A Treatment Feasibility Study of an Attention Retraining Approach for Post-traumatic Stress Disorder

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Abstract

Information-processing studies have shown an attentional bias (AB) towards threat cues in individuals with anxiety disorders. Research has consistently shown that AB to threat may play a causal role in the development and maintenance of anxiety disorders. Recent empirical evidence has demonstrated support for Attention Retraining (AR) to modify AB to threat, resulting in reductions of anxiety. Currently, AR approaches have not been systematically tested in individuals with Post-traumatic Stress Disorder (PTSD). The purpose of this study was to assess the feasibility of a computer-based attention retraining (CBAR) treatment for clinical levels of PTSD using a modified dot-probe paradigm. A single-case time-series design was employed with a treatment and post-treatment period, following baseline. Results indicated significant reductions in trauma-related symptoms, attention to threat cues, state anxiety and depression, along with a significant increase in coping self-efficacy. AB change for the group was not significant. A significant relationship between AB change and PTSD symptoms was found. The results were discussed from the standpoint of the viability of AR for trauma.

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Dedication

This thesis is dedicated to my mother. Her unwavering encouragement throughout my education has provided the foundation needed to persevere and accomplish my goals. Her steadfast support and love has been invaluable.

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1.0 - Introduction

PTSD is a multifaceted psychological disorder with devastating consequences to the individual. In the general population, 60% of men and 51% of women report experiencing at least one traumatic event, producing a lifetime prevalence rate of PTSD in 7.8% of these individuals (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). According to Anthony & Barlow (2002), individuals with PTSD are more likely to experience difficulties and impairment of functioning, exhibited by problems with social support, coping deficits, suicidal behavior, higher divorce rates, problems with child rearing, and domestic violence, as well as poor health outcomes, less life satisfaction, lower income, and frequent job changes. Cognitive Behavioral Treatments (CBTs) are an effective treatment option (Litz & Roemer, 1996; Resick & Calhoun, 2001, as cited in Barlow, 2001) though few mental health workers are trained in these techniques and the approach is demanding and time-consuming. Needed are approaches that could be administered briefly and with less emotional demands on the PTSD sufferer.

According to information-processing theories, cognitive biases play an important role in the development and maintenance of anxiety disorders. There are several models in the theoretical literature for information-processing biases related to anxiety and attention to threat (e.g., Beck, Emery, & Greenberg, 1985; Bower, 1981; Foa & Kozak, 1986; Lang & Craske, 1997; Mathews, 1990; Mathews & Mackintosh, 1998; Mathews & MacLeod, 2002; Williams, Watts, MacLeod, & Mathews, 1988). In one of the earliest models for understanding emotional disorders, Beck et al. (1985) argued that anxiety is characterized by information-processing biases and that biased processing of emotional information serves to maintain the psychopathology (e.g., Beck, 1976; Dalgleish, et al., 2003).

According to this model, anxiety is associated with hypersensitive alarm systems, characterized by a cognitive processing style known as the "vulnerability mode." The vulnerability mode represents an organization of cognitive structures (threat schema) that orient the individual to threatening situations, thus preferentially attending to threat-relevant details from the environment congruent to threat schemas (Beck & Clark, 1997; Beck et al., 1985). In this mode of processing, dysfunctional schemas produce hypersensitivity to threat cues and hyposensitivity to safety cues, with increased hypervigilance, physiological arousal and vulnerability to threat (Beck et al., 1985).

Accordingly, attentional bias (AB) to threat has been proposed to play a causal role in the development and maintenance of anxiety (MacLeod & Hagan, 1992; MacLeod, Rutherford, & Campbell, 2002; Mathews, 1990; Mogg, Bradley, & Williams, 1995; Mogg, Bradley De Bono, & Painter, 1997). Considerable research has established support that clinically anxious individuals process information differently than non-clinical populations, finding an AB for threat-relevant stimuli in anxious individuals (e.g., MacLeod, Mathews, & Tata, 1986; Mogg, Mathews, & Weinman, 1989; MacLeod & Mathews, 1991). Of significance to the present investigation are studies that conclude anxious individuals are biased toward threat cues in pre-attentive and attentive processes (e.g., Mathews, 1990; Mogg & Bradley, 1998; Williams et al., 1988). As such, researchers have argued that AB toward threat occurs during early, automatic stages of processing in anxious individuals (Amir, Foa, & Coles, 1998; MacLeod & Mathews, 1988, 1991; Mogg & Bradley, 1998; Williams, Watts, MacLeod, & Matthews, 1997).

