes and behavior regarding family obligation in three domains: Current Assistance (e.g., "How often do you help out around the

house?”), Respect for Family (e.g., “In general, how important is it that you follow you parents’ advice about choosing friends or boyfriends?”), and Obligation to Provide Future Support (e.g., “How important is it to you that in the future you have your parents live with you when they get older?”). These domains have been viewed as particularly relevant in assessing family context among youth of color (Hardway & Fuligni, 2006). The Chronbach’s alpha for all items in this measure was 0.78, and alphas were 0.59 for the Current Assistance subscale, 0.73 for the Respect for Family subscale, and 0.69 for the Obligation to Provide Future Support subscale.

***Cultural context.*** Adolescents’ race/ethnicity was assessed by asking them to indicate which of the following race/ethnicities they identified as: African American/Black, Hispanic/Latina, Caucasian/White, Asian, Native American, or Other. Girls were permitted to respond with more than one race/ethnicity.

One aspect of cultural context, Homogeneity of Friends, was assessed with a Likert item created for the study asking what proportion of participants’ friends were of their same race or ethnicity (*none, a few, about half, most, all*).

Ethnic identity was assessed with five Likert items from the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992) that inquire about adolescents’ sense of belonging, pride, commitment, and involvement in their racial/ethnic group (e.g., “I have a strong sense of belonging to my own ethnic group,” “I am active in organizations or social groups that include mostly members of my own ethnic group”). The Chronbach’s alpha for this measure was 0.75.

A four-item Likert-type Perceived Racial/Ethnic Discrimination Scale was created for the study to measure participants’ experiences with racial/ethnic discrimination and views that their racial/ethnic group was treated unfairly or looked down upon. Examples of items include: “I have experienced discrimination because of my race or ethnicity” and “People from my ethnic

group are sometimes looked down on by other people.” The Chronbach’s alpha for this racial/ethnic discrimination measure was 0.80.

For girls who endorsed speaking another language (n=106, 55% of total sample), Language Acculturation was measured with four Likert items created for the study that asked about adolescents’ frequency of exposure to their other language in a number of contexts (at home, with friends, while watching TV, while listening to music). For the present purposes, bilingual participants’ frequency of exposure to their other language was considered a marker of acculturation. The Chronbach’s alpha for this language-based acculturation measure used with a subset of the sample was 0.66.

**Risky behavior.** Eating pathology was assessed using the four-item Eating Disturbance subscale of the Adolescent Psychopathology Scale- Short Form (APS-SF; Reynolds, 1998), which consists of Likert items inquiring about how often over the previous three months adolescents had engaged in bingeing, purging, and food restriction/fasting. The Chronbach’s alpha for this eating pathology measure was 0.32. This low alpha is not unexpected given the low base rate of eating pathology in this population. Consequently, scores were dichotomized to reflect whether adolescents reported any ED symptoms or not, and individual disturbed eating behaviors assessed by each item were also examined singularly in relation to study variables.

Suicidal Ideation over the previous two weeks was assessed with the two Likert items composing the APS-SF’s Suicide subscale (“I felt that life was not worth living,” “I tried to, or seriously thought about killing myself”) and one item from the APS-SF’s Major Depression subscale (“I thought about killing myself”).

Self-Injurious Behavior was measured with a four-point Likert item created for the study that asked adolescents about the frequency with which they had engaged in self-injurious behavior in their lives (“I have hurt myself on purpose by scratching or cutting my body”).

Sexual Behavior was measured with eight items adapted from the Student Health Questionnaire (Coyle et al., 2004) asking whether adolescents had ever engaged in various sexual acts, and six items drawn from the 2009 Youth Risk Behavior Surveillance System (Eaton Kann, Kinchen, Shanklin, Ross, Hawkins, et al., 2010) (a national survey of high school students conducted by the Centers for Disease Control) assessing occurrence, frequency, and age of sexual intercourse, and use of protection and methods of birth control. For the current purposes, a count of the number of *yes* responses to nine items reflecting increasing sexual risk behavior (e.g., oral sex, vaginal sex, sex without protection, sex with multiple partners, etc.) was used to measure sexual activity.

Substance Use was assessed with four dichotomous *yes/no* questions about adolescents’ cigarette smoking and alcohol use that were modified from the 2009 Youth Risk Behavior Surveillance System (Eaton et al., 2010). Participants were asked whether they had ever tried smoking a cigarette and had tried more than a sip of alcohol and if so, whether they had engaged in such substance use over the previous 30 days.

### **Research Design and Analytic Plan**

**Research question 1: Psychometric properties of the A-DES.** Analyses first examined the psychometric properties of the A-DES and determined the best way to operationalize dissociative symptoms in adolescent girls by addressing the following questions:

*Do adolescents and mothers similarly report adolescent dissociative symptoms on the A-DES?* Cross-informant agreement between adolescent self-report and mother-report of A-

DES dissociative symptoms during both the initial and follow-up interviews were examined.

*Are adolescent- and mother-reported dissociative symptoms on the A-DES stable over time?* Test-retest reliabilities were assessed by examining correlations in self- and mother-reported dissociative symptoms between the initial interview and the follow-up telephone interview for a subset of participants. Follow-up interviews during which abbreviated A-DES measures were administered were conducted with 59 (30%) families an average of 9.18 weeks (SD=5.25 weeks) after the initial interview for adolescents and 8.15 weeks (SD=4.60) after the initial interview for mothers.

*What is the underlying factor structure of the A-DES?* Confirmatory factor analysis (CFA) was conducted to determine whether the four proposed subscales of the A-DES represented distinct factors. Using CFA, the A-DES's factor structure was also tested to compare various theorized and empirically supported models (one factor, two factors, three factors, four factors). Given that none of these models fit the data well, exploratory factor analysis (EFA) was then conducted to further examine the structure of the A-DES.

**Research question 2: Contextual determinants of dissociative symptoms.** The second phase of the study investigated the relationships between dissociative symptoms and the contextual factors of exposure to potentially traumatizing events (PTEs), family relationships, and race/ethnicity and culture. The following two main questions regarding the contextual context of dissociation were addressed.

*Are dissociative symptoms associated with exposure to trauma and relational and cultural factors among adolescent girls?* The relations between dissociative symptoms and various PTEs were examined singularly and as composite scales for lifetime and past year exposure, given evidence of cumulative effects of PTEs. ANOVA tests were also used to

examine whether adolescents who had been exposed to each PTE in the past year had higher dissociative and PTSD symptoms than adolescents who had experienced the events at some point in their lives, but not in the past year. Secondary analyses examined whether specific types of PTEs were more strongly associated with dissociation than others, and whether relations between PTEs and dissociative symptoms existed controlling for PTSD symptoms.

Bivariate correlations between dissociation and relational (relational style with mothers, maternal communication, affective tone of maternal relationship, attitudes and behavior regarding family obligation) and cultural (ethnic identity, homogeneity of friends, perceived discrimination, frequency of exposure to other language for bilingual adolescents) variables were examined singularly. The main effects (including unique and additive effects) of PTEs, relational factors, race/ethnicity, and cultural factors on dissociative symptoms were then analyzed singularly and together using *t*-tests and ANOVAs. Relational and cultural variables that were significantly correlated with dissociative symptoms at the bivariate level were included in a hierarchical multiple linear regression analysis to determine whether these factors predicted dissociative symptoms beyond the impact of exposure to PTEs and PTSD symptoms.

***Do relational and cultural factors act as risk or protective factors in the link between exposure to trauma and dissociative symptoms?*** Analyses were conducted to test whether relational, racial, and cultural factors moderated the relation between exposure to PTEs and dissociation following Holmbeck (1997) and Hayes' (2013) guidelines for testing moderation using regression. Potential interaction effects were investigated using the bootstrapping approach to testing moderation, utilizing Hayes' (2013) bootstrapping macro for SPSS called PROCESS. When a moderating effect of a contextual variable on the association between PTEs and dissociation was detected, additional bootstrapping analyses were conducted to examine if

the interaction would hold while controlling for PTSD symptoms.

**Research Question 3: Dissociative symptoms and risky behaviors.** The third phase of the study examined the clinical significance of dissociation by investigating the following questions.

*Do dissociative symptoms increase the likelihood of clinically relevant risky behavior in adolescent girls, beyond the effect of other forms of psychopathology?* Bivariate correlations were examined to determine whether dissociative symptoms were associated with adolescent risk behaviors (eating pathology, suicidal ideation, self-injurious behavior, sexual risk behavior, and substance use). When significant bivariate correlations were found, hierarchical regression analyses were conducted to determine whether the relationship between dissociative symptoms and risk behavior held, controlling for depression and PTSD symptoms.

*Does dissociation explain the relation between exposure to trauma and adolescent risky behavior, beyond the impact of other mental health symptoms?* For risky behaviors that were predicted by dissociation as well as PTEs, the Preacher and Hayes (2004) bootstrapping approach to regression was used to test whether dissociative symptoms mediated the association between PTEs and risk behaviors, controlling for other mental health symptoms. Advantages of this method for testing mediation compared to the traditional Baron and Kenny (1986) procedure include the ability to estimate models with a dichotomous outcome and to obtain bootstrap confidence intervals for estimation of indirect effects. Moreover, this model does not assume that indirect effects are normally distributed, as does the Sobel test of the indirect effect that is used in the Baron and Kenny approach (1986).

## **Power Analysis**

The sample size was selected to be sufficient for conducting factor analysis and path analysis in the full sample, and detecting racial/ethnic group differences. For path analysis and SEM, Kline (2005) recommended a sample size of 200. For factor analysis, a 5:1 ratio between sample size and items is recommended as a minimum (Bryant & Arnold, 1995), which was accomplished in the current study of 194 adolescents and 30 items on the A-DES. For tests of racial/ethnic group differences (main effects), a sample size of 45 adolescents per group provides adequate power ( $1-\beta=.80$ ) to detect a medium size effect ( $d=.50$ ) with alpha set at .05. Thus, power to detect racial/ethnic group differences was somewhat limited given the smaller group size of White adolescents. Latinas were oversampled because important within-group variation was anticipated based on acculturation factors. A sample size of over 100 Latinas provided sufficient power ( $1-\beta=0.80$ ) to detect medium to large size effects ( $r=0.35$ ) between acculturation factors and variables from other domains.

## **Results**

### **Research Question 1: Psychometric Properties of the A-DES**

The A-DES uses a Likert scale from 0-10, and the average score was 2.06 (SD = 1.71, range = 8.57). Based on the recommended clinical cut-off of 3.7 suggested by Armstrong and colleagues (1997), 16.5% ( $n=32$ ) of adolescents fell into this elevated dissociation classification, indicating the presence of pathological dissociative symptoms.

Due to low base rates of endorsement of dissociative symptoms on the A-DES, this measure was positively skewed (skew=1.31, SE=0.18; kurtosis= 1.8, SE=0.35) and thus violated the assumption of normality. To correct for this skewness, a natural log transformation was performed on A-DES scores. This transformation resulted in a more symmetrical distribution, as

indicated by improved skewness (skew=0.15, SE=0.18) and kurtosis (kurtosis=-0.70, SE=0.35) statistics. (See Figures 1-6 for histograms, normal probability plots, and boxplots of the raw and transformed A-DES data.) Subsequent analyses for Research Questions Two and Three were run using both A-DES average scores and their natural logs, and the same pattern of results emerged. The results presented for those research questions are for analyses using A-DES natural log scores.

**Do adolescents and mothers similarly report adolescent dissociative symptoms on the A-DES?** Adolescent and mother reports of adolescent dissociative symptoms were significantly correlated, with a low correlation coefficient of  $r=0.18$  ( $p<.05$ ) between the seven A-DES items administered to adolescents and mothers. At follow-up, adolescent and mother reports of dissociative symptoms assessed with the same seven items were also moderately correlated at  $r=0.34$  ( $p<.05$ ).

**Are adolescent- and mother-reported dissociative symptoms on the A-DES stable over time?** Test-retest reliability coefficients indicated that adolescent and mother-reported dissociative symptoms were highly stable over time among the subset of participants ( $n=54$ ) whose dissociative symptoms were re-assessed in a follow-up telephone interview an average of 9.18 weeks ( $SD=5.25$  weeks) for adolescents and 8.15 weeks ( $SD=4.60$  weeks) for mothers following the initial interview. Adolescent responses to the 14 A-DES items re-administered at these two time points were correlated at  $r=0.75$  ( $p<.001$ ), while the mother test-retest reliability coefficient for the seven adapted A-DES items was 0.54 ( $p<.001$ ).

**What is the underlying factor structure of the A-DES?** Confirmatory factor analysis (CFA) using the maximum likelihood procedure was conducted to determine whether the four proposed subscales of the A-DES represented distinct factors, and whether participants'

responses supported any of the various theorized and empirically based models. Three indices were used to evaluate the potential underlying factor structure of items in this measure, including a one-factor model, two- and three-factor models proposed in previous research, and a four-factor model reflecting the four A-DES subscales created by the measure's authors (Armstrong et al., 1997). Based on prevailing standards, the fit of these various models was determined to be good if the comparative fit index (CFI) was over 0.95 and the root mean square error of approximation (RMSEA) was under 0.06. Nonsignificant Chi square statistics also suggest good model fit, but this indicator is sensitive to sample size and likely to be significant even for good fitting models with moderately large sample sizes, as in the present study.

The Chronbach's alpha for the A-DES was high ( $\alpha=0.95$ ), indicating high inter-item correlations and suggesting that the A-DES was measuring a unidimensional construct, although it is still possible for there to be underlying correlated factors with a high Chronbach's alpha. However, when the empirically supported one-factor model was tested using CFA, the overall fit was not good ( $\chi^2(df=400)=1240.13, p<.001, CFI=0.73, RMSEA=0.11$ ). Next, a two-factor model found in an adult sample administered the DES (Olsen et al., 2013) consisting of an Absorption factor and an Amnesia/Depersonalization/Derealization factor (combined with the additional A-DES Passive Influence subscale) was tested using CFA. The overall fit for this model also was not good ( $\chi^2(df=404)=1276.00, p<.001; CFI=0.72; RMSEA=0.11$ ). The three-factor model (Amnesia, Absorption/Imaginative Involvement, Derealization/Depersonalization) that has received much empirical support using the adult DES was also tested, with the A-DES Passive Influence subscale added to the Derealization/Depersonalization factor. This model did not fit the current adolescent data well ( $\chi^2(df=402)=1247.07, p<.001; CFI=0.73; RMSEA=0.10$ ). Another three factor model (Depersonalization, Disintegration of Conscious Control, Amnesia)

that was supported in Yoshizumi and colleagues' (2010) study of Japanese adolescents also fit poorly ( $\chi^2(df=403)=1399.72, p<.001$ ; CFI=0.68; RMSEA=0.11). Finally, the four-factor model reflecting the four subscales that the A-DES was designed to measure (Dissociative Amnesia, Absorption and Imaginative Involvement, Passive Influence, Derealization/Depersonalization) was tested. This model offered only a minimal improvement in fit ( $\chi^2(df=399)=1234.28, p<.001$ ; CFI=0.73; RMSEA=0.10). Modification indices suggested by the output were attempted (e.g., correlating specific error terms), but none of these changes to the model improved fit to an acceptable level. (See Table 1 of the Appendix for fit indices of each of these CFA models.)

Given that none of these CFA models fit the data well, exploratory factor analysis (EFA) using the Mplus statistical package was conducted to further examine the structure of the A-DES. This type of hybrid EFA allows for an a priori specified range of factors to be extracted, and also allows for items to be treated as noncontinuous. Traditional EFA and CFA assume that the item measurement scale is continuous; however, the A-DES may not justifiably be considered continuous, given the low endorsement of many A-DES items in the current sample. A potential explanation for why none of the CFA models provided a good fit to the data was because many items on the A-DES were skewed due to a high number of "0" responses on the zero to ten Likert scale. Two EFAs were run allowing for one to four factors to be extracted. In the first EFA, all items were treated as continuous, while the second EFA treated items that were skewed due to low endorsement (defined as a zero response rate of greater than 70%) as dichotomous and all other items as continuous (see Table 2).

A two-factor structure fit the data well ( $\chi^2(df=376)=563.22, p<.001$ ; CFI=0.87; RMSEA=0.05), with all items loading onto one factor and the noncontinuous items also loading onto a second higher-order factor reflecting the response scale difference (see Table 3). In this

model, all items loaded at 0.4 and above onto the first factor (with the exception on Item 1, which had a loading of 0.38), and the 10 dichotomous items also cross-loaded at 0.75 and above onto the second measurement factor. A three-factor model provided the best fit to the data and was significantly better than the two-factor model ( $\Delta\chi^2(df=28)=75.40, p<.01$ ). All items loaded significantly onto the first factor at above 0.40, the 10 dichotomous items cross-loaded onto a second higher-order factor at above 0.70 as in the two-factor solution, and 6 items loaded onto a third factor at greater than 0.40 (see Table 4). These items loading onto Factor Three appear to be somewhat similar in content and seem to reflect a sense of external control over one's behavior or thoughts. A four factor model did not converge.

Based on these factor analysis results, a decision was made to treat the A-DES as a unidimensional measure and use average A-DES scores across all items in subsequent analyses. This decision was made because all items loaded onto one factor above the established threshold of 0.4 and the Chronbach's alpha for this measure was very high ( $\alpha=0.95$ ), indicating that all items cohered together as an overall dissociative symptom measure. Although the three-factor model provided the best fit, all items that loaded onto Factors Two and Three also loaded significantly onto Factor One alone. The second-order factor that emerged when items were allowed to be treated as dichotomous reflected measurement scale similarity (i.e., less frequently endorsed items) more than similar item content. In other words, all items on the ADES seem to be tapping the same underlying construct, but it may be inappropriate to use the same response scale for all of these items. However, it still makes sense to consider A-DES total scores because the average of item responses is able to capture individual differences across items. The third factor found in this study has not emerged in other studies of the A-DES, and thus may be

sample specific. Given issues of response scale non-normality discussed above, natural logs of the A-DES total scores were used in all subsequent analyses.

### **Research Question 2: Contextual Determinants of Dissociative Symptoms.**

The relations between dissociation, other mental health symptoms, and a variety of demographic variables were examined with bivariate correlations. Dissociative symptoms were significantly positively correlated with both PTSD symptoms ( $r=0.64, p<.001$ ) and depression ( $r=0.57, p<.001$ ). PTSD and depressive symptoms were also significantly correlated ( $r=0.70, p<.001$ ). There was a significant negative correlation between dissociation and adolescent age ( $r=-0.17, p<.05$ ), indicating that A-DES scores decreased as participant age increased.

Dissociative symptoms were not related to most socioeconomic demographic variables (maternal education level, parents' marital status, daughter's eligibility for free or reduced lunch), with the exception of a significant positive correlation between A-DES scores and receiving Section 8 government subsidized housing assistance ( $r=0.17, p<.05$ ). Age and Section 8 housing status were used in subsequent regression analyses as covariates.

### **Are dissociative symptoms associated with exposure to trauma and relational and cultural factors among adolescent girls?**

*Exposure to potentially traumatic events.* Dissociative symptoms were significantly correlated at a bivariate level with both lifetime ( $r=0.36, p<.001$ ) and past year ( $r=0.39, p<.001$ ) exposure to potentially traumatic events (PTEs). In addition, there were significant bivariate correlations between PTSD symptoms and lifetime ( $r=0.48, p<.001$ ) and past year ( $r=0.40, p<.001$ ) PTE exposure. Partial correlations were examined to determine whether significant associations between PTEs and dissociative symptoms remained, controlling for PTSD symptoms and, conversely, whether PTEs were still significantly associated with PTSD

symptoms, controlling for dissociative symptoms. This was done to determine if PTEs were associated with unique aspects of PTSD and dissociation, or just their shared variance.

