ATTENTIONAL BIAS IN WOMEN WITH HISTORIES OF CHILDHOOD EMOTIONAL ABUSE

by

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(Under the Direction of Joan L. Jackson)

ABSTRACT

The current study investigated the impact of childhood emotional abuse (CEA) on cognitive processing and compared performance to childhood sexual abuse (CSA) survivors and a non-abused control group. Two studies were conducted. The first study aimed to develop a list of the CEA-related words for use in the second study through ratings made by women endorsing a CEA history. In the second study, data were collected from 81 women, comprising three groups: CEA history, CSA history, or non-abused control. Attentional bias was assessed by Stroop task performance on neutral, positive, threat, CSA-related and CEA-related words. It was hypothesized Stroop Task performance would be related to abuse history (e.g., individuals with a CEA history would show increased response time to CEA words). Further, the current literature is unclear as to whether attentional bias is driven by abuse experiences or by abuse-related psychopathology. Thus, the impact of psychological symptoms was examined.

INDEX WORDS: Emotional Abuse, Attentional Bias, Modified Stroop Task

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CHAPTER ONE

INTRODUCTION

Overview

The impact of childhood abuse often outlasts the initial abuse experiences, impacting the child's psychological and physiological well-being, and potentially paves the way for a myriad of psychological difficulties in adulthood (Gibb et al., 2001, Hankin 2005). If a survivor of childhood abuse escapes the abusive situation without developing psychopathology (such as posttraumatic stress disorder (PTSD) or depression), the child often still exhibits cognitive and behavioral patterns that predispose the individual to future difficulties (Fani, Bradley-Davino, Ressler & McClure-Tone, 2011). For example, childhood maltreatment history has been shown to account for 20.8% of the variance in PTSD symptoms in response to trauma in adulthood, suggesting that trauma early in life may confer risk for cognitive biases and adult psychopathology (Fani et al., 2011). Researchers have worked to determine the impact of child abuse and, while less studied than its counterparts, recent attention has turned to adolescent and adult outcomes of experiencing childhood emotional abuse (CEA).

Recent work has shown that experiencing CEA does confer risk for negative psychological outcomes in adulthood, including the development of psychopathology (Hankin, 2005), however is not yet clear how CEA confers risk for these negative adult outcomes. One hypothesized mediator between childhood abuse experiences and adult psychopathology is the presence of cognitive bias (Fani et al., 2011; Freeman & Beck, 2000; Pine et al., 2005; Wigenfield et al., 2009). Cognitive bias may manifest itself in misinterpretations of ambiguous

stimuli (Matthews & MacLeod, 1994), preferential processing of negative or threatening stimuli (Hallion & Ruscio, 2011) or in the form of cognitive and situational processing deficits, leaving the individual vulnerable to the development of psychopathology (Williams, Mathews & MacLeod, 1996). Specifically, a broader hypervigilance to threat is involved in the development of later anxieties, including PTSD (Matthews & Mackintosh, 2000), while beliefs of helplessness and worthlessness can lead to depression (Gilboa & Gotlib, 1997).

To date, no research has been done to establish the presence of cognitive bias in women with histories of CEA and to differentiate bias in CEA survivors from that found in survivors of other forms of abuse, such as childhood sexual abuse (CSA). The aim of the current research is to test if the experience of CEA is related to differential cognitive processing of abuse-related stimuli, while controlling for any pre-existing psychopathological symptoms (i.e., anxiety, depression, PTSD). Further, given that the impact of CSA on cognitive processing biases has been established through past research (Freeman & Beck, 2000; McNally, Clancy, Schacter, & Pitman, 2000; Williams et al., 1996), a second aim is test for differences in cognitive performance between CEA and CSA survivors.

Forms of Childhood Maltreatment

Childhood Emotional Abuse

Recent attention within the field of childhood maltreatment has turned to focus on CEA as a form of parental behavior. This attention has led to debate amongst researchers regarding several aspects of CEA. One such aspect is the best definition of CEA and, based on this definition, the true prevalence of CEA. Most importantly, while research has established a link between CEA and negative adult outcomes (DiLillo, Peugh, Walsh, Panuzio, Trask, & Evans, 2009; Gibb et al., 2001; Hankin, 2005; Hart & Brassard, 1987), research has yet to clearly

delineate the pathway from CEA to ensuing adult outcomes, making it necessary to explore possible mediators between the two.

Recent estimates approximate the prevalence of CEA experiences at 13% within the general population (Dong, Anda, Dube, Giles, & Felitti, 2003) with other estimates as high as 32% of general population (Briere & Elliott, 2003). Often these estimates vary due to the use of different definitions of what constitutes emotional abuse. The American Professional Society on the Abuse of Children defines emotional maltreatment as "a repeated pattern of caregiver behavior or extreme incident(s) that convey to children that they are worthless, flawed, unloved, unwanted, endangered, or of value only in meeting another's needs" and specifies six forms of maltreatment: spurning, terrorizing, exploiting, corrupting, isolating and mental, health, medical and educational neglect (APSAC, 1995). An alternative framework, defines emotional maltreatment based on behaviors that compromise the psychosocial wellness of a child, including "emotional unavailability, unresponsiveness and neglect; negative attributions or misattributions to the child; developmentally inappropriate or inconsistent interactions with the child; failure to recognize or acknowledge the child's individuality and psychological boundary and failing to promote the child's social adaptation" (Glaser, 2002). Most recently, a collaborative study between the Centers for Disease Control and Kaiser Permanente, The Adverse Childhood Experiences (ACE) Study, provides a more explicit definition of childhood emotional abuse, defined as occurring when "a parent or other adult in the household [often] swore at, insulted, or put the [individual] down and sometimes, acted in a way that made the child think that he or she might be physically hurt" (Dong et al., 2003).

Frequent experiences of CEA have been linked to several negative outcomes with later psychological functioning in adulthood, including the development of an insecure attachment

style (Cicchetti, Rogosch & Toth, 1994; Hankin, 2005), psychopathology (Gibb et al., 2001; Hankin, 2005), negative cognitive style (Gibb et al., 2001) and a greater risk for future negative life events (Hankin, 2005). It has been suggested these negative effects of CEA occur because negative self-associations are handed to the victim from the perpetrator (Rose & Abramson, 1992). For example, a parent may say to a child "you are such a waste of time" and overtime, through repetition, the child begins to associate the word "worthless" with himself. As mentioned in the example above, over time, CEA experiences can lead to the development of a cognitive bias (in the form of attributional or attentional biases) for words presented to them in that fashion, including words such as stupid, worthless, inadequate. These associations are internalized as self-relevant and, are automatically processed (Hart & Brassard, 1987).

Automatic processing of these cues may predispose CEA survivors to depressive cognitions and these can escalate to major depression. For example, Gibb et al. (2001) demonstrated that healthy college-aged individuals who had experienced CEA were more likely than those who had experienced CSA or childhood physical abuse (CPA) to be diagnosed with either non-endogenous or hopelessness depression. Furthermore, van Harmelen, de Jong, Glashouwer, Spinhoven, Penninx, and Elzinga (2010) showed that while CEA, CSA, and CPA were all associated with enhanced automatic processing of self-associations for depressive and anxious stimuli, individuals with a history of CEA showed the greatest amount of automatic processing of negative self-associations.

Childhood Sexual Abuse

CSA is defined as occurring if, before he or she was 18 years of age, a child was touched or fondled by someone at least 5 years or older, or the adult had the child touch their body in a sexual way, or attempted/had oral, anal, or vaginal intercourse with the child (Dong et al., 2003).

Similar to the case with CEA, prevalence rates vary based on the definition used to assess CSA and the population sampled. For example, the ACE Study has estimated the prevalence of CSA to be from 15% to 33% of women (Vogeltanz, Wilsnack, Harris, Wilsnack, Wonderlich & Kristjanson 1999). In terms of adult outcomes, CSA has been one of the most studied forms of childhood maltreatment. This research has linked the experience of CSA to negative adult outcomes similar to those associated with CEA, including increased risk for later pathology, namely PTSD, increased risk for revictimization and most pertinent to this review, cognitive bias for abuse-related stimuli.

Cognitive Interference

Adults who experience trauma throughout their early lives, such as childhood maltreatment, often experience cognitive alterations that lead to biases in attention, situational interpretation, and memory (Vasterling & Brailey, 2005). While there are many possible characteristics that increase an individual's risk for the development of later psychopathology, including PTSD, maladaptive cognitive processing constitutes one set of potential risk factors for these negative outcomes (Fani et al., 2011). Research relating cognitive processing to traumatic experiences illustrates differences in the cognitive processing patterns dependent on proximal (adulthood trauma) vs. distal (childhood maltreatment) characteristics of traumatic experiences (Fani et al., 2011). Specifically, traumatizing childhood experiences can predict changes in cognitive and behavioral responses in adulthood (Repetti et al., 2002; Salmon & Bryant, 2002). These alterations may then predispose trauma survivors to future psychological difficulties, including psychopathology. The presence of negative cognitive bias has been hypothesized as a driving force behind the onset and maintenance of several forms of psychopathology and is most commonly associated with anxiety disorders and depression (Constans, 2005; Mathews &

MacLeod, 1994).

Attentional bias

Attentional bias is the form of cognitive interference most commonly associated with adult psychopathology and can be described as "a phenomenon whereby a mild threat stimulus leads to a disruption of ongoing cognitive activities due to an involuntary redirection of attentional resources to the stimulus" (Constans, 2005, pg. 106). Individuals who experience adverse life events, such as CEA, may internalize these experiences as self-relevant. When these self-relevant stimuli (words, imagery, even events) elicit attention, the stimuli may disrupt cognitive processing of other stimuli. Liebling and Shaver (1973) argue that this decreased processing of self-relevant information is due to "limited cognitive space" available to process information pertaining to self-referent information and information related to the task being performed. In other words, attention to self-relevant information prevents maximum attention to task performance (Geller & Shaver, 1976). Two main paradigms are employed to evaluate the presence of attentional bias in individuals' cognitive processing: the "dot-probe paradigm" and the "emotional" or "modified" Stroop task.

Testing for the presence of attentional bias. Two paradigms are currently used to assess for cognitive bias: the "dot-probe paradigm" and "emotional/modified Stroop task." The "modified" Stroop task has remained the main paradigm for evaluation of attentional bias, and research using the modified Stroop task provides robust evidence of attentional biases in a variety of psychological phenomena (Williams et al., 1996). However, recent studies have also employed the use of the dot-probe paradigm.

The Dot-Probe Paradigm. This paradigm requires the participant to view words or pictures on a screen (often a trauma-related word and non-trauma-related word). One of the

words on the screen is replaced by one of two probes. The participant responds by pressing a computer key matched with the particular probe shown. Attentional bias is inferred if the participant responds faster to a probe behind a trauma-related word, indicating the participant is focusing on the trauma-related word.

The Modified Stroop Task. The Stroop Task (Stroop, 1938) was created as an implicit test of attentional bias theoretically caused by the activation of memory-relevant stimuli. During the original Stroop Task, participants were asked to speak aloud the color of a word presented to them as fast as possible, while ignoring the meaning of the word. The words presented were words that represented colors that were different from the color of the text (e.g., the word "blue" in green text). Participants took longer to speak the text color of the mismatched color word than the matched color word (e.g. the word "blue" in blue text). This demonstrated cognitive interference because the word "blue" activates the memory of the individual's idea of blue. When presented with the word "blue" in a different color, the individual experiences a form of cognitive interference, expressed in the form of a longer response time to state the word, not the color of the word (Stroop, 1938). This delayed response is often referred to as the "Stroop effect" or "Stroop interference." Since its initial creation, evidence of the Stroop effect has been expanded to self-referent words (Geller & Shaver, 1976; Liebling & Shaver, 1972) and to words conveying emotion and/or threat (Williams et al., 1996).