Consistent with other anxiety disorders, many studies have found information-processing biases reflecting AB to threat (hypervigilance) toward trauma-specific threatening stimuli in individuals with PTSD (e.g., Buckley, Blanchard, & Neill, 2000; Harvey, Bryant, & Rapee, 1997; Thrasher, Dalgleish, & Yule, 1994). Similar to the anxiety literature, Heim, Owens, Plotsky, and Nemeroff (1997) proposed that trauma has marked and enduring effects on the development of maladaptive information processing biases.

Based on Lang's emotional processing theory (1977), researchers argue that AB associated with PTSD results from fear network development composed of mental fear structures associated with the trauma (Bryant & Harvey, 1997; Foa & Kozak, 1986; Foa, Steketee, & Rothbaum, 1989; Lang, 1977; Resick & Calhoun, 2001, as cited in Barlow, 2001). In comparison to other anxiety disorders, fear structures guide the interpretation of events as dangerous. Researchers have proposed that these fear structures are always activated in individuals with PTSD and this "survivor mode" of processing accounts for the persistent reexperiencing and hyperarousal characteristic of PTSD (Brewin & Holmes, 2003; Bryant & Harvey, 1995; Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988, as cited in Barlow, 2001; Litz & Roemer, 1996; Litz et al., 1996).

Consequently, once this fear network is activated, stimuli that resemble the trauma evoke exaggerated behavioral and cognitive responses manifested as the core features of PTSD. Activation manifests as heightened arousal (hypervigilance to perceived threat), reexperiencing

(information related to threatening stimuli enters consciousness), and avoidance (resulting from attempts to suppress intrusive symptoms) (Brewin & Holmes, 2003; Foa et al., 1989; Foa, Huppert & Cahill, 2006; Resick & Calhoun, 2001, as cited in Barlow, 2001). Selective attention to threat functions to confirm beliefs of danger and vulnerability (Litz & Keane, 1989, as cited in Anthony & Barlow, 2002). Heightened attention to threat is not adaptive in the absence of danger, and biased information processing precludes adaptive information from correcting the fear structure (Foa et al., 1989). Supporting these assumptions, researchers have found that trauma survivors who develop PTSD have threat biases in attention, cue interpretation and memory (Constans, J., 2005; Vasterling & Brailey, 2005). In a review by Buckley, Blanchard, and Neill (2000), individuals with PTSD demonstrate biases toward threatening stimuli relevant to their traumatic experiences. These biases may be etiologically relevant to the development of PTSD. AB to threat stimuli may lead to chronic overarousal and increased stress vulnerability contributing to the development and maintenance of PTSD (MacLeod et al., 2002).

AB for visual information may be particularly relevant to PTSD-related psychopathology (Foa et al., 1989). AB in PTSD has been evaluated using both the Stroop and the dot-probe experimental paradigms, using both subliminal and supraliminal presentation of stimuli (Buckley, et al., 2000; Buckley, Blanchard, & Hickling, 2002; MacLeod, 2005). The dot-probe paradigm offers advantages over the Stroop approach in measuring pre-attentive and attentive processes. MacLeod et al. (1986) developed the dot-probe paradigm to provide a direct examination of AB by measuring response time toward or away from threat stimuli (Mogg & Bradley, 1999). Unlike the Stroop task, the dot-probe task does not rely on cognitive interference to measure attention allocation. Moreover, the dot-probe paradigm mitigates response bias by having participants provide a neutral response, pressing a button, to a neutral stimulus (dot-probe) (Dalgleish, Moadi, Taghavi, Neshat Doost, &Yule, 2001; MacLeod et al., 1986; Mogg & Bradley, 1998).