Controlling for PTSD symptoms, the relation between dissociative symptoms and PTEs experienced in the previous year remained significant ( $r=0.18, p<.05$ ), but the correlation between lifetime PTE exposure and dissociation was no longer significant ( $r=0.06, p=.39$ ).

Controlling for dissociative symptoms, the associations between exposure to PTEs and PTSD symptoms remained significant for both lifetime ( $r=0.36, p<.001$ ) and past year ( $r=0.23, p<.001$ ) PTE exposure.

Next, the relations between specific types of individual PTEs and dissociative and PTSD symptoms were examined using ANOVAs. For each PTE assessed, mean dissociation and PTSD scores for adolescents who experienced and did not experience each event, as well as ANOVA F-test values (and effect sizes) comparing these trauma symptoms are presented in Table 5. Adolescents who endorsed ever experiencing the following events had significantly higher dissociative and PTSD symptoms than those who had not experienced these events: a natural disaster (dissociation  $F(1, 188)=6.74, p<.05, \eta^2=0.04$ ; PTSD  $F(1, 185)=7.91, p<.01, \eta^2=0.04$ ), a serious accident (dissociation  $F(1, 188)=7.87, p<.01, \eta^2=0.04$ ; PTSD  $F(1, 185)=9.50, p<.01, \eta^2=0.05$ ), being assaulted (dissociation  $F(1, 188)=5.48, p<.05, \eta^2=0.03$ ; PTSD  $F(1, 185)=10.01, p<.01, \eta^2=0.05$ ), witnessing an assault (dissociation  $F(1, 189)=22.71, p<.001, \eta^2=0.11$ ; PTSD  $F(1, 186)=25.33, p<.001, \eta^2=0.12$ ), witnessing physical violence between parents (dissociation  $F(1, 183)=11.56, p<.01, \eta^2=0.06$ ; PTSD  $F(1, 180)=31.14, p<.001, \eta^2=0.15$ ), and someone close being badly hurt or dying (dissociation  $F(1, 185)=5.88, p<.05, \eta^2=0.03$ ; PTSD  $F(1, 182)=9.74, p<.01, \eta^2=0.05$ ). Adolescents who witnessed the assault of a family member ( $F(1, 183)=12.10, p<.01, \eta^2=0.06$ ) and/or witnessed someone getting seriously

injured or killed ( $F(1, 184)=8.20, p<.01, \eta^2=0.04$ ) in their lives had significantly higher PTSD symptoms (but not dissociation) than those who had never witnessed those types of events.

ANOVA tests were also used to examine whether adolescents who had been exposed to each PTE in the past year had higher dissociative and PTSD symptoms than adolescents who had experienced the events in their lives, but not in the past year. Adolescents who witnessed someone getting seriously injured or killed over the past year endorsed significantly higher dissociation ( $F(1, 29)=11.97, p<.01, \eta^2=0.29$ ) as well as PTSD symptoms ( $F(1, 29)=9.29, p<.01, \eta^2=0.24$ ) compared to adolescents who had witnessed someone getting seriously injured or killed in their lifetimes (but not in the past year). Finally, adolescents who reported being in a serious accident ( $F(1, 46)=4.23, p<.05, \eta^2=0.07$ ) and/or assaulted ( $F(1, 61)=6.57, p<.01, \eta^2=0.13$ ) over the past year had significantly higher dissociative (but not PTSD) symptoms than those who experienced those events in their lives, but not over the past year.

Even when F-tests did not show significant mean differences in dissociation or PTSD symptoms depending on whether adolescents had experienced certain PTEs (ever and in the past year), all results were in the expected direction (i.e., there were higher mean dissociation and PTSD scores for adolescents who were exposed to PTEs), with the exception that adolescents who had witnessed their parents fighting in the past year had slightly (but not significantly) lower dissociation scores compared to adolescents who had witnessed their parents fighting at some prior point(s) in their lives. Witnessing someone seriously injured or killed within the past year was associated with the highest dissociation ( $\eta^2=0.29$ ) as well as PTSD ( $\eta^2=0.24$ ) symptoms based on effect sizes.

***Relational factors.*** For analyses examining the associations between dissociative symptoms and relational and cultural variables, bivariate correlations between dissociation and

these contextual variables were looked at singularly. (See Table 6 for these correlations.) There were significant correlations between dissociative symptoms and both the preoccupied ( $r=0.37$ ,  $p<.001$ ) and dismissing ( $r=0.31$ ,  $p<.001$ ) relational styles with mothers. In addition, dissociative symptoms were positively associated with maternal hostility ( $r=0.40$ ,  $p<.001$ ) and negatively associated with maternal warmth ( $r=-0.26$ ,  $p<.001$ ). Next, the four relational variables that were significantly correlated with dissociative symptoms at the bivariate level were included in a hierarchical multiple linear regression analysis to determine whether relational factors predicted dissociative symptoms beyond the impact of exposure to PTEs in the previous year (see Table 7). Controlling for the demographic variables of age and Section 8 housing, with past year PTEs included in the first step, the preoccupied (standardized  $\beta=.28$ ,  $t=4.41$ ,  $p<.001$ ) and dismissing (standardized  $\beta=.17$ ,  $t=2.16$ ,  $p<.05$ ) relational styles with mothers (but not maternal warmth and hostility) remained significantly associated with dissociative symptoms ( $R^2=0.34$ ,  $F(7, 179)=12.92$ ,  $p<.001$ ). An additional hierarchical regression was run with PTSD symptoms included as a covariate to determine if these relational variables would predict dissociative symptoms above and beyond PTSD symptoms (see Table 8). In this regression model, both preoccupied (standardized  $\beta=0.16$ ,  $t=2.81$ ,  $p<.01$ ) and dismissing (standardized  $\beta=0.16$ ,  $t=2.34$ ,  $p<.05$ ) relational styles with mothers remained significant predictors of dissociation ( $R^2=0.50$ ,  $F(8, 173)=21.79$ ,  $p<.001$ ).

***Racial and cultural factors.*** When asked which racial/ethnic group they belonged to, 102 (53%) participants identified as Latina, 32 (16%) as African American, 21 (11%) as White, and 29 (15%) identified as more than one race. Analyses of race/ethnicity treated those who identified as more than one race as a separate biracial/multiracial category, and also included those adolescents in each of the racial categories that they endorsed belonging to, thereby

classifying racial categories as non-mutually exclusive. For the latter method of racial classification, 123 (63%) of participants were classified as Latina, 54 (28%) as African American, and 42 (22%) as White.

Means and standard deviations for A-DES scores using both methods of racial classification are presented in Table 9. One-way ANOVAs were conducted to examine potential racial group differences in mean A-DES scores. There was no evidence of racial differences in mean dissociation scores when considering biracial/multiracial participants as a separate racial category (see Table 10) or when using the non-mutually exclusive method of racial classification (see Table 11). In addition, independent *t*-tests were conducted to further examine potential racial differences in dissociation by using the non-mutually exclusive classification method in which biracial/multiracial participants were included in each group that they endorsed belonging to (e.g., those who endorsed African American versus all of those who did not). Separate *t*-tests were run comparing mean dissociation scores for each racial group to mean scores across the other two racial groups (see Table 12). Again, no significant racial differences in mean A-DES scores were found using this method.

There were no significant bivariate correlations between any of the cultural variables (ethnic identity, homogeneity of friends, perceived discrimination, language acculturation) and dissociative symptoms (see Table 13). No significant associations were found between these cultural factors and PTSD symptoms either, with the exception of a significant correlation between perceived discrimination and PTSD symptoms ( $r=0.21, p<.01$ ).

**Do relational and cultural factors act as risk or protective factors in the link between exposure to trauma and dissociative symptoms?**

The potential moderating effect of relational (maternal relational style, maternal communication, affective tone of maternal relationship, attitudes and behavior regarding family obligation) and cultural (race, ethnic identity, homogeneity of friends, perceived discrimination, language acculturation) factors on the association between past year exposure to PTEs and dissociation was tested using the Hayes (2013) bootstrapping macro for SPSS called PROCESS. In these regression analyses, the demographic covariates of Section 8 housing status and adolescent age were controlled for. For analyses testing whether race was a moderator of the relationship between PTE exposure and dissociation (see Tables 14-16), participants were dichotomized into two groups (those who endorsed belonging to each specific racial group and those who did not) and analyses were run separately for each racial group, as was done for the *t*-tests investigating racial differences in dissociation. Biracial/multiracial participants were included in each group that they endorsed belonging to, resulting in non-mutually exclusive racial categories.

No significant interactions were found, indicating that none of the relational or cultural variables moderated the relation between exposure to PTEs and dissociative symptoms. However, the interaction for preoccupied relational style approached significance ( $\beta=0.06$ ,  $t=-2.21$ ,  $p=.08$ ), indicating that there was a trend for girls scoring higher on the preoccupied relational style with mothers to have more dissociation symptoms when they were exposed to PTEs over the past year. (This bootstrapped regression model is presented in Table 17).

Given that participant age was found to be significantly associated with dissociation, this demographic variable was also tested as a potential moderator of the relation between exposure

to PTEs and dissociation using the Hayes (2013) bootstrapping method for regression models. There were significant main effects of both lifetime exposure to PTEs and age on dissociation, as well as a significant interaction between age and lifetime exposure to PTEs, indicating that age did moderate the association between lifetime PTEs and dissociative symptoms (see Table 18). Posthoc probing of the interaction indicated that although PTEs were a significant predictor of dissociation across age groups, this effect was largest in the youngest adolescents. The beta weight for the impact of lifetime PTEs on dissociative symptoms was larger for younger adolescents;  $B=0.16$  ( $CI=0.11-0.21$ ,  $t=6.06$ ,  $p<.001$ ) at one standard deviation below the mean participant age of 15.40 years old (i.e., age 14.34), while  $B=.05$  ( $CI=0.00-0.10$ ,  $t=2.12$ ,  $p<.05$ ) at one standard deviation above the mean age (i.e., 16.46 years old), indicating that younger adolescents who experienced PTEs reported more dissociative symptoms than older adolescents who also experienced PTEs.

An additional bootstrapping moderation analysis was run to determine if this interaction would hold while controlling for PTSD. When PTSD symptoms were added as a covariate in the regression model predicting dissociative symptoms, there were significant main effects for age and PTSD symptoms, but the significance of the interaction effect between age and lifetime PTEs decreased (to  $p=.06$ ). However, the trend was still in the same direction, with younger adolescents experiencing PTEs being more likely to have higher A-DES scores than older adolescents (see Table 19). Posthoc probing showed that the beta coefficient remained significant for younger participants at one standard deviation below the mean age ( $B=0.06$ ,  $CI=0.00-0.11$ ,  $t=2.15$ ,  $p<.05$ ), although it was no longer significant at one standard deviation above the mean age ( $B=-0.00$ ,  $CI=-0.05-0.04$ ,  $t=-0.14$ ,  $p=.89$ ), indicating a continued stronger impact of PTEs on dissociation for younger adolescents when controlling for PTSD symptoms.

See Figure 7 for a line graph illustrating the moderating effect of adolescent age on the association between lifetime exposure to PTEs and dissociative symptoms, controlling for Section 8 housing and PTSD symptoms.

A significant moderating effect was not found for age on the relation between past year PTEs on dissociative symptoms, although there were still main effects in this model for past year PTEs and age on dissociation, and the interaction was in the same direction (i.e., younger girls experiencing PTEs in the past year had higher, but not significantly higher, A-DES scores than older girls) (see Table 20).

Also investigated was whether there was a moderating effect of age on the association between lifetime exposure to PTEs and PTSD symptoms, and whether this effect would remain when controlling for dissociation. There was a significant interaction effect of age and lifetime PTE exposure on PTSD symptoms (see Table 21), which no longer held after dissociative symptoms were included in the model as a covariate (see Table 22). In other words, the moderating effect of age on the relation between PTEs and dissociative symptoms appears to be distinct to dissociation rather than PTSD symptoms.

### **Research Question 3: Dissociative Symptoms and Risky Behaviors**

**Do dissociative symptoms increase the likelihood of clinically relevant risky behavior in adolescent girls, beyond the effect of other forms of psychopathology?**

*Eating pathology.* Adolescents reported low base rates of eating pathology; the average total score on the APS-SF Eating Disturbance subscale was 1.11 (SD=0.20), with possible scores ranging from 1-3. Twenty-six adolescents (13%) reported severe restrictive behavior (not eating for a 24-hour period after eating a big meal) over the past three months and three participants (2%) endorsed purging once or twice per week during this period, but no participant reported

engaging in food restriction or purging three or more times per week. On the item assessing bingeing behavior, 12 adolescents (6%) endorsed doing this once or twice per week and four (2%) three or more times per week. Finally, 30 participants (16%) reported that the sight of food made them feel sick at least once a week over the previous three months, and three (2%) adolescents reported having this experience three or more times per week.

Given the low base rates of eating pathology, scores on this measure were dichotomized to create two groups of adolescents: those who endorsed engaging in any of the four disturbed eating behaviors over the past three months ( $n=60$ , 31%) and those who did not. In addition, given that the internal consistency of the eating disturbance measure was relatively low (Chronbach's  $\alpha=.32$ ), which may be due to the low base rates and/or divergent types of eating pathology assessed, individual disturbed eating behaviors (binging, purging, and restricting) were also examined singularly in subsequent analyses.

Both average Eating Disturbance scale scores (Pearson correlation  $r=0.23$ ,  $p<.01$ ) and dichotomous scores indicating any disturbed eating behavior (point biserial correlation  $r=0.25$ ,  $p<.01$ ) were significantly associated with dissociative symptoms. In addition, there were significant Spearman's rank-order correlations between dissociation and two of the four individual eating disturbance items: the bingeing item (Spearman's  $\rho=0.22$ ,  $p<.01$ ) and the item assessing the experience of nausea at the sight of food (Spearman's  $\rho=0.17$ ,  $p<.05$ ). Hierarchical linear regression analysis was conducted to investigate whether dissociation was significantly associated with pathological eating behavior, above and beyond the impact of other mental health symptoms (PTSD, depression). Section 8 housing assistance was included as a covariate in this analysis because it was significantly associated with disturbed eating and dissociation. Controlling for this indicator of SES and other mental health symptoms,

dissociation did not predict dichotomized eating disturbance scores, nor did it remain a predictor of the individual pathological eating behaviors (binging, food-related nausea) that were associated with dissociation at a bivariate level.

***Suicidality and self-injurious behavior.*** Suicidal ideation over the previous two weeks was assessed with three items. Twelve girls (6%) girls reported that over the past two weeks, they sometimes felt that life was not worth living and 5 (3%) responded that they felt that way nearly all the time. Four girls (2%) reported sometimes thinking about killing themselves over the previous two weeks, and one girl (0.5%) responded that she thought about killing herself nearly all the time during this period. Five girls (3%) endorsed that they sometimes seriously thought about or tried killing themselves, and one girl (0.5%) reported that she seriously thought about (and/or attempted) suicide nearly all the time over the past two weeks. Notably, four girls (2%) did not respond to this item.

Regarding self-injurious behavior, 27 participants (14%) responded that they had hurt themselves on purpose by scratching or cutting their body once or twice in their lives, while nine girls (5%) reported that they had engaged in self-injurious behavior several times in their lives. No participant reported engaging in self-injurious behavior often.

Based on the low base rates of endorsement and restricted response range for the suicidal ideation and self-injurious behavior items, both measures were dichotomized, creating two groups of participants for each domain: those who endorsed ever feeling that life was not worth living and/or thinking about/attempting suicide ( $n=20$ , 10%) and ever engaging in self-injurious behavior ( $n=36$ , 19%), and those who did not report any suicidality or self-harm.

The dichotomized suicidal ideation measure was highly correlated with dissociation (point biserial  $r=.44$ ,  $p<.001$ ), as were all three of the individual suicidality items (Spearman's

rhos were 0.36,  $p < .001$  for the item assessing feeling that life was not worth living, 0.18,  $p < .05$  the item assessing thoughts about suicide, and 0.20,  $p < .01$  for the item assessing seriously thinking about suicide and/or making a suicide attempt). (See Figure 8 for a bar graph illustrating the percentages of participants endorsing suicidal ideation, depending on whether their dissociation score fell above the recommended clinical cut-off.) In addition, the point biserial correlation between dissociation and the dichotomized self-injurious behavior item was also significant at  $r = .16$ ,  $p < .05$ .

For subsequent analyses examining whether the association between suicidality and dissociation held controlling for PTSD and depression, one item was removed from the APS-SF's Major Depression subscale ("I thought about killing myself"), as this item was used as an indicator of suicidality. Hierarchical logistic regression analysis was run to determine whether the association between dissociative symptoms and suicidal ideation was significant above and beyond the influence of depressive and PTSD symptoms. These three mental health variables were standardized before entry in order to compare odds ratios and 95% confidence intervals. Dissociation did remain a significant predictor of suicidality, even after controlling for depression and PTSD (see Table 23). The final model odds ratio of 2.15 indicated that for every standard deviation unit increase in dissociation, the odds of suicidal ideation approximately doubled. Depressive symptoms were an even stronger predictor of suicidality; for every standard deviation unit increase in depression, suicidal ideation increased by nearly four times. PTSD symptoms did not significantly predict suicidality in this final model that included dissociative and depressive symptoms.

In contrast, dissociative symptoms did not significantly predict the likelihood of self-injurious behavior above and beyond the impact of depression and PTSD in hierarchical logistic

regression analysis.

**Sexual risk behavior.** In general, adolescents reported a relatively low level of sexual risk behavior; 52 girls (27%) reported ever having sexual intercourse. For the items assessing sexual risk, six girls (3%) endorsed having sexual intercourse with four or more people, two (1%) reported having intercourse with two or more people within the previous three months, and 16 (8%) reported that their partner did not use a condom the last time they had intercourse. Given the low base rate of sexual risk behavior in this sample, items with more than two response options were dichotomized (e.g., responses to the items inquiring about number of sexual partners ever and last year were collapsed into two categories: *one person* and *more than one person*). A sexual behavior composite (possible range 0-9) was then created by summing the number of items to which adolescents responded to indicating more advanced sexual activity (i.e., genital fondling of self or partner, oral sex of self or partner, sexual intercourse, sexual intercourse prior to age 14, more than one sexual partner ever) and more risky sexual activity (more than one sexual partner in the past three months, unprotected sex). Higher scores on this composite reflected engagement in more advanced and/or more high risk sexual activity. The mean of this sexual risk composite was 1.43 (SD=2.18). Sexual risk composite scores were not significantly correlated with dissociative symptoms (Spearman's  $\rho=.07$ ,  $p=.32$ ).

**Substance use.** On items assessing substance use, 62 (32%) of adolescents reported that they had ever smoked a cigarette, and 13 (7%) reported smoking within the past 30 days. Regarding alcohol use, 105 (54%) reported ever trying alcohol, with 41 (21%) reporting that they had consumed alcohol within the previous 30 days. Point biserial correlations showed that dissociation was significantly associated with ever drinking alcohol ( $r=0.18$ ,  $p<.05$ ), as well as with drinking over the previous 30 days ( $r=.18$ ,  $p<.01$ ). The correlation between dissociative

symptoms and ever smoking a cigarette approached significance ( $r=0.13$ ,  $p=.07$ ), but dissociation was not associated with smoking over the past 30 days.

Hierarchical linear regression analyses showed that dissociative symptoms did not predict drinking or smoking in models that controlled for adolescent age and other mental health symptoms. In the final models, only PTSD symptoms significantly predicted whether adolescents had consumed alcohol ever and over the previous 30 days.

