EMOTION DYSREGULATION AND TENSION-REDUCING BEHAVIORS IN COLLEGE STUDENTS WITH A HISTORY OF CHILD MALTREATMENT

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Survivors of child maltreatment report higher levels of certain maladaptive behaviors such as deliberate self-harm, bulimic behavior, maladaptive sexual behavior, substance use, and aggression. A functional approach to viewing these behaviors suggests that they serve a purpose; this purpose may be to reduce emotional distress. Maltreatment may impede the development of effective strategies for regulating emotions and without effective internal resources survivors may look to external methods (i.e., tension-reducing behaviors) to cope with emotions. Two hypotheses were examined: (1) maltreatment is linked to tension-reducing behaviors through the intermediary effects of emotion dysregulation; (2) emotion dysregulation predicts tension-reducing behaviors regardless of maltreatment history. Self-report questionnaires assessed all variables in 523 undergraduates. Structural modeling was used to test the proposed relationships. Results indicated a significant relationship between emotional maltreatment and three tension-reducing behaviors (bulimic, aggressive, and sexual behavior) when emotion dysregulation was present, but not a mediational relationship. Further, emotion dysregulation predicted three tension-reducing behaviors regardless of maltreatment history.
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Introduction

Unfortunately, child maltreatment is not an uncommon experience in our society. Child maltreatment includes all types of child abuse (sexual, physical, and emotional), as well as child neglect (including emotional, physical, medical, and educational neglect). Although the prevalence of one form of child maltreatment, sexual abuse, has been thought to be decreasing, the rates at which other forms of child maltreatment are reported to Child Protective Services (CPS) are continuing to increase (Stouthamer-Loeber, Loeber, Homish, & Wei, 2001). In 2002, the total number of reports made to the U.S. Department of Health and Human Services was more than 4.5 million, although not all of these reports were substantiated. It can be difficult to determine the actual prevalence of child maltreatment from CPS reporting rates, given that not all incidents of maltreatment are reported. However, a recent study of the prevalence of childhood maltreatment in a community sample of adults showed that the experience of childhood maltreatment is a frequent occurrence. The prevalence of any form of childhood maltreatment was over 30% for women and over 40% for men, with approximately 13% of women and men reporting the experience of multiple types of maltreatment (Scher, Forde, McQuaid, & Stein, 2004).

Psychological Effects of Child Maltreatment

Child maltreatment is disturbing because of the many short and long-term psychological problems with which it is associated. Research suggests that survivors of child maltreatment are at a greater risk for a number of long-term mental and physical health problems (Thompson, Arias, Basile & Desai, 2002). However, child maltreatment survivors display much variability in their psychological functioning. Some survivors report none or few symptoms, while others report complex assortments of psychological and interpersonal difficulties. Psychological problems that have been shown to occur more frequently in survivors of child maltreatment include depression, anxiety, posttraumatic stress symptoms, low self-esteem, increased risk for suicide attempts, impulse control problems, substance abuse, eating disorders, sexual maladjustment, self-mutilation, delinquency, and criminal behavior (Briere & Elliot, 2003; Briere & Runtz, 1990; Fondacaro, Holt, & Powell, 1999; Stouthamer-Loeber et al., 2001; van der Kolk, Perry, & Herman, 1991; Widom, 1999). Psychological symptoms and problematic behaviors, such as these, can have a serious negative impact on an individual’s quality of life even beyond childhood. A large national survey of 9,508 adults found evidence that the
experience of child maltreatment increased an adult’s risk for a number of activities that have serious health consequences (Felliti et al., 1998). These activities included smoking, severe obesity, alcoholism, and use of illicit drugs. The authors pointed out that when these harmful activities continue throughout the course of one’s life they may contribute to an individual’s early death.

The functional approach to viewing psychological difficulties suggests that all behavior, including maladaptive behavior, serves some purpose for the individual (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). An objective of the functional approach is to identify the ways in which psychological symptoms and behaviors assist individuals in coping with their environment. In this way, particular behaviors, which appear to be detrimental to the individual, may actually be helpful in certain contexts. For instance, behaviors such as aggression and substance use, although seemingly different and traditionally understood as aspects of separate disorders, may be functionally similar (Hayes et al., 1996). Researchers have suggested that several seemingly disparate behaviors such as aggression and substance use, termed tension-reducing behaviors (Briere & Runtz, 1993), may actually serve the function to gain control over and regulate the individual’s internal distress (van der Kolk, 1996; Briere & Runtz, 1993). For child maltreatment survivors, these seemingly maladaptive behaviors may actually be survival techniques developed to withstand and regulate the strong negative emotion associated with child abuse and neglect (Briere, 1996). The ability to regulate one’s emotions can be an important factor in the child maltreatment survivor’s future psychological and social functioning.

Attachment Theory and Emotion Regulation

Prior research on the development of emotion regulation in children has mainly focused on child-caregiver attachment bonds. The formation of the child’s attachment relationship is thought to parallel the development of other systems related to biological and emotional self-regulation. Several researchers believe that the child’s ability to self-regulate emotional systems is developed simultaneously during the process of attachment formation (e.g., Schore, 2003; Cassidy, 1994). It is through the secure attachment relationship with the caregiver that the child develops the capacity to regulate their physiological and emotional arousal (van der Kolk & Fisler, 1994). Neurobiological models of attachment also link the formation of a secure attachment with the development of self-regulatory capacities. In these models, both biological
and affective self-regulation has been linked to the development of a secure attachment in human and animal infants (Kraemer, 1992; Schore, 2003).

The development of a child’s ability to manage his or her emotions begins in infancy and relies heavily on the caregiver’s responsiveness to the child’s emotions (Fonagy, Gergely, Jurist, & Target, 2002). Children learn that emotions are manageable and they develop strategies for managing them through early interactions with their caregivers. Children learn through their caregiver’s mirroring of emotions that their emotions have a consistent effect on their environment. This may help the child feel more secure and stable within his or her environment. Children also learn strategies for accepting their emotional experience through the caregiver’s validation and responsiveness to the child’s emotions. Strategies for modulating emotions and self-soothing are often learned from the caregiver’s modeling of these behaviors (Thompson, Flood, & Lundquist, 1995). A responsive caregiver can often relieve a child’s distress; when this is impossible the caregiver can help the child learn to tolerate frustration, as well as develop ways to modulate this distress on his or her own (Keiley, 2002).

Children who are abused or neglected by caregivers often receive absent, inconsistent, or damaging care. The erratic care that the maltreated child often receives may impede the child’s ability to acquire and master emotional regulation strategies. In one study, 80% of children with a history of maltreatment demonstrated dysregulated emotion patterns compared with only 37.2% of nonmaltreated children (Maughan & Cicchetti, 2002). The increased levels of distress often present in the lives of children who experience child maltreatment may put the child at a further disadvantage for developing emotional regulation skills. Children who live in highly stressful environments may become overwhelmed by their constant arousal and fail to differentiate between different emotional states (Thompson et al., 1995). The heightened levels of distress in the lives of children who experience maltreatment combined with the fewer learned emotion regulation strategies may leave these children with few internal resources for coping with strong emotions (Cloitre, 1998).

While an insecure attachment style does not imply a psychological disorder, it does increase an individual’s vulnerability to developing a psychological or behavioral disorder. This is illustrated by the rare occurrence of individuals with secure attachment styles in clinical populations. In nonclinical populations, the percentage of securely attached individuals is typically about 65 percent (De Wolff & van IJzendoorn, 1997); a meta-analysis of thirty-three
studies found that only approximately 12-14% of those in clinical populations were described as being securely attached (van IJzendoorn & Bakermans-Kranenburg, 1996). A study by van der Kolk, Perry, and Herman (1991) found that attachment disruptions in childhood were associated with higher levels of disordered eating and suicide attempts in adulthood. The lack of a secure attachment style is often considered to be a correlate of emotion dysregulation, because the process of attachment formation is often considered to be the context in which emotion regulation skills are learned (Goldberg, 2000; Schore, 2003). The quality of the child-caregiver attachment relationship therefore has implications for the child’s ability to learn ways to manage emotion.

*Emotion Regulation*

Deficits in emotion regulation have been suggested to impact several psychological and behavioral patterns. However, the construct of emotion regulation has typically been difficult to define. Past research on the construct of emotion regulation and its correlates have primarily focused on the individual’s ability to contain or eliminate negative emotions (Catanzaro & Mearns, 1990). However, recent definitions of emotion regulation have become increasingly complex. Emotion regulation is no longer understood as only involving the process of suppressing or tolerating emotion. It is now understood that the ability to regulate one’s emotion is inextricably tied to monitoring, understanding, and experiencing that emotion (Denham, 1998). Gratz and Roemer (2004) conceptualize emotion regulation as consisting of four dynamics:

1. The awareness and understanding of emotions.
2. The acceptance of emotions.
3. The ability to control impulsive behaviors and behave in accordance with desired goals when experiencing negative emotions.
4. The ability to use situationally-appropriate emotion regulation strategies flexibly to modulate emotional responses as desired to meet individual goals and situational demands. (Gratz & Roemer, 2004, p. 44)

The recent development of a measure based on these four dynamics, the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) may allow researchers to address the complexities involved in studying emotion regulation. This more complex definition of emotion regulation may allow for more specific examinations of emotion dysregulation and its influence over a variety of emotional experiences.
The experience of dysregulated emotion includes escalating levels of negative emotion and the inability, due to lack of emotion regulation skills or expectations, to manage this heightened emotional experience. An over reliance on one method to regulate all types of emotional experiences or a failure to regulate emotions flexibly also may result in emotion dysregulation (Cole, Michel, & Teti, 1994). There has been some initial research demonstrating the implications of emotion dysregulation in clinical disorders including generalized anxiety disorder (Mennin, Heimberg, Turk, & Fresco, 2002), conduct disorder (Keiley, 2002), and borderline personality disorder (Linehan, Cochran, & Kehrer, 2001). However, the number of empirical studies has been limited.

*Tension-Reducing Behaviors*

It is possible that without many effective internal resources to cope with negative emotions, a child maltreatment survivor may look to external methods to reduce his or her internal distress (van der Kolk & Fisler, 1994). Using a functional perspective, behaviors such as aggression and substance use can be seen as “tension-reducing behaviors” or as external methods developed for relieving or avoiding internal distress (Briere & Runtz, 1993; Hayes, et al., 1996; Polusny & Follette, 1995). Other behaviors, such as acts of deliberate self-harm (i.e., self-injurious behavior), maladaptive sexual behavior, and symptoms of bulimia have also been suggested to operate as methods for alleviating internal distress (Briere & Runtz, 1993; van der Kolk, 1996). The heightened anxiety, depression, and posttraumatic symptoms associated with child maltreatment may be due in part to the survivor’s inability to regulate his or her emotional experience, whereas the maladaptive or self-destructive behaviors may be attempts to modulate those undesirable emotional experiences.