In the dot-probe task, a threatening word and a neutral word are simultaneously presented on a computer screen and appear for a brief duration (500 to 1500 milliseconds). Following the presentation of these stimuli, a dot-probe appears in the position of one of the word stimuli (threat or neutral). The participant's task is to press a button that corresponds to the position of the probe on the screen. The task is considered a pure measure of visual attention since participants will respond to the probe faster if already attending to that spatial location. AB

toward threat is indicated by faster reaction times (RT) to probes that replace threat word stimuli (Bar-Haim, Lamy, Pergamin, 2007; Bryant & Harvey, 1997; Dalgleish et al., 2001).
The dot-probe task has been used to demonstrate AB in individuals with PTSD (Ononaiye, Turpin, Reidy, 2007). For example, Bryant and Harvey (1997) found an AB toward threat in adult victims of motor vehicle accidents with clinical or subclinical levels of PTSD. While the typical finding in individuals with PTSD has been toward a bias toward threat stimuli, Elsesser Sartory, and Tackenberg (2004) reported a differential bias depending on whether the victims had acute or chronic trauma reactions. Trauma survivors with Acute Stress Disorder demonstrated a tendency to direct their attention away from trauma-related pictures, while survivors with chronic PTSD directed their attention toward trauma-related pictures. In their 2005 study, Elsesser and colleagues used the dot-probe task to compare recent trauma survivors and a control group - trauma survivors took significantly longer to respond to trauma-relevant stimuli. Combined, these studies present a mixed picture of whether individuals with PTSD have a bias toward or away from threat cues, with such bias possibly varying depending on the duration since the traumatic event.

Researchers have developed interventions for anxiety disorders based on these information-processing biases. These interventions attempt to modify negative AB, which in turn leads to reductions in anxiety (MacLeod & Hagan, 1992; MacLeod et al., 2002; Hazen, Vasey, & Schmidt, 2009). MacLeod et al. (2002) concluded that AR is causally related to reductions in anxiety symptoms. AR treatments have been used successfully for individuals with panic disorder, social phobia, specific phobia, obsessive-compulsive disorder, and generalized anxiety disorder (Amir, Najmi, & Morrison, 2009; Amir, Weber, Beard, Bomyea, & Taylor, 2008; Hazen, et al., 2009; MacLeod et. al., 2002; Wells, A., 1990; Wells, White, & Carter, 1997). In these studies, AR interventions modified both AB and clinical symptoms of anxiety, with maintenance of treatment effects at one-year follow-up.

To date, however, no study has examined whether AR can improve adjustment for individuals with PTSD. Cognitive-behavioral treatments (CBT) for PTSD, among the most effective treatments available, rely on the application of conscious strategies, such as cognitive restructuring and exposure, to produce improvement. While such approaches are thought to change trauma response at an information processing level, they do not target attention factors, considered key in the information processing sequence of information storing and retrieval.

Based on information-processing theory and extensive research of AR in other anxiety-related disorders, it will be argued by the present author that modification of AB using AR may lead to symptom improvement in PTSD and thus, be a feasible treatment approach for trauma.

1.1 - Hypotheses

Existing research has not yet tested AR approaches for trauma, thus the current study aimed to evaluate the feasibility of a CBAR intervention for PTSD and to demonstrate the relationship between improvement in AB and PTSD-related symptoms. Toward this end, the following hypotheses were examined:

Hypothesis 1. Participants will experience a significant reduction in trauma-related symptoms from the baseline period through the treatment and post-treatment periods;

Hypothesis 2. Participants will experience a significant reduction in symptoms of state anxiety and depression as a function of the treatment intervention;

Hypothesis 3. Participants will experience an increase in efficacy for coping, reflecting a perception that they can deal effectively with trauma-related situations;

Hypothesis 4. Participants will experience significant reductions in AB to threat from baseline through the treatment and post-treatment periods; and

Hypothesis 5. For participants who experience symptom reduction, there will be significant correlations between reductions in AB to threat and symptom reduction through the baseline and treatment periods.