**Does dissociation explain the relation between exposure to trauma and adolescent risky behavior, beyond the impact of other mental health symptoms?** The previous analysis indicated that dissociation was not uniquely related to most of the risk behaviors, making this research question only relevant for suicidal ideation. Given that dissociation significantly predicted suicidal ideation above and beyond the impact of other mental health symptoms, and that exposure to PTEs was also associated with suicidality (point biserial  $r=0.37$ ,  $p<.001$  for lifetime PTEs,  $r=0.27$ ,  $p<.001$  for previous year PTEs), the potential mediating effect of dissociation on the relationship between PTEs and suicidality was explored using the Preacher and Hayes (2004) bootstrapping approach to regression. Since suicidality was a dichotomous outcome, estimations of the magnitude of effects were based on a logit model, and thus total effects cannot be decomposed into direct effects plus indirect effects, as with ordinary least squares (OLS) regression. Demographic covariates of age and Section 8 housing were not included in these tests because they were not significantly associated with the outcome of suicidal ideation.

There were significant indirect effects for the prediction of suicidal ideation from exposure to PTEs (lifetime and past year) through dissociative symptoms, indicating that dissociation mediated the relationship between PTEs and suicidality, above and beyond the

mediating effects of depression and PTSD (see Figures 9 and 10). There were also significant indirect effects for depressive symptoms, suggesting dual pathways predicting risk for suicidality from exposure to PTEs. The total effect of past year PTEs on suicidality was no longer significant once the mental health mediators (dissociation and depression) were included in the model, whereas the total effect of lifetime PTEs on suicidality remained significant when these mediators were included. This suggests that dissociation and depression can be viewed as “full mediators” of the relationship between recent PTEs and suicidality, whereas these mental health symptoms were “partial mediators” of the lifetime PTEs-suicidality association. Perhaps more importantly, these results suggest that depressive symptoms and dissociation may be distinct or independent mediational pathways by which exposure to negative events leads to suicidal ideation.

### **Discussion**

There is an emerging body of research suggesting that dissociation is an important trauma-related outcome that has implications for the nature, severity, treatment responsiveness, and behavioral outcomes of trauma-related psychopathology. Preliminary evidence suggests that adolescent girls may be particularly vulnerable to experiencing dissociation in response to trauma, and that dissociative symptoms may also be associated with more maladaptive outcomes in this population. However, due to limited research, little is known about psychometric properties of adolescent dissociation measures, contextual determinants of dissociation beyond and in relation to its well established link with trauma, or relationships between trauma, dissociation, and adolescent risk behaviors. The present study examined measurement issues, contextual determinants, and associated risk behaviors of dissociation in a community sample of 194 low-income, diverse 13- to 17-year-old girls.

### **Psychometric Properties of the A-DES**

The average total A-DES score of 2.06 (with a standard deviation of 1.71) was similar to, although slightly lower than, average scores found in other adolescent community samples. For example, Smith and Carlson (1996) reported an average A-DES score of 2.24 (SD=1.40) and Farrington and colleagues (2001) an average score of 2.59 (SD=1.72) among girls in their sample. In the present sample, the A-DES had adequate psychometric properties. Its internal reliability was excellent (Cronbach's  $\alpha=0.95$ ), as has been shown by other researchers (e.g., Armstrong et al., 1997), indicating that the items were highly correlated and cohered together as an overall dissociation symptom measure. Inter-rater agreement for adolescent self-report and mother observer-report of dissociative symptoms on seven of the 30 A-DES items was low to moderate, although this correlation was significant.

Notably, inter-rater agreement for A-DES responses provided at follow-up by a subset of families was higher than agreement at the initial interview ( $r=0.18$  versus  $r=0.34$ ). It is possible that this difference may be due to the different administration formats of these assessments, as participants completed the A-DES using audio computer-assisted self-interviews (ACASI) at the initial time point, whereas follow-up interviews were personally administered over the phone. It is possible that the verbal method of administration resulted in increased similarity in dissociative symptom ratings by mothers and daughters, compared to the computerized administration method.

An important limitation of the dissociation literature is that only one known study to date has examined inter-rater agreement across adolescent- and observer-reported dissociative symptoms. In a study of 10- to 18-year-olds in residential psychiatric treatment, Kisiel and Lyons (2001) examined correlations between adolescent-reported A-DES scores and mental

health treatment provider-reported scores on the Child Dissociation Checklist (Putnam, Helmers, & Trickett, 1993), which utilizes observer-report and is intended for use with 5- to 12-year olds. As in the present study, adolescent and observer reports of dissociative symptoms were only moderately correlated ( $r=.28$ ), suggesting that these measures are not assessing identical dissociative constructs. However, the level of agreement for dissociative symptoms found in this study and by Kisiel and Lyons (2001) is similar to that found between adolescents and parents for most measures of internalizing symptoms (see Rescorla, Ginzburg, Achenbach, Ivanova, Almqvist, Begovac, et al., 2013 for a large cross-national study).

It cannot be determined from this or previous studies whether adolescents or mothers provide a more sensitive report of adolescent dissociation. Due to their very nature, some dissociative symptoms (e.g., depersonalization, derealization) may not be amenable to observer report, and thus self-report likely captures a wider range of dissociative symptoms (Ogawa et al., 1997). However, it is also possible that adolescents have not yet developed the capacity to reflect and report upon their internal experience in general, or to recognize dissociative discontinuities in their sense of awareness or behavior (Carlson, Yates, & Sroufe, 2009). Thus, adolescent self-report may not offer the most accurate perspective on the presence of dissociative symptoms. It is important that future adolescent studies include multiple methods of reporting on dissociation (e.g., self, parent, teacher), and examine inter-rater agreement as well as compare convergent validity with variables that have been shown to be related to dissociation (e.g., trauma exposure, other symptomology, risk behaviors).

Adolescent-reported dissociation scores at the initial interview were highly correlated with scores on an abbreviated 14-item telephone interview version of the A-DES ( $r=0.75$ ), indicating good test-retest reliability that was similar to the two-week reliability coefficient

( $r=0.77$ ) reported by Smith and Carlson (1996). Test-retest reliability for mother-reported dissociation on the seven adapted A-DES items was slightly lower but still adequate ( $r=0.54$ ). These findings indicate that although mothers and daughters are not observing or reporting similar symptoms, there is stability in individual observations over time.

Confirmatory factor analyses of the A-DES did not provide support for any of the theoretically or empirically derived multi-factor structures. Although the A-DES was designed with four subscales intended to measure various aspects of adolescent dissociation (Dissociative Amnesia, Absorption and Imaginative Involvement, Passive Influence, Derealization/Depersonalization), this four-factor structure did not provide a good fit to the current study's A-DES data. A two-factor model found in a female undergraduate sample administered the DES (Olsen et al., 2013) consisting of an absorption factor and an amnesia/depersonalization/derealization factor also fit poorly. The theoretically derived three-factor model representing the three DES subscales (Amnesia, Absorption/Imaginative Involvement, Derealization/Depersonalization) that has received considerable support in adult samples (e.g., Carlson et al., 1991; Sanders & Green, 1994; Stockdale et al., 2002) also did not provide good fit to the current data, nor did a three-factor model (depersonalization, disintegration of conscious control, amnesia) found in an adolescent community sample (Yoshizumi et al., 2010).

The majority of factor analytic studies of the A-DES have yielded a unidimensional factor structure among community samples (Farrington et al., 2001; Muris et al., 2003; Nilsson & Svedin, 2006; Tolmunon et al. 2007). Although the Chronbach's alpha for the A-DES was high ( $\alpha=0.95$ ), indicating high inter-item correlations and suggesting that the A-DES was

measuring a unidimensional construct, the empirically supported one-factor model did not show good overall fit in the current study.

Importantly, a response scale difference was observed across A-DES scores. Many items were normally distributed, with participants responding across the full 11-point Likert range. However, some items were skewed due to low base rates of endorsement. On those items, the majority of participants endorsed “zero,” reporting that they never experienced the dissociative symptom, while only a few adolescents endorsed that they had experienced the symptom at all (i.e., a score above zero). Specifically, there were ten A-DES items for which over 70% of adolescents responded “zero.” Factor analysis results indicate that this response scale difference accounts for the poor fit of the one-factor model in this sample. Using a hybrid EFA in which items were allowed to be treated as noncontinuous, a two-factor structure was found to provide a good fit to the data. All items significantly loaded onto one factor, and a second-order factor emerged consisting of the ten items that were treated as dichotomous due to their low (i.e., under 30%) base rates of any endorsement. Upon examination, these items were not similar in content, and thus only cohered together due to their shared measurement scale.

A three-factor EFA model provided the best fit to the data, with all items loading significantly onto the first factor, the 10 dichotomous items cross-loading onto a second higher-order factor (as in the two-factor solution), and six items (five of which were dichotomous items) also loading onto a third factor. The items loading onto the third factor appear to be somewhat similar in content and reflect a sense of external control over one’s behavior, thoughts, or conscious experience (e.g., “I hear voices in my head that are not mine,” “Something inside of me seems to make me do things that I don’t want to do,” “I find writings, drawings or letters that I must have done but I can’t remember doing,” “I find myself standing outside of my body,

watching myself as if I were another person”). This third factor has not emerged in other factor analytic studies of the A-DES, and thus may be sample specific. However, future research should explore the presence of this separate factor in other samples. It is possible that the sense of lack of volitional control over experience and behavior represents a distinct aspect of dissociation among adolescents.

In sum, the factor analysis results suggest that all items on the A-DES were measuring the same underlying construct, and the poor fit of the unidimensional structure was due to measurement scale differences across items. Some items appeared to be tapping normative experiences and had a full range of responses, whereas other items assessed experiences that were only present among a subset of adolescents, and may represent more pathological forms of dissociation. This is consistent with Waller and colleagues’ (1996) taxometric analysis findings that some adult DES items reflected dimensional constructs or traits (e.g., absorption) that were relatively nonpathological and normative, whereas other less frequently endorsed items measured more pathological forms of dissociation (e.g., depersonalization, derealization, amnesia). The latter items were found to identify individuals belonging to a pathological dissociative latent class. Those items make up the DES-Taxon (DES-T), a shortened DES measure created by Waller et al. (1996) that is intended to identify pathological dissociation.

Martinez-Taboas and colleagues (2004) subsequently developed the Adolescent Dissociative Experiences Scale-Eight (ADES-8) to measure adolescent pathological dissociation by selecting eight A-DES items that were similar in content to the DES-T items. Notably, in the present study, six of the ten “dichotomous” items that received low endorsement, and four of the six items that loaded onto a third factor are part of the ADES-8. The ADES-8 items also had low endorsement in both Puerto Rican community (53% total scores of zero) and general clinical

(46% zero scores) samples. The ADES-8 showed convergent validity with variables related to pathological dissociation, including psychiatric impairment and comorbidity, abuse history, and violence exposure.

These findings have implications for the development of more refined and efficient measures of adolescent dissociation. Although A-DES average total scores are able to capture individual differences across items, this 30-item, 11-point Likert scale may be more complicated and longer than necessary. Future research should examine how A-DES items can best be combined, given the different response scales observed in this and other studies. Importantly, responses across items cannot be viewed “equally” in terms of clinical significance. For instance, a score of “one” (i.e., *rarely*) on an item assessing the normative experience of absorption (e.g., “I get so wrapped up in watching TV, reading, or playing video game that I don't have any idea what's going on around me”) has a different meaning than a score of “one” on the more infrequently endorsed (and likely more pathological) item “Something inside of me seems to make me do things that don't want to do.” To eliminate response scale differences and capture population variability, it may make sense to reduce the A-DES to a dichotomous (*yes/no*) scale. Alternatively, the measure could be shortened for use in clinical settings as a brief screening tool for pathological dissociation. Therefore, future research should examine how individual items as well as a shortened scale (e.g., consisting of the low base rate items found in this study) are concurrently and longitudinally associated with clinically salient factors such as symptom comorbidity, risky behavior, and functional impairment.

It is also worth noting that the A-DES would benefit from updating of some items to be more developmentally appropriate and reflect secular changes. For instance, the item “I get so wrapped up in my toys or stuffed animals that they seem alive” had low endorsement in this

sample, which may be because it is not a developmentally appropriate indicator of dissociation in adolescents. Anecdotally, during follow-up phone interviews, adolescents often laughed at this item and emphatically responded “Never!” in a manner suggesting that they found the item absurd. Furthermore, measure updates should incorporate advances in technology. For example, the item “I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me” could be expanded to include the internet, as many adolescents also display absorption in this modern activity, some likely to the extent of dissociation. It will be important to establish new norms for these types of “dissociative” experiences, given that long periods of absorption in video games and similar technology are often reported by adolescents and parents.

A final, more broad methodological consideration in the measurement of dissociation involves the need for supplementary methods to be used in conjunction with self and observer reports. By their very nature, core dissociative symptoms such as amnesia (inability to recall autobiographical information) and depersonalization/derealization (experiences of unreality or detachment from oneself or surroundings) may not be readily apparent or observable by oneself (regardless of developmental level) or others. Accordingly, there are several promising psychophysiological approaches to assessing dissociation. In clinical and nonclinical samples, individuals reporting high dissociation have been shown to display different patterns of physiological reactivity, including suppressed autonomic responses of heart rate and skin conductance (Griffin et al., 1997; Koopman et al., 2004; Sierra, Senior, Dalton, McDonough, Bond, & Phillips 2002) and elevated stress cortisol levels (Giesbrecht, Smeets, Merckelbach, & Jelicic, 2007; Koopman, Sephton, Abercrombie, Classen, Butler, Gore, Felton, et al., 2003). Some of those studies assessed physiological variables at “baseline,” some soon after the

experience of a traumatic event, and others while asking participants to recount memories of traumatic events. In addition, recent functional imaging studies of individuals with PTSD have found that those with comorbid depersonalization and derealization symptoms exhibit heightened activation in prefrontal brain regions (e.g., rostral anterior cingulate cortex, medial prefrontal cortex) and reduced activation in limbic areas (e.g., the amygdala) when prompted to reflect on their traumatic experiences by reading their personal trauma scripts (Lanius et al., 2010, 2012). Future research should be conducted to provide a more clear and detailed understanding of psychophysiological and neurobiological concomitants of dissociation, with the goal of combining self-report measures such as the A-DES with these objective neurobiological indicators for more comprehensive, accurate measurement of dissociation.

### **Contextual Determinants of Dissociative Symptoms**

There is a well established association between exposure to traumatic events and dissociative symptoms. However, there has been little research investigating the relationship between trauma exposure and dissociation independently of PTSD symptoms, which frequently co-occur with dissociation. Indeed, in this adolescent female sample, there was a moderately strong relationship between dissociation and PTSD symptoms ( $r=0.64$ ). To better understand specificity in the relationship between traumatic events and dissociation, this study investigated the relationship between dissociation and exposure to trauma, over and above dissociation's shared relationship with PTSD symptoms. Relational and cultural factors that may influence dissociation, either directly or as moderators of the link between traumatic events and dissociation, were also examined.

**Exposure to trauma.** Dissociative symptoms were significantly associated with both lifetime and previous year exposure to traumatic events, and the relation between dissociative

symptoms and events experienced by adolescents in the past year (but not total events ever experienced) remained significant controlling for PTSD. Conversely, PTSD symptoms were also related to total events and events experienced in the past year, independently of their overlap with dissociation. Thus, dissociative symptoms were uniquely associated with exposure to recent (but not distal) trauma, over and above a shared relationship with PTSD symptoms.

These findings are consistent with prospective research in adult samples showing that for most, dissociative symptoms are heightened immediately following the experience of a traumatic event, and then gradually decrease over the following several weeks to months (Cardena & Spiegel, 1993; Dancu et al., 1996), with only a minority of individuals continuing to experience chronic elevated dissociation (Carlson, Dalenberg, & McDade-Montez, 2012). This study also adds to the knowledge base by providing information about how dissociative symptoms are related to PTSD symptoms depending on time elapsed since the traumatic event. It appears that in the relatively short-term period (i.e., within one year) following the experience of a traumatic event, dissociative symptoms represent a trauma response that is distinct from PTSD among adolescent girls, whereas in more long-term responses to trauma, dissociative symptoms overlap with PTSD symptoms to a greater degree.

Although the presence of a dissociative subtype of PTSD was not explicitly tested in the current study, these findings are consistent with empirical evidence from adult studies regarding a dissociative subtype of PTSD (Lanius et al., 2010). In response to more distal trauma (i.e., events experienced over one year ago), the subset of adolescent girls experiencing both dissociative and PTSD symptoms could be viewed as having a dissociative subtype of PTSD that differentiated them from other adolescents who experienced PTSD symptoms without comorbid dissociation. Based on recent studies of adults with PTSD, Lanius and colleagues (2012)

concluded that not all individuals who meet criteria for PTSD have high levels of dissociation, whereas most people experiencing high dissociation have PTSD. The results of the present study appear to support this conclusion, with one caveat. The finding that traumatic events experienced within the previous year were significantly related to dissociative symptoms independently of their shared association with PTSD symptoms suggests that following more recent exposure to trauma, some adolescent girls may display high levels of dissociation without co-existing elevated PTSD symptoms.

There is no known research to date investigating the presence of a dissociative subtype of PTSD among children or adolescents, although the DSM-5 PTSD criteria that include the new dissociative subtype apply to these younger populations, as well. It is critical that future studies investigate whether, as in adults (Lanius et al., 2010, 2012), there is a subgroup of youth who belong to a latent class characterized by high levels of PTSD and dissociation, distinct patterns of emotional dysregulation in functional neuroimaging, and differential treatment responses. It is important to note that the present study examined all facets of dissociation assessed by the A-DES (i.e., amnesia, absorption and imaginative involvement, passive influence, and derealization/depersonalization), whereas the studies of adults yielding a dissociative subtype of PTSD only focused on the dissociative symptoms of depersonalization and derealization. Future research should also examine how other dissociative symptoms (e.g., amnesia, identity disruption) relate to PTSD symptoms.

Another important consideration for the interpretation of the present study's results is that for analyses involving PTSD, items in the PTSD measure that assessed dissociative-like PTSD symptoms (i.e., flashbacks, amnesia for traumatic memories) were not removed, as some other researchers have done in their analyses examining PTSD and dissociative symptoms together

(e.g., Carlson, Dalenberg, & McDade-Montez, 2012). Given that the PTSD symptoms involving dissociation were treated as PTSD symptoms in analyses, current findings may actually underestimate the unique relationships that dissociative symptoms had (independent of PTSD symptoms) with other study variables (e.g., exposure to trauma, risk behaviors).

This study also examined whether specific types of potentially traumatizing events were more strongly associated with dissociation and/or PTSD than others. Results showed that exposure to some traumatic events was related to both dissociative and PTSD symptoms, whereas other events were more distinctly associated with dissociative or PTSD symptoms alone. Across all events, witnessing someone seriously injured or die was found to have the strongest relation with both types of trauma symptoms. Other lifetime events that were associated with both dissociative and PTSD symptoms included experiencing a natural disaster, serious accident, assault (as a victim or witness), someone close being badly hurt or dying, and witnessing physical violence between parents.

There was also evidence that experiencing certain events over the past year was associated with particularly high trauma symptomology, compared with experiencing those events at some more distant time in the past. Specifically, adolescents who witnessed someone getting seriously injured or killed over the past year reported significantly higher dissociative and PTSD symptoms compared to adolescents who had witnessed serious injury or death in their lifetimes, but not in the past year. In addition, adolescents who reported being in a serious accident and/or assaulted over the past year had higher dissociative (but not PTSD) symptoms than those who experienced those events in the past. Adolescents who witnessed the assault of a family member and/or saw someone getting seriously injured or killed in their lives had

significantly higher PTSD symptoms (but not dissociation) than those who had never experienced those types of events.