Not surprisingly, individuals with a history of child maltreatment have been shown to have a higher risk of engaging in many types of tension-reducing behaviors (Meston, Heiman, & Trapnell, 1999; Moran, Vuchinich, & Hall, 2004; Schoemaker, Smit, Bijl, & Vollebergh, 2002; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Weilderman, Sansone, & Sansone, 1999). Many scholars suggest that the dysregulated emotion related to maltreatment plays a role in the development or maintenance of tension-reducing behaviors (Briere, 1996; Polusny & Follette, 1995; van der Kolk, 1996). Maladaptive tension-reducing behaviors may develop as a means to survive strong negative emotions in childhood and then persist because of the individual’s failure
to learn other more appropriate emotion regulation strategies (Briere, 1996). However, these assumptions have been strictly theoretical to this point.

The present study examined five tension-reducing behaviors: the bingeing and purging behaviors of bulimia, deliberate self-harm behavior (i.e., self-injurious behavior), problematic substance use, maladaptive sexual behavior, and aggressive behavior. These proposed tension-reducing behaviors were chosen for study because of their association in previous empirical studies with childhood maltreatment and because it has been suggested that they function to relieve or avoid negative emotional experiences (Briere & Runtz, 1993; van der Kolk, 1996; van der Kolk and Fisler, 1994).

*Bulimic Symptoms*

Bulimia, as a disorder, consists of behaviors such as binge eating, feelings of being unable to control eating behavior, and using inappropriate methods to compensate for food intake (DSM-IV-TR; American Psychiatric Association, 2000). While bulimia as a disorder is relatively infrequent in nonclinical populations (1% in general female populations and .01% in general male populations; APA, 2000), subclinical forms of bulimia, in which individuals engage in some, but not all symptomatic behaviors or behaviors at a subclinical level, are fairly common. A study of college women reported that while only 3% of the sample was diagnosed with bulimia, another 63% engaged in bingeing, purging, or subthreshold levels of bulimic behavior (Mintz & Betz, 1988). The prevalence for bulimia is highest for females in their mid-teens and twenties with studies reporting the prevalence rate of bulimia to range from 4% to 8% for this population. The occurrence of subclinical levels of bulimia is also highest among young females (Rand & Kuldau, 1992; Hoek & van Hoeken, 2003). Additionally, college students often show higher rates of bulimia than their non-college student peers. Rand and Kuldau (1992) found that female college students reported significantly more bulimic behaviors than non-college student females of the same age. In fact, because of this increased rate of disordered eating in college populations, some researchers and clinicians suggest that all presenting clients at university counseling centers should be screened for eating disorder symptomatology (Hoyt & Ross, 2003). The majority of research on bulimia focuses on female populations because bulimia occurs much more frequently in females than males (Hoek & van Hoeken, 2003). However, the course and outcome of bulimia has been shown to be similar for males and females (Eliot & Baker, 2001).
The consistent finding of an increased rate of bulimic symptoms in survivors of childhood maltreatment, especially sexual and multiple types of abuse, has led researchers to look for a reason for this relationship (Connors & Morse, 1993). Schoemaker, Smit, Bijl, and Vollebergh (2002) found that a history of two or more forms of abuse (emotional neglect, psychological, physical, or sexual abuse) or psychological abuse alone was a significant risk factor for the later development of bulimia in a community sample. Leonard, Steiger, and Kao (2003) found that bulimic women reported significantly higher levels of childhood abuse than nonbulimic women.

One theory proposed for this relationship is that the act of bingeing and purging is motivated by the desire to escape from or modulate negative emotion (Heatherton & Baumeister, 1991; Root & Fallon, 1989). Bulimia is strongly associated with negative moods such as anxiety and depression. Evidence indicating that negative moods often precede binge episodes has led researchers to suggest that bulimic behavior may be used as a way to regulate emotion (Polivy & Herman, 1993). Researchers such as Briere (1993) and van der Kolk (1996) suggest that bulimic behaviors occur more often in child maltreatment and trauma survivors because this group uses bulimic behavior as a method to escape or regulate negative emotion related to distressing childhood maltreatment experiences.

**Deliberate Self-Harm**

Deliberate self-harm (i.e., self-injurious behavior) is defined as purposeful acts to harm one’s own body without the intention to commit suicide, but severe enough to cause tissue damage (Gratz, 2001; Kress, 2003). These behaviors include burning, punching, scratching or, most commonly, cutting oneself. Prevalence rates for deliberate self-harm in college populations have recently been shown to be unexpectedly high. While previous nonclinical community populations have revealed prevalence rates as low as 4% (Briere & Gil, 1998), other recent studies have shown the percentage of college students who have engaged in at least one form of deliberate self-harm to range from 35% to 41% (Gratz, 2001; Gratz, Conrad, & Roemer, 2002; Paivio & McCulloch, 2004). These variations in prevalence rates may be due to greater precision in the assessment of self-harm in the latter studies. Studies showing lower rates (e.g., 4%) of deliberate self-harm measured the construct with single items (Briere & Gil, 1998). Recent measures of deliberate self-harm ask specific behaviorally-based questions about a variety of self-harm behavior such as cutting, burning, or punching oneself, as well as interfering with
healing of wounds, biting and scratching oneself, using chemicals to burn skin, and carving marks into the skin (Gratz, 2001). The assessment of multiple forms of self-harm may be one explanation for higher prevalence rates in recent studies.

There have been mixed findings on gender differences in deliberate self-harm. Past research has suggested that females engage in deliberate self-harm at a much higher rate than males, although recent studies of non-clinical populations have shown deliberate self-harm to be equally prevalent in male and female populations (Briere & Gil, 1998; Gratz, 2001; Gratz, Conrad, & Roemer, 2002). However, it has been suggested that males and females may be engaging in different types of deliberate self-harm behavior and only recently has a variety of self-harm behavior been examined empirically (Bowen & John, 2001).

Several studies have reported that deliberate self-harm is engaged in more frequently by survivors of child maltreatment. While the link between deliberate self-harm behavior and child maltreatment is most often observed in clinical settings (van der Kolk, Perry, & Herman, 1991), there are also several studies of nonclinical populations in which this relationship is observed. For example, a study of community women reported that those women who described experiencing sexual or physical abuse as children were more likely to report having engaged in self-harm behavior (Weilderman, Sansone, & Sansone, 1999). Noll, Horowitz, Bonanno, Trickett, and Putnam (2003) found that women with a history of sexual abuse reported engaging in deliberate self-harm behavior and suicide attempts four times as often as those who had no history of sexual abuse. Briere and Gil (1998) reported that child abuse, especially child sexual abuse, was associated with deliberate self-harm behavior in clinical and nonclinical populations. Gratz, Conrad, and Roemer (2002) reported childhood experiences of separation, emotional neglect, and sexual abuse to significantly predict deliberate self-harm behavior in college students. While not all individuals who experience childhood trauma or maltreatment engage in deliberate self-harm behavior, a majority of inpatients who do engage in deliberate self-harm have trauma or maltreatment in their past (van der Kolk, Perry, & Herman, 1991).

Deliberate self-harm behavior has been suggested to be a tension-reducing behavior used to relieve intolerable internal distress (Briere & Runtz, 1993; van der Kolk, 1996; Yates, 2004). Reasons frequently reported by individuals for engaging in self-harm behavior, such as releasing tension, discharging anger, self-soothing, and relieving anguish lend support for this theory (Yates, 2004). One study provided further support this theory by showing that specific deficits in
emotion regulation (i.e., identifying and labeling emotional experience) mediated the relationship between child maltreatment and deliberate self-harm in college women (Paivio & McCulloch, 2004).

**Problematic Substance Use**

Rates of substance use in college populations, especially alcohol use, have been shown to be at a high level. College students generally report higher frequencies of alcohol use than same age peers who do not attend college (Clements, 1999; O’Malley & Johnston, 2002). A review of five large scale national surveys found that on average approximately 40% of college students are classified as binge drinkers, which is defined as having five or more drinks in a row for men and four or more drinks in a row for women at least once during a two week period (O’Malley & Johnston, 2002). Male college students typically report higher frequencies of alcohol use and more frequent episodes of binge drinking than female students (Clements, 1999). Additionally, recent marijuana use was reported by approximately 20% of college students and cocaine use by approximately 2% of college students (O’Malley & Johnston, 2002). These high rates of substance use can be problematic because heavy use of alcohol and drugs increases the risk for later substance abuse and dependence diagnoses, as well as increases risk for fatal accidents and death (Ham & Hope, 2003).

While all types of illegal drug use is typically considered problematic, problematic alcohol use is generally defined by heavy alcohol use, such as binge drinking, as well as by the experience of negative consequences due to drinking alcohol (Ham & Hope, 2003). Problematic drug and alcohol use later in life has consistently been associated with a history of childhood maltreatment (Downs & Harrison, 1998). For example, a prospective study found that women who had substantiated experiences of physical abuse, sexual abuse, or neglect as children were at an increased risk for the diagnosis of drug and alcohol abuse (Widom & White, 1997) and reported an increased amount of non-clinical levels of alcohol abuse symptoms when followed twenty years after the maltreatment experience (Schuck & Widom, 2001). Moran, Vuchinich, and Hall (2004) reported that adolescents in a community sample with a history of one of four types of childhood maltreatment (emotional abuse, sexual abuse, physical abuse, or combined sexual and physical abuse) had significantly increased levels of drug and alcohol use.

Drug and alcohol use has been widely accepted to be a mechanism used by some for reducing internal distress. It has been proposed that these substances are used by child
maltreatment survivors to regulate negative affect by numbing or distracting the survivor from his or her emotional experience (van der Kolk, 1996; Briere & Runtz, 1993). The self-medication hypothesis of substance abuse (Khantzian, 1985) suggests that specific substances are chosen by those with painful or negative emotion in order to help them cope more easily with these affective states. One study, which found that a significant number of people are motivated to drink alcohol in order to regulate emotion, provides support for this theory (Cooper, Frone, Russell, & Mudar, 1995). Additionally, Epstein, Saunders, Kilpatrick, and Resnick (1998) reported that PTSD symptoms mediated the relationship between childhood rape and adult alcohol abuse symptoms in a sample of community women, providing further evidence that alcohol use may follow emotional distress as a coping strategy by the abuse survivor.