2.0 - Method

2.1 - Participants

The final sample of participants consisted of six adults (5 females, 1 male) from the community and the Virginia Tech student population (aged 19-48) who met inclusion criteria (See Table 1 for participant characteristics). Participants were treatment in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 2002). The study was approved by the IRB of Virginia Tech.

Participants were eligible to participate in the study if they met criteria for PTSD (clinical or sub-clinical level) as assessed by the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I PTSD Module) (see description of measure below). Eligible participants experienced their target trauma since adolescence (age 12). Participants prescribed psychotropic medications agreed to remain on their current dosage for the duration of treatment. No

participants were receiving treatment during the study, and the participants taking psychotropic medication did not report any changes during the study (two of the six participants). Exclusion criteria included: 1) a current, self-reported diagnosis of Bipolar I Disorder and/or Psychosis; 2) individuals not stabilized on psychotropic medication for one month or longer; and 3) current, self-reported problems with substance abuse/dependence.

All participants in the final sample met clinical criteria for a DSM-IV diagnosis of PTSD at baseline per the clinical interview (SCID-I), defined as meeting the following criterion: 1) Criterion A: Exposure to a traumatic event, with a response involving intense fear, helplessness, or horror; 2) Criterion B: one (or more) symptoms of persistent re-experiencing; 3) Criterion C: three (or more) symptoms of persistent avoidance of stimuli associated with trauma and numbing of general responsiveness (not present before the trauma); 4) Criterion D: two (or more) persistent symptoms of increased arousal; Criterion E: duration of the symptoms (Criteria B, C, and D) is more than one month; and Criterion F: symptoms cause clinically significant distress or impairment in important areas of functioning (American Psychiatric Association, 2000).

Inter-rater reliability. The administration of the structured diagnostic interview (SCID-I -PTSD Module) was tape-recorded for each participant at the pre-baseline, post-baseline, and post-treatment assessment. An independent rater reviewed the structured diagnostic interviews at pre-treatment for participants comprising the final sample. The rater did not serve as an experimenter in this study and was kept blind to the treatment purposes. Kappa coefficients were computed to determine level of agreement/disagreement (Fleiss, Levin, & Paik, 2003; Spitzer, Cohen, Fleiss, & Endicott, 1967). In this study, kappas were computed for the presence or absence of each symptom and for diagnosis of PTSD. For the study sample (6 participants), a kappa of 0.98 was indicated for presence or absence of PTSD symptom, with a kappa of 1.0 (perfect agreement) for diagnosis.

Participant 1. Participant 1 is a 24-year-old, single, Caucasian female who was recruited from the community and unemployed. Her highest level of completed education was high school, though she reported attending two years of college. Current and/or prior counseling history was denied. Illicit drug and alcohol consumption were denied. Participant 1 was taking several medications begun in 2007 (i.e., Celexa for depression, Methadone for pain relief, and Nexium for acid reflux). This participant agreed to remain on psychotropic medication during the baseline and treatment phases of this study and to notify the experimenter if there were any

changes. Completion of the Stressful Event History (SEH) revealed a history of serious life-threatening illness and sexual assault as a child. According to the SCID-I-PTSD Module, the participant met clinical criteria for PTSD. The traumatic event targeted in this study was related to a life-threatening illness occurring subsequent to surgery for gallstones. Reportedly, the liver and digestive tract were severed resulting in the possibility of death. The participant reported intense feelings of fear and helplessness. Multiple related surgeries were reported, with the last in June 2009. Participant 1 endorsed four of the five symptoms of Criterion B-Re-experiencing, seven of the seven symptoms of Criterion C-Avoidance, and three of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since the surgery in May 2007 and were experienced in the past month. Significant distress and impairment were reported.