These findings indicate that experiencing certain traumatic events increases risk for the development of dissociation and/or PTSD. Moreover, the temporal proximity to the event also appears to influence the type of trauma symptoms exhibited. However, it does not appear that certain types of events (e.g., violence, natural disaster, accidents) are specifically linked to particular trauma symptoms. It has been speculated that dissociation is most strongly related to interpersonal forms of trauma, and there is evidence that severe dissociative pathology (e.g., Dissociative Identity Disorder) is associated with early, chronic, severe childhood abuse (e.g., Hornstein & Putnam, 1992; Spiegel, 1997). Interestingly, results of this study suggest that witnessing serious injury or death was most strongly associated with dissociation, more so than being a victim of interpersonal violence. Other non-interpersonal types of events (experiencing a natural disaster, serious accident, and someone close being badly hurt or dying) were also strongly linked to dissociation. These findings suggest that framing dissociative symptoms as a traumatic response specifically to interpersonal events may not be appropriate for adolescent girls. Within the current sample, it appeared to be more severe types of events, rather than the extent to which they could be considered “interpersonal,” that was the common feature among the specific types of events associated with dissociation.

There has also been debate in the field regarding whether physical, sexual, or emotional abuse is most strongly predictive of dissociation. Studies have yielded inconsistent results in this area, and a meta-analysis by van IJzendoorn and Schuengel (1996) found an equally strong impact of physical and sexual abuse on dissociation across studies (with identical effect sizes of 0.42). However, this meta-analysis did not examine the impact of the lesser studied experiences

of verbal abuse and emotional neglect, which several studies have been found to be more strongly associated with dissociative symptoms than physical or sexual abuse (Brunner et al., 2000; Dutra Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2009). Due to Institutional Review Board limitations, this study did not directly ask about physical abuse by a parental figure or past sexual abuse, although one item on the exposure to potentially traumatic events measure asked whether adolescents had been “slapped, hit or beaten up,” which was found to be associated with dissociative symptoms. Thus, this study could not examine the relative contributions of physical, sexual, or emotional abuse/neglect in the prediction of dissociation.

**Relational factors.** Also investigated was the impact of contextual relational and racial/ethnic/cultural factors on dissociative symptoms, and their possible interactions with exposure to trauma in predicting dissociation, in order to determine whether these contextual variables served as risk or protective factors for the development of dissociation in response to trauma. Several aspects of the maternal relational context were found to be associated with dissociation. In general, adolescent girls who reported higher preoccupied and dismissing relational styles with their mothers, higher maternal hostility, and less maternal warmth exhibited higher dissociative symptoms. Preoccupied and dismissing relational styles remained significantly associated with dissociation, above and beyond the impact of exposure to traumatic events in the previous year, as well as PTSD symptoms. However, maternal warmth and hostility were not related to dissociation when controlling for exposure to trauma, indicating that girls whose maternal relationships were characterized by hostility and a lack of warmth may have been more likely to be exposed to traumatic events, which then increased their likelihood of dissociative symptomology. None of the relational factors (relational style with mothers, affective tone of maternal relationship, maternal communication, attitudes and behavior

regarding family obligation) were found to moderate the relationship between exposure to trauma and dissociation, although the interaction for preoccupied relational style approached significance ( $p=.08$ ), indicating that there was a trend for girls endorsing preoccupied relational styles with their mothers to exhibit higher dissociation symptoms in response to exposure to traumatic events over the past year.

The significant association between preoccupied relational style with mothers and dissociation was also found in a female undergraduate sample (Sandberg, 2010). However, that relationship did not hold controlling for the impact of childhood physical abuse and child/adult sexual victimization, although another type of insecure attachment (fearful attachment style) uniquely predicted dissociation. In a prospective study, children displaying anxious/avoidant (as well as disorganized) attachment with caregivers during the Strange Situation assessment in infancy went on to have higher dissociative symptoms in grade school and adolescence (but not young adulthood). It has been posited that avoidantly attached children's strategy of coping with rejection from caregivers by defensively excluding information and feelings that may activate the attachment system may render them more vulnerable to dissociation in response to trauma (Egeland & Susman-Stillman, 1996). However, in light of their finding that infant avoidant attachment was no longer related to dissociation at age 19, Ogawa et al. (1997) hypothesized that by young adulthood, individuals with avoidant histories may develop more mature defense mechanisms that allow them to exclude traumatic events from conscious awareness, while still allowing those experiences to be integrated into their sense of self.

In the present study, both forms (preoccupied, dismissing) of adolescent relational styles with mothers that reflect insecure attachment were related to dissociation, independently of exposure to trauma. Adolescent girls with a preoccupied relational style characterized by over-

involvement in relationships with their mothers and anxiety about maternal acceptance/rejection experienced higher dissociative symptoms, as did girls who endorsed the opposite dismissive pattern (the outgrowth of infant avoidant attachment) of avoiding closeness and dependence in maternal relationships. According to attachment theory, internal working models of insecure attachments confer generic vulnerability to poor outcomes by conveying expectations that the attachment figure will not be available or will respond negatively to requests of help and comfort (Bowlby, 1973). For adolescents in this study, the experience of early parental unavailability to soothe and help to regulate affect in times of distress that presumably led them to go on to develop preoccupied or dismissing relational styles may have also disrupted their development of effective emotion regulation skills, thereby increasing their likelihood of using dissociation as a coping approach in response to trauma. However, the cross-sectional nature of this study does not allow for any causal conclusions to be drawn about the relationship between relational style and dissociation. Another methodological limitation is this study's use of a self-report measure of relational style, rather than the gold standard measure of adolescent/adult attachment, the Adult Attachment Interview (AAI; Main, Kaplan, & Cassidy, 1985). Use of the AAI would have enabled the identification of adolescents with unresolved/disorganized attachment style, which has been linked to dissociation both theoretically (Liotti, 1992, 1999, 2004) and empirically (West et al., 2001).

Recently, developmental theorists have suggested that potentially enduring disrupted forms of parent-child communication may be more important than early attachment in the development of dissociative symptoms because such long-term processes continually reinforce the child's segregated and contradictory mental processes, resulting in internalization of non-integrated affective parental dialogues, and subsequent failure to understand and integrate self-

experiences (Dutra et al., 2009; Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006). It has been proposed that sustained disturbances in the parent-child relationship explain why child maltreatment leads to the development of dissociation (Dutra et al., 2009). This study provided partial support for this theory in that the affective tone of the maternal relationship (i.e., low warmth, high hostility) was related to dissociation, echoing the findings of previous adult studies that utilized retrospective recall measures of family environment and relationships (e.g., Mann & Sanders, 1994; Modestin, Lotscher, & Erni, 2002). However, this association was no longer significant once the influence of exposure to traumatic events was accounted for, and relational factors did not moderate the association between traumatic events and dissociative symptoms. Future studies should continue to investigate the impact of family relational context on dissociation at later stages in development including adolescence in order to expand understanding of the role of relational factors in the etiology of dissociation throughout the lifespan.

**Racial/ethnic/cultural factors.** Previous studies have found racial differences in dissociation, with higher rates among African American adolescents (Nugent et al., 2011) and adults (Douglas, 2009; Dunn et al., 1994; Seedat, Stein, & Forde, 2003), although racial/ethnic differences have not been observed in all adult samples (Zatzick, Marmar, Weiss, & Metzler, 1994). Moreover, Latinos have been found to display greater peritraumatic dissociative symptoms (Pole, Best, Metzler, & Marmar, 2005), which have been associated with low levels of acculturation among young adult Latinos (Marshall & Orlando, 2002). The present study oversampled Latinas in order to increase power to detect within-group variation in study variables based on acculturation. It has also been posited that the Latino cultural value of *fatalism* (i.e., the belief that adversity is sent by God and should be endured) may be related to

greater use of passive coping approaches, thereby leading to increased likelihood of dissociation (Greenwall & Cosden, 2009; Perilla, Norris, & Lavizzo, 2002). Higher rates of dissociation observed among Latinos have also been hypothesized to be due to the somewhat prevalent culturally defined syndrome of *ataque de nervios* that involves dissociative symptoms (e.g., depersonalization, amnesia, identity alteration) and is observed among individuals from Spanish-speaking Caribbean cultures (particularly Puerto Ricans), often following trauma exposure (Cuevas et al., 2010; Perilla, Norris, & Lavizzo, 2002; Pole, Gone, & Kulkarni, 2008).

The present study did not find significant differences in dissociation scores across racial groups, and none of the cultural variables examined (ethnic identity, homogeneity of friends, perceived discrimination, language acculturation) were significantly related to dissociative symptoms. No significant associations were found between these cultural factors and PTSD symptoms either, with the exception of a significant relationship between perceived discrimination and PTSD. In addition, no moderating effect of race or any of the cultural variables was found on the association between exposure to traumatic events and dissociative symptoms.

It is possible that racial group differences in dissociation existed within the present sample but were not detected due to limited power, given the small number of white adolescents ( $n=33$ ). This group size is slightly below the sample size needed per group ( $n=45$ ) to detect a medium size effect. Thus, there may have been a small effect of race on dissociative symptoms that could not be identified. An examination of total A-DES scores by racial groups shows that African American girls had the highest mean score of 2.24 ( $SD=1.70$ ), followed by Latinas ( $M=2.01$ ,  $SD=1.74$ ), and then Whites ( $M=1.86$ ,  $SD=1.61$ ). This pattern is identical to unpublished findings by the PI using data from the Project on Human Development in Chicago

Neighborhoods in which there were significantly higher dissociative symptoms among African American adolescent girls compared to Caucasian and Latina girls, and among Latina compared to Caucasian girls.

Importantly, Douglas (2009) found that although African Americans reported higher levels of dissociation than Whites in their undergraduate sample, high dissociative symptoms were related to less psychological distress for African Americans compared to Whites. Douglas (2009) proposed that racial differences exist in the meaning of high dissociation, hypothesizing that African Americans may be more likely to use dissociative coping in an adaptive manner as a way of relinquishing control in situations that are perceived uncontrollable, such as being the victim of racial discrimination. Although the current study did not find an association between perceived discrimination and dissociation, future studies should continue to investigate racial differences in dissociation using large samples with adequate power to detect smaller effect sizes, as well as cultural contextual factors (e.g., acculturation, discrimination, religiosity) that might explain potential racial differences in dissociation.

**Age.** The influence of age on dissociation was not an a priori focus of this study, yet age differences were found in dissociative symptoms, and age was a moderator of the association between exposure to trauma and dissociation. It is well established that rates of normative dissociation decrease from childhood into adolescence and adulthood (Steiner et al., 2003), while dissociative symptoms tend to remain stable or increase across development in those who go on to experience pathological dissociation (Putnam, Hornstein, & Peterson, 1996). However, studies of dissociative symptoms in youth (i.e., from ages 10 to 18) using the A-DES have generally not found significant age differences in community (Farrington et al., 2001) or clinical (Kisiel & Lyons, 2001) samples. In the present sample, dissociative symptoms were

significantly negatively associated with adolescent age, with A-DES scores decreasing as participant age increased. To some degree, dissociative processes (e.g., daydreaming, fantasy play, differentiated/isolated self-representations) are characteristic of childhood functioning and may represent typical manifestations of cognitive structures and normative regulatory strategies that decline across childhood (Carlson, Yates, & Sroufe, 2009). Thus, although not observed in other adolescent samples, the decreasing levels of dissociation with age seen in this study may reflect a normative developmental decline in dissociation.

However, additional moderation analyses showed that the impact of lifetime (but not past year) exposure to traumatic events on dissociation differed depending on adolescent age. Specifically, younger adolescents who experienced traumatic events exhibited higher levels of dissociative symptoms than older adolescents who were also exposed to traumatic events. When controlling for PTSD symptoms, the significance of this interaction effect slightly decreased (to  $p=.06$ ), with a continued stronger impact of traumatic events on dissociation for younger compared to older girls. In contrast, the interaction effect of age and lifetime traumatic events on PTSD symptoms no longer held once dissociative symptoms were accounted for, indicating that the moderating effect of age on trauma symptomology was distinct to dissociation. These results suggest that experiencing multiple traumatic events at a younger age increases specific vulnerability for dissociative symptomology among adolescent girls, whereas risk for PTSD does not appear to vary depending on age of trauma exposure.

This increased risk for dissociation in response to trauma at younger ages is consistent with theoretical models of dissociation, and has also been documented empirically. Studies of adults retrospectively reporting on childhood abuse have found higher levels of dissociation among women with earlier age of onset of physical and/or sexual abuse (Kirby, Chu, & Dill,

1993), and women with histories of incest prior to age 13 compared to those who first experienced physical and/or sexual abuse in adulthood (after age 17) (Zlotnick, Shea, Pearlstein, Begin, Simpson, & Costello, 1996). In a prospective study from infancy to young adulthood with multiple assessment points, Ogawa et al. (1997) found that trauma exposure in infancy was a powerful predictor of dissociation at later time points.

The present study did not specifically assess severity or chronicity of trauma, but these previously discussed studies also found that severe, chronic trauma was related to higher dissociative symptoms (Chu & Dill, 1990; Kirby et al., 1993; Ogawa et al., 1997; Zlotnick et al., 1996). It is likely that age, chronicity, and severity of trauma are intercorrelated and cannot be separated analytically (or theoretically) (Ogawa et al., 1997) in order to test their relative contributions to dissociation. Unfortunately, children who live in chaotic environments in which they are exposed to severe trauma at a young age often remain in these environments and continue to experience trauma throughout childhood and adolescence (Ogawa et al., 1997). The present study adds to the evidence base documenting that it is these children who are most at risk for the development of dissociation.

A number of theoretical models have been proposed to explain how and why early trauma increases vulnerability for later dissociation. These models delineate risk for dissociation in the context of early developmental processes in various domains (self-organization, affect regulation, language, cognition, the brain). Caregiver relationships play a primary role in a number of these models, either as the source of (relational) trauma, or as risk/protective factors in the development of dissociation following trauma that occurs outside of the caregiving relationship.

As previously discussed, a certain degree of dissociation is normative in childhood. For instance, young children have not yet developed the cognitive ability to process complex or contradictory affects and experiences, and thus their minds “naturally fractionate” (e.g., compartmentalizing content into positive versus negative, good versus bad) (Carlson, Yates, and Sroufe, 2009). Similarly, early self-representations are differentiated and isolated from one another, and become increasingly integrated across development. Infants’ and young children’s experiences are organized into a series of discrete behavioral states, which repeat in behavioral cycles that become increasingly complex and integrated with maturation, contributing to the development of a unified sense of self (Wolfe, 1987). Young children also have high fantasy capacities, and some have imaginary companions (Putnam, 1993).

These natural dissociative propensities in early childhood are thought to serve as “foundations” for the development of pathological dissociation, depending on exposure to trauma, relational context, and other developmental capacities (e.g., Carlson, Yates, & Sroufe, 2009; Putnam, 1993). According to Carlson, Yates, and Sroufe (2009), affectively overwhelming traumatic experiences in early childhood may consolidate dissociative propensities into rigid patterns of pathological dissociation if the child lacks the developmental capacity to engage in more adaptive coping approaches (e.g., self-soothing, symbolizing and processing trauma through play or language), and lacks supportive caregiving relationships to promote affect regulation and organization of experience. In Liotti’s (1992, 1999, 2004) diathesis-stress model of pathological dissociation, trauma must occur in the attachment relationship during infancy, when children’s internal working models of attachment are still forming. This relational trauma prevents the development of a unitary and cohesive sense of self

and other and results in disorganized attachment, which subsequently increases vulnerability for dissociative reactions to later stressful or traumatic experiences.

Dissociative Identity Disorder (DID), arguably the most severe form of dissociation, represents an extreme example of the how dissociative phenomena in childhood can become crystallized into pathological dissociation. In current conceptualizations, DID is viewed as a complex posttraumatic developmental disorder that begins before the age of 5 or 6, when children have not yet consolidated a unified sense of subjective self and thus are vulnerable to developing alternate identities in response to traumatic experiences (Spiegel, 2013). Moreover, a transactional relationship has been posited to exist in which dissociative processes both affect and are affected by the development of the self (Putnam, 1993). A lack of self-organization can lead to dissociation in the presence of trauma and, reciprocally, dissociation may then disrupt the development of the self, increasing the likelihood of future dissociation.

Neurobiological models (Schore, 2009; Siegel, 2009) have also been proposed to explain how early trauma imparts vulnerability for pathological dissociation. These models are based on research showing that early caregiver relationships play an important role in organizing the development of brain structures that regulate social and emotional processes. In groundbreaking work, Schore (2009) integrated findings and theory from the fields of developmental psychopathology, attachment, psychiatry, and developmental affective neuroscience into a model explaining how relational trauma in infancy may alter the developmental trajectory of the right brain, thereby increasing risk for dissociation. Schore's model is based on the premise that attachment relationships play a critical role in the developmental maturation of the central nervous system's limbic system that processes and regulates social-emotional stimuli, and the autonomic nervous system that generates the somatic aspects of emotions. During the first few

years of life, the right brain is dominant and undergoing a critical growth period, and thus is particularly vulnerable to the influence of adverse experiences. Schore (2009) cited neuroscience research showing that: 1) early adverse developmental experiences can result in permanent physiological reactivity in limbic areas in the brain; 2) emotional and social deprivation interfere with the normal development of the synaptic architecture, which causes subsequent behavioral and cognitive deficits; and 3) early adverse experience results in increased sensitivity to the effects of stress later in life, increasing vulnerability to stress-related psychiatric disorders.

Schore (2009) posited that early abuse and neglect produce an “immature” right brain with impaired higher corticolimbic modulation of emotion regulation, resulting in an enduring predisposition to pathological dissociation. Shore’s model focuses on neural processes during early childhood as a source of vulnerability for dissociation; however, there is increasing evidence that early adolescence is also a period of rapid and sensitive neural change (e.g., Blakemore & Choudhury, 2006; Steinberg, 2005). Plausibly, this may also be a time when individuals are particularly prone to dissociation in response to traumatic events, as found in this study. If further research supports these findings, it will be important for neurological and neuropsychological research to explore potential underlying mechanisms.

### **Dissociative Symptoms and Risky Behaviors**

Dissociative symptoms have been linked to a number of high-risk behaviors, including disturbed eating (Carlson et al., 2013; Lyubomirsky, Casper, & Sousa, 2001), suicidal ideation and attempts (Carlson et al., 2013; Foote et al., 2008), self-injurious behavior (Martinez-Taboas et al., 2004; Saxe, Chawla, & van der Kolk, 2002), sexual risk behavior (Kisiel & Lyons, 2001), and substance use (Schafer et al., 2010; Seedat, Stein, & Forde, 2003). These risky behaviors are

also associated with exposure to trauma, and it has been hypothesized that the well-established dissociative response to trauma accounts for (i.e., mediates) the association between trauma and destructive behavior. Although these behaviors often emerge during adolescence, most of the existing research examining their association with dissociative symptoms has used exclusively adult samples. Another limitation is that studies have not investigated whether dissociative symptoms specifically predict risky behaviors and mediate links between trauma exposure and these behavioral outcomes, beyond other more common types of psychopathology (e.g., PTSD, depression) that tend to co-occur with trauma and dissociation. Thus, it is possible that higher dissociative symptoms may be part of a pattern of general elevated maladjustment, rather than a specific risk for destructive behaviors. The present study addressed this limitation by examining whether dissociative symptoms incrementally predicted clinically concerning risk behaviors, both in general and in response to traumatic events.

In the current sample of adolescent girls, dissociative symptoms were significantly associated at the bivariate level with a number of risky behaviors (eating disturbance, alcohol consumption, self-injurious behavior, suicidality), although they were not found to be related to other behaviors (sexual risk behavior, cigarette smoking). However, once PTSD and depressive symptoms were included as predictors in the hierarchical regression models, dissociation no longer predicted these outcomes, with the exception of suicidal ideation (which will be discussed below). Thus, it is possible that the associations found in previous studies between dissociation and eating pathology, self-harm, and substance abuse may reflect the co-occurrence of dissociative symptoms with other symptomology (e.g., depression, PTSD) as part of a pattern of general maladjustment, rather than as a specific risk for destructive behaviors. These results imply that assessing for dissociation among adolescent girls may not provide additional clinically

salient information about risk status in the domains of eating, self-injurious behavior, sexual risk, and substance use than would screening for more common trauma and depressive symptoms that are frequently comorbid with dissociation.