**Maladaptive Sexual Behavior**

Difficulties with sexuality in adulthood have also been associated with a history of childhood maltreatment. For the purpose of this study, both risky sexual behavior (e.g., nonuse of contraceptives, indiscriminate sexual behavior) and dysfunctional sexual behavior (e.g., concern or dissatisfaction with sex, using sex to meet nonsexual needs; Briere, 1995) will be considered. The association between childhood maltreatment and adult maladaptive sexual behavior has been shown to be especially strong for those with a history of child sexual abuse, whereas other types of abuse and neglect have received mixed support. For example, Noll, Trickett, and Putnam (2003) found that community women with a history of sexual abuse reported more preoccupation with sex, a younger age at first consensual intercourse, and were more likely to be teenage mothers. In a study of college women, Briere and Runtz (1990) reported a statistically significant unique relationship between child sexual abuse and adult dysfunctional sexual behavior. One study of college men and women examined the association between four types of child maltreatment, sexual abuse, physical abuse, emotional abuse, and neglect, with several variables related to adult sexuality (Meston, Heiman, & Trapnell, 1999). This study found that for women only, childhood sexual abuse, independent of all other types of abuse, was positively associated with variables related to adult sexuality, such as reported sexual drive, frequency of intercourse, more liberal sexual attitudes, and likelihood of engaging in unrestricted sexual behavior.

However, there have been findings linking other types of childhood abuse and adult maladaptive sexual behavior. A study of community women found that women with a history of
child sexual abuse or child sexual and physical abuse combined described more negative affect during sexual arousal and reported a greater number of lifetime consensual intercourse partners (Schloredt & Heiman, 2003). Meston, Heiman, and Trapnell (1999) found that for male college students only emotional abuse, independent of all other types of abuse, was significantly related to sexual dissatisfaction.

The Meston et al. (1999) study also highlights the fact that gender may influence subsequent sexual behavior of the child maltreatment survivor. A review of male sexual abuse survivors reported few studies examining gender differences in adult sexuality after child sexual abuse. However, it is believed that, in general, males may be more likely to experience sexual identity confusion (Hunter, 1991), and that fewer male than female child sexual abuse survivors exhibit maladaptive sexual behavior in adulthood (Dhaliwal, Gauzas, Antoniwicz, & Ross, 1996). Because the literature on maladaptive sexual behavior has been mostly confined to research on its association with child sexual abuse, the present study will seek to clarify the association between other forms of child maltreatment (e.g., psychological abuse, physical abuse, and neglect) with maladaptive sexual behavior.

**Aggressive Behavior**

Aggression or aggressive behavior has also been associated with childhood maltreatment. Aggressive behavior in adulthood has been most often linked with an individual’s history of childhood physical abuse (Malinosky-Rummel & Hansen, 1993). Briere and Runtz (1990) reported that among college women, a history of childhood physical abuse was specifically related to aggression toward others. A study of male and female college students found similar results; college men and women who were physically abused as children exhibited more aggressive tendencies (Graybill, Mackie, & House, 1985). In a community sample of men and women, it was reported that childhood exposure to physically abusive or harsh treatment increased the risk of involvement in violent behavior in adulthood (Fergusson & Lynskey, 1997).

However, there is also evidence that an increased risk of involvement in aggressive behavior is linked with childhood sexual abuse and childhood neglect. Siegel (2000) reported that community women who were sexually abused as children had an increased likelihood of fighting with others during their adolescence and adulthood. A study of community men reported that victims of child maltreatment (most common types of abuse reported were failure to provide/neglect 41.8%, physical abuse 38.2%, and emotional maltreatment 32.8%) had a higher
prevalence of disruptive or delinquent behavior. Specifically, the maltreated men were more likely to engage in minor aggression, physical fighting, and violence (Stouthamer-Loeber, Loeber, Homish, & Wei, 2001). In addition, Widom and White (1997) reported that adults who were sexually or physically abused or neglected as children were more likely to be arrested for non-violent and violent crimes.

Although there are fewer studies on aggression as a tension-reducing behavior, it has been speculated that aggressive behaviors can be used to regulate negative emotion. The more frequent occurrence of aggressive behavior in survivors of child abuse and neglect suggests that such behavior may be functional to the individual in some way (Hayes et al., 1996; van der Kolk, 1996). It has been proposed that engaging in aggressive acts may help to externalize and act out the chronically distressful states which may disturb child maltreatment survivors (Briere, 1996).

It is well accepted that males are on average more aggressive than females and this typically holds true in studies of aggressive behavior after child maltreatment. Some researchers believe this is due to the social acceptance of certain emotions and behaviors for each gender. Males survivors of child abuse or trauma are more likely to report anger and less likely to report fear than female survivors (Briere, 1996; Lisak, 1995).

**Current Study**

The purpose of the current study was to empirically examine the role of emotion dysregulation in the engagement of five specific maladaptive tension-reducing behaviors: the bingeing and purging behavior of bulimia, self-harm behavior, problematic substance use, maladaptive sexual behavior, and aggression by child maltreatment survivors. These specific behaviors were chosen because of the increased frequency with which they have been associated with child maltreatment in previous literature, as well as the proposed theory that each behavior may actually function to regulate emotion (Briere & Runtz, 1993; Hayes, et al., 1996). It was suggested that because individuals with dysregulated emotion may not have adequate skills for emotion regulation, they may rely on these less adequate strategies for regulating emotion. Although each of these suggested tension-reducing behaviors are topographically different, it was proposed that the underlying mechanism for engaging in these behaviors is the same: emotion regulation.
Hypotheses

The primary hypothesis of the study was that emotion dysregulation mediates the relationship between a reported history of childhood maltreatment and the engagement in tension-reducing behaviors in adulthood. Although some previous studies have found abuse-specific effects (e.g., sexual behavior linked primarily to child sexual abuse), it was expected that multiple forms of child maltreatment are linked to tension-reducing behaviors because of the intermediary effects of emotion dysregulation regardless of the type of abuse. It was also expected that child maltreatment would be positively correlated with emotion dysregulation, which in turn, would be positively correlated with the occurrence of tension-reducing behaviors. Because types of maltreatment frequently overlap (Higgins & McCabe, 2001), the original proposed model included all types of abuse and neglect which were collapsed into one construct of child maltreatment. The construct of child maltreatment included child sexual abuse, child physical abuse, child emotional abuse, and child emotional neglect and child physical neglect. Further, the proposed hypothesis that emotion regulation mediates the relationship between child maltreatment and tension-reducing behaviors suggests that type of maltreatment is less important. As long as the maltreatment experience resulted in dysregulated emotion, it was expected that the survivor would engage more frequently in tension-reducing behavior regardless of type of abuse experienced. However, given that past research has reported greater or lesser psychological distress based on type of maltreatment (for example, Gauthier, Stollak, Messe, & Aronoff, 1996) each type of child maltreatment was also examined separately in relation to emotion dysregulation and tension-reducing behavior.

Although the major theory tested was the assumption that the link between child maltreatment and tension-reducing behavior is mediated by emotion dysregulation, it was also hypothesized that the link between emotion dysregulation and tension-reducing behavior would exist regardless of child maltreatment history.

Method

Participants

Participants included 523 female (64%, n = 337) and male (36%, n = 186) undergraduate students between the ages of 18 and 28 recruited from a midsized public university in the Midwest. They received introductory psychology course credit for their participation. The total sample (N = 523) was randomly divided into two halves in order to conduct analyses on two
independent population samples. Initial hypothesis testing and exploratory analyses were conducted on Sample 1 (n = 257) and these results were confirmed on Sample 2 (n = 265). Demographic characteristics of both samples are presented in Table 1. Analyses indicated that there were no significant differences between the two samples on any demographic characteristics. The total sample (N = 523) was comprised of mostly of Caucasian students (92.7%) in their first (56.7%) or second years (26.9%). The average family income reported by participants was between $75-85,000. The average age of participants was 19.08 (SD = 1.61) and the majority of participants (98%) had never been married.

Measures

*The Aggression Questionnaire (AQ)*. The AQ (Buss & Perry, 1992) is a 29-item self-report measure of aggression. Each item is rated on a 5-point Likert scale ranging from items that are least to most characteristic of the respondent. The AQ consists of four scales which have been shown to relate to a subtrait of aggression: Physical Aggression, Verbal Aggression, Anger, and Hostility. Responses for each scale are summed, with higher scores indicating higher levels of each component of aggression. The total aggression score is calculated from the summed scale scores. The scale scores and total aggression score have shown adequate test-retest reliability over a nine week period (.72 to .80) and adequate internal consistency alphas ranging from .72 to .85 for scales and .89 for the total aggression score (Buss & Perry, 2002; Suris et al., 2004). The AQ has been widely used among college student samples. In the current study, the total aggression score’s internal consistency alphas were of .90 for Sample 1 and .92 for Sample 2.

*The Bulimia Test - Revised (BULIT-R)*. The BULIT-R (Thelan, Farmer, Wonderlich, & Smith, 1991) is a 28-item self-report measure of bulimia and bulimic symptomatology based on DSM-IV criteria. Respondents indicate the degree to which they engage in bulimic beliefs (e.g., “I feel tormented by the idea that I am fat or might gain weight”) and behaviors (e.g., “I eat a lot of food when I’m not even hungry”). Item responses are summed to create a total score of bulimic symptomatology. The BULIT-R is widely used and normed in nonclinical college populations and has high internal reliability, ranging from .97 to .98, and good test-retest reliability at .95 over a two-month period (Thelan et al., 1991; Thelan, Mintz, & Vander Wal, 1996). In the current study, the total score had an internal consistency alpha of .93 for Sample 1 and .93 for Sample 2.
Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item retrospective self-report questionnaire consisting of five scales which measure five different types of negative childhood experiences: emotional neglect, emotional abuse, physical neglect, physical abuse, and sexual abuse. Each type of experience is assessed using five items in which the respondents rate the truth of a statement (e.g., “I didn’t have enough to eat”) on a 1 to 5 scale ranging from “Never True” to “Very Often True”. Responses from each scale are then summed producing scores that range from 5 to 25 for each scale, with higher scores indicating a greater severity of abuse or neglect. The CTQ has demonstrated reliability and validity, illustrated by convergent validity with clinician and therapist interview ratings of abuse, test-retest reliability coefficients ranging from .79 to .86 and internal consistency reliability coefficients ranging from .66 to .92 across a variety of samples including college students (Bernstein & Fink, 1998; Wright et al., 2001). In the current study, internal consistency alphas for each subscale were as follows: Sexual abuse: Sample 1 = .97, Sample 2 = .95, physical abuse: Sample 1 = .72, Sample 2 = .72, physical neglect: Sample 1 = .45, Sample 2 = .69, emotional abuse: Sample 1 = .81, Sample 2 = .86, and emotional neglect: Sample 1 = .86, Sample 2 = .88.