While it is clear that the Stroop Task works as an implicit measure of cognitive bias for self-relevant words, the mechanism of action for the Stroop Task has been debated due to differential performance on the Stroop Task. One possible mechanism is related to an individual's tendency to selectively attend to threat information (Mogg, Mathews, Bird & Macgregor-Morris, 1990). A second theory involves the activation of memory networks (Bower,

1981). Under this theory, when the presence of a stimulus is linked to a relevant memory node, the activated node may in turn activate a network of memory nodes. Bower (1981) argued that a continued state of emotional activation by memory nodes increases attention to mood-congruent information. This switch in attention processing causes the individual to allocate more effort to self-referent information processing and allocate less effort to task performance.

Clinically Significant Psychopathology and Attentional Bias

Both attentional bias to negative stimuli and hypervigilance to threat have been related to the presence of adult psychopathology (Gilboa & Gotlib, 1997; Williams et al., 1996). Research indicates a strong empirical foundation for use of the attentional bias paradigms in investigating bias present in clinical levels of adult and adolescent psychopathology. This relationship is especially prominent when studying the relationship between emotional disorders, such as depression, anxiety, and posttraumatic stress disorder (PTSD), and impaired performance on cognitive tasks.

Depression

There is a clear connection between depressive symptomatology and impaired Stroop performance (Gotlib & McCann, 1984; Gotlib & Cane, 1987; Kertzman, Reznik, Hornik-Lurie, Weizman, Kotler, & Amital, 2009). Mildly depressed college students (Gotlib & McCann, 1984) as well as psychiatric inpatients with Major Depressive Disorder (Gotlib & Cane, 1987) evidence longer response times in response to depression-associated words as compared to neutral and mania-related words. Untreated individuals suffering from Major Depressive Disorder also show increased reaction times in processing mood-congruent words on the Stroop Task (Kertzman, et al. 2009). Furthermore, both currently depressed and previously depressed individuals show increased attentional bias to sad faces compared to never-depressed controls

(Fritzsche et al., 2010) on the dot-probe task. This latter finding suggests a potential role of remaining cognitive processing interference in the recurrence of depression after a period of remission.

Anxiety Disorders

Research with clinically anxious individuals indicates that those with high levels of chronic anxiety exhibit selective attention towards threatening material (see Mogg & Bradley, 1998; Williams et al., 1996). This difficulty disengaging from threatening material has also been found in individuals with subclinical anxiety (Amir, Elias, Klumpp & Przeworski, 2003; Fox, Russo, Bowels, & Dutton, 2001) in the dot-probe paradigm. These mixed findings make it unclear whether attentional focus towards threat is a byproduct of a pre-existing anxiety disorder or if the attentional bias is a risk factor for the development of anxiety disorders (Williams et al., 1996).

PTSD

The presence of cognitive interference in individuals with PTSD is common throughout the literature. McNally, Amir, and Lipke (1996) found that war-exposed veterans showed increased reaction times (e.g. Stroop interference) to war-related, positive and neutral words in comparison to a control group. These results indicate that for individuals with active PTSD, there is both a general and specific processing bias for emotion-provoking stimuli evidenced by the an overall increased reaction time, which was most severe for trauma words, less severe but present for positive words and the least for neutral words. Similarly, Kaspi, McNally and Amir (1995) found trauma-exposed veterans with PTSD show increased response latencies for combat-related words. Interestingly, they also found a similar, but muted response in trauma-exposed veterans without PTSD. In regard to cognitive interference after sexual trauma, Foa,

Feske, Murdock, Kozak and McCarthy (1991) showed that rape survivors with current PTSD, compared to rape survivors without PTSD and a control group exhibited longer word latencies in response to assault-related words. Similar to McNally et al. (1996), this finding indicates that rape victims show a selective processing bias for rape-related stimuli. Further, this processing bias has been shown in response to different types of traumatic experiences in both adults (Mueller-Pfeiffer et al., 2010) and children (Vythilingam et al., 2007).

Finally, Elsesser, Sartory and Tackenberg (2004) found mixed support for a disorder-specific differential effect for chronic levels of PTSD versus acute stress disorder (ASD). Specifically, Elsesser and colleagues found no evidence of an attentional bias to trauma-relevant pictures in adult trauma victims with ASD, whereas those with chronic PTSD showed increased attention, but not significantly so, towards trauma-relevant pictures. Given that participants' reaction time was independent of probe position, suggesting a lack of selective attention to relevant stimuli, the authors attributed all increased reaction times to heightened arousal, rather than cognition. This same effect was repeated in a second follow-up study (Elsesser, Sartory & Tackenberg, 2005).

In sum, previous research indicates the presence of both disorder-specific responses and responses relevant to an individual's life experiences (i.e. maltreatment experiences) to Stroop Task stimuli (Gilboa-Schechtman, Revelle, & Gotlib, 2000). Given that victims of childhood abuse exhibit a proclivity for the development of depressive and anxiety disorders, especially PTSD, it is necessary to consider the impact of child abuse on the development of cognitive bias and later psychopathologic conditions. With the robust findings of cognitive interference (as indicated by Stroop performance) in individuals with PTSD, research has naturally drifted towards exploring the impact of CSA and Stroop interference, given a high probability of PTSD

within CSA survivors. Unfortunately, the impact of other forms of childhood abuse, such as CPA and CEA, have received little to no attention in the area of cognitive bias, despite similarly robust findings linking these two adverse childhood experiences to later psychopathology.

Childhood Maltreatment and Attentional Bias

Adults and Children with General Maltreatment Histories

Two studies have assessed attentional bias in adults and children with non-specific maltreatment histories. Utilizing the dot-probe paradigm, both studies found evidence of attentional biases in traumatized individuals. Specifically, Fani and colleagues (2011) found adults with maltreatment histories (CSA and/or CPA and/or CEA) evidenced an attentional bias toward happy faces, but not towards or away from threatening faces. Further, this pattern of behavior was shown to mediate the relationship between childhood maltreatment history and adult PTSD diagnosis. Further, Pine and colleagues (2005) applied to the dot-probe paradigm in evaluating attentional bias in children with and without a history of maltreatment (again, CSA and/or CPA and/or CEA), but found that children with a history of maltreatment only showed an avoidance of threatening faces (i.e. an attentional bias towards nonthreatening faces). From this somewhat contradictory evidence, Fani and colleagues (2011) suggest their findings of a bias towards positive faces may actually relate to avoidance of the negative rather than attention to the positive.

Adults with Childhood Sexual Abuse Histories

Most studies of attentional bias have focused on the cognitive impact of CSA. These studies have shown significant evidence of cognitive interference in survivors. In a comparison of adult women with a history of CSA and current PTSD versus non-traumatized controls,

Klumpers, Timmerman, Loonen, Tulen, Fekkes, and Boomsma (2004) found increased response times on the classic Stroop color-naming task. Due to use of additional physiological measures, results indicated there were no differences between groups in terms of a physiological response (no evidence of increases in heart rate, catecholaminergic, or cortisol response). The authors concluded that Stroop Task interference is not driven by physiological stress responses after trauma.

As indicated above, there appears to be a relationship between PTSD and the presence of attentional bias. This relationship has also been raised within the CSA-attentional bias literature. In a study of the neural correlates of Stroop performance, the presence of PTSD amongst abused individuals enhanced Stroop interference compared to those without PTSD (Bremner et al, 2004). McNally et al. (2000) argued group differences in Stroop performance of women with recovered, continuous or repressed memories of CSA, were driven by the presence of PTSD rather than by current memory status. This was due to the fact that despite memory status, participants' self-reported PTSD symptom severity predicted the amount of Stroop interference.

Finally, Field, Classen, Butler, Koopman, Zarcone and Spiegel (1999) studied the Stroop effect for control, neutral, general threat and sexual abuse words in a sample of women with both CSA and PTSD, half of whom had been sexually re-victimized within the past 6 months. Results indicated that the experience of recent trauma might also impact Stroop performance. Specifically, while both groups of women showed Stroop interference to sexual abuse words over all other word types, there was evidence for a greater Stroop effect for those women who had been recently re-victimized. Further, when controlling for stress symptomatology, the relationship between revictimization and response latency on sexual victimization words remained significant. Thus, while stress symptoms and revictimization are related, stress

symptomatology did not directly contribute to the presence of cognitive interference in revictimized women. This study contributes to the literature in two ways. First, given that participants had the greatest amount of interference to words pertaining to sexual abuse, individuals may show an enhanced Stroop effect to more personalized stimuli. Second, the authors demonstrated recent trauma might have an impact on Stroop performance over that of past trauma, but this relationship was unrelated to current level of symptomatology. This idea that temporal proximity of trauma may influence Stroop interference is further indicated by the exploration of Stroop interference in research with sexually abused adolescents (Blake & Weinberger, 2006; Waller & Ruddock, 1995).

Two more complex studies of attentional bias and CSA history indicate unique aspects of the impact of CSA on adult attentional bias. Blake and Weinberger (2006) looked for a Stroop effect in CSA survivors on word types pertaining to intimacy, general threat words (words pertaining to threat, but not to abuse, e.g. “funeral” or “cancer”), and neutral words. The authors found no Stroop effect between groups and concluded based on these and previous results that the Stroop effect is more robust with trauma and/or abuse words than other related sets of words. Waller and Ruddock (1995) compared individuals with diagnosed eating pathology who had a history of CSA against those without a CSA history, finding a significant Stroop interference between groups on food and abuse related words, indicating that despite both groups having diagnosed eating pathology, the CSA group showed increased latencies for both food and abuse words. Contained within this finding is that there was no interference effect of abuse words on those without a history of CSA. From these findings, it was concluded that attentional bias stemming from childhood abuse could be associated with cognitive inference to words associated with abuse experiences and additional forms psychopathology, such as eating pathology. This

finding is in opposition to that of McNally et al. (2000), in that it demonstrates that abuse experiences alone may generate Stroop interference to abuse- and psychopathology-related words.

In summary, research with adult survivors of CSA has shown that 1) interference on attentional bias measures, namely the Stroop task, is related to cognitive rather than physiological variables, 2) the relationship between CSA and adult attentional bias may be a mediated by psychopathology and 3) the extent of the interference may be related to the proximity of traumatic events, as well as, 4) the specificity of word stimuli.

Adolescents with Childhood Sexual Abuse Experiences

As Field et al. (2009) suggested, the time since an abusive or traumatic experience may impact the presence of attentional bias. Thus, research has attempted to address the impact of recent CSA on cognition by studying maltreated adolescents. Freeman and Beck (2000) compared three samples of adolescents: history of CSA and current PTSD, history of CSA and no current diagnosis of PTSD, and a never-abused control group. Overall, results indicated that the CSA with PTSD group showed a significantly larger Stroop effect than the other groups. However, the CSA without PTSD group did not differ significantly from the other groups indicating that this group fell in-between the two groups and thus showed some, albeit an insignificant, Stroop interference. Also noteworthy, when controlling for current symptoms of anxiety and depression, the enhanced effect for those with CSA with PTSD was attenuated, leaving the two abuse groups equivalent in terms of cognitive interference. Dubner and Motta (1999) also found an enhanced Stroop effect for adolescents with PTSD over those with only a history of CSA.

Researchers have found evidence of Stroop interference in individuals with a history of childhood sexual abuse but without PTSD as well. Coleman, Rourke, and Levis (2008) compared Stroop interference in survivors of CSA, CPA and both CSA and CPA. This methodology makes it difficult to draw any conclusion in regard to abuse experience and Stroop effect, however results did indicate that individuals within the high abuse group showed a significant delay in naming abuse-relevant words compared to those in the low-abuse group and showed no differences in naming positive or neutral words.

From research with adult and adolescent survivors of CSA, it is apparent that the experience of CSA is enough to induce cognitive bias in individuals with later trauma and psychopathology. However, CSA is not the only type of childhood abuse that should be considered to induce cognitive bias. While limited, there have been investigations into the impact of childhood physical abuse (CPA) on cognitive processing.