However, it is also possible that certain risky behaviors had not yet emerged in the present sample of younger adolescents (mean age=15.4). Base rates of risk behaviors were generally low in this sample, compared to prevalence rates from large national probability samples. Compared to 2011 national Youth Behavior Surveillance System (Eaton, Kann, Kinchen, Shanklin, Flint, Hawkins, et al., 2012) statistics for girls in grades 9 through 12 (mean age=16.3), girls in the present sample reported lower rates of sexual risk behavior (27% versus 46% for ever having sex, 3% versus 13% for having sex with 4 or more people), alcohol use (54% versus 71% for ever drinking alcohol, 21% versus 38% for drinking in the past 30 days), cigarette smoking (32% versus 43% for ever smoking, 7% versus 9% for smoking in the past 30 days), and disturbed eating behavior (13% versus 17% for not eating in a 24 hour period over the past 30 days to lose or keep from gaining weight, 2% versus 6% for vomiting over the past 30 days to lose or keep from gaining weight).

It is possible that girls in the current sample might later go on to engage in these risk behaviors during or following adolescence, but these risk behaviors had not yet begun for many adolescents at the time of their interviews. The prevalence of multiple risk behaviors was found to increase dramatically with age in a national probability sample examining a number of behaviors (sexual behavior, alcohol use, drug use, cigarette smoking, weapon carrying, non-seat belt use); only one in 12 adolescents aged 12 to 13 years engaged in two or more risk behaviors, compared to one-third of 14- to 17 year-olds, and one half of 18- to 21 year-olds (Brenner & Collins, 1998). Eating pathology has been found to develop later in adolescence, as well, with

reported peak risk for onset at age 16 for binge eating and age 18 for purging (Stice, Killen, Hayward, & Taylor, 1998). Thus, associations between dissociative symptoms and risky behavior may not emerge until late adolescence to young adulthood, with the increased developmental onset of risk behaviors. Longitudinal research should study the links between dissociation and risky behavior over time in adolescence in order to test for the presence of a distinct, causal relationship, and the potential mediating effect of dissociation on risk behaviors in response to trauma that has been found in other studies (e.g., Everill et al., 1995b; Low et al., 2000; Lyubomirsky, Casper, & Sousa, 2001).

It is important to note that while base rates of a number of risk behaviors in the current study were low and below national norms for high school-aged youth, possibly due to the younger adolescent sample, the reported rate of self-injurious behavior in this study (19%) was within the range (13 to 23%) that has been found in other adolescent studies (for a review, see Jacobson & Gould, 2007). Future research should investigate whether self-injurious behavior is distinctly related to dissociation, as has been found in previous adolescent (Kisel & Lyons, 2001; Zoroglu et al., 2003) and adult (Saxe, Chawla, & van der Kolk, 2002) samples. It is possible that these previously observed associations were due to dissociation being part of a larger trauma-related symptom constellation also consisting of PTSD and depressive symptoms.

Unlike the other risky behaviors examined in this study, suicidal ideation was specifically predicted by dissociative symptoms, independently of depression and PTSD symptoms. For every standard deviation unit increase in dissociation, the odds of suicidal ideation approximately doubled. Depressive symptoms were an even stronger (independent) predictor of suicidality; for every standard deviation unit increase in depression, suicidal ideation increased by nearly four times. PTSD symptoms did not significantly predict suicidality in this final model

that included dissociative and depressive symptoms. Several other adolescent community (Zoroglu et al., 2003) and clinical (Martinez-Taboas et al., 2004) studies have also reported associations between dissociation and suicidality. The present study adds to that evidence by demonstrating that a distinct relationship exists between dissociation and suicidality, beyond the influence of other frequently comorbid symptoms. In the only other known study to control for other mental health symptoms, Foote et al. (2008) showed that a dissociative disorder diagnosis significantly predicted a history of multiple suicide attempts, beyond the influence of PTSD, borderline personality disorder, and alcohol abuse/dependence in an adult outpatient psychiatric sample. Together, these findings suggest that dissociation uniquely and independently increases risk for suicidality.

In addition, dissociative symptoms were found to mediate the relationship between exposure to trauma and suicidality, above and beyond the mediating effects of depression and PTSD. Dissociation and depression were both “full mediators” of the relationship between traumatic events experienced over the previous year and suicidality. In other words, the total effect of past year trauma exposure on suicidality was no longer significant once these mental health symptoms were included in the model. Dissociation and depression also partially mediated the association between total lifetime traumatic events and suicidality. These results suggest that dissociation and depressive symptoms may be distinct mediational pathways by which exposure, particularly recent exposure, to traumatic events leads to suicidal ideation. These findings are consistent with previous studies in which dissociation also explained the relationship between trauma exposure and suicidality. Among children and adolescents in residential treatment, dissociation fully mediated associations between childhood sexual abuse history and suicide risk (i.e., ideation, gestures, and/or intent) (Kisiel & Lyons, 2001).

Independently of other mental health symptoms (internalizing, externalizing, PTSD), dissociation was also a mediator of the relationship between violence exposure and suicidal ideation in adolescent girls (but not boys) from a large urban community sample (Zona & Milan, 2012).

Existing theories seeking to explain the links between dissociation and risky behaviors (e.g., self-harm, sexual risk behavior, disturbed eating) view these behaviors as attempts to self-regulate and terminate a dysregulated, detached dissociative state or, conversely, as means of producing a dissociative state in order to cope with negative affect. However, suicidality differs from other risky behaviors in its nature and meaning, and thus those theories are not as applicable. Few investigators have theoretically or empirically studied why or how dissociation might impart specific risk for suicidality.

Some research has focused on the lesser studied somatic aspects of dissociation in relation to suicidality. Somatoform dissociation is viewed as the lack of integration of somatic experiences, functions, and responses, and can involve insensitivity to physical pain and motor inhibition (Nijenhuis, 2001). Dissociative symptoms in adults (assessed by the DES) have been found to be associated with higher pain thresholds and lower pain sensitivity and analgesia among college students (Giolas & Sanders, 1992) and individuals with borderline personality disorder (Ludäscher, Bohus, Lieb, Philipsen, Jochims, & Schmahl, 2007; Ludäscher, Stiglmayr, Mauchnik, Lanius, Bohus, & Schmahl, 2010). According to Orbach (1994, 1997; Orbach, Lotem-Peleg, & Kedem, 1995), suicidality requires a dissociative process that restricts experience of one's body/self and the world. Orbach and colleagues posited that in the presence of mounting intolerable stress, helplessness, and hopelessness, bodily dissociative experiences (e.g., detachment/indifference towards one's body, physical numbness, pain analgesia) reduce

inhibitions against self-inflicted bodily harm, thereby facilitating suicidal acts against the body. In preliminary support of this theory, Orbach, Stein, Shani-Sela, and Har-Even (2011) found that suicidal adolescent inpatients reported higher levels of body dissociation than nonsuicidal inpatients and controls.

Although this is a promising theory as to why dissociative symptoms may increase the likelihood of suicide attempts in the presence of suicidal ideation, it does not explain the relationship between dissociation and suicidal ideation alone that was found in this and other studies. One possible link between dissociation and suicidal ideation is in regards to fantasy proneness, defined as extensive involvement in fantasy and daydreaming (Merckelbach, à Campo, Hardy, & Giesbrecht, 2005; Merckelbach, Horselenberg, & Schmidt, 2002). Fantasy proneness may naturally co-occur with dissociative tendencies as part of the dissociative facet of absorption (Platt, Lacey, Iobst, & Finkelman, 1998) and, like dissociation, it might also become more developed among traumatized individuals as an alternative method of “escape” from inescapable traumatic experiences (Barrett, 1992). Given this heightened fantasy proneness, dissociative individuals may be more likely to fantasize about suicide as an escape from negative affect or situations. In Baumeister’s (1990) escape theory of suicide, suicidal ideation is viewed as motivation to escape from aversive self-awareness, and suicide as the ultimate step in an effort to escape from oneself and the world. Baumeister proposed a chain of events leading up to suicidality, beginning with the internal attribution of failure that brings about painful self-awareness and negative affect, which the individual tries to escape from by achieving a state of cognitive deconstruction. Cognitive deconstruction has similarities to derealization/depersonalization (e.g., constricted temporal focus, emotional numbness, reduced self-awareness), as well as cognitive components (concrete thinking, cognitive rigidity,

immediate/proximal goals). From this deconstructed state, irrationality and disinhibition are thought to arise, making drastic measures such as suicide appear acceptable. Therefore, fantasy proneness, combined with aspects of derealization and depersonalization, might be specific aspects of dissociation that increase likelihood of suicidal ideation and, for some, suicide attempts.

There is a need for research investigating mechanisms by which dissociation leads to suicidal ideation and attempts, including somatic, fantasy proneness, and derealization/depersonalization dissociative processes. The current study could not examine relationships between actual suicide attempts and dissociation due to low base rates of attempts in this community sample. Only one study has documented an association between adolescent dissociation and suicide attempts (Zoroglu et al., 2003). Studies should be conducted with large, at-risk clinical samples with higher base rates of suicidal ideation and attempts in order to further identify mechanisms by which dissociation leads to suicidality. This may be particularly important among Latina adolescent girls, the largest group in this study, who consistently have the highest rate of suicidal ideation in national epidemiological studies (e.g., Eaton et al., 2012).

### **Clinical Implications**

The results of this study suggest that younger adolescents are at high risk for experiencing dissociative symptoms in response to chronic or cumulative trauma exposure. The finding that dissociative symptoms distinctly and incrementally predicted suicidal ideation and represented an independent pathway by which trauma exposure led to suicidality highlights the importance of assessing and treating dissociative symptoms in trauma exposed adolescents. These results also imply that assessing for the more frequently (and more easily) observed symptoms of depression and PTSD will not identify some suicidal girls who are experiencing

only dissociative symptomology. Given that assessment and diagnosis of adolescent dissociation is rare (Silberg & Dalam, 2009), suicidal girls may be overlooked in clinical settings if they do not present with more apparent and frequently evaluated symptoms. Moreover, there is evidence suggesting that individuals with dissociative symptoms do not respond well to standard treatment interventions (e.g., for PTSD) that do not specifically address their dissociation (Brand, Classen, Lanins, Loewenstein, McNary, Pain, & Putnam, 2009; Brand, Classen, McNary, & Zaveri, 2009; Lanius et al., 2010, 2012).

The majority of treatment literature on dissociation focuses on adults, and accumulating research indicates that adult dissociation is associated with a difficult, chronic treatment course, with greater treatment utilization yet less symptom relief and higher attrition rates. Extremely high psychiatric treatment costs have been documented for dissociative disorder patients, relative to patients with other diagnoses (Galbraith & Neubauer, 2000; van der Kolk, 2008). Among treatment-seeking wives of deployed active duty military personnel, those with dissociative disorders were found to utilize the highest number of mental health care visits, compared to women with 17 other psychiatric disorders (Mansfield, Kaufman, Marshall, Gaynes, Morrissey, & Engel, 2010). Dissociative symptoms were also related to treatment drop-out among sexually abused children (Hebert & Tourigny, 2010) and adult drug abusers (Tamar-Guro, Karadag, Evren, & Karagoz, 2008). Moreover, dissociative symptoms predicted poor treatment responses among inpatients with borderline personality disorder (Kleindienst, Limberger, Ebner-Priemer, Keibel-Mauchnik, Dyer, & Berger, 2010) as well as mood, anxiety and somatoform disorders (Spitzer, Barnow, Freyberger, & Grabe, 2007). In a study of exposure therapy for PTSD, individuals with high (versus low) levels of dissociation were more likely to retain their PTSD diagnosis at follow-up (69% versus 10%), even though both groups showed equal rates of

improvement in PTSD symptoms (Hagenaars, van Minnen, & Hoogduin, 2010).

It has been speculated that individuals with dissociation are unable to fully emotionally engage with trauma-related information, which is a critical aspect of exposure therapy (Foa & Kozak, 1986; Jaycox, Foa, & Morral, 1998). There is evidence that dissociative states inhibit emotional, amygdala-based learning processes, which may interfere with acquisition and extinction processes that are central to exposure-based approaches (Ebner-Priemer, Mauchnik, Kleindienst, Schmahl, Peper, Rosenthal, et al., 2009). Thus, dissociation may not allow for habituation when exposed to traumatic memories, thereby preventing processing of traumatic memories and corrective safety information. For individuals with high dissociation, exposure to traumatic memories may iatrogenically lead to an increase in dissociative and PTSD symptoms, emotion dysregulation, and overall distress and functional impairment (Lanius et al., 2012).

Few existing treatments are specifically intended to target dissociative symptoms, and there is a paucity of well-designed studies investigating treatment outcomes among dissociative patients (for a review, see Brand et al., 2009b). However, recent publications have outlined expert clinician recommendations for the treatment of adults with dissociative disorders (Brand, Myrick, Loewenstein, Classen, Lanius, McNary, et al., 2012) and complex PTSD (Cloitre, Charuvastra, Carapezza, Stolbach, & Green, 2011). These recommendations emphasize the use of sequenced, phase-based approaches to address dissociation and comorbid symptoms. The first stage generally involves a focus on patient safety (i.e., with regard to suicidality and high-risk behavior) and symptom stabilization, and the second on processing traumatic memories. In the stabilization stage of dissociative disorder treatment, skill building work in the areas of emotional regulation, impulse control, interpersonal effectiveness, grounding, and containment of intrusive material is recommended (Brand et al., 2012). In the second stage, trauma exposure

and relaxation techniques, modified to prevent patients from being overwhelmed, should be integrated with the core foundational interventions from stage one (Brand et al., 2012). In addition, specific trauma-focused cognitive therapy is recommended to address trauma-based cognitive distortions (Brand et al., 2012). The complex PTSD literature also recommends exploration of traumatic memories in this second stage, with the goals of initially reducing associated emotional distress, followed by reappraisal of the meaning of these memories and their integration into a coherent and positive narrative and sense of identity (Cloitre et al., 2011; Herman, 1997). The third and final stage of complex trauma treatment focuses on helping the patient to develop interpersonal connections with others and engage in meaningful activities (Herman, 1997).

Due to the complexity and chronicity of dissociative and related symptoms, lengthy treatment over a number of years is often required (Brand et al., 2009, 2012; Brand & Stadnik, 2013). The limited treatment outcome research suggests that with long-term therapy, many individuals with dissociative disorders display improvements in dissociative symptoms, comorbid symptoms (depression, anxiety, PTSD, suicidality, general distress), and social and occupational functioning, although a substantial number of individuals remain symptomatic (Brand et al., 2009a, 2009b, 2012). Treatment that specifically focuses on identifying and reducing the use of dissociation appears to be most effective (Brand et al., 2009, 2012).

An empirically supported treatment for chronic PTSD from childhood maltreatment targets comorbid dissociative symptoms and has demonstrated efficacy in treating individuals with dissociation. This treatment uses a stage-oriented model consisting of skills training in affective and interpersonal regulation (STAIR), followed by modified prolonged exposure (Cloitre, Koenen, Cohen, & Han, 2002). In a randomized controlled trial, participants with high

baseline dissociation who received the STAIR/exposure treatment continued to improve during follow-up, whereas those treated with STAIR/supportive counseling maintained treatment gains, and those receiving supportive counseling/exposure exhibited loss of posttreatment PTSD symptom gains (Cloitre, Stovall-McClough, Noonan, Zorbas, Cherry, Jackson, 2010).

There has been much less empirical attention to the treatment of dissociation in childhood and adolescence, which has been attributed to lack of recognition of and discomfort with diagnosing dissociative symptoms in children and adolescence within the general psychiatric community (Silberg & Dallam, 2009). A significant advancement in this area was the compilation of a set of guidelines for the evaluation and treatment of dissociative symptoms in children and adolescents by the International Society for the Study of Dissociation (ISSD, 2004). Consistent with adult treatment recommendations, these guidelines emphasize a focus on safety, affect regulation, interpersonal relationships, and trauma work. The guidelines state that first and foremost, a safe, non-abusive environment is required for successful treatment. Thus, treatment of children in unstable families might be limited to crisis intervention and promotion of stability. A major identified treatment goal involves helping the child or adolescent to learn to regulate affect (e.g., through skills training). It is also recommended that clinicians assist children in acknowledging how dissociation helped them to deal with overwhelming trauma, but is no longer useful. Highlighting dissociative avoidance during therapy is recommended to identify precipitating situations, with teaching of self-monitoring techniques of focused attention to interrupt dissociative processes. In addition, a gentle yet firm approach is recommended to help youth to take responsibility for their behavior, even though it might seem out of their control. Adjunctive family therapy is highly recommended, including dyadic work to promote parent-child attachment and reciprocal communication, as well as parent psychoeducation about

dissociation that involves promoting parents' acceptance of children's emotional expression and discouraging reinforcement of regressive coping (ISDD, 2004; Silberg & Dallam, 2009).

Given that trauma-related dissociative symptoms were shown to confer specific vulnerability for suicidal ideation in the present study, there is a need for the development of treatments for adolescents that specifically address dissociative symptoms in the context of trauma treatment. Based on the adult literature, a stage-based approach is indicated that initially focuses on the development of affective regulation and interpersonal skills before proceeding to processing of traumatic experiences using exposure techniques. Dissociative symptoms in adults are associated with significant individual suffering, as well as societal economic burden (Lanius et al., 2010). Therefore, assessment and treatment of adolescent dissociation, particularly in at-risk younger girls with trauma histories, is critical in order to prevent these adolescents from progressing along a developmental trajectory that leads to chronic, treatment resistant symptoms accompanied by multiple comorbidities and high risk behaviors.

### **Study Limitations**

The results of this study are important contributions to the sparse literature on adolescent dissociation, as they broaden the scope of existing research by examining measurement issues, associations with relational factors beyond infancy, and relationships with trauma and clinically salient outcomes beyond more common forms of psychopathology. However, it is important to note that this study used a cross-sectional design, and thus causal conclusions cannot be drawn from the results. Multiple waves of longitudinal data are highly preferable over cross-sectional data for making inferences about directionality from mediational tests. In addition, there is a possible reporting bias in the present study, as some measures (e.g., exposure to potentially traumatizing events) were dependent upon retrospective recall. Adolescents experiencing high

levels of dissociation may have been especially likely to inaccurately report previous experiences. In addition, the sample was composed of predominantly Latina and African American girls from low-income families, and therefore generalization of results to other demographic populations should be made with caution. Relatedly, there was a relatively small sample of certain groups (e.g., African American girls; first generation immigrants) to fully test cultural issues.

### **Conclusions**

This study of diverse adolescent girls contributes to the evidence base documenting a strong association between exposure to trauma and dissociation, and shows that dissociation was related to recent trauma exposure beyond its overlap with PTSD symptoms. It appears that younger adolescents are particularly vulnerable to experiencing dissociative symptoms in response to recent trauma. The results highlight the importance of assessing and treating dissociative symptoms among trauma-exposed adolescent girls, as dissociation was distinctly related to suicidal ideation in response to trauma, above and beyond other frequently co-occurring mental health symptoms. Additional research is necessary to elucidate dissociative developmental trajectories and provide insight into the mechanisms, processes, and risk and protective factors underlying the development of dissociation following exposure to trauma in order to inform prevention and intervention efforts in childhood and adolescence.

## Appendices

### Tables

Table 1.