Cognitive Appraisal of Risky Events - Revised (CARE-R). The CARE-R (Katz, Fromme, & D’Amico, 2000) measures respondent’s perceived likelihood of negative and positive consequences of a variety of risky activities. The respondents’ actual involvement in risk-taking behaviors such as heavy drinking, illicit drug use, and risky sexual behavior is also assessed. Respondents complete three ratings of each behavior, Positive Consequences, Negative Consequences and Actual Involvement. For purposes of this study, scores from the Actual Involvement scale will be used to reflect engagement in problematic drug use, with higher scores reflecting greater involvement. In the current study, the internal consistency alpha for actual involvement was .67 for drug use in Sample 1 and .47 in Sample 2.

Deliberate Self-Harm Inventory (DSHI). The DSHI (Gratz, 2001) is a 17-item, self-report, behaviorally based measure of deliberate self-harm behavior. Deliberate self-harm behavior is defined as purposeful acts to harm one’s own body without the intention to commit suicide, but severe enough to cause tissue damage. Respondents were asked whether they engage in 17 specific types of self-harm behavior, the estimated frequency of the behavior, and the most recent time in which they engaged in the behavior. Participants’ responses to each frequency question will be summed to create a continuous variable indicating the total frequency of self-
harm behavior. The DSHI has demonstrated high internal consistency ($\alpha = .82$), adequate test-retest reliability, and adequate construct, convergent, and discriminant validity (Gratz, 2001). In the current study, the internal consistency alpha for the total frequency of self-harm behavior was .43 for Sample 1 and .42 for Sample 2; while the internal consistency alpha for the categorical self-harm variable was .65 for Sample 1 and .75 for Sample 2. The current study used the total frequency of self-harm behavior variable.

*Difficulties in Emotion Regulation Scale (DERS).* The DERS (Gratz & Roemer, 2004) is a 36-item self-report measure developed to assess clinically-relevant difficulties in emotion regulation. Participants are asked to indicate how often the statements apply to themselves using a five-point frequency scale. The DERS reflects difficulties within four dimensions of emotion regulation: awareness and understanding of emotions, acceptance of emotions, ability to engage in goal-directed behavior and refrain from impulsive behavior when experiencing negative emotions, and access to flexible emotional regulation strategies perceived as effective. The DERS is coded so that higher scores indicate greater difficulty in emotion regulation. A total score comprised of the four factors will be used to determine the total amount of emotion dysregulation reported. The DERS has demonstrated high internal consistency with alphas ranging from .80 to .89, good test-retest reliability, and adequate construct and predictive validity. In the current study, the internal consistency alpha of the total score was .85 for Sample 1 and .82 for Sample 2.

*Drinking Behavior Questionnaire (DBQ).* The DBQ consists of 5 questions designed by the author to measure the quantity and frequency of the respondents’ use of alcohol. Both “typical use” and “actual use in the past month” were measured. In order to remain consistent with the other questionnaires used in this study only the questions pertaining to “actual use in the past month” were included in the analyses. In the current study, the internal consistency alpha of the total score for actual alcohol use in the past month was .94 for Sample 1 and .92 for Sample 2.

*Generalized Expectancy for Negative Mood Regulation Scale (NMR).* The NMR (Catanzaro & Mearns, 1990) is the most widely used measure of emotion regulation. The NMR is a 30-item self-report questionnaire designed to measure respondents’ expectancies for the regulation of negative moods. A 5-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree” allows respondents to indicate the extent to which they believe that they will
be able to cope when they are upset. The NMR has acceptable internal consistency with alphas ranging from .86 to .92. The NMR has adequate construct and discriminant validity and test-retest reliability ($r = .78$ for women; $r = .67$ for men at six to eight weeks; Catanzaro & Mearns, 1990). Items are coded so that higher scores indicate greater expectancies for negative mood regulation and a total score is calculated. In the current study, the internal consistency alpha of the total NMR score was .65 for Sample 1 and .58 for Sample 2.

*Trauma Symptom Inventory (TSI).* The TSI (Briere, 1995) evaluates posttraumatic stress and other psychological effects of traumatic events. It consists of 100 items on a four-point frequency scale. The questionnaire includes ten clinical scales that measure trauma-related symptoms. For the purposes of this study, two scales were used: the Sexual Concerns (SC) and Dysfunctional Sexual Behavior (DSB) scales will be used to assess sexual difficulties that have been associated with maltreatment. The SC scale assesses distress concerning sex, such as unwanted thoughts or feelings about sex. The DSB scale assesses engaging in sexual behavior indiscriminately or to meet nonsexual needs. The TSI has demonstrated adequate reliability and validity (mean internal consistency alpha coefficients = .84 for college populations) with clinical and nonclinical populations (Briere, 1995). In the current study, the internal consistency alphas for the SC scale were .82 for Sample 1 and .83 for Sample 2, and for the DSB scale were .84 for Sample 1 and .83 for Sample 2.

**Procedure**

Self-report questionnaires were used to measure all constructs under examination. Questionnaires were counterbalanced in order to reduce order effects. Participants were informed in writing and verbally about their rights as research participants and the general purpose of the study. The participants were told that their information was completely anonymous and that they could choose to discontinue testing at any time. The consent form stated that there would be questions regarding potentially sensitive issues which may prove distressing to the participant. The participants were fully debriefed after the completion of the study and given contact information for the primary investigators and community resources to provide support should any of the questionnaires have caused them distress.

**Data Analyses**

Structural equation modeling (SEM) was used to examine the relationship between emotion dysregulation, child maltreatment, and engagement in tension-reducing behaviors. All
SEM analyses were conducted using Mplus software (Muthen & Muthen, 2001). The goodness-of-fit of the models were assessed using maximum likelihood estimation (MLE), as well as the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA).

A MLE chi-square test assesses the overall fit of the hypothesized model with the actual data. In this case, a p-value greater than .05 indicates that the model is consistent with the data and should be retained. However, the chi-square test is influenced by sample size and can incorrectly indicate a well fitting model in very large samples (Raykov & Marcoulides, 2000). Therefore, additional fit indices should also be consulted when assessing model fit (Browne & Cudeck, 1993).

The CFI and TLI are both alternative fit indices which contrast the fit of the hypothesized model to the fit of the null model. Both indices range from 0 to 1.0 with values of .9 and greater indicating acceptable fit and values of .95 and greater indicating well fitting models (Bentler, 1990). However, the TLI decreases with the addition of parameters and is therefore always more conservative than the CFI (Tanaka, 1993). The RMSEA is constrained by zero with values less than .05 indicating well fitting models and values greater than .10 indicating poor fitting models. The RMSEA includes a consideration of the hypothesized model’s complexity and is less sample dependent than other fit indices (Browne & Cudeck, 1993).

In the current study, the latent variables and structural composition of the full hypothesized model were tested first. This was done to test the exact hypothesized relationships between variables. Next measurement models of each latent structure were conducted to confirm the integrity of the model components. The next step was to test the theoretically driven structure of the model. At this point, the hypothesized model was not entirely consistent with the data, and so theoretically driven modifications were made to improve the model fit. Next, because modifications were made to the hypothesized model (to improve model fit to the data), then confirmatory analyses were needed to replicate the modified model in a separate dataset. For that reason in the current study, one-half of the entire dataset (Sample 1) was randomly selected and used for the initial exploratory analyses, while the other one-half of the dataset (Sample 2) was used only for replication in order to confirm the results of the initial analyses.
Results

Descriptive Analyses

For descriptive purposes, threshold scores for each type of abuse were calculated using the cut-off scores of Walker and colleagues (1999). These cut-off scores demonstrated accuracy at or above 85% when compared to independent clinical interviews. Those meeting these cut-off score for abuse or neglect have generally experienced moderate to severe maltreatment. Overall, 26.9% of participants in Sample 1 and 25.5% of participants in Sample 2 reported experiencing some type of child maltreatment (See Table 2). There were significant differences found between Sample 1 and Sample 2 for child sexual abuse, \( t(513) = 2.07, p = .04 \), and child physical neglect, \( t(515) = 2.17, p = .03 \), with participants from Sample 2 reporting higher levels of sexual abuse and physical neglect than Sample 1. All other types of child maltreatment were equivalent across samples.

Prevalence rates for the participants’ problematic engagement in the five proposed tension-reducing behaviors are presented in Table 3. All participants engaging in illegal drug use and deliberate self-harm were considered problematic. High frequency alcohol use indicated using alcohol two to three times a week or more often. Problematic rates of bulimic symptoms, aggressive behavior, sexual concerns, and dysfunctional sexual behavior indicated those participants scoring more than one standard deviation above the mean for each scale. Levels of engagement in the total combined sample for these behaviors ranged from 13.5% for dysfunctional sexual behavior to 46.1% for high frequency alcohol use. There were no significant differences found across the two samples for levels of engagement in the proposed tension-reducing behaviors.

Hypothesized Model

All subsequent analyses are conducted with Sample 1 unless specified as confirmatory analyses. The hypothesized model was tested using SEM. This original proposed model contained three latent variables: child maltreatment, emotion dysregulation, and tension-reducing behaviors (See Figure 1). The child maltreatment factor was measured by the CTQ (Bernstein & Fink, 1998) and proposed to consist of sexual abuse, physical abuse, emotional abuse, emotional neglect, and physical neglect. The latent construct of emotion dysregulation was proposed to be assessed by two measures: the DERS (Gratz & Roemer, 2004) which assesses difficulties in emotion regulation and the NMR (Catanzaro & Mears, 1990) which assesses mood regulation.
expectancies. The tension-reducing behavior construct was proposed to consist of bulimic symptoms (measured by the BULIT-R; Thelan et al., 1991), problematic substance use (measured by the DBQ and CARE-R; Katz, Fromme, & D’Amico, 2000), aggressive behavior (measured by the AQ; Buss & Perry, 1992), maladaptive sexual behavior (measured by the TSI; Briere, 1995), and deliberate self-harm behavior (measured by the DSHI; Gratz, 2001). This full initial model with all latent constructs measured at the item level was tested using SEM, but the model did not converge. Given this, bivariate correlations were computed on the model variables (See Table 4). Only variables significantly correlated at the bivariate level were included in the subsequent measurement models.

Measurement Models

In order to ensure that each component of the model was being assessed adequately, measurement models of each latent construct were examined. There were three latent variables in the proposed model: child maltreatment, emotion dysregulation, and tension-reducing behaviors. Only variables significantly correlated in the proposed direction were tested in this manner.