Adolescents with Childhood Physical Abuse Experiences

To date, two studies have investigated the impact of a history of CPA on cognition with the Stroop Task. The results of one study, Coleman et al. (2008), have been discussed above. Briefly, this study looked at Stroop interference in a group of individuals with CSA only, CPA only or both CSA and CPA and found a general Stroop effect to CPA and CSA words. These results only allow us to speculate that CPA might show an impact on cognition as tested by the Stroop Task similar to that of the experience of CSA. One additional study addressed the distinct impact of CPA versus that of CSA on Stroop performance in an adolescent sample (Dubner & Motta, 1999). This study's findings related to CSA have been discussed previously. There was an effect of CPA on sexual abuse words, however this effect was not significant. Similar to Freeman and Beck (2000), the impact of abuse words was greatest for CSA survivors

and somewhat (yet, insignificantly) greater for CPA survivors than for individuals with no history of abuse. It is of note that this study showed that CPA survivors have increased interference to words thought to pertain to sexual abuse. This finding could simply be due to comorbid sexual abuse (which was not controlled for) or it could suggest that the experience of any type of abuse might have an impact on the cognitive processing of any type of abuse words. It is important to consider that some of the participants in this study met criteria for PTSD and that could have also impacted the positive findings for Stroop interference.

Possible Influencing Factors on Attentional Bias in Survivors of Childhood Abuse

The aforementioned research elucidates several factors that may impact Stroop performance in survivors of childhood abuse. These factors include types of words used in the Stroop experiment, abuse factors (such as time since abuse) and the effect of additional psychopathology. The impact of these factors must be considered in future research design and each will be considered individually below.

Word Type

Some studies have found Stroop interference solely on abuse-specific words (Coleman et al., 2008; Field et al., 1999; McNally et al., 2000), while others have found Stroop effects pertaining to multiple word types (Bremner et al., 2004; Dubner & Motta, 1999; Freeman & Beck, 2000; Waller & Ruddock, 1995). Differential Stroop interference has also been shown for individuals with differential psychopathology (McNally et al., 1996; Wigenfield et al., 2009; Watts, McKenna, Sharrock, & Trezise, 1986). There is no definitive explanation for these mixed results pertaining to word types. These findings may be sample-specific or they may suggest an important direction to test in future methodologies. It is possible that individuals with abuse histories may show cognitive bias for general threat over positive or neutral stimuli given the

anxiety-provoking nature of abuse. A related issue is that of the actual words used during Stroop testing. Some more recent studies have used the same word lists previously shown to elicit Stroop interference, however others have not. This differential word use may also impact word type findings within the Stroop literature.

Abuse Factors

Researchers have also studied the potential effects of individual differences in abuse experience. These factors include perpetrator type (family member, non-family member), time since abuse or trauma and use of force. Waller and Ruddock (1995) found no correlation between perpetrator type or the use of force in CSA experiences and Stroop performance, however there was a correlation between time since abuse and Stroop performance. Results indicated that longer amounts of time since the abuse were related to greater Stroop interference to abuse words. These results contradict those of Field et al. (1999) who found that women with CSA history showed a greater Stroop effect if they had been recently re-victimized. Waller and Ruddock (1995) attribute their results to the strengthening of cognitive pathways pertaining to past abuse over time, while Field et al. (1999) attribute their findings to a recency effect on Stroop performance.

Psychopathology

The mixed findings regarding CSA and Stroop performance and the presence of comorbid PTSD is indicative of a need to evaluate possible underlying psychopathology in cases of child abuse. Specifically, five studies reviewed above found a Stroop effect within previously abused individuals to be correlated with present PTSD symptomatology (Bremner et al., 2004; Dubner & Motta, 1999; Freeman & Beck, 2000; Klumpers et al, 2004; McNally et al., 2000); whereas three other studies showed Stroop effect unrelated to PTSD symptomatology (Blake &

Weinberger, 2006; Coleman et al., 2008; Field et al, 1999). Finally, Freeman and Beck (2000) found that the differences between the CSA with PTSD and the CSA without PTSD groups were attenuated when the researchers controlled for the current symptoms of anxiety and depression. This attenuation is important given that trait anxiety has also been shown to impact Stroop performance beyond anxiety associated with a history of child abuse (Miller & Patrick, 2000).

The above examples indicate that it is possible for the relationship between childhood abuse and Stroop interference to be influenced by comorbid psychopathology. However, these results also suggest that childhood abuse may still affect Stroop performance when outside psychopathology is controlled. While not directly related to CSA, these mixed results have occurred with Stroop task paradigms and other traumatic experiences. For example, Kaspi et al. (1995), discussed above, found increased response latencies in trauma-exposed veterans with and without PTSD. While, Vrana, Roodman and Beckham (1995) showed veterans with PTSD demonstrated significantly greater cognitive interference compared to veterans with similar war-exposure, but no PTSD. Additionally, Waller and Ruddock (1995) found that in women who had CSA histories, abuse variables (familial abuse, use of physical force), temporal onset (abuse prior to eating disorder), and eating disorder symptom severity predicted the severity of eating pathology. These results suggest cognitive bias stemming from previous experiences of childhood abuse may impact the relationship between other types of psychopathology and Stroop interference.

The dot-probe paradigm has also shown similar issues in elucidating a true determinate of the adult attentional bias - childhood maltreatment link. It is difficult to discern the link between childhood maltreatment and attentional bias to happy faces found by Pine et al. (2005) because

the majority of the children with childhood maltreatment experiences were diagnosed with PTSD. Furthermore, the studies by Elsesser and colleagues (2004, 2005) yield questions about the level of psychopathology required to "drive" the development of attentional bias versus the level of trauma or abuse required to "drive" attentional bias.

How might current psychopathology influence performance on attentional tasks? PTSD represents an intense reaction to threatened death or injury that is either directed at or witnessed by the individual. Two of the three hallmark symptoms of PTSD include re-experiencing the trauma and increased arousal after the trauma. Both of these symptoms reflect the presence of interrupted cognitive processing within individuals with PTSD. Specifically, re-experiencing symptoms, such as flashbacks to the event, occur because of the way the trauma memories are encoded within the individual's memory. One theory behind re-experiencing applies Bower's (1981) network theory and could explain the presence of a robust Stroop effect in individuals with re-experiencing symptoms. Hypervigilance symptoms may also impact Stroop performance. After experiencing a traumatic event, trauma survivors show an increased awareness to threatening stimuli. This hypervigilance to threat is common within several types of anxiety disorders, not just PTSD (Milller & Patrick, 2000; Watts, McKenna, Sharrock & Trezise, 1986).

Investigations for possible mechanisms of action implicated in the effect of depression on attentional tasks have suggested that both the relevance of the words to the individual's main concern (or history) and the words' congruency with the individual's current mood state, but not the emotional valence of the word, are of critical importance for distinctive processing of stimuli presented on the Stroop Task (Gilboa-Schechtman, et al., 2000). Thus, for depressed individuals, a mild cognitive bias towards depression-relevant stimuli serves to pull attention

away from non-depressive stimuli and this effect may be exaggerated when a depressed individual is experiencing particularly intense negative affect. This finding delineates the need for specificity in the effect of stimuli for different disorders. Thus, individuals currently experiencing depression should exhibit a different response to words, indicating more hopelessness than those indicating fear, another negative emotion. This finding supports the idea that previous, adverse experiences impact performance on cognitive tasks.

Summary

In summary, there is a clear connection between the experience of childhood abuse and risk for later psychopathology or at least psychological difficulties. One possible pathway involved in the relationship between childhood abuse and later psychopathologies is the presence of cognitive processing biases. These biases are implicated in the onset, maintenance and recurrence of later psychopathology. One possible way of measuring this processing deficit for abuse-related words has been shown through differential performance on the Stroop Task by individuals with different types of psychopathology. Research has established a relationship between CSA and Stroop Task inference, however it is unclear whether this relationship requires the presence of clinically significant pathology to represent a significant deficit. On the other hand, the relationship between CEA and Stroop performance has yet to be investigated. It is necessary and important to understand the relationship between the experience of CEA and deficits in cognitive processing caused by cognitive bias. Further, it is important to explore the relationship between cognitive interference and differential forms of child maltreatment because research regarding differential cognitive processing is vital in understanding potential differences in adult outcomes of various forms of childhood abuse.

CHAPTER TWO

RATIONALE, SIGNIFICANCE, & HYPOTHESES

Rationale

The present study aimed to investigate the impact of a history of CEA on attentional bias as measured by cognitive interference on the Stroop Task. This area has remained uninvestigated within the current literature on the impact of childhood maltreatment on cognitive performance. Given that the presence of a negative cognitive bias (attention to negative stimuli or threat in the case of maltreatment) predisposes individuals to many types of psychopathology and that the experience of childhood maltreatment, including emotional abuse, has been linked to the development of various forms of psychopathology, including depressive and anxiety disorders, it seems plausible that the presence of cognitive bias may act as a viable link between childhood abuse experiences and the development of later psychopathology.

While it is clear that survivors of CSA show interference in Stroop Task performance when presented with stimulus of words associated with their maltreatment experience, the impact of other forms of childhood abuse on cognitive processing of abuse-related stimuli is not clearly established. After 15 years of previous research on attentional bias and CSA history, the exact combination of factors required to develop such bias from adverse childhood experiences is still unclear and research into such risk factors is lacking in other types of child maltreatment, particularly CEA, which conveys equally potent risk for negative psychological consequences (Hankin, 2005). Therefore, it is of great import to assess for the presence of attentional bias within individuals with CEA histories in order to elucidate how CEA experiences may confer

risk for poor psychological functioning in adulthood through alterations in cognitive processing of abuse-related environmental stimuli.

Research described previously suggests Stroop interference occurs because the words presented are relevant to the participants' experiences of childhood abuse, hence why survivors of CSA have slowest reaction times or interference to CSA-related words. Several word lists known to elicit Stroop interference exist within the current literature for CSA survivors. However, there is no standardized list of validated CEA-related words for use with the Stroop task. Accordingly, in order to examine cognitive bias in individuals with histories of childhood emotional abuse, it was first necessary to conduct a pilot study aimed at developing and testing a set of words for the Stroop Task that are relevant to women who have experienced CEA (Study 1).

The second study aimed to assess the impact of CEA experiences on cognitive processing in abuse survivors compared to those without such experiences. This study hypothesized that if CEA is enough to produce a Stroop effect, a debated topic within the current literature, individuals with a history of CEA should show differential performance in response to Stroop Task words relevant to the experience of emotional abuse. Under this same caveat, CSA survivors should also exhibit longer response times to words associated with the experience of CSA. Limiting the current study to individuals with only one type of abuse experience, by ruling out those with comorbid abuse experiences, CSA survivors should not show as great a Stroop effect on CEA words, and CEA survivors should not show as great an effect on CSA words. However, given that different forms of abuse can lead to similar negative attributions about the self, one notable a caveat is the possibility that CSA and CEA survivors could also show increased reaction times in response to the other abuse-related words. Finally, given that the

control group should not have experienced any significant instances of childhood abuse, it was hypothesized that individuals without a history of child abuse (the control condition) would not show any significant differences in response latencies between word types.

When examining cognitive bias in populations with abuse histories, it is important to consider the dispute within previous research regarding the relationship between Stroop Task performance and clinically significant psychopathology. More specifically, some theorists argue that an individual must exhibit clinical levels of psychopathology before he or she will exhibit significant Stroop interference to experience-relevant words. If this is true for the current sample, then only individuals with current psychopathology will exhibit a Stroop effect during the task. Given that such variables have been shown in past studies to impact Stroop performance, the presence and impact of psychological symptoms must be assessed as an alternative explanation for the hypothesized relationship between abuse experiences and cognitive bias. Thus, this study also included measures assessing current symptoms of depression, posttraumatic stress, anxiety sensitivity, and trait and state anxiety. Inclusion of these measures may help to elucidate any relationship between current psychopathology and Stroop performance.