*Fit Indices of Each Confirmatory Factor Analysis Model of the A-DES*

Model	$\chi^2$	df	CFI	RMSEA
Independence	3533.25*	435	<.001	0.19
One factor	1240.13*	400	0.73	0.11
Two factors (Holmes model)	1276.00*	404	0.72	0.11
Three factors (DES model)	1247.07*	402	0.73	0.10
Three factors (Yoshizumi model)	1399.72*	403	0.68	0.11
Four factors (A-DES model)	1234.28*	399	0.73	0.10

\* $p < .001$

Table 2

*Fit Indices of Each Exploratory Factor Analysis Model of the A-DES*

Model	$\chi^2$	df	CFI	RMSEA
One factor				
Continuous	1311.19*	405	0.71	0.11
Dichotomous	776.99*	405	0.73	0.07
Two factors				
Continuous	1062.80*	376	0.78	0.10
Dichotomous	563.22*	376	0.87	0.05
Three factors				
Continuous	888.66*	348	0.83	0.09
Dichotomous	488.82*	348	0.90	0.05
Four factors				
Continuous	781.18*	321	0.85	0.09
Dichotomous	N/A	N/A	N/A	N/A

\* $p < .001$ 

*Notes.* For dichotomous models, items with a “0” endorsement rate greater than 70% were treated as dichotomous, while all other items were treated as continuous. The four-factor dichotomous model did not converge.

Table 3

*Factor Loadings of Two-Factor, Higher-Order Exploratory Factor Analysis Model of the A-DES*

Item	Factor 1	Factor 2
1. I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me.	.39	
2. I get back tests or homework that I don't remember doing.	.63	
3. I have strong feelings that don't seem like they are mine.	.62	
4. I can do something really well one time and then I can't do it at all another time.	.66	
5. People tell me I do or say things that I don't remember doing or saying.	.64	
6. I feel like I am in a fog or spaced out and things around me seem unreal.	.73	
7. I get confused about whether I have done something or only thought about doing it.	.76	
8. I look at the clock and realize that time has gone by and I can't remember what has happened.	.70	
9. I hear voices in my head that are not mine. (D)	.53	.83
10. When I am somewhere that I don't want to be, I can go away in my mind.	.52	
11. I am so good at lying and acting that I believe it myself.	.59	
12. I catch myself "waking up" in the middle of doing something.	.69	
13. I don't recognize myself in the mirror. (D)	.55	.75
14. I find myself going somewhere or doing something and I don't know why.	.63	
15. I find myself someplace and I don't remember how I got there. (D)	.47	.81
16. I have thoughts that don't really seem to belong to me. (D)	.55	.84
17. I find that I can make physical pain go away.	.44	
18. I can't figure out if things really happened or if I only dreamed or thought about them.	.65	
19. I find myself doing something that I know is wrong, even when I really don't want to do it.	.45	

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20. People tell me that I sometimes act so differently that I seem like a different person.	.68	
21. It feels like there are walls inside of my mind.	.59	
22. I find writings, drawings or letters that I must have done but I can't remember doing. (D)	.58	.80
23. Something inside of me seems to make me do things that I don't want to do. (D)	.56	.86
24. I find that I can't tell whether I am just remembering something or if it is actually happening to me.	.55	
25. I find myself standing outside of my body, watching myself as if I were another person. (D)	.53	.85
26. My relationships with my family and friends change suddenly and I don't know why.	.62	
27. I feel like my past is a puzzle and some of the pieces are missing.	.69	
28. I get so wrapped up in my toys or stuffed animals that they seem alive. (D)	.52	.83
29. I feel like there are different people inside of me. (D)	.53	.83
30. My body feels as if it doesn't belong to me. (D)	.54	.81

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*Note.* D = dichotomous item (with "0" endorsement rate >70%).

Table 4

*Factor Loadings of Three-Factor Exploratory Factor Analysis Model of the A-DES*

Item	Factor 1	Factor 2	Factor 3
1. I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me.	.43		
2. I get back tests or homework that I don't remember doing.	.64		
3. I have strong feelings that don't seem like they are mine.	.62		
4. I can do something really well one time and then I can't do it at all another time.	.65		
5. People tell me I do or say things that I don't remember doing or saying.	.63		
6. I feel like I am in a fog or spaced out and things around me seem unreal.	.73		
7. I get confused about whether I have done something or only thought about doing it.	.75		
8. I look at the clock and realize that time has gone by and I can't remember what has happened.	.69		
9. I hear voices in my head that are not mine. (D)	.57	.86	.40
10. When I am somewhere that I don't want to be, I can go away in my mind.	.52		
11. I am so good at lying and acting that I believe it myself.	.60		
12. I catch myself "waking up" in the middle of doing something.	.69		
13. I don't recognize myself in the mirror. (D)	.55	.72	.40
14. I find myself going somewhere or doing something and I don't know why.	.62		
15. I find myself someplace and I don't remember how I got there. (D)	.49	.83	
16. I have thoughts that don't really seem to belong to me. (D)	.57	.85	
17. I find that I can make physical pain go away.	.45		
18. I can't figure out if things really happened or if I only dreamed or thought about them.	.65		

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19. I find myself doing something that I know is wrong, even when I really don't want to do it.	.45		.47
20. People tell me that I sometimes act so differently that I seem like a different person.	.68		
21. It feels like there are walls inside of my mind.	.59		
22. I find writings, drawings or letters that I must have done but I can't remember doing. (D)	.60	.80	
23. Something inside of me seems to make me do things that I don't want to do. (D)	.56	.81	.57
24. I find that I can't tell whether I am just remembering something or if it is actually happening to me.	.55		
25. I find myself standing outside of my body, watching myself as if I were another person. (D)	.53	.80	.49
26. My relationships with my family and friends change suddenly and I don't know why.	.62		
27. I feel like my past is a puzzle and some of the pieces are missing.	.68		
28. I get so wrapped up in my toys or stuffed animals that they seem alive. (D)	.57	.86	
29. I feel like there are different people inside of me. (D)	.55	.84	
30. My body feels as if it doesn't belong to me. (D)	.54	.76	.52

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*Note.* D = dichotomous item (with "0" endorsement rate >70%).

Table 5

*Mean Dissociation and PTSD Scores for Participants Experiencing Various PTEs, ANOVA F-tests and Effect Sizes for Differences in Trauma Symptoms Depending on Endorsement of PTEs*

Event	A-DES mean score				PTSD mean score			
	Yes (%)	No (%)	F	$\eta^2$	Yes (%)	No (%)	F	$\eta^2$
<b>Accident</b>								
Lifetime (n=193)	2.57 (33%)	1.81 (67%)	7.87**	0.04	2.04 (32%)	1.71 (67%)	9.50**	0.05
Past year (n=63)	3.55 (25%)	2.24 (75%)	4.23*	0.07	2.14 (26%)	2.00 (74%)	0.34	0.01
<b>Disaster</b>								
Lifetime (n=194)	3.36 (12%)	1.18 (88%)	6.74*	0.04	2.22 (11%)	1.78 (89%)	7.91**	0.04
Past year (n=22)	4.85 (27%)	2.80 (73%)	2.55	0.11	2.40 (29%)	2.15 (72%)	0.39	0.02
<b>Assaulted</b>								
Lifetime (n=194)	2.51 (25%)	1.91 (74%)	5.48*	0.03	2.09 (26%)	1.73 (74%)	10.01**	0.05
Past year (n=48)	3.22 (38%)	2.08 (63%)	6.57*	0.13	2.19 (38%)	2.03 (79%)	0.66	0.01
<b>Witnessed assault</b>								
Lifetime (n=194)	2.45 (66%)	1.29 (34%)	22.71***	0.11	1.99 (33%)	1.47 (67%)	25.33***	0.12
Past year (n=127)	2.84 (43%)	2.18 (57%)	2.92	0.02	2.02 (43%)	1.97 (57%)	0.17	0.00
<b>Witnessed family member assaulted</b>								
Lifetime (n=194)	2.29 (15%)	1.98 (85%)	0.88	0.01	2.22 (15%)	1.74 (85%)	12.10**	0.06
Past year (n=28)	2.47 (21%)	2.24 (79%)	0.36	0.01	2.60 (21%)	2.11 (79%)	2.50	0.09
<b>Witnessed fighting between parents</b>								
Lifetime (n=194)	2.60 (34%)	1.72 (66%)	11.56**	0.06	2.18 (35%)	1.62 (65%)	31.14***	0.15

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Past year (n=63)	2.56 (52%)	2.65 (48%)	0.14	0.00	2.18 (47%)	2.14 (48%)	0.05	0.00
Witnessed child assaulted								
Lifetime (n=194)	2.12 (74%)	1.85 (26%)	2.53	0.01	1.85 (76%)	1.73 (24%)	1.07	0.01
Past year (n=142)	2.20 (80%)	1.92 (20%)	1.52	0.01	1.88 (80%)	1.73 (20%)	1.21	0.01
Witnessed injury or death								
Lifetime (n=194)	2.53 (16%)	1.94 (84%)	2.04	0.01	2.13 (17%)	1.74 (83%)	8.20**	0.04
Past year (n=31)	3.70 (42%)	1.68 (58%)	11.97**	0.29	2.59 (42%)	1.79 (58%)	9.29**	0.24
Someone close badly hurt or killed								
Lifetime (n=194)	2.38 (43%)	1.79 (57%)	5.88*	0.03	2.00 (43%)	1.68 (57%)	9.74**	0.05
Past year (n=80)	2.43 (38%)	2.35 (63%)	0.32	0.00	2.18 (38%)	1.89 (63%)	3.47	0.04

*Notes.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . A-DES mean scores are presented for interpretation purposes; for F-tests, natural log A-DES scores are presented. Statistics for past year PTE exposure include only those participants who endorsed ever experiencing each specific event (i.e., percentages represent the ratio of adolescents who endorsed experiencing [or not experiencing] each event in the past year to the subsample of adolescents who endorsed ever experiencing the event, and F-tests compare mean dissociative and PTSD symptoms of these two groups).

Table 6

*Bivariate Correlations between Relational Variables and Dissociative and PTSD Symptoms*

Variable	Dissociation	PTSD
Preoccupied style	0.37**	0.34**
Dismissing style	0.31**	0.22*
Maternal warmth	-0.26**	-0.26**
Maternal hostility	0.40**	0.36**
Maternal communication frequency	-0.16	0.02
Maternal communication tone	-0.90	0.00
Attitude toward family obligation (total)	-0.02	0.02
Family assistance	0.10	0.14
Family respect	-0.07	-0.04
Family obligation for future support	-0.05	0.01

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

Table 7

*Hierarchical Multiple Linear Regression of Relational Variables Predicting Dissociative Symptoms, Controlling for Demographic Variables and Past Year Exposure to PTEs*

Predictor variable	$\beta$	$t$	$R^2$	$\Delta R^2$	F (df)	df	$\Delta F$
Step 1			0.06		5.35 **	2, 184	
Section 8 housing	0.16	2.23*					
Age	-0.17	-2.31*					
Step 2			0.20	0.15	15.21***	3, 183	33.08***
Section 8 housing	0.13	2.02*					
Age	-0.16	-2.34*					
Past year PTEs	0.38	5.75***					
Step 3			0.34	0.14	12.92***	7, 179	9.16***
Section 8 housing	0.06	0.97					
Age	-0.13	-2.12*					
Past year PTEs	0.31	4.72***					
Preoccupied relational style	0.28	4.41***					
Dismissing relational style	0.17	2.16*					
Maternal warmth	0.02	0.26					
Maternal hostility	0.07	0.08					

*Notes.* \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ . Standardized beta values are presented.

Table 8

*Hierarchical Multiple Linear Regression of Relational Variables Predicting Dissociative Symptoms, Controlling for Demographic Variables, Past Year Exposure to PTEs, and PTSD Symptoms*

Predictor variable	$\beta$	$t$	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Step 1			.44		46.45****	3, 178	
Section 8 housing	0.12	2.16*					
Age	-0.12	-2.05*					
PTSD symptoms	0.62	11.06****					
Step 2			.46	.02	37.23****	4, 177	5.82*
Section 8 housing	0.12	2.09*					
Age	-0.12	-2.08*					
PTSD	0.57	9.30****					
Past year PTEs	0.15	2.41*					
Step 3			.50	.05	21.79****	8, 173	3.90**
Section 8 housing	0.07	1.33					
Age	-0.10	-1.90					
PTSD	0.49	7.59****					
Past year PTEs	0.16	2.61**					
Preoccupied relational style	0.16	2.81**					
Dismissing relational style	0.16	2.32*					

Maternal warmth	-0.04	-0.53
Maternal hostility	0.10	0.14

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*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . Standardized beta values are presented.

Table 9

*Means and Standard Deviations for Dissociation Scores by Race*

Race	n (%)	Mean A-DES score (SD)
<u>Mutually Exclusive</u>		
African American	32 (17%)	1.98 (1.74)
Latina	102 (53%)	1.99 (1.65)
White	31 (16%)	1.88 (1.63)
Biracial	28 (15%)	2.60 (1.95)
<u>Non-Mutually Exclusive</u>		
African American	51 (26%)	2.26 (1.70)
Latina	109 (56%)	2.01 (1.74)
White	33 (17%)	1.86 (1.61)

*Notes.* For non-mutually exclusive method, race classified by including biracial and multiracial participants in every racial category to which they endorsed belonging (i.e., Biracial category collapsed into African American, Latina, and White categories). A-DES mean (non-transformed) scores are presented.

Table 10

*One-Way ANOVA Comparing Mean Differences in Dissociative Symptoms by Race, with Mutually Exclusive Racial Categories*

Source	Sum of Squares	Degrees of freedom	Mean Square	F	<i>p</i>
Between groups	0.19	2	0.10	0.34	0.72
Within groups	53.70	190	0.28		
Total	53.89	192			

*Note.* Race classified by considering biracial and multiracial participants as a separate racial category.

Table 11

*One-Way ANOVA Comparing Mean Differences in Dissociative Symptoms by Race, with Non-Mutually Exclusive Racial Categories*

Source	Sum of Squares	Degrees of freedom	Mean Square	F	<i>p</i>
Between groups	0.91	3	0.30	1.08	0.36
Within groups	52.99	189	0.28		
Total	53.89	192			

*Note.* Race classified by including biracial and multiracial participants in every racial category to which they endorsed belonging (i.e., Biracial category collapsed into African American, Latina, and White categories).

Table 12

*Independent t-tests Comparing Dissociation Scores for Each Racial Group Separately*

Race	n (%)	Mean ln A-DES score (SD)	<i>t</i>	df	<i>p</i>
African American	53 (27%)	1.01 (0.53)	-0.54	191	0.59
All other groups	140 (73%)	0.96 (0.53)			
Latina	122 (63%)	0.99 (0.53)	-0.50	191	0.62
All other groups	71 (36%)	0.95 (0.53)			
White	42 (22%)	0.99 (0.54)	-0.15	191	0.88
All other groups	151 (78%)	0.97 (0.53)			

Table 13

*Bivariate Correlations between Cultural Variables and Dissociative and PTSD Symptoms*

Variable	Dissociation	PTSD
Ethnic identity	-0.07	-0.03
Racial homogeneity of friends	-0.03	-0.09
Perceived discrimination	0.13	0.21*
Language acculturation	0.05	-0.02

*Note.* \* $p < .01$

Table 14

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of African American Race on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for Demographic Variables*

	$\beta$ (SE)	CI	<i>t</i>	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Model				0.21		9.48**	5, 181	
<u>Predictors</u>								
Section 8 housing	0.16 (0.08)	0.01, 0.32	2.10*					
Age	-0.08 (0.03)	-0.15, -0.02	-2.44*					
Past year PTEs	0.15 (0.03)	0.10, 0.21	5.78**					
African American	-0.01 (0.08)	-0.17, 0.15	-0.15					
PTEs x African American	-0.08 (0.03)	-0.04-0.20	-2.44		0.01		1, 181	1.81

Note. \* $p < .05$ , \*\* $p < .001$

Table 15

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Latina Race on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for Demographic Variables*

	$\beta$ (SE)	CI	<i>t</i>	$R^2$	$\Delta R^2$	F	Df	$\Delta F$
Model				0.20		9.29**	5, 181	
<u>Predictors</u>								
Section 8 housing	0.17 (0.08)	0.01, 0.32	2.09*					
Age	-0.08 (0.03)	-0.15, -0.02	-2.42*					
Past year PTEs	0.15 (0.03)	0.10, 0.20	5.73**					
Latina	0.00 (0.07)	-0.14, 0.15	0.06					
PTEs x Latina	-0.06 (0.06)	-0.17-0.05	-1.02		0.00		1, 181	1.05

*Note.* \* $p < .05$ , \*\* $p < .001$

Table 16

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Caucasian Race on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for Demographic Variables*

	$\beta$ (SE)	CI	<i>t</i>	$R^2$	$\Delta R^2$	F	Df	$\Delta F$
Model				0.21		9.38**	5, 181	
<u>Predictors</u>								
Section 8 housing	0.19 (0.08)	0.02, 0.35	2.25*					
Age	-0.08 (0.03)	-0.14, -0.01	-2.33*					
Past year PTEs	0.15 (0.03)	0.10, 0.20	5.72**					
White	0.09 (0.09)	-0.09, 0.27	1.02					
PTEs x White	0.04 (0.06)	-0.08-0.17	0.64		0.00		1, 181	0.40

Note. \* $p < .05$ , \*\* $p < .001$

Table 17

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Preoccupied Relational Style with Mothers on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for Demographic Variables*

	$\beta$ (SE)	CI	$t$	$R^2$	$\Delta R^2$	F	Df	$\Delta F$
Model				0.31		16.49**	5, 181	
<u>Predictors</u>								
Section 8 housing	0.11 (0.07)	-0.04, 0.25	1.45					
Age	-0.07 (0.03)	-0.13, -0.01	-2.21*					
Past year PTEs	0.14 (0.02)	0.09, 0.19	5.59**					
Preoccupied style	0.20 (0.04)	0.13, 0.28	5.24					
PTEs x Preoccupied	0.06 (0.03)	-0.01, 0.12	-2.21		0.01		1, 181	3.08

Note. \* $p < .05$ , \*\* $p < .001$

Table 18

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Age on the Relation between Lifetime Exposure to PTEs and Dissociation, Controlling for an Indicator of SES*

	$\beta$ (SE)	CI	$t$	$R^2$	$\Delta R^2$	F	Df	$\Delta F$
Model				0.23		13.41***	4, 182	
<u>Predictors</u>								
Section 8 housing	0.17 (0.08)	0.02, 0.32	2.19*					
Lifetime PTEs	0.10 (0.02)	0.07, 0.14	5.82***					
Age	-0.12 (0.03)	-0.19, -0.05	-3.59***					
Lifetime PTEs x Age	-0.05 (0.02)	-0.08, -0.02	-3.02**		0.04		1, 182	9.12**

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 19

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Age on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for an Indicator of SES and PTSD Symptoms*

	$\beta$ (SE)	CI	$t$	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Model				0.45		29.27***	5, 176	
<u>Predictors</u>								
Section 8 housing	0.15 (0.07)	0.02, 0.28	2.31*					
PTSD symptoms	0.43 (0.05)	0.33, 0.52	8.54***					
Lifetime PTEs	0.03 (0.02)	-0.01, 0.06	5.82					
Age	-0.08 (0.03)	-0.13, -0.02	-2.57*					
Lifetime PTEs x Age	-0.03 (0.01)	-0.06, 0.00	-1.87		0.01		1, 176	3.51

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 20

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Age on the Relation between Past Year Exposure to PTEs and Dissociation, Controlling for an Indicator of SES*

	$\beta$ (SE)	CI	$t$	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Model				0.20		11.56***	4, 182	
<u>Predictors</u>								
Section 8 housing	0.15 (0.08)	-0.01, 0.31	2.19*					
Past year PTEs	0.15 (0.03)	0.10, 0.20	5.65***					
Age	-0.09 (0.04)	-0.16, -0.02	-2.47*					
Past year PTEs x Age	-0.02 (0.03)	-0.07, 0.03	-0.82		0.00		1, 182	0.68

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 21

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Age on the Relation between Lifetime Exposure to PTEs and PTSD Symptoms, Controlling for an Indicator of SES*

	$\beta$ (SE)	CI	<i>t</i>	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Model				0.28		17.31***	4, 177	
<u>Predictors</u>								
Section 8 housing	0.07 (0.10)	-0.13, 0.27	0.70					
Lifetime PTEs	0.18 (0.02)	0.10, 0.20	7.85***					
Age	-0.10 (0.04)	-0.10, -0.02	-2.35*					
Lifetime PTEs x Age	-0.06 (0.02)	-0.10, -0.02	-2.91**		0.03		1, 177	8.46**

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 22

*Regression Analysis Using Bootstrapping Method to Test the Moderating Effect of Age on the Relation between Lifetime Exposure to PTEs and PTSD Symptoms, Controlling for an Indicator of SES and Dissociation*

	$\beta$ (SE)	CI	<i>t</i>	$R^2$	$\Delta R^2$	F	df	$\Delta F$
Model				0.45		29.27*	5, 176	
<u>Predictors</u>								
Section 8 housing	-0.06 (0.09)	-0.23, 0.11	-0.66					
Dissociation	0.69 (0.08)	0.53, 0.85	8.54*					
Lifetime PTEs	0.11 (0.02)	0.07, 0.15	5.21*					
Age	-0.02 (0.04)	-0.10, 0.05	-0.54					
Lifetime PTEs x Age	-0.03 (0.02)	-0.06, 0.01	-1.36		0.01		1, 176	1.85

*Note.* \* $p < .001$

Table 23

*Hierarchical Logistic Regression for Prediction of Suicidality from Dissociative Symptoms, Controlling for Other Mental Health*

*Variables*

Predictor variable	B (SE)	Wald	OR	OR 95% CI	$\chi^2$	df
Step 1					63.44***	2
PTSD	0.89 (0.38)	5.39*	2.42	1.15-5.12		
Depression	1.52 (0.44)	12.23***	4.58	1.95-10.76		
Step 2					5.17*	1
PTSD	0.67 (0.41)	2.67	1.96	0.88-4.40		
Depression	1.34 (0.44)	9.32**	3.81	1.61-9.00		
Dissociation	0.77 (0.34)	4.95*	2.15	1.10-4.22		

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Final model  $\chi^2$  (df=3)=68.21,  $p < .001$ .