Child Maltreatment. The measurement model of the child maltreatment latent structure was tested first. Although all types of child maltreatment were significantly correlated with each other, sexual abuse, physical abuse, and physical neglect were not significantly correlated with emotion dysregulation and were therefore dropped from further analyses. The emotional neglect scale score ($M = 7.40, SD = 3.17$) and the emotional abuse scale score ($M = 7.13, SD = 3.04$) were significantly correlated ($r(243) = .677, p = .001$). Exploratory analyses revealed high factor loadings for child emotional neglect ($\lambda = .818$) and child emotional abuse ($\lambda = .786$) suggesting a latent structure. This factor was termed emotional maltreatment and was included as a latent construct in subsequent analyses.

Emotion Dysregulation. The emotion dysregulation construct was examined next. It was proposed that emotion dysregulation would be a latent construct measured by both difficulty in emotion regulation (measured by the DERS total score) and by a lack of expectancy to regulate negative mood states (measured by the NMR total score). The DERS total score ($M = 78.35, SD = 20.353$) and the NMR total score ($M = 73.30, SD = 16.07$) were significantly correlated ($r(232) = .696, p = .001$). Exploratory analyses revealed adequate factor loadings for the DERS ($\lambda = .820$) and the NMR ($\lambda = .444$) suggesting one latent structure. This factor was termed emotion dysregulation and included as a latent construct in the following analyses.
Tension-reducing Behaviors. Lastly, the proposed latent construct tension-reducing behaviors was examined. Cronbach’s alpha analyses indicated that the drug use ($\alpha = .667$) and alcohol use ($\alpha = .901$) variables should not be combined to form one factor of substance use ($\alpha = .252$) as was initially proposed. Therefore the two substance use variables were kept separate. Bivariate correlations indicated that drug use and alcohol use variables were not significantly correlated with emotion dysregulation or any forms of child maltreatment and therefore were dropped from further analyses. However, although the deliberate self-harm variable was significantly correlated with child emotional abuse, child emotional neglect, and emotion dysregulation it was not significantly correlated with any of the four other proposed tension-reducing behaviors. Given this, the deliberate self-harm variable was dropped from further analyses. Analyses indicated that the remaining proposed tension-reducing behaviors (aggression, bulimic symptoms, sexual concerns, dysfunctional sexual behavior) were significantly related to child emotional maltreatment, emotion dysregulation, and to each other, but they did not load onto one common factor.

Final Model

Given the findings from the measurement models, the final model included four tension-reducing behavior variables (aggression, bulimic symptoms, sexual concerns, and dysfunctional sexual behavior) predicted by the latent factor, emotional maltreatment, through the latent factor emotion dysregulation (See Figure 2). This model fit statistics were all excellent, $\chi^2 (255, 13) = 15.732, p = .264, CFI = .993, TLI = .986, RMSEA = .029$, suggesting a very good fit between the model and the data. This final model was retained and used in subsequent analyses to test the hypothesis that these emotional maltreatment and tension-reducing behaviors are related through the mediating effects of emotion dysregulation.

Mediational Analyses

The next step was to test the hypothesis that emotion dysregulation mediated the relationship between child maltreatment and tension-reducing behaviors. This was accomplished by testing separate SEM models in the three steps outlined by Baron and Kenny (1986) for determining mediation. The first step must establish that the independent variable (emotional maltreatment) has an effect on the proposed mediator variable (emotion dysregulation). The second step must establish that the mediator (emotion dysregulation) has an effect on the dependent variable (tension-reducing behavior). The third step must establish that the
independent variable (emotional maltreatment) has an effect on the dependent variable (tension-reducing behavior). The fourth, and final step, must establish that the proposed mediator variable (emotion dysregulation) accounts for the association between the independent variable (emotional maltreatment) and the dependent variable (tension-reducing behavior) when all three constructs are included in a model.

Mediational analyses were conducted using SEM. The first model tested the association between emotional maltreatment and emotion dysregulation. Results from this model indicated that emotional maltreatment was significantly related to emotion dysregulation ($\lambda = .410$). The model fit the data well, $\chi^2(255, 1) = .069$, $p = .793$, CFI = .999, TLI = .999, RMSEA = .001, indicating that emotional maltreatment significantly predicted emotion dysregulation. The second model tested the direct association between emotional maltreatment and the four tension-reducing behaviors. This model also fit the data well, $\chi^2(255, 3) = 2.732$, $p = .434$, CFI > .99, TLI > .99, RMSEA = .001. All of the paths were significant and in the expected direction indicating that emotion dysregulation significantly predicted four tension-reducing behaviors: aggression ($\lambda = .395$), bulimic symptoms ($\lambda = .316$), sexual concerns ($\lambda = .325$), and dysfunctional sexual behavior ($\lambda = .251$). The third model tested the direct association between child emotional maltreatment and the four proposed tension-reducing behaviors: aggression, bulimic symptoms, sexual concerns, and dysfunctional sexual behavior. The model appeared to fit the data adequately, $\chi^2(255, 4) = 10.334$, $p = .035$, CFI = .980, TLI = .923, RMSEA = .079. However, the direct paths from emotional maltreatment to bulimic symptoms ($\lambda = .126$), sexual concerns ($\lambda = .116$), and dysfunctional sexual behavior ($\lambda = .123$) were not significant; only the path from emotional maltreatment to aggression ($\lambda = .189$) was significant (see Figure 3).

Therefore, the third step of the process for establishing mediation was not demonstrated. This suggests that emotional maltreatment did not have a direct effect on three of the four proposed tension-reducing behaviors. These results indicate that mediation is not the best explanation for the relationship between child emotional maltreatment, emotional dysregulation, and the proposed tension-reducing behaviors. However, the exceptional fit of the aforementioned models suggest that there is a significant indirect relationship between the constructs.

Confirmatory Analyses

Since the final model (See Figure 2), which demonstrated that emotional maltreatment was indirectly linked with four tension-reducing behaviors (bulimic symptoms, aggression,
sexual concerns, and dysfunctional sexual behavior) when emotional dysregulation was present, underwent several respecifications which were driven by both theory and data analysis, it was necessary to replicate the goodness-of-fit of the final model on a separate sample. Therefore, goodness-of-fit statistics were computed for the final model on the other half of the randomly separated dataset (See Figure 4). Expectedly, the fit indices of the confirmatory analyses decreased to some extent (Raykov & Marcoulides, 2000); however, the final model fit the data adequately, \( \chi^2(269, 13) = 54.487, p = .0000, \) CFI = .928, TLI = .845, RMSEA = .109. However, not all parameter estimates were still significant. The emotion dysregulation parameter estimate for the NMR and the path leading from emotional maltreatment to the emotion dysregulation latent variable were no longer significant and in the expected direction. In this case, the NMR variable no longer loaded onto the emotion dysregulation factor (\( \lambda = -.007, \) ns). Additionally, the path from emotional maltreatment to emotion dysregulation was no longer significant. Results of the confirmatory analyses and the relatively lower factor loading of the NMR in the exploratory analyses (\( \lambda = .444 \)) suggests that the NMR may not fit with the current conceptualization of emotion dysregulation. It is possible that the NMR variable may be interfering with the fit of the model in both the exploratory and confirmatory analyses. Therefore, post hoc analyses were conducted in which the NMR variable was omitted from the model. These post hoc analyses were conducted on both datasets. However, the confirmatory analyses partially replicated the previously tested model structure and provided further support for the final model which demonstrated a significant indirect relationship between emotional maltreatment, emotion dysregulation, and the four proposed tension-reducing behavior variables: aggression, bulimic symptoms, sexual concerns, and dysfunctional sexual behavior.

**Post-Hoc Analyses**

Results of both the exploratory and confirmatory analyses suggested that the NMR may be interfering with the fit of the final model. Therefore, two additional SEM analyses were conducted to examine the goodness-of-fit of the model without the NMR variable. The first post-hoc SEM analysis was conducted with the exploratory sample. All variables in the final model were included, with the exception of the NMR variable, and the structure of the model remained unchanged (See Figure 5). Results indicated that the data fit this model well, \( \chi^2(255, 8) = 14.087, p = .0795, \) CFI = .984, TLI = .957, RMSEA = .055. All parameter estimates were significant and in the proposed directions.
Next, an identical model (the final model not including the NMR variable) was tested in the confirmatory sample. Results suggested that this model also fit the data well, $\chi^2(269, 8) = 30.584, p = .0002$, CFI = .959, TLI = .891, RMSEA = .102 (See Figure 6). All parameter estimates were significant and in the proposed directions. It appears that the hypothesized structure of the model is a better fit to both independent samples when the NMR variable is not included as a component of the emotional dysregulation latent variable.

Discussion

The purpose of the current study was to empirically examine the role of emotion dysregulation in the engagement of five tension-reducing behaviors (the bingeing and purging behavior of bulimia, deliberate self-harm behavior, problematic substance use, maladaptive sexual behavior, and aggression), which have been theorized to function as methods to help individuals avoid or alleviate distress. Many clinicians and scholars have suggested that these types of tension-reducing behaviors develop and are maintained as a means to allow the individual to survive strong negative emotions (Briere, 1996; Polusny & Follette, 1995; van der Kolk, 1996). Additionally, the current study focused on adult survivors of child maltreatment. Survivors of childhood maltreatment sometimes experience later psychological difficulties and higher levels of negative emotion than individuals who do not experience childhood maltreatment (Briere & Elliot, 2003; Fondacaro, Holt, & Powell, 1999; van der Kolk, Perry, & Herman, 1991). Furthermore, child maltreatment survivors often are not able to learn or practice emotion regulation skills (Thompson, Flood, & Lundquist, 1995). Therefore, child maltreatment survivors may experience both heightened distress and have fewer learned emotion regulation strategies. This could leave child maltreatment survivors more vulnerable to using external methods to regulate their emotion. Although Briere (1996) and others argue convincingly for the tension-reducing model, these ideas have been strictly theoretical to this point.

Several prior studies have examined the association between child maltreatment and the five abovementioned tension-reducing behaviors. For example, bulimia has been linked with emotional abuse and multiple types of child abuse (Schoemaker, Smit, Bijl, & Vollebergh, 2002), deliberate self-harm has been linked with sexual and physical abuse (Weilderman, Sansone, & Sansone, 1999), maladaptive sexual behavior has been linked with sexual abuse and multiple types of abuse (Schloredt & Heiman, 2003), aggression has been linked to general child maltreatment (Stouthamer-Loeber, Loeber, Homish, & Wei, 2001), and substance use has been
linked to all types of maltreatment (Moran, Vuchinich, & Hall, 2004). It has often been speculated that emotion dysregulation underlies these behaviors, although few studies have directly measured emotion regulation in relation to child maltreatment or tension-reducing behaviors. Therefore, the current study sought to: (1) empirically examine the composition of the constructs of child maltreatment, emotion dysregulation, and tension-reducing behaviors, (2) empirically examine the theoretical assumption that a link exists between emotion dysregulation and engagement in tension-reducing behaviors, and (3) more specifically, test the hypothesis that emotion dysregulation mediates the relationship between child maltreatment and engagement in tension-reducing behaviors.