Significance and Hypotheses

The proposed study was novel in that it was the first to assess attentional bias in women with CEA experiences. The study was also novel in that it involved the development of a set of words salient to those who have been emotionally abused. Further, the study hypotheses and data analyses provide both stringent within- and between-group tests of attentional bias, which, respectively, control for general attentional bias to positive, threat, less-relevant abuse words, and an idiosyncratic response to Stroop stimuli. Based on the results of previous Stroop Task

literature, it was hypothesized that individuals with a history of CEA would display increased response latencies (i.e., interference) to CEA-relevant words only. Second, it was hypothesized that those with a history of CSA would demonstrate similar interference to those with CEA history, but only to CSA-relevant words. Given that control group participants have no history of childhood abuse, it was hypothesized that control participants would show no differential interference to any word type. Following these initial analyses, the impact of psychological symptoms was explored, however no specific hypotheses regarding the impact of psychopathology were made.

CHAPTER THREE

STUDY 1 METHODS

Participants

Participants were female students recruited from introductory psychology classes through the research pool during the 2012 spring semester. Study participation credit was given to fulfill a research requirement towards course completion. All participants completed an online survey of self-report questionnaires including demographic measures, retrospective self-reports of childhood abuse experiences, psychopathology, and three word rating scales created for use in the current study. In total, 41 participants (11.17 % of the original sample) were included within the current analyses based on their endorsed level of CEA on the emotional abuse subscale of the Adverse Child Experiences Study Questionnaire (i.e., 20 individuals with no CEA history determined by a score of 5 vs. 21 individuals with a moderate to severe history of CEA, determined by a score of 13 or higher). Participants were in their late teens (M= 18.83, SD = .97). With regard to ethnic background, 77.5% of the sub-sample described themselves as European American, 9.8% as African American or black, 7.4% as Asian American and 3.9% as Hispanic.

Measures by Construct

Childhood Abuse

Adverse Child Experiences Study Questionnaire (ACE; Dube, Williamson, Thompson, Felitti & Anda, 2004). The ACE measure was used to assess childhood experiences of CEA, CPA and CSA. The ACE questionnaire was developed for use in the

Adverse Childhood Experiences (ACE) Study based at Kaiser Permanente's San Diego Health Appraisal Clinic, to assess the longitudinal impact of abuse and family dysfunction during childhood on multiple adult outcomes, prospectively and retrospectively. Questions for the ACE were adapted from the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) and assess for abuse experiences during the respondents' first 18 years of life. One example of a question pertaining to emotional abuse is "People in your family said hurtful or insulting things to you," rated from 1 (strongly disagree) to 5 (strongly agree). The CTQ has moderate to high internal consistency (α = .66 - .92) and test-retest reliability (r = .79 - .86, over a period of 4 months; Bernstein et al., 2003) within clinical and non-clinical populations of adolescents and adults. Preliminary ACE data show the CEA subscale demonstrates moderate test-retest reliability (Dube et al., 2004) with a kappa coefficient of .66. Given this data, Dube et al. (2004) conclude these reliability statistics associated with the ACE support its use in studies retrospectively assessing childhood abuse experiences.

CEA Word List

To determine a list of words for use in the modified Stroop task, participants were presented with a list of 42 words (Appendix A) thought to be conceptually associated with the experience of CEA. The word list was generated for the current study by the researcher and included words considered reflective of CEA experiences. A primary list of words was generated based on words commonly used in validated CEA measures (e.g., stupid, ugly), and additional synonyms were added through the use of a thesaurus in order to generate a varied list of stimuli. Participants were asked to rate each word for relevance (i.e. How much does this apply to you?), valence (i.e., How threatening is this word to you?), and frequency of usage (i.e. How often do you use this word?) on a scale from 1 ("not at all") to 5 ("extremely").

Procedure

Female participants were recruited through the research participation (RP) pool of The University of Georgia and completed an online survey via Qualtrics survey software. Informed consent was obtained online prior to completing the survey. After completing the ACE questionnaires, the participants provided threat, relevance, and frequency ratings for each of the 42 words.

Data Analysis Plan

Ten words were required for use as the CEA-related word list in Study 2. To select these words, initial t-tests using relevance ratings were conducted to determine which words were different between CEA and non-CEA groups. In order to reduce the number of words, an exploratory factor analysis was conducted using the relevance and threat ratings of the CEA history group. Words with the highest factor loadings on the first factor were considered for inclusion in Study 2. Following, synonyms and confounded words were removed to obtain the final list of ten words.

CHAPTER FOUR

STUDY 1 RESULTS

Selection of Words for Inclusion in Stroop Task

T-tests and a follow-up exploratory factor analysis were conducted in order to select words for the CEA-related word list. Participants were split into two groups: a CEA group (n = 21*)*, which included women who endorsed moderate to severe levels of CEA (score of 13 or higher on ACE emotional abuse subscale), and a no CEA group (n = 20; score of 5 on ACE emotional abuse subscale*)* including women who denied any significant history of CEA. T-tests were first conducted to test for significant differences in "relevance" ratings of the proposed CEA words. Analyses revealed significant ($p < .05$) group differences in word ratings on 27 of the 42 words. All significance values, means, and standard deviations are displayed in Table 1.

Following t-tests, a principle components analysis (PCA) was conducted with the "applicability" ratings by the CEA group. As a secondary means of word selection, an additional PCA was conducted using the "threat" ratings by the CEA group. Factor loadings on the first factor of each analysis were of primary interest. The 15 words that evidenced the highest loadings on Factor 1 on both analyses were selected for use. Following, four synonyms and one confounded word were removed from the list, yielding the final list of 10 words to match the 10 words in each of the other word lists.

Table 1

Means and Standard Deviations for Word Applicability Ratings and by Abuse Group

Word	CEA Group	No CEA	*t(39)*
Worthless	**2.05 (1.36)**	**1.00 (0.31)**	**-3.11****
Stupid	1.81 (1.33)	1.25 (0.55)	-1.78
Ugly	2.26 (0.97)	1.25 (0.55)	-4.22**
Lazy	2.19 (1.24)	1.80 (0.70)	-1.24
Loser	1.76 (0.83)	1.25 (0.91)	-1.88
Pitiful	**1.81 (1.08)**	**1.05 (0.22)**	**-3.16****
Mediocre	1.76 (0.89)	1.53 (0.70)	-0.93
Fool	1.80 (1.11)	1.15 (0.37)	-2.5**
Foolish	**2.10 (1.30)**	**1.40 (0.60)**	**-2.22****
Useless	1.86 (1.31)	1.20 (0.41)	-2.18**
Waste	**1.71 (1.15)**	**1.10 (0.37)**	**-2.37****
Unimportant	**2.24 (1.38)**	**1.40 (1.00)**	**-2.24****
Trash	1.62 (1.07)	1.00 (0.31)	-2.65**
Trashy	1.33 (0.66)	1.05 (0.22)	-1.86
Idiot	**1.86 (1.28)**	**1.10 (0.31)**	**-2.64****
Gross	1.38 (0.67)	1.00 (0.00)	-2.61**
Weird	2.67 (1.32)	1.95 (1.19)	-1.83
Hideous	1.48 (0.81)	1.10 (0.31)	-1.98
Revolting	1.33 (0.58)	1.05 (0.22)	-2.09*
Failure	**2.33 (1.49)**	**1.30 (0.47)**	**-3.02****
Inadequate	**2.19 (1.25)**	**1.25 (0.44)**	**-3.24****
Pathetic	2.00 (1.45)	1.15 (0.37)	-2.54**
Sorry	1.90 (1.00)	1.25 (0.55)	-2.62**
Lame	1.67 (0.91)	1.35 (0.75)	-1.22
Weak	1.90 (1.14)	1.40 (0.68)	-1.74
Lousy	**1.62 (0.92)**	**1.05 (0.22)**	**-2.75****
Jerk	1.57 (0.87)	1.10 (0.31)	-2.33**
Moron	1.48 (0.87)	1.05 (0.22)	-2.16*
Freak	1.65 (0.88)	1.20 (0.52)	-1.97
Fat	2.43 (1.54)	1.40 (0.68)	-2.80**
Disgusting	1.43 (0.75)	1.00 (0.00)	-2.63**
Nasty	1.43 (0.81)	1.05 (0.22)	-2.06
Repulsive	1.24 (0.62)	1.05 (0.22)	-1.30
Sickening	1.33 (0.66)	1.00 (0.00)	-2.32*
Terrible	1.57 (0.98)	1.10 (0.31)	-2.10*
Deficient	1.62 (0.80)	1.05 (0.22)	-3.12**
Faulty	1.81 (1.17)	1.05 (0.22)	-2.93
Defective	**1.81 (1.21)**	**1.00 (0.00)**	**-3.07****
Incompetent	1.81 (1.17)	1.20 (0.52)	-2.17**
Awful	1.19 (0.60)	1.00 (0.00)	-1.45
Dumb	1.67 (1.06)	1.30(0.47)	-1.44
Dull	1.48 (0.81)	1.15 (0.49)	-1.56

Note. Standard deviations are in parentheses. *$p < .05$. **$p < .01$. Words selected for inclusion in final list are noted in bold.

CHAPTER FIVE

STUDY 2 METHODS

Participants

Study 2 included 81 female students recruited from introductory psychology classes through the RP pool and who received research credit towards course completion. Women were given the opportunity to participate in the study based on their self-report of childhood abuse on an online screener. In order to participate, women were required to meet criteria for one of three possible abuse groups: CEA, CSA, or No Abuse. For study inclusion, women in the CEA group endorsed a history of moderate or higher CEA experiences on the ACE (i.e., score of 13 or higher on the CEA subscale) and also could not endorse a history of CSA or a significant level of CPA on the CAMI. Women placed in the CSA group were required to endorse a history of unwanted sexual activity with an older family member, relative or family friend prior to the age of 18 on the CAMI, but also could not endorse CEA or CPA higher than a minimal rating level (i.e., 5 or higher on CEA subscale of the ACE, endorsing 3 or more physical abuse behaviors on the CAMI). Lastly, individuals included in the no abuse control group were selected based on their denial of any CSA behaviors, and endorsement of no more than minimal CEA and CPA behaviors. Additionally, women who self-described as color-blind were excluded from participation in Study 2, given the requirement to decipher colors on the screen during the Stroop Task. Following completion of the online screener, individuals who met criteria for inclusion were contacted by the researcher to schedule participation in the second portion of the study.

From the pool of 474 women screened, 186 eligible women were invited to participate based on their self-reported childhood abuse experiences. From the group of 186 women, 81 (43.5%) opted to participate in Study 2. Each participant was assigned a group status based on their reported childhood abuse history: 28 women endorsed a history of at least moderate CEA, 22 women endorsed a history of CSA (i.e. unwanted sexual contact prior to age 18), and 31 women denied any history of physical, sexual, or emotional abuse. The mean age of the study sample was 18.9 (*SD*=1.09). A total of 74.1% identified as Caucasian, 11.1% as African American, 4.9% Hispanic, 4.9% Asian American, 1.2% Hawaiian Islander and 1.2% as "other." With regard to ongoing psychopathology, participants indicated a mild level of depressive symptomatology (*M* = 11.45, *SD* = 10.12), minimal posttraumatic stress symptomatology (*M* = 29.56, *SD* = 12.13), minimal state anxiety (*M* = 33.86, *SD* = 11.58), mild trait anxiety (*M* = 40.09, *SD* = 11.60), and minimal to mild levels of anxiety sensitivity (*M* = 19.07, *SD* = 12.95).

Measures by Construct

Childhood Abuse

Adverse Child Experiences Study Questionnaire (ACE; Dube et al., 2004). Described in Study 1.

The Computer Assisted Maltreatment Inventory (CAMI, DiLillo et al., 2006). The screening questions for CSA and CPA on the CAMI were used to assess CSA history and rule out CPA history. The CAMI retrospectively measures experiences of childhood abuse and witnessing intimate partner violence. The measure assesses the experience, duration, frequency, nature of the abuse experience(s) as well as the number of perpetrators and the individual's relationship to the perpetrator(s).