Participant 2. Participant 2 is a 19-year-old, single, Caucasian female who is a full-time student at Virginia Tech. Current and/or prior counseling history was denied. Drug and alcohol consumption were denied. Traumatic events from the SEH revealed a history of sexual and physical assault as a child, having a close friend or family member be killed, being threatened with a weapon, and having a relative she lived with die by suicide. The targeted event in this study was having a relative die by suicide as the participant indicated that this was the most traumatic and distressing. The participant witnessed her mother's suicide in March 2008. According to the SCID-I-PTSD Module the participant met clinical criteria for PTSD. The participant reported intense feelings of fear, helplessness, and horror and endorsed five of the five symptoms of Criterion B-Re-experiencing, seven of the seven symptoms of Criterion C-Avoidance, and five of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since the trauma in March 2008 and were experienced in the past month. Significant distress and impairment were reported.

Participant 3. Participant 3 is a 48-year-old, single, Caucasian female who was recruited from the community and was employed at Virginia Tech. It should be noted that Participant 3 was prescribed antidepressant medication, Effexor XR, and Valium for anxiety since July 2007. The participant agreed to remain on her current dose of medications during the baseline and treatment phases of this study and to notify the experimenter if there were any changes. No changes were reported. The participant reported receiving psychological treatment related to head pain. Reportedly, since there was no documented medical reason, the participant feels her

difficulties are psychosomatic. No improvements in symptoms were reported in the last 6 months prior to the study. Prior and/or current treatment for PTSD or related symptoms was denied. Drug and alcohol consumption were denied. Completion of the SEH revealed a history of a motor vehicle accident (MVA), April 16th shooting at Virginia Tech, and involuntary psychiatric hospitalization. The traumatic event targeted in this study was the involuntary psychiatric hospitalization. Reportedly, the participant was hospitalized subsequent to her fear of death and serious illness due to unrelenting and undiagnosed medical symptoms (i.e., head and tooth pain). According to the SCID-I-PTSD Module (see description of measure below), the participant met clinical criteria for PTSD. The participant reported intense feelings of fear and helplessness. Participant 3 endorsed five of the five symptoms of Criterion B-Re-experiencing, five of the seven symptoms of Criterion C-Avoidance, and three of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since the hospitalization in June 2007 and were experienced in the past month. Significant distress and impairment were reported.

Participant 4. Participant 4 is a 20-year-old, single, Indian male who was a full-time student at Virginia Tech. Drug consumption was denied. Alcohol consumption was reported (two drinks, twice per week). Completion of the SEH revealed being in a life-threatening motor vehicle accident (MVA) which involved watching others be seriously injured (i.e., mother and father in MVA), having a family member killed (i.e., aunt and uncle), and sexual assault as a child (at age 5). According to the SCID-I-PTSD Module the participant met clinical criteria for PTSD. The traumatic event targeted in this study was related to the MVA in 2005. The participant was the driver and lost control of the vehicle resulting in life-threatening injuries to his mother and father. The participant reported intense feelings of fear helplessness, and horror. Participant 4 endorsed five of the five symptoms of Criterion B-Re-experiencing, six of the seven symptoms of Criterion C-Avoidance, and five of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since the MVA in November 2005 and all symptoms were experienced in the past month. Significant distress and impairment were reported.

Participant 5. Participant 5 is a 19-year-old, single, Asian female who is enrolled full-time at Virginia Tech. Current and/or prior counseling history was denied. Drug and alcohol consumption were denied. Completion of the SEH revealed having a close friend or family

member killed. The participant reported being close friends with the two Virginia Tech students recently murdered at Jefferson Forest National Park. According to the SCID-I-PTSD Module the participant met clinical criteria for PTSD. The traumatic event targeted in this study was related to the murder of her close friends and was considered vicarious traumatization. The participant reported intense feelings of fear and helplessness related to the trauma. Participant 5 endorsed five of the five symptoms of Criterion B-Re-experiencing, three of the seven symptoms of Criterion C-Avoidance, and five of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since the trauma in August 2009 and all symptoms were experienced in the past month. Significant distress and impairment were reported.