Standardized mean scores for all mental health variables (PTSD, depression, dissociation) were used.

**Figures**

Figure 1

*Histogram of Total Average A-DES Scores*

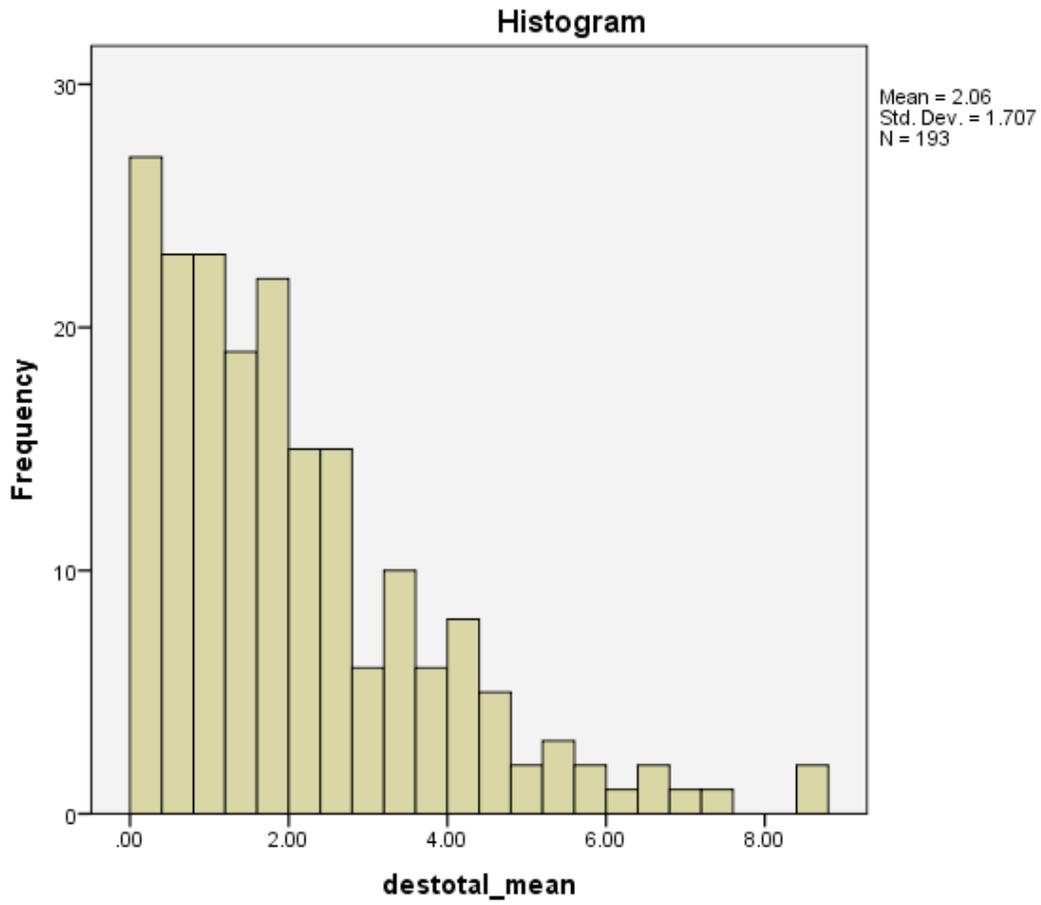


Figure 2

*Histogram of Natural Log Transformed Total Average A-DES Scores*

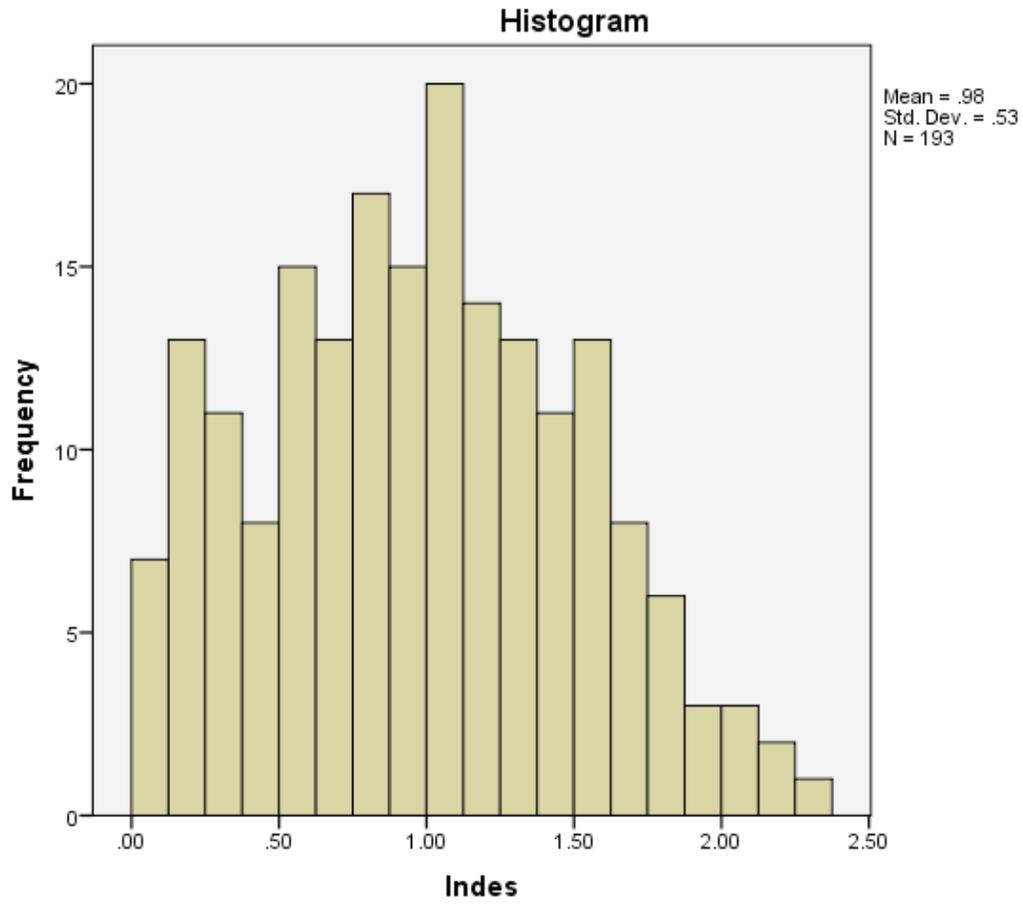


Figure 3

*Normal Probability Plot of Total Average A-DES Scores*

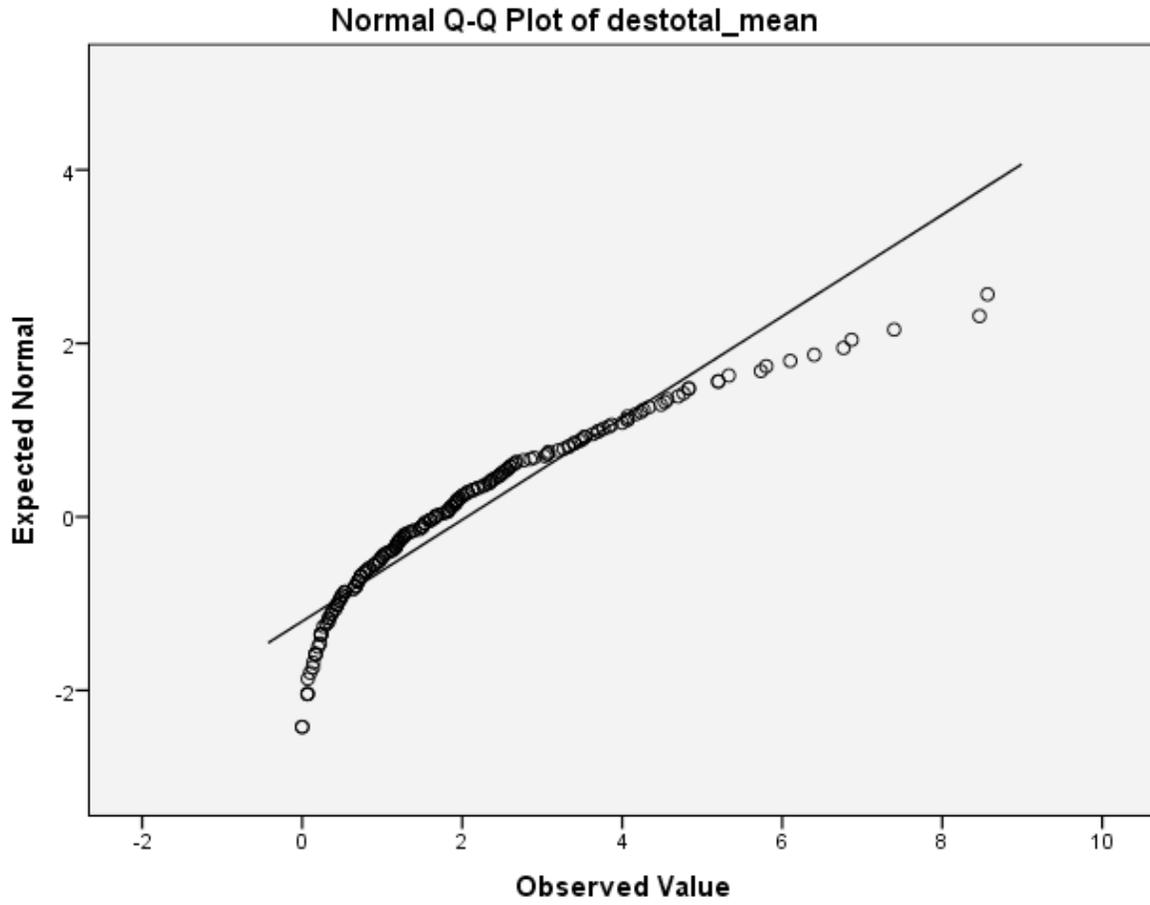


Figure 4

*Normal Probability Plot of Natural Log Transformed Total Average A-DES Scores*

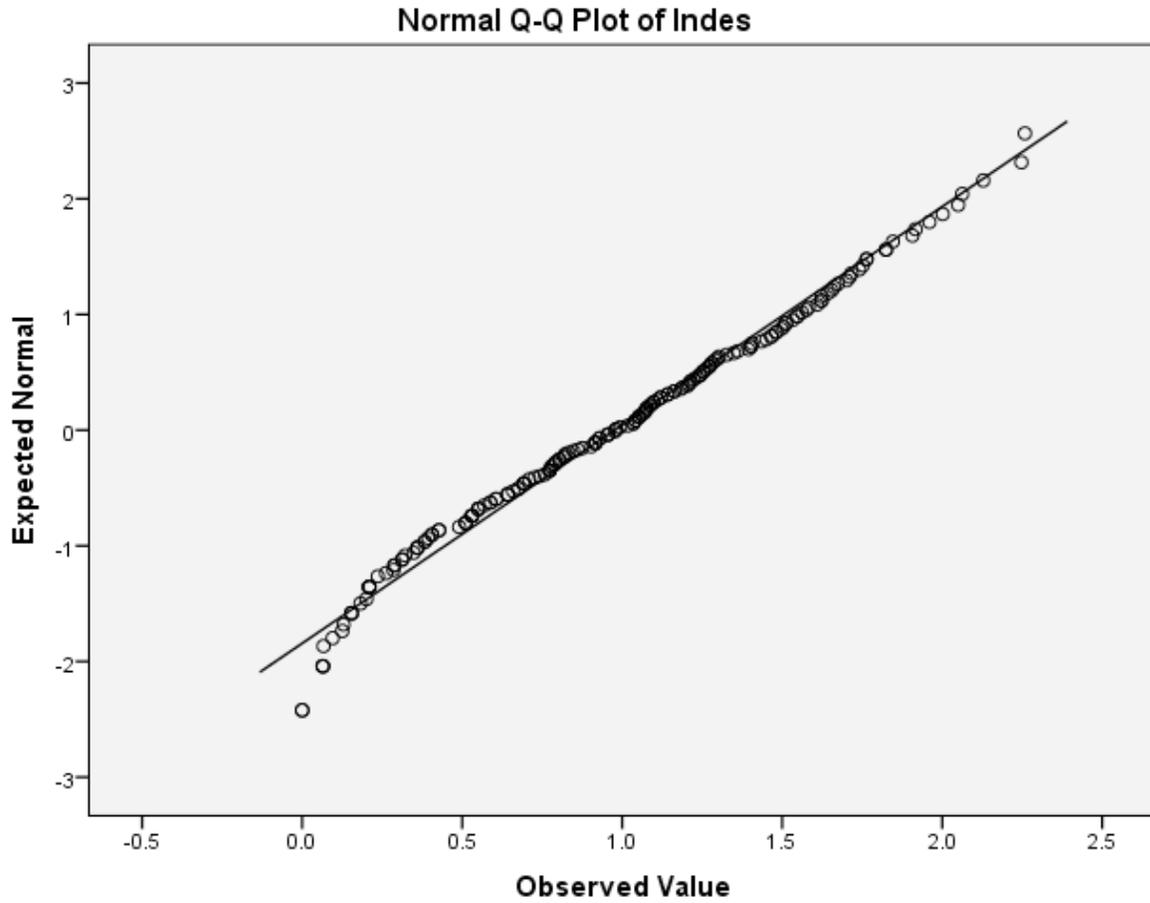


Figure 5

*Boxplot of Total Average A-DES Scores*

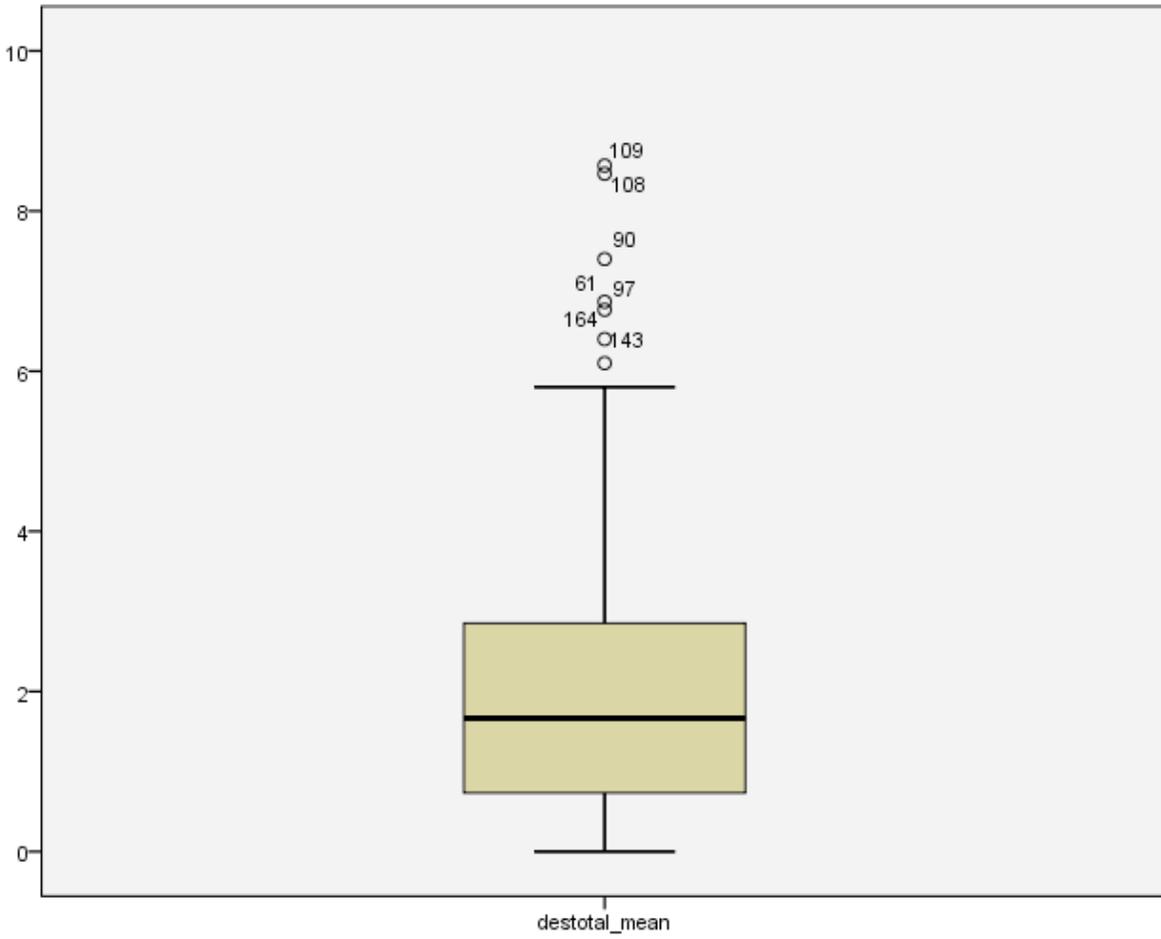


Figure 6

*Boxplot of Natural Log Transformed Total Average A-DES Scores*

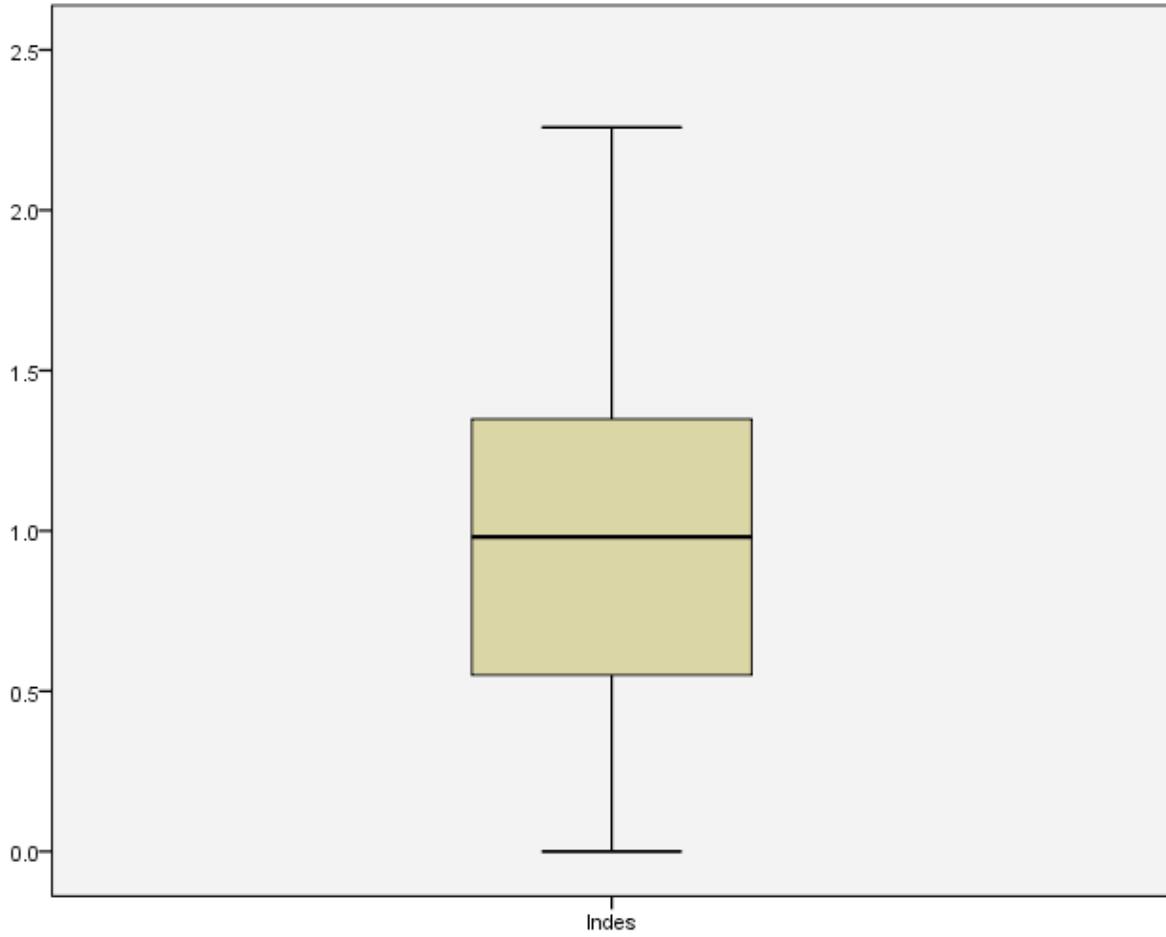
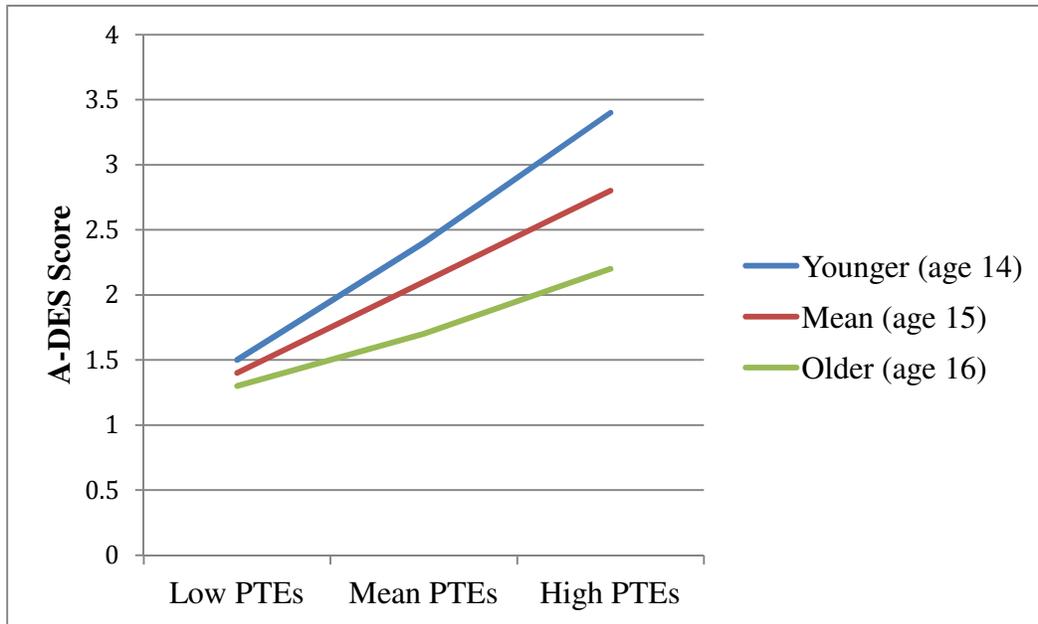


Figure 7

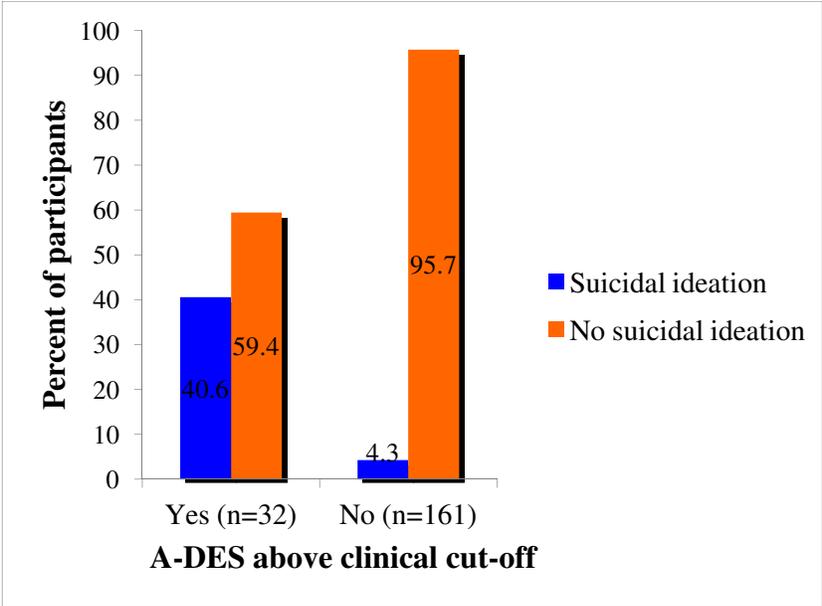
*The Moderating Effect of Adolescent Age on the Association between Lifetime Exposure to PTEs and Dissociative Symptoms, Controlling for Section 8 Housing and PTSD Symptoms*



*Notes.* “Low PTEs” refers to lifetime PTE exposure at one standard deviation below the mean level of PTE exposure, while “High PTEs” are one standard deviation above the mean level of PTE exposure. “Age 14” refers to one standard deviation below the mean age (i.e., 14.34), “Age 15” to the mean age of 15.40, and “Age 16” to one standard deviation above the mean age (i.e., age 16.46).

Figure 8

*Percent of Participants Reporting Suicidal Ideation, Depending on Level of Dissociation*



*Note.* Armstrong and colleagues' (1997) recommended average A-DES clinical cut-off score of 3.7 was used.

Figure 9

*Parallel Meditational Pathways from Past Year PTEs to Suicidal Ideation through Dissociation and Depressive Symptoms*

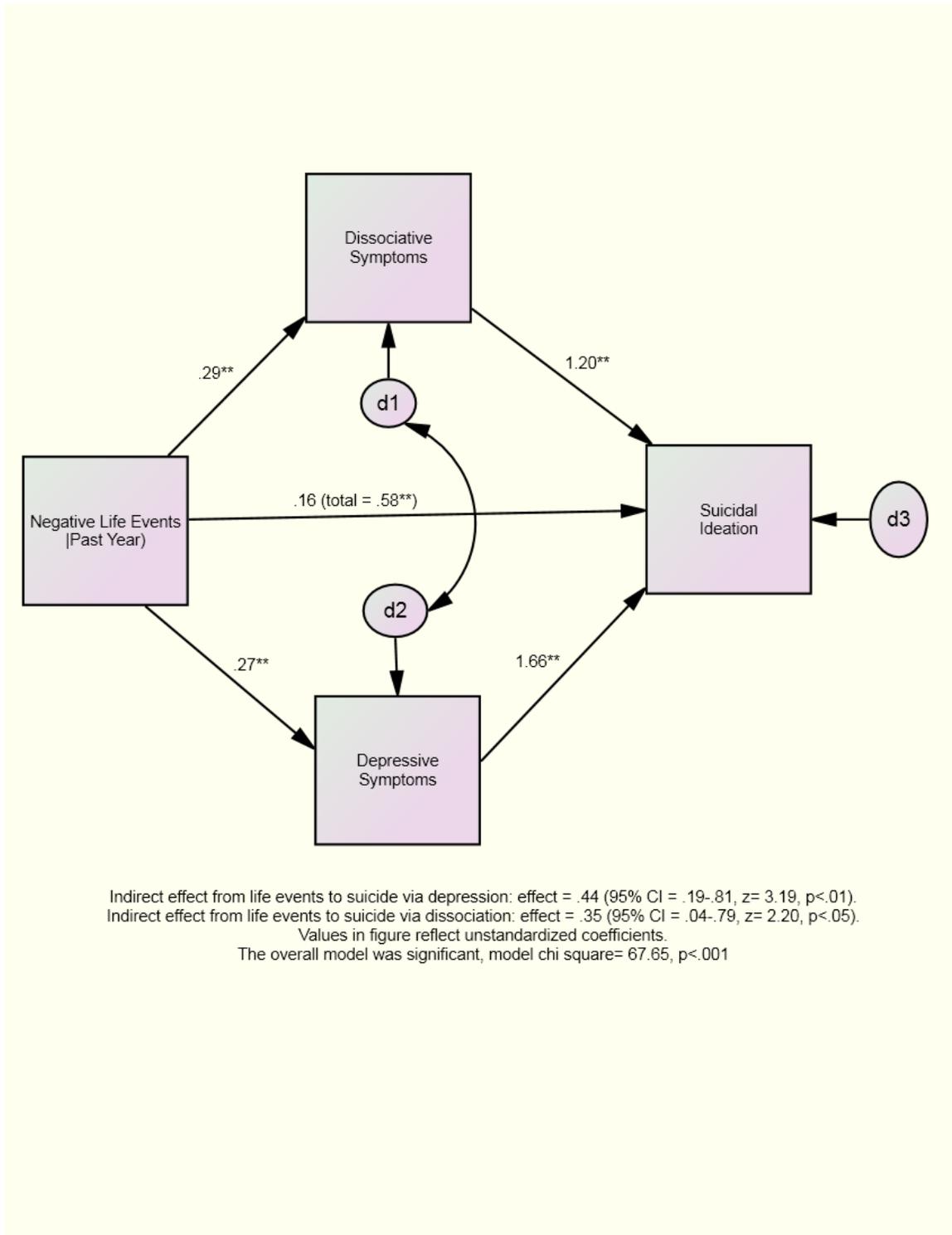
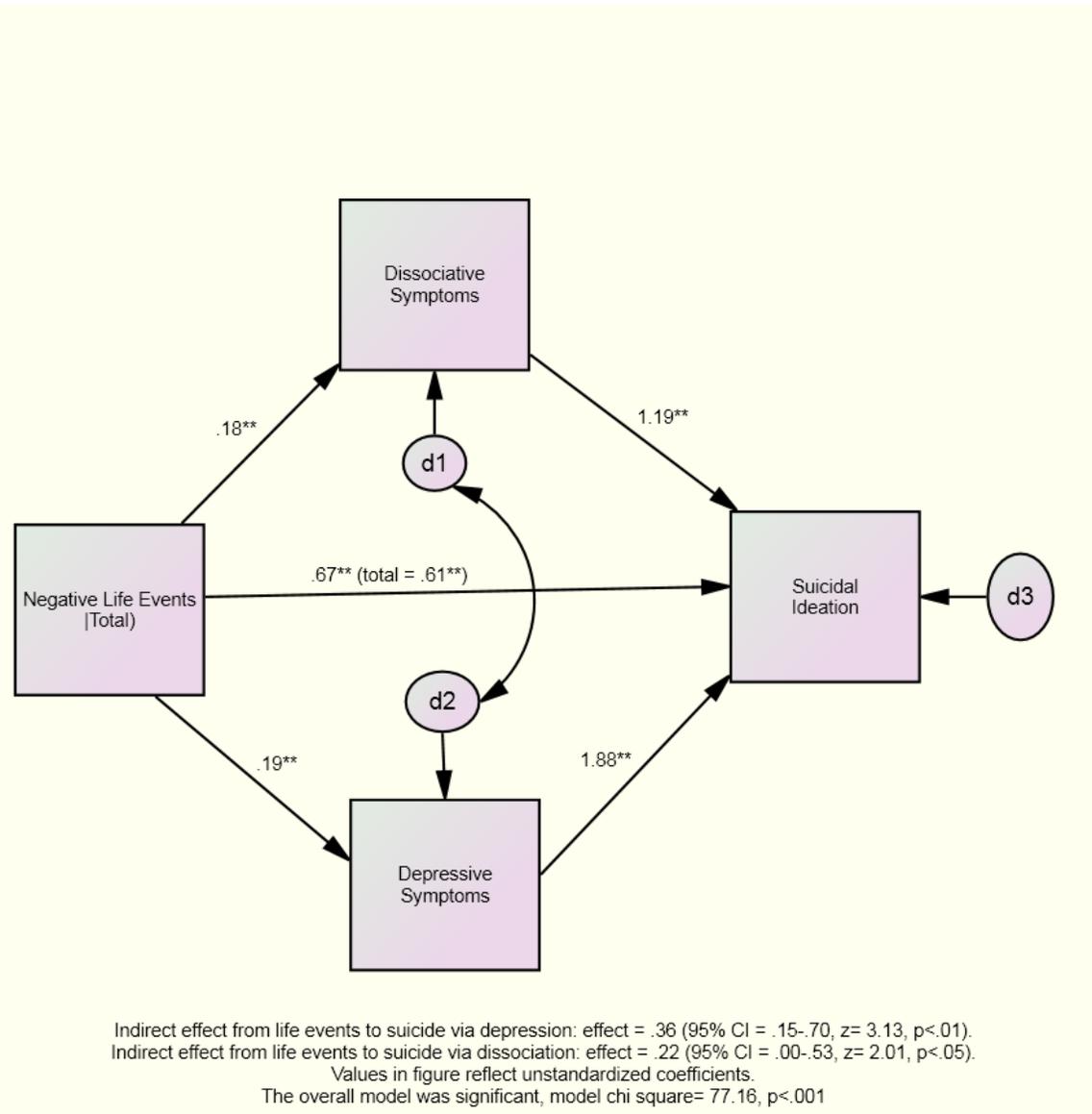


Figure 10

*Parallel Meditational Pathways from Lifetime PTEs to Suicidal Ideation through Dissociation and Depressive Symptoms*



## Measures

*Adolescent Dissociative Experiences Scale (A-DES; Armstrong, Carlson, & Putnam, 1997)*

Directions: The next questions ask about different kinds of experiences that happen to people. For each question, rate how often each experience happens to you. Choose 0 if it never happens and 10 if it is always happening. If it happens sometimes, choose a number between 1 and 9 that best describes how often it happens to you.

1. I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me.
2. I get back tests or homework that I don't remember doing.
3. I have strong feelings that don't seem like they are mine.
4. I can do something really well one time and then I can't do it at all another time.
5. People tell me I do or say things that I don't remember doing or saying.
6. I feel like I am in a fog or spaced out and things around me seem unreal.
7. I get confused about whether I have done something or only thought about doing it.
8. I look at the clock and realize that time has gone by and I can't remember what has happened.
9. I hear voices in my head that are not mine.
10. When I am somewhere that I don't want to be, I can go away in my mind.
11. I am so good at lying and acting that I believe it myself.
12. I catch myself "waking up" in the middle of doing something.
13. I don't recognize myself in the mirror.
14. I find myself going somewhere or doing something and I don't know why.
15. I find myself someplace and I don't remember how I got there.
16. I have thoughts that don't really seem to belong to me.
17. I find that I can make physical pain go away.
18. I can't figure out if things really happened or if I only dreamed or thought about them.
19. I find myself doing something that I know is wrong, even when I really don't want to do it.
20. People tell me that I sometimes act so differently that I seem like a different person.
21. It feels like there are walls inside of my mind.
22. I find writings, drawings or letters that I must have done but I can't remember doing.
23. Something inside of me seems to make me do things that I don't want to do.