CSA screening questions assess for a childhood history by asking if 1) prior to the age of

18, any unwanted sexual acts were perpetrated by a 2) family member, other relative, or 3) anyone who was five or more years older than the participant and involved the individual: a) exposing his or her genitals to, or masturbating in front of, the participant, b) kissing, touching, or fondling the participant in a sexual way or forcing the participant to touch or fondle them, c) attempting to have sexual intercourse (oral, anal, or vaginal) with the participant or d) the participant and the individual actually engaging in sexual intercourse (oral, anal, or vaginal). CPA experiences include information about the nature of the experience(s), duration, frequency, the number of and relation to the perpetrator(s) and the extent of injuries received. With regard to the screening questions, the endorsement of three or more perpetrated abusive behaviors (e.g., hitting/slapping, hitting with an object, choking, burning) indicates the possibility of CPA.

In previous studies, the CAMI has demonstrated excellent internal consistency for CSA, CPA and CEA with reliability estimated at .96, .86 and .96, respectively (DiLillo et al., 2009). The CAMI also demonstrates adequate test-retest reliability with kappa coefficients ranging from .74-.95 for CSA, .66-.82 for CPA and .62-.84 for CEA. CAMI scores also evidence strong correlations with scores on the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998), another retrospective childhood abuse measure, with r=.76 for CEA (PA) and r=.58 for CSA. These high correlations between the same scales on the CTQ and lead DiLillo and colleagues (2010) to conclude the CAMI has good criterion validity. Finally, the CAMI severity score has a lower correlation with measures of social desirability scores than the CTQ severity score (DiLillo et al, 2010).

Depression

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI is a 21-item measure of depressive symptomatology. The measure assesses the cognitive, somatic

and affective symptoms commonly associated with depression. Participants rate symptom endorsement during the past two weeks. Higher BDI-II scores indicate greater severity of current depressive symptoms, not DSM-IV-TR diagnoses. The BDI-II has a reported coefficient alpha of .92 in an outpatient sample and a coefficient alpha of .93 for a college student sample (Beck et al., 1996). The BDI-II demonstrates convergent validity with the Beck Hopelessness Scale (r = .35) and the Hamilton Psychiatric Rating Scale for Depression (r =. 56; Cahill et al., 2006).

Traumatic Stress Symptoms

PTSD Checklist-Civilian Version (PCL; Weathers, Huska, & Keane, 1991). The PCL is a self-report measure of posttraumatic symptomatology. Respondents endorse the frequency of 17 items encompassing the PTSD symptoms listed in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition on a scale of 1 (not at all) to 5 (extremely). The measure allows for a determination of PTSD diagnosis by comparing symptom endorsement to DSM-IV criteria or by using a cutoff score from 44-50 (Andrykowski, Cordova, Stuts & Forneris, 1998; Weathers & Ford, 1996). The PCL has demonstrated high internal consistency (Cronbach's alpha coefficients: .94 for PCL total score and .85 for re-experiencing, .85 for avoidance, and .87 for hypervigilance symptoms; Ruggiero, Del Ben, Scotti & Rabalais, 2003). Research using the PCL-C has shown the measure to have good specificity (.76-.99) and sensitivity (.60-1.00) in diagnosing PTSD (Brewin, 2005). The PCL is also regarded as having good convergent validity, given high correlations with other well-established measures of PTSD symptomatology including the Impact of Events Scale and the Mississippi Scale for PTSD, Civilian Version (Ruggiero et al., 2003).

Anxiety

The State-Trait Anxiety Inventory- Form Y (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI is a 40-item self-report questionnaire measuring state-dependent and trait symptoms of anxiety. State-dependent (STAI-S) and Trait (STAI-T) anxiety are assessed on separate questionnaires, each containing 20 questions. Items on each form are balanced in polarity containing questions pertaining to both the absence ("I feel calm") and presence ("I feel worry") of anxiety (Vautier & Pohl, 2009). Item endorsement is noted on a 4-point Likert scale (1-"not at all" to 4-"very much") assessing intensity of the anxious symptom. The STAI has been shown to have strong internal consistency (average α's> .89; Barnes, Harp & Jung, 2002). Given the nature of the construct state anxiety, STAI-S has low temporal stability (Barnes et al., 2002). The STAI-T has demonstrated excellent test-retest reliability (Barnes et al., 2002), and research with the STAI has shown the measure to have adequate convergent and discriminant validity with other measures (e.g., Beck Anxiety Inventory) and to differentiate patient and control samples (Spielberger, 1983).

The Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). Anxiety sensitivity refers to fears associated with the sensations of anxious arousal. The ASI-3 measures such fears through 18 items comprising three subscales: physical concerns (e.g., "When my stomach is upset, I worry that I might be seriously ill."), cognitive concerns (e.g., "When my thoughts seem to speed up, I worry that I might be going crazy") and social concerns (e.g., "I worry that other people will notice my anxiety"). Participants rate each of the 18 statements on a scale of 1 (very little; coded as 0) to 5 (very much, coded as 4). Total scores range between 0 and 72. Recent research has demonstrated the ASI-3 is comprised of a stable three-factor structure across clinical and non-clinical samples. Within English-speaking samples, it demonstrates adequate

internal consistency (Physical Concerns α = .79-.86; Cognitive Concerns α = .83-.91; Social Concerns α = .78-.86; Taylor et al., 2007).

Attentional Bias

Participants completed a computerized, modified Stroop Task to measure attentional bias in the processing of abuse-related stimuli. For each participant the Stroop Task consisted of 50 words (ten words from each of the five word types: positive, neutral, general threat, CSA-related and CEA-related words) presented five times in random order. Words in the positive (McNally et al., 2000), neutral (Foa et al., 1991), general threat (Foa et al., 1991), and CSA-related (Field et al, 1999) groups were taken from previous successful research studies of Stroop interference within the literature. CEA-related words were taken from Study 1. These words are presented in Table 2. All word lists demonstrated adequate internal consistency across participant ratings of "threat" made after completion of the Stroop task: positive (α =.92), threat (α = .93), CSA-related (α = .91), CEA-related (α = .87), and neutral (α = .80) words. Response accuracy (i.e., correct color selection) was assessed across the total sample and ranged between .98 for CSA-related words and .99 for neutral (fruit) words.

For the computerized Stroop Task, each word stimulus was presented on a 17-inch computer monitor. During the task participants viewed randomized words in the colors blue, green, yellow, and red and were instructed to select the color of each word by pushing the appropriate colored key on the attached keyboard as fast as possible without considering the meaning of the word on the screen. Following a practice test, participants responded to each word five times, for a total of 250 test trials. Reaction time was recorded for each response using E-Prime Software.

For purposes of this study, attentional bias was operationalized as differential interference (increased reaction time compared to neutral words) to one specific word type as compared to other word types. For data analysis, reaction times for each individual were calculated using average reaction times to each word. Following, average reactions times for each word type were calculated by taking the overall mean of all the words within one word type. Consistent with contemporary practice (Williams et al., 1996), interference scores were calculated for positive, threat, CSA and CEA conditions by subtracting neutral condition type reaction time from the reaction time for each condition respectively (e.g., average reaction time to positive words – average reaction time for neutral words; average reaction time to CEA-related words - average reaction time to neutral words, etc.).

Table 2
List of Stroop Task Stimuli by Word Type

Word Type	Words
Neutral (Fruit)	banana, cherry, grape, raisin, prune, apple, peach, strawberry, melon, pear
Positive	loyal, cheerful, laugh, merry, polite, sociable, admire, clever, joyful, delighted
Threat	anxiety, death, cancer, tumor, stress, funeral, panic, coffin, guilt, nervous
CSA-Related Words	victim, abused, rape, molester, fondle, oral sex, erection, trapped, penetrate, force
CEA-Related Words	foolish, waste, lousy, idiot, worthless, failure, pitiful, defective, inadequate, unimportant

Procedure

Following completion of an online screener, eligible female participants were contacted by the researcher via e-mail and invited to participate in the main portion of the study in exchange for additional research credit towards course completion. Prior to completing relevant study measures, participants read and gave informed consent. Following, each woman was

administered a packet of questionnaires containing the CAMI, ACE, BDI-II, STAI, PCL, and ASI-3. Following completion of the self-report questionnaires, participants completed the practice Stroop Task in the presence of the researcher. After the researcher ascertained the participant's comprehension of the Stroop Task procedure, the participant was left to complete the computerized Stroop Task in private. Once complete, participants were asked to rate the words from the Stroop Task in terms of valence (i.e., "Please rate the following words based on how threatening (i.e. upsetting) these words are to you"). Prior to leaving the lab, participants were debriefed about the purpose of the study, thanked for their participation and given a list of referrals if they experienced any distress associated with study participation.

Data Preparation

Given the absence of outliers on the modified Stroop task, average word type reaction times and interference scores were generated for each participant. Levels of depressive and posttraumatic stress symptomatology, state/trait anxiety, and anxiety sensitivity were determined by summing participant responses on each measure. Following the protocol suggested by Hawthorne and Elliot (2005), missing data on psychological measures for five participants was replaced using each individual's mean score for the completed items. All participant data was eligible for inclusion in the current study following replacement of missing data.

CHAPTER SIX

STUDY 2 RESULTS

Abuse History and Attentional Bias

It was hypothesized that individuals would demonstrate interference in an experience-specific manner. That is, it was hypothesized that individuals with a history of CEA would display increased interference to CEA-relevant words only, those with a history of CSA would demonstrate interference to CSA-relevant words only, and the control group would show no differential interference to any word type. A 3 (abuse group) x 4 (word type) repeated measures ANOVA was conducted to assess the impact of childhood abuse history (i.e. CEA, CSA, No-Abuse/Control) on participant's interference scores across the four word types (positive, threat, CSA-related, and CEA-related). Results indicated a main effect for word type, F (3, 76) = 7.534, p <.01, partial eta squared = .209, with the sample demonstrating differences in mean interference scores across word types (see Figure 1). Follow-up contrasts revealed significant difference between the CSA-related word types (M = -5.94, SD = 41.35) and each of the three other word types: positive interference (M = -20.55, SD = 39.84), threat interference (M = -20.51, SD = 35.92), and CEA interference (M = -16.90, SD = 38.15), such that participants experienced greater interference (i.e., spent a greater amount of time responding to) with CSA words than any other word type. The main effect of abuse group (i.e., childhood abuse history) was not significant, F (2, 78) = .426, p =.655, partial eta squared = .011. The interaction between word

type and abuse group was not statistically significant, F (6, 154) = 1.388, p =.220, partial eta squared = .034.[1] Mean interference scores for each group are presented in Table 3.