Participant 6. Participant 6 is a 20-year-old, single, Caucasian female who is enrolled full-time at Virginia Tech and is also employed part-time. Current and/or prior counseling history were denied. Drug use was denied. Alcohol consumption was reported (4 beverages, 2 times a week). Completion of the SEH revealed a history of sexual and physical assault. The participant reported being sexually and physically assaulted multiple times during an abusive relationship. The abuse lasted approximately five years beginning in 2003 and the participant reported intense feelings of fear and helplessness. According to the SCID-I-PTSD Module, the participant met clinical criteria for PTSD. The traumatic event targeted in this study was related to the sexual assault as this was indicated as the most distressing trauma and related to her current difficulties. The participant reported intense feelings of fear and helplessness. Participant 6 endorsed five of the five symptoms of Criterion B-Re-experiencing, four of the seven symptoms of Criterion C-Avoidance, and four of the five symptoms of Criterion D-Hyperarousal. These reported symptoms began and have persisted since February 2004 and all symptoms were experienced in the past month. Significant distress and impairment were reported.

2.2 - Procedures

Participants were recruited through the SONA Experiment Management System, Department of Psychology at Virginia Tech, as well as through flyers placed on campus and in the surrounding community (see Appendix A). Virginia Tech students interested in participating in the study accessed the Department of Psychology's secure SONA site where they were given a description of the study (see Appendix B). Students that remained interested were required to sign an Internet informed consent (IIC) and informed that they could withdraw at anytime (eee

Appendix C). The initial screening was accomplished using a preliminary Internet screen (see Appendix D), with more detailed screening and comprehensive informed consent (CIC) accomplished in a face-to-face interview (see Appendix E). Participants recruited through SONA were permitted to receive up to ten points of extra credit for participating in research experiments. Typically, students earn one point of extra credit per hour of research participation.

For participants recruited through SONA, the study consisted of four parts. Part I was completed online through survey.vt.edu, in which participants read the study description, gave Internet Informed Consent, and completed preliminary screening questions (1-point extra credit). Students meeting eligibility criteria per the preliminary screening questionnaire were invited by the researcher to participate in Part II (in-person pre-baseline intake assessment) and provided with an invitation code to sign up for participation (2-points extra credit). Participants deemed to have met the eligibility criteria per the pre-baseline assessment were invited to begin Part III. Part III (baseline phase) consisted of the baseline phase and post-baseline assessment (3-points extra credit). Participants that completed the baseline phase were invited to begin Part IV (treatment phase, post-treatment phase, and post-treatment assessment) (9-points extra credit). Thus, treatment completers received the maximum amount of extra credit (10-points).

Participants recruited from the Blacksburg and surrounding community contacted the experimenter by means of email per flyer information. Individuals expressing interest in the study were emailed a study description and CIC to review by the researcher. Those that remained interested in the study and felt they met inclusion criteria were asked to provide a telephone number and available contact times in order to arrange a brief telephone interview for preliminary screening. During the telephone interview, a brief study description was given, any questions regarding the description were answered, and verbal consent to complete the preliminary screening questions was obtained. Individuals that met eligibility criteria per the preliminary screening assessment were scheduled to attend the in-person pre-baseline intake assessment. Those deemed to have met the eligibility criteria per the pre-baseline assessment were invited to the baseline phase, followed by the treatment and post-treatment phases. Community-based individuals did not receive compensation for study participation.

Anticipating treatment dropouts, twelve eligible participants were recruited for the study. The final sample of participants completed all assessments over the baseline phase. Completion of the baseline phase consisted of the pre-baseline assessment, completion of all self-monitoring

measures during the baseline phase (seven assessments measured every three days for a three-week period), and the post-baseline assessment. Participants completing the baseline phase began the treatment phase, which consisted of eight AR treatment sessions (two times a week for a four-week period). These participants then began the post-treatment phase, completing self-monitoring measures during the two-week post-treatment phase (four assessments measured every three days), and subsequently attended the post-treatment assessment.