**Child Maltreatment as a Latent Construct**

Because types of child maltreatment frequently overlap (Higgins & McCabe, 2001), the original proposed model included all types of abuse and neglect collapsed into one latent construct of child maltreatment. It was proposed that all types of maltreatment have the possibility of leading to dysregulated emotion and so all types should be included in the latent construct (see Figure 4). However, measurement models of the maltreatment construct indicated that emotional neglect and emotional abuse loaded onto one factor, while contrary to prediction, sexual abuse, physical abuse, and physical neglect variables did not load onto the same factor. Moreover, emotional abuse and neglect were the only two forms of child maltreatment significantly associated with emotion dysregulation and tension-reducing behaviors, whereas sexual abuse, physical abuse, and physical neglect were not (for correlations see Table 4). This suggests that emotional abuse and emotional neglect may share common characteristics and outcomes.

**Emotion Dysregulation as a Latent Construct**

The construct of emotion regulation appears to have evolved considerably in recent time. Most recent survey research of emotion regulation has used a definition which is more complex and includes the awareness and acceptance of emotion, as well as the ability to modulate emotional experiences. For this reason, the current study used two measures of emotion regulation which were hypothesized to load onto a common emotional dysregulation factor. The two measures appeared to focus on somewhat different but related aspects of emotion regulation. The NMR (Catanzaro & Mearns, 1990), the most widely used measure of emotion regulation, examined the expectancies that individuals have that they will be able to modulate their emotions
and cope with negative emotional experiences. The DERS (Gratz & Roemer, 2004) examined individuals’ awareness, understanding, and acceptance of emotions, as well as their ability to flexibly modulate negative emotional experiences.

In exploratory analyses these two measures loaded onto one latent factor suggesting that the concepts they measure were significantly related (See Figure 2). However, this latent structure was not replicated in the confirmatory analyses (See Figure 4). Confirmatory analyses indicated that the NMR no longer loaded onto one common factor with the DERS. Additionally, the confirmatory analyses indicated that the path from emotional maltreatment to emotion dysregulation was no longer significant. These results suggested that inclusion of the NMR in the analyses may have hindered the fit of the model, especially in the confirmatory analyses. Therefore, post-hoc SEM analyses were conducted on the final model with the NMR variable excluded from the emotion dysregulation factor (See Figures 5 and 6). These analyses indicated that the data from both the exploratory and confirmatory samples fit the new model well without the NMR variable. Further, the post-hoc SEM analyses conducted on the confirmatory sample found that the hypothesized path from child emotional maltreatment to emotional dysregulation was significant when the NMR variable was no longer included in the model.

These results suggest further that these two measures may be assessing considerably different aspects of emotion regulation. It appears that the NMR could be described more accurately as a measure of coping, as it focuses primarily on expectancies to contain or eliminate negative emotion. Coping with emotion may be an important element of regulating emotion, but may not embody the entire concept. The DERS appears to measure a more comprehensive definition of emotion regulation by assessing the ability to experience and understand emotions, as well as cope flexibly with them. Emotion dysregulation, as measured by the DERS, appears to more adequately illustrate the difficulties with emotion regulation that are consistent with both child maltreatment and tension-reducing behaviors as described in the current study.

*Tension-Reducing Behaviors as a Latent Construct*

A functional approach to classifying behavior examines the ways that seemingly disparate maladaptive behaviors may actually serve to help individuals cope with their environment (Hayes et al., 1996). Using this approach, it was hypothesized that although the five tension-reducing behaviors: bulimic symptoms, substance use, deliberate self-harm, maladaptive sexual behavior, and aggression, may appear topographically different, they are all functionally
similar. The hypothesized function of these behaviors was emotion regulation (Briere & Runtz, 1993). Therefore, it was proposed that all five of these behaviors would be significantly correlated with one another and emotion dysregulation. Bivariate correlations indicated that four variables met both of these criteria: bulimic symptoms, aggression, sexual concerns, and dysfunctional sexual behavior. While each of these behaviors has traditionally been viewed as components of separate disorders, results showed that all of them were significantly related to each other. Additionally, the significant correlations between each of these variables and emotion dysregulation suggest that their association may be due to their common relationship with dysregulated emotion.

Contrary to prediction, two proposed maladaptive behaviors, substance use and deliberate self-harm, were not found to fit onto the hypothesized tension-reducing behavior factor. It is possible that the high level of substance use, especially alcohol use, in the current sample may have affected the ability to detect differences amongst those who use substances. Nearly one-half (45.5%) of the participants reported using alcohol two to three times a week or more, and a substantial portion (36.9%) of the participants reported using illegal substances in the past six months. This may be a case of a ceiling effect or an issue involving restricted range of variance. Since most of the sample reported using substances at high levels it is difficult to discern those who may be using high levels of substances for emotion regulation purposes and those who are using substances for other reasons.

Furthermore, deliberate self-harm did not fit the model as hypothesized, but in a somewhat different manner than substance use. Deliberate self-harm was significantly associated with various forms of emotional maltreatment, as well as emotion dysregulation as measured by the DERS (Gratz & Roemer, 2004). However, deliberate self-harm was not significantly associated with the any of the other proposed tension-reducing behaviors (For bivariate correlations see Table 4). It may be that deliberate self-harm does function as a tension-reducing behavior, as the results suggest, but perhaps deliberate self-harm reduces emotional distress in a different manner than the other tension-reducing behaviors. It may be that deliberate self-harm is engaged in only by a certain subset of the population, or only when individuals experience certain emotions or certain levels of emotions. The current study suggests that deliberate self-harm is associated with emotional dysregulation, but that it is somehow dissimilar from the other
tension-reducing behaviors. Future research should further examine the differences and similarities between deliberate self-harm and other tension-reducing behaviors.

Next, it was proposed that each of the remaining tension-reducing behaviors would load onto one common latent factor. However, this was not the case. While most of the variables, besides bulimic symptoms and aggression, were significantly correlated with each other, results indicated that these variables did not form a latent structure. It may be that these behaviors are functionally similar and serve to assist in emotion regulation, as the bivariate correlations suggest, but that such behaviors may be used by different individuals or used in different situations. It may be that an individual who discovers an effective strategy for regulating his or her emotion may continue to use that one strategy exclusively, rather than use multiple tension-reducing behaviors interchangeably. Therefore, while the behaviors may have a common function they would not used by every individual indiscriminately and for that reason may not load onto one latent construct.

Hypotheses and Implications

It is a commonly accepted theory that individuals often engage in certain behaviors to modulate their emotional experiences. Tension-reducing behaviors are believed to be behaviors which are detrimental to the individual, but engaged in none-the-less, to improve the individual’s emotional experiences. Past descriptive studies have indicated that individuals who engage in tension-reducing behaviors, such as substance use and deliberate self-harm, often report the reason they engage in these behaviors is to regulate their emotions (Cooper, Frone, Russel, & Mudar, 1995; Nock & Prinstein, 2004), which also lends support to the tension-reduction model.

Generally, tension-reducing behaviors are often associated with emotional dysfunction or distress, but are typically thought of as symptoms of different psychological disorders. Although tension-reducing behaviors are often associated with child maltreatment or traumatic experiences (Briere & Runtz, 1993; van der Kolk, 1996), it is possible that higher levels of emotion dysregulation, regardless of child maltreatment status, would predict higher levels of engagement in tension-reducing behaviors. For these reasons, it was hypothesized that individuals’ engagement in tension-reducing behaviors would be associated with their level of emotion dysregulation, regardless of their history of child maltreatment.

Results of the current study support the hypothesis that emotional dysregulation significantly predicts engagement in three tension-reducing behaviors: aggression, bulimic
symptoms, and maladaptive sexual behavior. Only a few studies have examined aggression or sexual behavior as methods to regulate emotional experiences, while there have been a larger number of studies looking at this theory in relation to bulimic symptoms. Aggressive behavior has been proposed to act as a tension-reducing behavior by allowing individuals a way to externalize or act out negative and highly distressful emotional experiences (Briere, 1996; van der Kolk, 1996). Maladaptive sexual behavior has been linked with negative emotional states such as depression and dissociation (For a review see Becker, Rankin, & Rickel, 1998). Therefore, it has been suggested that sexual behavior may function to alleviate or help an individual avoid these negative emotional experiences (Briere, 1996; van der Kolk, 1996). Bulimic symptoms have been suggested to function to help individuals escape from or modify their negative moods (Baumeister, 1991; Root & Fallon, 1989). Bulimic behavior has been found to follow negative mood states which supports the theory that individuals engage in bulimic behavior to alleviate these negative moods (Polivy & Herman, 1993). The current study lends empirical support to the tension-reduction model. In the current study, each of these tension-reducing behaviors was predicted by emotion dysregulation. These three behaviors may allow individuals to avoid their negative emotional states or may function by improving their mood directly.

These results provide significant empirical evidence for the often presupposed theory that individuals use these maladaptive external behaviors to modulate emotional experiences (Briere & Runtz, 1993; Polusny & Follette, 1995; van der Kolk, 1996). The current study was not able to specifically determine the causal connection between emotion dysregulation and these three tension-reducing behaviors (bulimic symptoms, aggression, and maladaptive sexual behavior). However, results suggest that high levels of emotion dysregulation predict engagement in the three tension-reducing behaviors. Therefore, individuals with less awareness, understanding, and flexibility in regard to their emotions and fewer expectations that they are able to regulate their emotions may be more likely to engage in the maladaptive behaviors (aggression, bulimic symptoms, and maladaptive sexual behavior) examined in the study. Current findings suggest that these behaviors may be related via their association with dysregulated emotion, which provides support for viewing these behaviors functionally (Hayes et al., 1996), rather than topographically.
A good deal of prior research has reported a relationship between many different types of
child maltreatment and the five tension-reducing behaviors which were examined in this study
(Meston, Heiman, & Trapnell, 1999; Moran, Vuchinich, & Hall, 2004; Schoemaker, Smit, Bijl,
& Vollebergh, 2002; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Weilderman, Sansone,
& Sansone, 1999). Based on prior research, it was assumed that the current study would also
show an association between child maltreatment and tension-reducing behaviors. Furthermore, it
was hypothesized that emotional dysregulation would mediate this prior relationship between
child maltreatment and engagement in tension-reducing behaviors. Specifically, it was
hypothesized that emotion dysregulation would be the mechanism by which the relationship
between child maltreatment and tension-reducing behaviors occurs. However, the current study
did not provide support for this hypothesis. There was a significant indirect relationship between
child emotional maltreatment (i.e., emotional abuse and neglect) and three specific tension-
reducing behaviors (bulimic symptoms, aggression, and maladaptive sexual behavior) when
emotion dysregulation was present; although results suggest this is not a mediational
relationship.