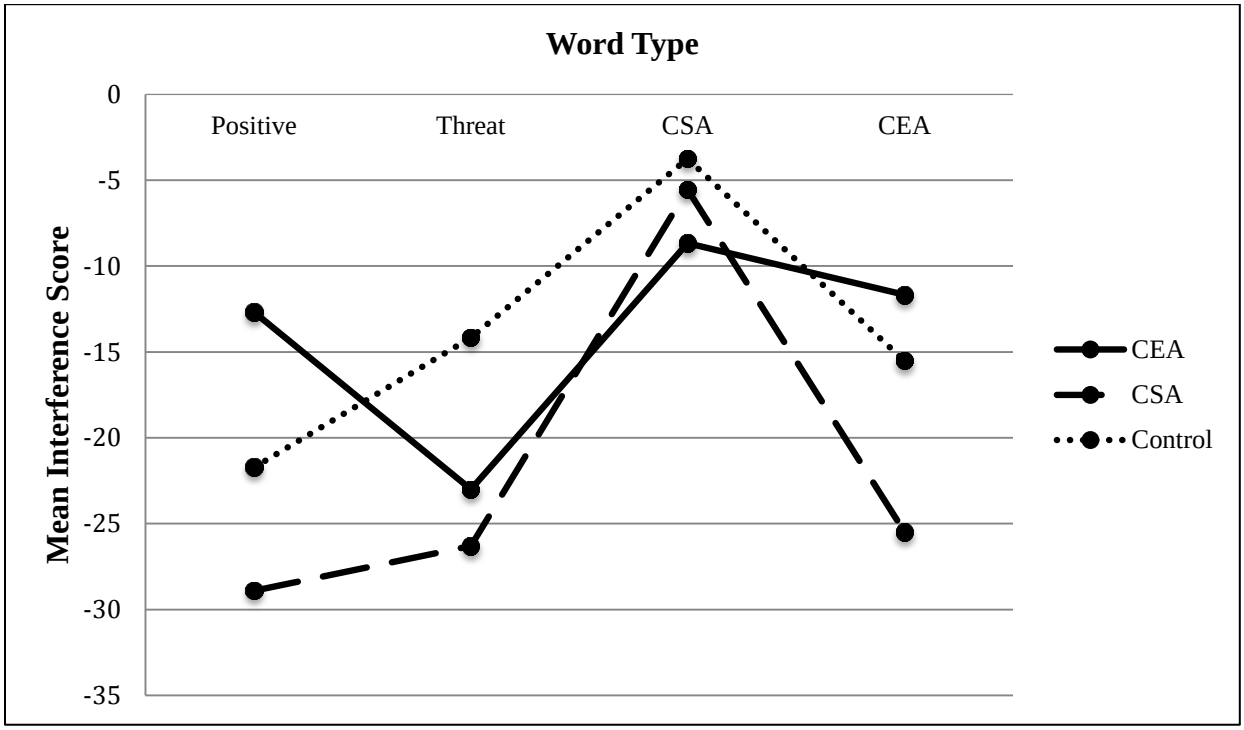

Figure 1. Impact of word type on Stroop interference by abuse group. More negative scores reflect faster reactions/reduced interference scores.

Table 3
Means and Standard Deviations of Interference Scores by Word Type and Abuse Group

Word Type	CEA	CSA	Control
Positive	-12.68 (44.52)	-28.89 (44.06)	-21.73 (29.37)
Threat	-23.00 (33.33)	-26.30 (40.19)	-14.16 (35.18)
CSA	-8.68 (38.63)	-5.54 (53.38)	-3.75 (34.79)
CEA	-11.68 (40.50)	-25.48 (38.46)	-15.52 (35.89)

Note. Standard deviations are in parentheses

[1] Given the high degree of interference evidenced by participants to neutral words, a series of repeated measures ANOVAs were conducted using the five reaction times and alternative interference scores (i.e., subtracting the mean for positive word type or the mean of positive and neutral words). Similar effects were found with each additional analysis, thus, the planned and most commonly assessed type of interference score (i.e., neutral words) is presented here.

Psychopathology and Attentional Bias

An additional aim of the current study was to assess the impact of psychological symptoms on Stroop interference. A one-way between-groups ANOVA was conducted to determine any group differences in endorsed psychopathology. Group differences were noted in depressive symptoms: F (2, 78) = 11.92, $p < .01$), posttraumatic stress: F (2, 78) = 14.70, $p < .01$), trait anxiety F (2, 78) = 16.39, $p < .01$), state anxiety: F (2, 78) = 10.92, $p < .01$), and anxiety sensitivity: F (2, 78) = 10.64, $p < .01$). Group means are displayed in Table 4.

Follow-up contrasts using the Bonferroni test revealed that, compared to women in the CSA and control groups, women in the CEA group indicated significantly higher levels of depressive symptomatology (CEA: M = 17.57, SD = 10.41; CSA: M = 11.14, SD = 10.52; Control: M = 6.15, SD = 5.87), anxiety sensitivity (CEA: M = 27.04, SD = 11.97; CSA: M = 16.95, SD = 12.73; Control: M = 13.39, SD = 10.43), and trait anxiety (CEA: M = 48.18, SD = 11.60; CSA: M = 39.00, SD = 10.92; Control: M = 33.55, SD = 6.93). Additionally, women in the CEA group noted higher levels of posttraumatic stress symptoms (CEA: M = 36.82, SD = 12.30) and state anxiety (M = 40.36, SD = 10.84) than the control group (posttraumatic stress: M = 22.13, SD = 6.52; state anxiety: (M = 27.74, SD = 7.90), but were not significantly different from the CSA group in posttraumatic stress symptoms (M = 30.78, SD = 12.33) or state anxiety (M = 34.23, SD = 12.73).

Table 4
Mean Self-Reported Psychopathology by Group

Word Type	CEA	CSA	Control
Depression (BDI-II)	17.57 (10.41)[ot]	11.14 (10.52)	6.15 (5.87)
Posttraumatic Stress (PCL-C)	36.82 (12.30)[t]	30.78 (12.33)	22.13 (6.52)
Trait Anxiety (STAI-T)	48.18 (11.60)[ot]	39.00 (10.92)	33.55 (6.93)
State Anxiety (STAI-S)	40.36 (10.84)[t]	34.23 (12.60)	27.74 (7.90)
Anxiety Sensitivity (ASI-3)	27.04(11.97)[ot]	16.95 (12.73)	13.39 (10.43)

Note. Standard deviations are in parentheses. [o]Significantly higher than CSA group [t]Significantly higher than Control Group.

Bivariate correlations for psychological measures and Stoop Interference scores for each group are presented in Tables 5 (Control Group), 6 (CEA Group), and 7 (CSA Group). For all groups, no Stroop interference scores were significantly correlated with any psychological symptom measures.[3]

To test for the impact of psychopathology on the relation between abuse experience and interference to abuse-specific words, five hierarchical regression analyses were conducted to assess for a moderating effect of psychological symptoms (i.e., depression, posttraumatic stress, state and trait anxiety, and anxiety sensitivity) on the relationship between abuse experience (i.e., CEA, CSA) and abuse-specific word type interference (i.e., CEA-related interference scores for CEA group, CSA-related interference scores for CSA group). Abuse experience was dummy coded (i.e., CEA 0, CSA 1) and entered into Step 1 for all models, followed by the specific set of psychological symptoms (i.e., BDI, PCL, STAI-T, STAI-S, or ASI) in Step 2. At Step 3, the interaction term, abuse experience by psychological symptoms, was entered into the model.

[3] Bivariate correlations were also conducted between psychopathology measures and mean Stroop reaction times for the total sample and each group. The pattern of correlations was the same as for Stroop interference scores.

Results (summarized in Appendix B) indicated no significant relationships of abuse experience, psychological symptoms, or their interaction with interference to abuse-specific word stimuli.

Table 5
Correlations and Descriptives of Key Variables for Control Group (n =31)

	1	2	3	4	5	6	7	8	9
1. Positive Interference	1.00								
2. Threat Interference	.50**	1.00							
3. CSA Interference	.50**	.39*	1.00						
4. CEA Interference	.59**	.40*	.71**	1.00					
5. BDI Total Score	.00	-.09	-.02	.22	1.00				
6. PCL-C Total Score	-.16	-.08	.02	.19	.86**	1.00			
7. STAI-Trait Anxiety Total Score	-.07	-.16	-.02	-.04	.64**	.52**	1.00		
8. STAI-State Anxiety Total Score	.04	-.14	.09	.26	.87**	.75**	.75**	1.00	
9. ASI-3 Total Score	-.03	-.03	-.09	-.25	.53**	.44*	.51**	.50**	1.00
M	-21.73	-14.15	-3.75	-15.52	6.15	22.13	33.55	27.74	13.39
(*SD*)	(29.37)	(35.18)	(34.79)	(35.89)	(5.87)	(6.52)	(6.93)	(7.90)	(10.43)

Note. BDI = Beck Depression Inventory; PCL-C = PTSD Checklist- Civilian Version; STAI = State-Trait Anxiety Inventory; ASI-3 = Anxiety Sensitivity Inventory-3
* $p < .05$. ** $p < .01$.

Table 6

Correlations and Descriptives of Key Variables for CEA Group (n=28)

	1	2	3	4	5	6	7	8	9
1. Positive Interference	1.00								
2. Threat Interference	.73**	1.00							
3. CSA Interference	.75**	.79**	1.00						
4. CEA Interference	.72**	.79**	.79**	1.00					
5. BDI Total Score	.17	.03	-.03	.10	1.00				
6. PCL-C Total Score	.03	-.13	-.12	-.03	0.60**	1.00			
7. STAI-Trait Anxiety Total Score	.08	.03	-.11	-.12	0.74**	.41*	1.00		
8. STAI-State Anxiety Total Score	.09	.12	.04	-.11	0.60**	.40*	.77**	1.00	
9. ASI-3 Total Score	.01	-.17	-.17	-.07	0.41*	.59**	.48*	.41*	1.00
M	-12.68	-23.00	-8.68	-11.68	17.57	36.82	48.18	40.36	27.04
(*SD*)	(44.52)	(33.33)	(38.63)	(40.50)	(10.41)	(12.30)	(11.60)	(10.84)	(11.97)

Note. BDI = Beck Depression Inventory; PCL-C = PTSD Checklist- Civilian Version; STAI = State-Trait Anxiety Inventory; ASI = Anxiety Sensitivity Inventory-3 * $p < .05$. ** $p < .01$.

Table 7
Correlations and Descriptives of Key Variables for CSA Group (n=22)

	1	2	3	4	5	6	7	8	9
1. Positive Interference	1.00								
2. Threat Interference	.76**	1.00							
3. CSA Interference	.62**	.69**	1.00						
4. CEA Interference	.61**	.59**	.70**	1.00					
5. BDI Total Score	-.09	-.05	.07	-.21	1.00				
6. PCL-C Total Score	.22	.17	.19	-.06	.88**	1.00			
7. STAI-Trait Anxiety Total Score	.14	.22	.19	-.15	.86**	.90**	1.00		
8. STAI-State Anxiety Total Score	.12	.02	.05	-.16	.78**	.86**	.85**	1.00	
9. ASI-3 Total Score	.11	-.03	.10	-.11	.83**	.90**	.80**	.74**	1.00
M	-28.90	-26.30	-5.54	-25.48	11.14	30.78	39.00	34.23	16.95
(*SD*)	(44.05)	(40.19)	(53.38)	(38.46)	(10.53)	(12.33)	(10.92)	(12.60)	(12.73)

Note. BDI = Beck Depression Inventory; PCL-C = PTSD Checklist- Civilian Version; STAI = State-Trait Anxiety Inventory; ASI = Anxiety Sensitivity Inventory-3; * $p < .05$. ** $p < .01$.

Post Hoc Analyses

Reaction Times to Neutral Stimuli. As earlier described, the statistical test of the primary hypothesis of this study utilized interference scores computed by subtracting mean reaction time to neutral stimuli from mean reaction time to the other stimulus word types, respectively. The presence of *negative* interference scores, indicating that the reaction times were longer to neutral than other word types, prompted a post hoc examination of the reaction time data. To assess for overall differences in reaction times to word type, a repeated measures ANOVA was conducted to assess differences between abuse groups word type reaction time. Similar to those demonstrated with interference scores, results indicated a significant main effect of word type, F (4, 75) = 7.534, p <.01, partial eta squared = .384. Again, main effects for abuse group, F (4, 75) = .435, p = .649, partial eta squared = .011, and the interaction term, F (4, 75) = 1.229, p = .286, partial eta squared = .062 were not statistically significant (See Figure 2). Follow-up contrasts examining word type reaction times revealed significant difference between the Neutral (M = 647.26*ms*, SD = 97.96*ms*) and CSA-related word types (M = 641.32*ms*, SD = 101.31*ms*), which were not significantly different from each other, and the three other word types: positive interference (M = 626.71*ms*, SD = 92.11*ms*), threat interference (M = 626.75*ms*, SD = 99.17*ms*), and CEA interference (M = 630.36*ms*, SD = 96.52*ms*), such that participants demonstrated longer reaction time to neutral and CSA-related words than to other word types.