24. I find that I can't tell whether I am just remembering something or if it is actually happening to me.
25. I find myself standing outside of my body, watching myself as if I were another person.
26. My relationships with my family and friends change suddenly and I don't know why.
27. I feel like my past is a puzzle and some of the pieces are missing.
28. I get so wrapped up in my toys or stuffed animals that they seem alive.
29. I feel like there are different people inside of me.
30. My body feels as if it doesn't belong to me.

*Adapted A-DES Items Administered to Mothers for Observer Report*

Directions: The next questions ask about different kinds of ways adolescents sometimes act. For each question, indicate how often your daughter acts this way, where 0 means never and 10 means all the time.

1. She gets so wrapped up in watching TV, reading, or playing a video game that she doesn't have any idea what's going on around her.
2. She can do something really well one time and then she can't do it at all another time.
3. She does or says things that she doesn't seem to remember doing or saying.
4. She is good at lying and acts as though she believes it herself.
5. She sometimes acts so differently that she seems like a different person.
6. Her relationships with family and friends change suddenly.
7. She gets so wrapped up in her toys or stuffed animals, as if they are alive.

*Abbreviated A-DES Items Administered to Adolescents during Follow-Up Phone Interview*

Directions: The next questions ask about different kinds of experiences that happen to people. For each question, rate how often each experience happens to you. Choose 0 if it never happens and 10 if it is always happening. If it happens sometimes, choose a number between 1 and 9 that best describes how often it happens to you.

1. I feel like I'm in a fog or spaced out and things around me seem unreal.
2. I hear voices in my head that are not mine.
3. I find myself someplace and don't remember how I got there.
4. I find that I can make physical pain go away.
5. People tell me that I sometimes act so differently that I seem like a different person.
6. I find writings, drawings or letters that I must have done but I can't remember doing.
7. I find myself standing outside of my body, watching myself as if I were another person.
8. My body feels as if it doesn't belong to me.
9. I get so wrapped up in watching TV, reading, or playing a videogame that I don't have any idea what's going on around me.
10. I can do something really well one time and then I can't do it at all another time.
11. People tell me I do or say things that I don't remember doing or saying.
12. I am good at lying and acting that I believe it myself.
13. My relationships with family and friends change suddenly and I don't know why.
14. I get so wrapped up in my toys or stuffed animals that they seem alive.

*Exposure to Potentially Traumatizing Events (PTEs)*

Directions: The following is a list of events that some people experience. For each event, please tell us if this has ever happened to you.

1. Were you ever involved in a serious fire, earthquake, flood, or other disaster?
2. Were you ever involved in a serious accident (like a car accident, or a very bad fall)?
3. Have you ever seen someone else hit or beaten up?
4. Have you ever seen a kid get hit or beaten up at school or in the neighborhood?
5. Have you ever been slapped, hit, or beaten up?
6. Have you ever seen someone else get seriously injured or killed?
7. Have you ever seen someone in your family get physically attacked, assaulted, stabbed, or shot at?
8. Has someone you were close to (family, close friend, boyfriend) ever been badly hurt or killed (whether you saw it or not)?
9. Have you ever seen your parents (or stepparents or parents' girlfriend or boyfriend) get in a really bad fight with each other?

*Note.* If an adolescent responded that an event had ever happened to her, she was then asked: Did this happen to you in the last year?

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