Results did not indicate a mediational relationship because the current study did not find
a direct relationship between a history of maltreatment and tension-reducing behaviors. Given
this consistent finding in prior research, it is surprising that child maltreatment was not directly
associated with tension-reducing behaviors (Meston, Heiman, & Trapnell, 1999; Moran,
Vuchinich, & Hall, 2004; Schoemaker, Smit, Bijl, & Vollebergh, 2002; Stouthamer-Loeber,
Loeber, Homish, & Wei, 2001; Weilderman, Sansone, & Sansone, 1999). There may be several
explanations for this finding. First, past studies examining the link between maltreatment and
tension-reducing behaviors have primarily measured only one type of maltreatment and only one
form of maladaptive behavior. The current study measured multiple forms of maltreatment and
multiple tension-reducing behaviors. By defining these constructs more broadly in the current
study, some specific relationships may not be detected as easily. Additionally, the current study
used multivariate statistics, which may be more conservative than univariate statistics. Further,
the current study included male and female participants. Studies of maltreatment and tension-
reducing behaviors often focus on either males or females, with the bulk of the research having
included only females. Relationships between maltreatment and tension-reducing behaviors
could sometimes be specific to gender, which could affect the outcomes of the current study.
Also, the current sample of child maltreatment survivors were enrolled in college and could therefore be less distressed than other previous studies which have used non-college samples. These differences between previous studies and the current study could have led to differences in the findings related to child maltreatment and tension-reducing behaviors.

Interestingly, results did indicate a significant indirect relationship between emotional maltreatment and tension-reducing behaviors when emotion dysregulation was present. It is possible that the significant indirect relationship detected in this study may be one of moderation, rather than mediation. A moderational effect differs from a mediational effect in that a moderator variable impacts the relationship between two other variables (Baron & Kenny, 1986; Holmbeck, 1997). A moderational relationship may indicate that child emotional maltreatment does not result in engagement of tension-reducing behaviors unless there is significant emotional dysregulation. This type of indirect relationship, although not mediational as hypothesized, also provides empirical support for the tension-reducing model. Although this relationship appears to be moderational, future studies should specifically test the existence of a moderational relationship.

Although emotion dysregulation did not mediate the relationship between child maltreatment and tension-reducing behaviors, it was found that emotion dysregulation did predict tension-reducing behaviors regardless of maltreatment status. Child emotional maltreatment did not predict tension-reducing behaviors unless dysregulated emotion was present. This suggests that for child emotional maltreatment survivors, engagement in tension-reducing behaviors varies as a function of the level of dysregulated emotion they experience. Not all emotional maltreatment survivors will engage in tension-reducing behaviors, but those with high levels of emotional dysregulation may be more likely to engage in bulimic behavior, aggressive behavior, or maladaptive sexual behavior. These findings are consistent with clinical observations of the higher prevalence of these maladaptive behaviors in those who seek help in clinical settings (Becker, Rankin, & Rickel, 1998; Briere, 1996; Heatherton & Baumeister, 1991). It may also help explain the high degree of variability in outcomes of child maltreatment survivors; not all emotional maltreatment survivors may engage in tension-reducing behaviors, only those who have high levels of emotional dysregulation may take part in these behaviors.
Clinical Implications

These findings have important implications for clinical interventions and prevention programming. There have been several recent clinical interventions for borderline personality disorder or complex post traumatic stress disorder which have included aspects of emotion regulation skills training (Cloitre, 1998; Linehan et al., 2001). While these interventions have had successful results overall, it is not known if the emotion regulation skills training actually contributes to the success of these interventions. The current study lends support for the utility of including training in emotion regulation strategies in these interventions and suggests that this aspect of training may be especially important when working with populations who engage in aggressive, bulimic, or maladaptive sexual behavior. Further, these types of clinical interventions are often developed to meet the needs of child maltreatment survivors (Cloitre, 1998; Linehan et al., 2001). The current findings indicate that emotion dysregulation predicts one’s engagement in tension-reducing behaviors regardless of maltreatment history. Therefore, clinical interventions which contain emotion regulation training may also be helpful for individuals who have not had a child maltreatment experience, but nevertheless have difficulties regulating their emotions.

Additionally, because the proposed tension-reducing behaviors are both relatively frequent among college students and detrimental to students’ health, many universities conduct prevention programs to reduce the occurrence of these types of behaviors. For example, colleges often conduct programs designed to reduce the prevalence of eating disorders, indiscriminate sexual behavior, and relational aggression. Currently, many of these collegiate prevention programs are educational, providing information to students about the risks and consequences involved in these behaviors. Most collegiate prevention programs have not been empirically evaluated, but those that have been evaluated show little or no actual reduction in the occurrence of the targeted behaviors (Breitenbecher & Scarce, 2001; Martz & Bazzini, 1999; Walters, Bennett, & Noto, 2000). The link found in the current study between emotion dysregulation and aggression, bulimic symptoms, and maladaptive sexual behavior is important to the development of future collegiate interventions. Interventions that focus on reducing maladaptive behavior, such as these tension-reducing behaviors, may be more effective when viewing these behaviors as strategies for coping with negative emotional experiences. These interventions may be more successful by helping students become more aware of their motivations for engaging in these
behaviors and educating them on other more effective and appropriate ways to regulate their emotions.

**Strengths and Limitations of the Current Study**

The current study has several strengths. The current study empirically examined the theoretical assumption that individuals engage in certain maladaptive behaviors in order to regulate their emotional experiences. This assumption was guiding the development of clinical interventions without being explicitly tested (Cloitre, 1998; Linehan et al., 2001). The current study fills this gap in the literature by empirically examining this theoretical assumption. The current results, which indicate that this theoretical assumption may be correct for emotionally maltreated individuals who have dysregulated emotional experiences, provide support and specificity to this theory.

An additional strength of the current study was the examination of multiple forms of maltreatment and multiple types of tension-reducing behaviors. Previous studies often only focus on single forms of maltreatment and single forms of behavior. The study of multiple forms of maltreatment is important because in actuality types of maltreatment frequently overlap (Higgins & McCabe, 2001). Studying maltreatment across different types allows a closer approximation to how maltreatment actually occurs and it allows the examination of how these different types of maltreatment and maladaptive behaviors interact.

A significant strength of the current study is the use of SEM to test the proposed relationships between constructs. SEM allows for testing theory about conceptual relationships, as well as assessing the structural makeup of these constructs. Additionally, SEM assesses all variables simultaneously and takes into account measurement error which produces a more stringent assessment of the models being assessed than typical regression analyses (Bollen & Long, 1993). The current study also provided replication of the final model. Replication is necessary when modifications have been made to a hypothesized model to better fit the data; however many studies using SEM do not include this important final step (Raykov & Marcoulides, 2000).

An additional strength of the current study is the use of both male and female participants in the study sample. Previously, few studies have examined these constructs in both men and women. Research on topics such as aggression and bulimia are almost always conducted with only one gender. Additionally, child maltreatment studies, especially child sexual abuse, are
most often conducted only with female participants (Lisak, 1995). The current study includes men and women and therefore allows for the examination of infrequently studied, but important phenomenon, such as bulimic symptoms in men and aggressive behavior in women. This allows greater generalizability of the study results and fills in several gaps on topics not frequently researched.

Limitations of the current study include the retrospective, cross-sectional design which does not allow for causal predictions. Additionally, the college student sample may consist of individuals with lower levels of child maltreatment, dysregulated emotion, and tension-reducing behaviors which may not allow the findings to generalize to more disordered populations. However, previous studies of emotion regulation have primarily focused on clinical populations and the current study will expand our knowledge to include a less disordered population. Another limitation of the current study is that the college student sample is very homogenous, with little ethnic, cultural, or economic diversity. This may affect the generalizability of the results to other populations. Additionally, the low prevalence rates of physical and sexual abuse in the sample may have impacted the likelihood of detecting significant relationships between these forms of abuse and other variables. Although associations were not found between physical and sexual abuse and the other variables of interest, these forms of child abuse are likely very important in relation to emotional dysregulation and tension-reducing behavior. The current findings may be a result of the small number of participants who endorsed physical and sexual abuse experiences, rather than an actual lack of association between the variables. In addition, the nature of the college sample may have impacted not only the prevalence of sexual and physical abuse, but also the severity of symptomatology associated with these forms of abuse. Because previous studies have identified that both of these forms of abuse are commonly associated with tension-reducing behavior, we do not assume on the basis of the present findings that sexual or physical abuse does not impact emotional dysregulation or tension-reducing behaviors. Larger samples with increased diversity in life experience and psychological functioning are needed to study this question further.

Recommendations for Future Research

The findings and limitations of the current study lead naturally to several areas of future research. The current study did not find support for the hypothesis that emotion dysregulation functions as a mediator between child emotional maltreatment and engagement in tension-
reducing behaviors. Further, current findings did not detect a direct relationship between child emotional maltreatment and engagement in tension-reducing behaviors. Further research is necessary to replicate this finding and clarify the conditions which impact the occurrence or non-occurrence of this direct relationship.

However, the current study did find that there was an indirect relationship between emotional maltreatment and engagement in tension-reducing behaviors when emotional dysregulation was present. Although results suggest that this indirect relationship may be moderational, this was not specifically examined. Additional research is needed to specifically test the nature of this indirect relationship.

A significant strength of this study was the inclusion of male and female participants. This allows for the consideration of constructs often only examined in one gender. However, it was not within the scope of this study to examine differences between genders. Patterns of emotion dysregulation and engagement in tension-reducing behaviors may vary by gender and future studies would benefit by examining these differences.
References


Appendix A

Tables
Table 1.