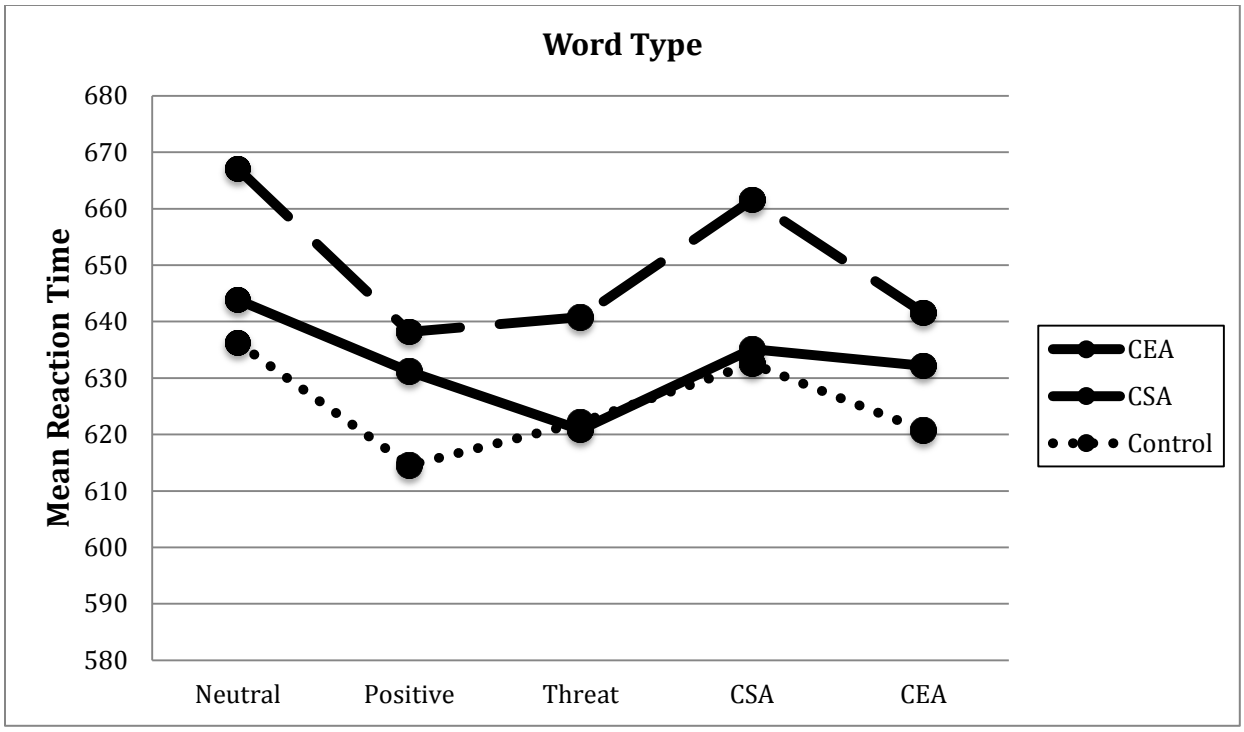

Figure 2. Impact of word type on Stroop reaction time by abuse group. Higher scores reflect slower reactions/longer response times.

Table 8
Means and Standard Deviations of Reaction Times by Word Type and Abuse Group

Word Type	CEA	CSA	Control
Neutral	643.83 (84.26)	667.1 (134.27)	636.28 (78.47)
Positive	631.15 (89.01)	638.2 (112.30)	614.55 (80.00)
Threat	620.83 (83.08)	640.79 (130.33)	622.12 (89.03)
CSA	635.15 (90.88)	661.55 (134.08)	632.53 (83.30)
CEA	632.15 (89.63)	641.61 (130.55)	620.76 (74.10)

Note. Standard deviations are in parentheses. Reaction times to Neutral and CSA words are significantly longer than reaction times to positive, threat, and CEA.

Group Differences in Word Ratings

Failure to find differences between abuse groups prompted two sets of exploratory analyses involving group differences in word ratings. The first set of analyses explored differences in perceived threat ratings of each word type between the abuse groups in Study 2. Theory involving the Stroop task holds that interference is due to the perceived threat of the word stimuli presented. To ensure that the word lists were "explicitly" perceived as threatening by the groups they were associated with (i.e., CEA group rating CEA-relevant words as more threatening, CSA group rating CSA-relevant words as more threatening) compared to the ratings of abuse groups, we tested group differences in the threat ratings for each word type. Similarly, a second set of analyses comparing group differences in CEA word ratings between Study 1 and Study 2 CEA groups was conducted to ensure that the CEA words selected from Study 1 were not sample specific.

To examine perceived threat between Study 2 abuse groups, one-way between groups ANOVAs were conducted to test for abuse group differences in overall threat (emotional valence) ratings for each word list. Statistically significant group differences were noted for ratings of positive words: F (2, 78) = 4.29, p = .02), CSA-related words: F (2, 76) = 4.93, p=.01, and CEA-related words: F(2, 77) = 6.80, p<.01. Mean word type ratings for each group are listed in Table 7. Post-hoc analyses using Bonferroni contrast tests indicated the mean for the CEA group (M = 1.45, SD = 0.88) was significantly higher than the control group (M = 1.05, SD = .18) on ratings of positive words. The mean threat ratings for CSA-related words were significantly higher for the CSA group (M = 4.15, SD = 1.47) than the control group (M = 2.92, SD = 1.46). Lastly, individuals in the CEA group (M = 3.56, SD = 1.39) indicated significantly greater threat ratings for CEA-related words compared to those in the CSA (M = 2.63, SD =

1.15) or control group (*M* = 2.42, *SD* = 1.13). Taken together, group differences support the idea that individuals within abuse groups found the word lists considered relevant to their abuse experiences as threatening.

Table 9
Mean Word Type Ratings by Group

Word Type	CEA	CSA	Control
Fruit	1.18 (0.53)	1.12 (0.28)	1.01 (.035)
Positive	1.45 (0.88)^{t}	1.11 (0.28)	1.05 (0.18)
Threat	4.03 (1.31)	3.87 (1.55)	3.31 (1.31)
CSA	3.44 (1.23)	4.15 (1.47)^{t}	2.92 (1.46)
CEA	3.56 (1.39)^{ot}	2.63 (1.15)	2.42 (1.31)

Note. Standard deviations are in parentheses. ^{x}Significantly higher than CEA group, ^{o}Significantly higher than CSA group ^{t}Significantly higher than Control Group.

To examine the generalizability of the CEA word list between the CEA groups in Study 1 and Study 2, a series of independent samples t-tests was conducted to ascertain any sample differences in perceived valence of the CEA-related words. Results of these analyses indicated rating differences in four of the ten words. Mean word ratings for each of the 10 words are listed in Table 8. Women in Study 1 rated the word "idiot" (M = 2.73, SD = 1.56) to be slightly more threatening than those in Study 2 (M= 1.00, SD = 0.00), $t(48) = 5.92$, $p < .001$. In contrast, women in Study 2 reported three words to have a higher valence than those in Study 1. More specifically, women in Study 2, respectively, reported the words "waste" (M = 2.64, SD = 1.49), "defective" (M = 3.04, SD = 1.64) and "inadequate" (M = 3.14, SD = 1.60) to be more threatening than women in Study 1, (M= 1.86, SD = 1.13), $t(48) = -2.10$, $p = .04$; (M= 1.81, SD = 1.37), $t(48) = -2.80$, $p = .01$; (M= 2.18, SD = 1.22), $t(48) = -2.41$, $p = .02$. Given that most word ratings between the two CEA groups were either equivalent or found more threatening by the second group supports the relevance and generalizability of the proposed CEA word list.

Table 10
Mean CEA Word Threat Ratings between Study 1 & Study 2 CEA Groups

CEA Word	Study 1	Study 2	*t*(48)
Foolish	1.77(1.11)	1.82(1.16)	-0.15
Waste	1.86(1.13)	2.64 (1.50)	-2.10*
Lousy	1.60 (0.91)	2.00 (1.14)	-1.40
Idiot	2.72 (1.55)	1.00 (0.00)	5.23**
Worthless	2.41 (1.53)	3.21 (1.52)	-1.85
Failure	2.95 (1.76)	3.18 (1.50)	-0.49
Pitiful	1.86 (1.08)	2.40 (1.47)	-1.41
Defective	1.82 (1.37)	3.04 (1.64)	-2.80**
Inadequate	2.18 (1.22)	3.14 (1.60)	-2.41**
Unimportant	2.32 (1.36)	2.86 (1.69)	-1.22

Note. Standard deviations are in parentheses. *$p < .05$. **$p < .01$

CHAPTER SEVEN

GENERAL DICUSSION

The results of the current studies support previous research that individuals do show differential Stroop interference to threatening word types; however it may be that past childhood experiences only play a small role in cognitive processing of environmental stimuli. Unfortunately, our hypotheses regarding differential Stroop performance based on history of child abuse were not fully realized. More specifically, the results of Study 2 offer support for the specified CSA group hypotheses, namely that those with a history of CSA do demonstrate increased Stroop interference to abuse-relevant words. Individuals within the CEA group, however, failed to demonstrate the specified relationship to CEA-related word type. Notably, CEA and control groups exhibited increased interference to CSA-related words, instead. The finding that individuals with CSA histories take longer to respond to CSA-related words is consistent within the current literature (Blake & Weinberger, 2006; Bremner et al., 2004; Coleman et al., 2008; Dubner & Motta, 1999; Field et al., 1999; Freeman & Beck, 2000; Klumpers et al., 2004; McNally et al., 2000; Waller & Ruddock, 1995); however, the failure to differentiate interference from the CSA-group and other groups on CSA-related words is generally inconsistent, but possibly understandable.

Although no differential effects were found between groups with regard to word-type interference, it is noteworthy and interesting that all of the college women sampled exhibited increased interference to the CSA-related words. A handful of studies (Dubner & Motta, 1999; Freeman & Beck, 2000; Naidich & Motta, 2000) have previously demonstrated shared

interference between groups hypothesized to show differential Stroop interference. For example, Freeman and Beck (2000) found similar cognitive interference to abuse-related words between three groups of adolescent girls (i.e., CSA with PTSD diagnosis, CSA with no PTSD diagnosis, and a non-abuse control group). Similar to the results cited above, the Freeman and Beck (2000) sample demonstrated increased, but not significantly different, interference scores within the two CSA groups compared to the control group.

A viable explanation for these findings, as well as those within the current study, is that these undifferentiated group performances are reflective of attentional bias to relevant concerns that may not be reflected by the grouping variable (Dubner & Motta, 1999; Freeman & Beck, 2000; Naidich & Motta, 2000). As Williams et al., 1996 note "relatedness to current concern is necessary to explain Stroop interference in nonclinical participants" (pg. 19). Given that college women are at an increased risk of experiencing a sexual assault relative to their age-matched non-college peers (Fisher, Cullen, & Turner, 2000), the CSA-related words (e.g., victim, rape, molester, fondle, oral sex, erection, trapped, penetrate, force) may have also conjured schemas or imagery of rape. Thus, the increased interference seen within the groups may be due to the increased concern and salience of sexual assault, in addition to interference conferred by the past CSA experiences of the CSA group.

An additional explanation for the increased interference to CSA-related words may be that there is a certain "shock value" associated with the CSA-related words. Thus, the emotional salience and intense reaction conveyed by these words could have been sufficient to alter the response time to these words compared to other word stimuli. While plausible, current theory regarding Stroop interference favors the idea of relatedness over that of emotional salience in predicting Stroop interference (Williams et al., 1996). While not yet explored within the area of

childhood maltreatment, Stroop interference studies exploring this phenomenon suggest that relevance of words outweighs the valence of such words, as the level of interference between comparably positively- and negatively-valenced words has been found to depend on the relevance of such words (Mathews & Klug, 1993).