Of the 243 students who completed Part I-preliminary screening, 59 (24%) were eligible and invited to participate in Part II-pre-baseline intake assessment. Individuals were ineligible for the study for not meeting criteria for PTSD (clinical or subclinical) or for completing the preliminary screening questionnaire in error (e.g., no experience of trauma). Of the 59 students who were invited, 27 (46%) attended the pre-baseline assessment. Of the 27 participants that completed the pre-baseline assessment and met inclusion criteria, 12 (44%) were invited to participate in Part III-baseline phase. Of the 12 participants that began the baseline phase, 6 (50%) completed self-report measures (7 assessments) and were invited to participate in Part IV-treatment phase. Participants who did not begin the treatment phase of the study failed to return the baseline assessments and did not respond to email prompts. Of the 6 participants that began the treatment phase, all (100%) completed the treatment phase, post-treatment phase, and post-treatment assessment (see Figure 1 for participant flowchart).

Baseline Phase. During the pre-baseline assessment, each participant gave Informed Consent. Once consent to participate was obtained, the SCID-I-PTSD Module was administered in order to ensure participants met DSM-IV diagnostic criteria for PTSD (clinical or subclinical). Following the administration of the SCID-I-PTSD Module, the following self-report measures were completed: (a) Demographic Information Form, (b) Stressful Experience History (SEH), (c) Stressful Responses Questionnaire (SRQ), (d) State-Trait Anxiety Inventory-State Scale (STAI-S), (e) Center for Epidemiological Studies-Depression Scale (CES-D), (f) Impact of Events Scale-Revised (IES-R), (g) Self-Efficacy Scale (SES), and the (h) Rating Scale for Word Stimuli (WRS) (see description of measures below). Participants were then administered the dot-probe task with no differential reinforcement in order to assess for AB and establish a baseline to compare to AB in the post-treatment phase (see description of dot-probe task below).

Following the in-person pre-baseline assessment, eligible participants received an assessment packet, including the dependent measures, to be completed every three days during the three-week baseline period. These self-monitoring measures included the STAI-S, Coping Confidence Scale (CCS), Stressful Responses Questionnaire-Revised (SRQ-R), and Trauma Attention Measure (TAM) along with three stamped, addressed envelopes to mail completed materials to the experimenter (see description of measures below). Participants completed self-report measures during the baseline phase to establish data patterns prior to treatment.

During baseline, symptoms related to PTSD, anxiety, attention allocation and coping were tracked and monitored. Measures were intended to assess coping self-efficacy (CCS), attention to and distress related to internal and external threat cues (TAM), trauma symptoms (SRQ-R), and state anxiety (STAI-S). Participants were instructed to complete these brief self-report measures every three days for a total of seven baseline assessments, taking approximately ten minutes per assessment. Email prompts were sent twice weekly as reminders to complete and return the measures, as well as to inform participants of completed assessments received by the experimenter.

After the three-week baseline phase, participants were emailed to schedule the post-baseline assessment. Participants in the final sample completed and returned all of the baseline assessments (a minimum of five out of the seven was required). During the post-baseline assessment, participants completed the following measures: SRQ, IES-R, CES-D, SES, STAI-S, and WRS. The SCID-I-PTSD Module was again administered to establish that diagnostic criteria continued to be met. The dot-probe task, with no differential reinforcement of neutral words, was administered to assess for AB and examine whether change occurred during baseline.

Treatment phase. Participants who completed the three-week baseline phase began the CBAR treatment phase. CBAR treatment consisted of eight AR sessions, administered at a two times a week rate for a consecutive four-week period. Each CBAR session lasted approximately one hour. Treatment sessions included administration of the dot-probe task with 90% reinforcement to neutral words and the administration of the self-report measures. During the treatment phase, participants continued to monitor changes in the primary outcome variables by completing the following measures at each session: STAI-S, CCS, SRQ-R and TAM. Treatment

sessions were scheduled approximately three days apart to measure treatment gains and to correspond with the three-day intervals established for the completion of self-monitoring measures.

Post-treatment phase. Following the completion of the treatment phase, participants were given the post-treatment assessment packet consisting of the STAI-S, CCS, SRQ-R, and TAM to be completed every three days over the two-week period, completing the assessment measures four times over the post-treatment phase. The post-treatment assessment was scheduled for two weeks post-treatment in order to obtain a data pattern and to more reliably assess treatment effects. At the end of the two-week post-treatment assessment period, participants were asked to complete the following measures at the post-treatment assessment: SRQ, IES-R, CES-D, SES, STAI-S, WRS, and SCID-I-PTSD Module. Participants were again administered the dot-probe task with no differential reinforcement of neutral words.