Demographic characteristics of sample 1, sample 2, and total combined sample.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample #1 (n = 254)</th>
<th>Sample #2 (n = 269)</th>
<th>Total Sample (N = 523)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Age</td>
<td>19.06</td>
<td>1.26</td>
<td>19.09</td>
</tr>
<tr>
<td>Gender</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Female</td>
<td>65.4</td>
<td></td>
<td>63.6</td>
</tr>
<tr>
<td>Male</td>
<td>34.6</td>
<td></td>
<td>36.4</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>91.4</td>
<td></td>
<td>93.3</td>
</tr>
<tr>
<td>Asian</td>
<td>1.9</td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>African American</td>
<td>1.6</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>Other</td>
<td>5.1</td>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td>Marital Status</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Never Married</td>
<td>96.9</td>
<td></td>
<td>98.1</td>
</tr>
<tr>
<td>Current Year in School</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Freshman</td>
<td>54.1</td>
<td></td>
<td>58.7</td>
</tr>
<tr>
<td>Sophomore</td>
<td>26.1</td>
<td></td>
<td>27.5</td>
</tr>
<tr>
<td>Junior</td>
<td>10.5</td>
<td></td>
<td>9.7</td>
</tr>
<tr>
<td>Senior</td>
<td>6.6</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>Family Income</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Under $25,000</td>
<td>3.0</td>
<td></td>
<td>3.6</td>
</tr>
<tr>
<td>$25,001-35</td>
<td>3.4</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>$35,001-45</td>
<td>3.4</td>
<td></td>
<td>4.4</td>
</tr>
<tr>
<td>$45,001-55</td>
<td>4.2</td>
<td></td>
<td>5.2</td>
</tr>
<tr>
<td>$55,001-65</td>
<td>6.7</td>
<td></td>
<td>8.5</td>
</tr>
<tr>
<td>$65,001-75</td>
<td>6.7</td>
<td></td>
<td>8.1</td>
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<tr>
<td>$75,001-85</td>
<td>9.2</td>
<td></td>
<td>11.7</td>
</tr>
<tr>
<td>$85,001-100</td>
<td>16.0</td>
<td></td>
<td>13.3</td>
</tr>
<tr>
<td>$100,000-150</td>
<td>17.6</td>
<td></td>
<td>18.5</td>
</tr>
<tr>
<td>Above $150</td>
<td>29.8</td>
<td></td>
<td>24.2</td>
</tr>
</tbody>
</table>

Note. No significant differences were found between samples.
Table 2.

*Prevalence rates and significant differences between types of child maltreatment for sample 1 and sample 2.*

<table>
<thead>
<tr>
<th>Type of Child Maltreatment</th>
<th>Sample 1 (n = 254)</th>
<th>Sample 2 (n = 269)</th>
<th>Total Combined Sample (n = 523)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>2.4*</td>
<td>6.7*</td>
<td>4.6</td>
<td>2.07</td>
<td>.04*</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>7.3</td>
<td>12.7</td>
<td>9.9</td>
<td>1.43</td>
<td>.15</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>8.4*</td>
<td>13.1*</td>
<td>10.7</td>
<td>2.17</td>
<td>.03*</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>17.7</td>
<td>13.5</td>
<td>15.3</td>
<td>-.42</td>
<td>.67</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>5.7</td>
<td>6.7</td>
<td>6.1</td>
<td>.548</td>
<td>.548</td>
</tr>
<tr>
<td>Any one type of maltreatment</td>
<td>26.4</td>
<td>25.5</td>
<td>26.9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. *All types of child maltreatment were measured by the Childhood Trauma Questionnaire.* *Indicates significant differences at p < .05.*
Table 3.

*Percentage of participants engaging in proposed tension-reducing behaviors for each population sample.*

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Total Combined Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Illegal drug use</td>
<td>36.9</td>
<td>77</td>
<td>31.2</td>
</tr>
<tr>
<td>High frequency alcohol use</td>
<td>45.5</td>
<td>115</td>
<td>46.6</td>
</tr>
<tr>
<td>Deliberate Self-Harm</td>
<td>22.4</td>
<td>57</td>
<td>27.9</td>
</tr>
<tr>
<td>Bulimic Symptoms</td>
<td>19.7</td>
<td>46</td>
<td>16.8</td>
</tr>
<tr>
<td>Aggressive Behavior</td>
<td>17.9</td>
<td>42</td>
<td>17.3</td>
</tr>
<tr>
<td>Sexual Concerns</td>
<td>16.9</td>
<td>41</td>
<td>16.0</td>
</tr>
<tr>
<td>Dysfunctional Sexual Behavior</td>
<td>12.4</td>
<td>30</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Note. *High frequency alcohol use indicates alcohol use two to three times a week or more. Prevalence rates for bulimic symptoms, aggressive behavior, sexual concerns, and dysfunctional sexual behavior indicate the percentage of participants who scored more than one standard deviation above the mean score for each scale. Due to missing data sample sizes varied.*
Table 4. *Correlation matrix for all variables in the proposed model.*

<table>
<thead>
<tr>
<th></th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>11.</th>
<th>12.</th>
<th>13.</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>CSA</td>
<td>.100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CPA</td>
<td>.469**</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>CEA</td>
<td>.376**</td>
<td>.423**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>CEN</td>
<td>.206**</td>
<td>.308**</td>
<td>.677**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>CPN</td>
<td>.409**</td>
<td>.479**</td>
<td>.425**</td>
<td>.359**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>6.</td>
<td>Difficulties in Emotion Regulation</td>
<td>.075</td>
<td>.117</td>
<td>.268**</td>
<td>.267**</td>
<td>.113</td>
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<td></td>
<td></td>
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<tr>
<td>7.</td>
<td>Negative Mood Regulation</td>
<td>.079</td>
<td>.081</td>
<td>.277**</td>
<td>.318**</td>
<td>.070</td>
<td>.696**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Drug Use</td>
<td>-.040</td>
<td>.073</td>
<td>.060</td>
<td>-.025</td>
<td>.071</td>
<td>.125</td>
<td>.097</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>9.</td>
<td>Alcohol Use</td>
<td>-.105</td>
<td>.036</td>
<td>-.105</td>
<td>-.074</td>
<td>-.032</td>
<td>.080</td>
<td>-.023</td>
<td>.495**</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>10.</td>
<td>Deliberate Self-Harm</td>
<td>-.086</td>
<td>.165*</td>
<td>.316**</td>
<td>.215**</td>
<td>.095</td>
<td>.197**</td>
<td>.128</td>
<td>.016</td>
<td>-.012</td>
<td>1.00</td>
<td></td>
<td></td>
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<tr>
<td>11.</td>
<td>Aggression</td>
<td>.036</td>
<td>.224**</td>
<td>.220**</td>
<td>.273**</td>
<td>.182**</td>
<td>.477**</td>
<td>.404**</td>
<td>.324**</td>
<td>.229**</td>
<td>.105</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Bulimic Symptoms</td>
<td>-.001</td>
<td>.052</td>
<td>.222**</td>
<td>.058</td>
<td>.045</td>
<td>.397**</td>
<td>.201**</td>
<td>.096</td>
<td>.194**</td>
<td>.072</td>
<td>.018</td>
<td>1.00</td>
</tr>
<tr>
<td>13.</td>
<td>Dysfunctional Sexual Behavior</td>
<td>.058</td>
<td>.156*</td>
<td>.182**</td>
<td>.035</td>
<td>.151*</td>
<td>.294**</td>
<td>.159*</td>
<td>.301**</td>
<td>.315**</td>
<td>.018</td>
<td>.269**</td>
<td>.418**</td>
</tr>
<tr>
<td>14.</td>
<td>Sexual Concerns</td>
<td>.056</td>
<td>.237**</td>
<td>.241**</td>
<td>.139*</td>
<td>.198**</td>
<td>.419**</td>
<td>.231**</td>
<td>.230**</td>
<td>.185**</td>
<td>.026</td>
<td>.403**</td>
<td>.405**</td>
</tr>
</tbody>
</table>

*Note.* CSA = child sexual abuse, CPA = child physical abuse, CEA = child emotional abuse, CEN = child emotional neglect, CPN = child physical neglect. *p < .05; **p < .01.
Appendix B

Figures
Figure 1.

Original proposed model and measures used to assess each construct: Child maltreatment and tension-reducing behaviors are proposed to be linked through the intermediary effects of emotion dysregulation.
Final model: Emotional maltreatment indirectly affects tension-reducing behaviors through emotion dysregulation.

Fit Statistics
Chi-square (13, N =255) = 15.732, p = .264
CFI = .993
TLI = .986
RMSEA = .029
Figure 3. Direct Model: Emotional maltreatment directly predicting tension-reducing behaviors.

Fit Statistics
Chi-square (4, N = 255) = 10.334, p = .035
CFI = .980
TLI = .923
RMSEA = .079
Figure 4.
Replication of final model.

Fit Statistics
Chi-square (13, N = 269) = 54.487, $p = .0000$
CFI = .928
TLI = .845
RMSEA = .109
Figure 5.

Post hoc SEM analyses conducted on exploratory sample with NMR variable omitted.

Fit Statistics
Chi-square (8, N =255) = 14.087,  \( p = .0795 \)
CFI = .984
TLI = .957
RMSEA = .055
Figure 6.

Post hoc SEM analyses conducted on confirmatory sample with NMR variable omitted.

Fit Statistics
Chi-square (8, N =269) = 30.584,  \( p = .0002 \)
CFI = .959
TLI = .891
RMSEA = .102
Appendix C

Unpublished Measure

Drinking Behavior Questionnaire
Drinking Behavior Questions

1. On average, how often do you typically drink alcohol (e.g., beer, wine, mixed drinks, etc.)? (Estimate based on the past 6 months).
   a. Nearly every day
   b. 4-5 times per week
   c. 2-3 times per week
   d. About once a week
   e. 2-3 times a month
   f. About once a month
   g. I do not drink at all

2. On average, how much alcohol do you typically drink in one sitting (evening)? (Estimate based on the past 6 months).
   a. 10 or more drinks
   b. 7-10 drinks
   c. 5-6 drinks
   d. 3-4 drinks
   e. 1-2 drinks
   f. I do not drink at all

3. How often in the past month did you drink alcohol (e.g., beer, wine, mixed drinks, etc.)?
   a. Nearly every day
   b. 4-5 times per week
   c. 2-3 times per week
   d. About once a week
   e. 2-3 times a month
   f. About once a month
   g. I do not drink at all

4. In the past month, how much alcohol did you typically drink in one sitting (evening)?
   a. 10 or more drinks
   b. 7-10 drinks
   c. 5-6 drinks
   d. 3-4 drinks
   e. 1-2 drinks
   f. I do not drink at all
5. How often in the past month did you drink 4 or more alcoholic drinks (e.g. beer, wine, mixed drinks, etc)?

   a. Nearly every day
   b. 4-5 times per week
   c. 2-3 times per week
   d. About once a week
   e. 2-3 times a month
   f. About once a month
   g. I do not drink at all