The lack of interference to CEA-related words for the CEA group is counterintuitive given the hypothesized relevance of the words and the quantitative evidence that the women in Study 2 rated nine of the ten CEA-related words as being equivalent or more emotionally salient than the sample of women in Study 1. However, as noted above, if current Stroop theory holds that "relatedness to current concern" (pg.19, Williams et al., 1996) is sufficient in non-clinical populations to produce a Stroop interference effect, it may be that while upsetting or threatening, the current CEA-related words were not specific-enough or relevant to the individuals in the CEA group. Instead, it may be that words specific to each individual's abuse experience (i.e., relevance) may be more salient than a general list of the experience-based, hypothetically related words (Freeman & Beck, 2000; Gilboa-Schectman et al., 2000; Matthews & Klug, 1993). Riemann and McNally (1995) demonstrated the importance of relevance by examining Stroop interference to words related to four (two positive, two negative) content areas specific to each study participant theorized to represent areas of their greatest concerns. Results of the study suggested that words from the highest negative and highest positive content area produced the highest interference. Accordingly, while it is clear that the current CEA-related words are emotionally salient to the current CEA group, these words might not be personally relevant enough to cause attentional bias.

It is unclear why the current study failed to find any connection between Stroop interference (or general response time) and abuse history for any participant group. These

findings are inconsistent with much of the established Stroop literature testing the association between psychological symptoms and cognitive processing in sub-clinical or college samples (Amir et al., 2003; Gilboa-Schechtman et al., 2000; Gotlib & McCann, 1984; Matthews & McLeod, 1985; Mogg et al., 1989; Williams et al., 1996). It is important to note that the results expressed in such articles were conducted through a heterogeneous collection of Stroop methods (e.g., blocked vs. randomized word presentation; dot-probe paradigm vs. Stroop paradigm) and utilized participants with varying level of psychopathology. In comparison to previous studies, the current sample endorsed relatively few psychological symptoms; however, the current CEA sample did endorse mild depression and posttraumatic stress symptomatology. Based on the work of Gilboa-Schechtman et al. (2000), it seems there may be two reasons as to why participants' symptoms were unrelated. First, as described above, the lack of personal relevance within the current word list could be to blame. Second, the participants' current mood may have impacted the level (or lack) of interference seen.

Gilboa-Schectman et al. (2000) found that interference to negative- and positive-emotion words were specific to negative and positive priming conditions prior to Stroop completion, given that affective mood states often increase automatic processing of environmental stimuli (Richards, French, Johnson, Naparstek, & Williams, 1992). Thus, while some participants endorsed mild to moderate psychological symptoms, which could have impacted testing, this effect may have been made more evident following the use of an emotional priming task. Lastly, one must consider the results of a recent review, which evaluated the robustness of the Stoop effect within the context of PTSD.

In comparing the results of published research and dissertation abstracts, Kimble, Frueh, and Marks (2009) found significant publication bias within the Stroop literature, such that 75%

of dissertation abstracts and 66% of peer-reviewed literature failed to find Stroop interference to trauma-related words in individuals with PTSD across several specific types of trauma (including CSA and CPA). The authors concluded that the current bias within the literature was due to both a "bottom" and "top" file drawer effect. That is, studies that did find Stroop effects were conducted by highly regarded researchers within trauma research and were published in journals with high impact factors, whereas those that did not often went unpublished.

Taken together, it seems there are four possible reasons for the failure to relate current psychological symptoms and Stroop interference: the relative lack of psychological symptoms within the majority of the sample, reduced personal relevance of words, the absence of an affective prime, or even a general misperception within the current literature regarding the robustness of the Stroop effect.

Limitations

While the current study is novel in many ways, it is not without limitations. First the current sample is fairly homogenous. Both Study 1 and Study 2 were primarily composed of Caucasian undergraduate women in their late teens. The demographic make-up of the current study limits the generalizability of the findings to only such women as were included within the current study. Within the set parameters for abuse history, the women in Study 2 experienced varying levels of severity of abuse at different time points within their lives. For example, two women within the CEA or CSA group could have experienced very different abusive experiences (e.g. moderate severity vs. extreme severity) that lead to their eligibility for study participation. It may be that these idiosyncrasies could have muted the Stroop effect, and had the current study employed more stringent inclusion criteria (i.e. severe CEA or CSA only), the current effects may have more similarly mimicked the results in the early CSA studies cited

previously. Additionally, it was aim of the study to collect data from women with distinct (i.e. non-comorbid) abuse experiences; however the current sample of women may represent a more distinct group of abuse survivors than might exist within the normal population. It is, however, noteworthy that these women are coping with a mild degree of posttraumatic stress, depressive symptomatology, and anxiety sensitivity that may stem from such abuse experiences.

In addition to sample limitations, there are several methodological limitations that might have impacted our ability to find stronger and different effects. As suggested above, the current results for CEA-related words may be muted for several reasons. One such reason may be due to reduced relevance of the CEA words presented. Previous studies have suggested more robust effects when words are selected by the participant as self-relevant, regardless of the level of emotionality associated with the words (Mathews & Klug, 1993; Riemann & McNally, 1995; Williams et al., 1996). An additional reason for the reduced impact of current psychopathology on symptoms may have to been due to the lack of an eliciting prime aimed at modifying study participants' affect prior to completion of the Stroop paradigm (Gilboa-Schectman et al., 2000; Richards et al., 1992). Lastly, it is important to consider the characteristics of the particular Stroop paradigm selected for use in the current study.

Previous research has suggested that larger Stroop interference effects have been found when using a blocked, rather than the randomized, designs (Williams et al., 1996), that is, all words from one word type are shown in succession during a single block and subsequent blocks with additional word types are completed in succession, rather than the successive presentation of randomized words within a single block utilized within the current study. Indeed, Waters, Sayette, Franken, and Schwartz (2005) note robust effects showing that participants exhibit larger Stroop effects when presented with the blocked format given the carry-over from word to

word, which allows cognitive bias to compound upon cognitive bias, totaling in increased interference to a specific word type. Notably, the effect is theorized to be most robust within the group of interest. Waters et al. (2005) argue further that mixed blocks also generate a carry-over effect, however this carry-over effect slows cognitive processing from word to word (i.e. word type to word type), muting robust effects that might be more salient within a blocked design. Despite suggestions that randomized presentation designs lead to a smaller, less robust effect, it is important to consider the generalizability of each method and the hypothesized cuing that occurs within real life settings. More specifically, a randomized design postulates attentional bias cues are expected to appear sporadically and more subtly within the individual's environment, whereas a blocked presentation design (as used in addictions or eating pathology research) lends itself to environments where attentional bias cues are more obvious and salient (Waters et al., 2005). Given the way abuse factors are postulated to shape interpretations based on subtle environmental cues, it seems that the use of randomized presentation, while a current limitation, most likely reflects the effect that would be expected within adults with histories of childhood abuse.

Implications and Future Directions

Despite limitations, this study is novel and noteworthy for several reasons, as it currently expands, confirms, and challenges the extant literature in several ways. Foremost, this study is the first to examine Stroop interference within a sample of women with histories of moderate to extreme CEA. Also noteworthy is the development and use of a novel list of words hypothesized to be related to CEA experiences for use in a modified emotional Stroop task. Additionally, the use of two comparison groups (i.e., CSA survivors and a no abuse control group) in addition to a more rigorous presentation design, allowed for a stringent test of the

current hypothesized relationship between cognitive processing of word stimuli and childhood experiences.

The results of current study confirm previous findings that women with histories of CSA evidence increased Stroop interference to CSA-related words. Notably, the two other groups also demonstrated this interference to CSA-related words, but not to any other word type. While unexpected, these findings contribute to the current literature by supporting similar, yet overlooked, findings within previous literature (Dubner & Motta, 1999; Freeman & Beck, 2000; Naidich & Motta, 2000) and by supporting a theory regarding the contribution of more salient and relevant stimuli to Stroop interference (Mathews & Klug, 1993; Riemann & McNally, 1995; Williams et al., 1996).

Given the results of the current study and the limitations discussed above, it is not currently possible to draw any specific conclusions about the presence, or impact, of cognitive bias in survivors of CEA to CEA-related stimuli. However, the findings of this study provide several avenues for future research. More specifically, future research in this area may wish either to utilize an emotional induction or priming task (Mogg, Mathews, Bird & McGregor-Morris, 1990; Williams et al., 1996) prior to administration of the Stroop task or a blocked design for word presentation, as previous research has demonstrated greater effects following these two methodological aspects. Moreover, future studies may wish to explore the interference phenomenon within more homogenous abuse groups (i.e. those with similar severities or abuse characteristics), as this may help to reduce superfluous variance due to idiosyncratic abuse factors.

Despite unexpected findings, this study expands the rationale for, and possibility of, further assessment of attentional bias within female survivors of CEA. Given differences in self-

reported levels of current psychopathology noted between abuse and control groups, particularly for those individuals with CEA histories, it is clear that there is still much work to be done in understanding how emotionally abusive experiences lead to maladjustment later in life. Past evidence and current research supports the notion that self-relevant stimuli and past experiences have the power to shape systems of attention and perception and increase risk for the development of psychological disorders, such as depression and anxiety. While it is still unclear how experiences of CEA shape attentional bias to later influence perception of relevant events and saliency of ongoing concerns, this is still an area of ongoing interest that may lead to a fuller understanding of processes involved in forming adult outcomes of CEA survivors. It is hoped that ongoing attentional bias theory may be cultivated and expanded upon through the findings of the current study and that research will continue to elucidate the possible connections between childhood experiences, attentional bias, and psychopathology.

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APPENDICES

Appendix A

List of Hypothesized CEA-Related Words Considered for Inclusion in Study 2

1. Awful
2. Deficient
3. Defective
4. Disgusting
5. Dull
6. Dumb
7. Failure
8. Fat
9. Faulty
10. Fool
11. Foolish
12. Freak
13. Gross
14. Hideous
15. Idiot
16. Inadequate
17. Incompetent
18. Jerk
19. Lame
20. Lazy
21. Loser
22. Lousy
23. Mediocre
24. Moron
25. Nasty
26. Pathetic
27. Pitiful
28. Repulsive
29. Revolting
30. Sickening
31. Sorry
32. Stupid
33. Terrible
34. Trash
35. Trashy
36. Ugly
37. Unimportant
38. Useless
39. Waste
40. Weak
41. Weird
42. Worthless

Appendix B

Summary of Hierarchical Multiple Regression Analyses Predicting Stroop Interference to Abuse-Specific Words

Model 1. Abuse experience and depression predicting interference to abuse-related words

Step 1	ΔR^2	β
Abuse Experience	0.00	0.07
Step 2		
Depressive Symptoms	0.01	0.10
Step 3		
Abuse Experience x Depression	0.00	-0.01

Model 2. Abuse experience and posttraumatic stress symptoms predicting interference to abuse-specific words

Step 1	ΔR^2	β
Abuse Experience	0.00	0.07
Step 2		
Posttraumatic Stress Symptoms	0.01	0.08
Step 3		
Abuse Experience x Posttraumatic Stress Symptoms	0.01	0.32

Model 3. Abuse experience and anxiety sensitivity predicting interference to abuse-specific words

Step 1	ΔR^2	β
Abuse Experience	0.00	0.07
Step 2		
Anxiety Sensitivity	0.00	0.02
Step 3		
Abuse Experience x Anxiety Sensitivity	0.01	0.17

Model 4. Abuse experience and trait anxiety predicting interference to abuse-specific words

Step 1	ΔR^2	β
Abuse Experience	0.00	0.07
Step 2		
Trait Anxiety	0.00	0.08
Step 3		
Abuse Experience x Trait Anxiety	0.01	0.48

Model 5. Abuse Experience and state anxiety predicting interference to abuse-specific words

Step 1	ΔR^2	β
Abuse Experience	0.00	0.07
Step 2		
State Anxiety	0.00	0.07
Step 3		
Abuse Experience x State Anxiety	0.00	-0.02

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