Therapists. In this study, there were two therapists each of whom were present during the administration of the AR treatment. The primary therapist was also the experimenter and was responsible for the administration of AR for five participants. A second therapist, an advanced doctoral student trained to requisite levels of competence, administered AR for one participant. In addition to administering the AR treatment, each therapist corresponded with participants to schedule treatment sessions and administered the dependent measures.

2.3 - Experimental Design

A single case A-B design was implemented with treatment beginning after a three-week baseline period. Data was collected on each participant and individually analyzed (Johnston & Pennypacker, 1993). During the baseline phase, repeated measures established the prediction of a data path for the treatment phase. This design allowed for replication of the effects of treatment on the dependent variables across participants. An advantage of the single-case time-series design was the opportunity to investigate intra- and inter-individual responses to treatment. To this point, AR research has only employed group designs and thus findings represent effects aggregated across individuals.

According to Watson and Workman (1981), the present single-case design controls for potential confounds such as repeated testing and regression to the mean, maturation, and exposure to the clinical setting. It increases confidence that observable changes are due to the intervention. According to Borckardt and Nash (2002), tracking symptoms across baseline and

intervention phases can lead to data sets that afford insight into whether, when and even why an intervention works. In addition, time-series designs have been acknowledged by the American Psychological Associations Division 12 Task Force on Promotion and Dissemination of Psychological Procedures as an important methodological approach to testing treatment efficacy (Borckardt & Nash, 2002).

Treatment development. This study was designed to determine whether AR was a feasible treatment approach for PTSD and related symptoms. The CBAR treatment was a modified version of the dot-probe paradigm used in AR studies with anxiety-disordered participants (MacLeod & Hagan, 1992; Mogg et al., 1995; MacLeod et al., 2002; Mathews & MacLeod, 2002; Amir, Klumpp, & Przeworski, 2003; Amir, et al., 2008; Hazen et. al., 2009). For this experiment, the dot-probe task was written in E-Prime, Version 1.1, Psychology Software Tools, Inc. E-Prime is a suite of applications that allows the experimenter to create a computerized experimental design, implement the experiment. The software also allows for data collection and statistical analyses.

According to Mogg et al., (1997), tapping into the preconscious threat bias is best accomplished when a match exists between the content of the stimulus and the participant's anxiety. One explanation for such findings is that the preconscious bias depends on the threat value of the stimulus for the individual (called the specificity hypothesis), which in turn depends on the personal relevance of the stimulus to the person's anxieties and learning experiences (Mogg & Bradley, 1998; Reimann, Amir, & Louro, 1994; Reimann & McNally, 1995; Heinrichs & Hofmann, 2001). If a stimulus is evaluated as being threatening at a pre-attentive stage of processing, initial orienting of selective attention will be automatically directed towards it. For this reason, attention is more likely to be allocated towards highly salient stimuli.

Consistent with these arguments, the current author developed six individualized treatment programs in E-Prime tailored to ensure relevance to the trauma experienced by each participant. Similar to the Ononaiye et al. study (2007), 16 trauma-specific words were generated for each of four different aspects of the traumatization process, for a total of 64 threat word stimuli per individual. The trauma-specific threat words were developed from the following traumatic process cues: (a) negative emotional evaluation to trauma (e.g., embarrassed, guilty, shame, failure, rage, shock); (b) external trauma situations (e.g., assault, crash, murder, rape, violence); (c) physical/somatic responses to trauma (e.g., pain, hurt, heartbeat, sweating); and (d)

interpersonal cues/situations (e.g., date, fight, traffic, stranger, massacre). For example, participants who experienced a motor-vehicle accident (MVA) were presented with trauma-specific words (i.e., crash, accident, vehicle). Similarly, traumatic experiences related to sexual assault were presented with relevant stimuli (i.e., rape, molest, shame). Some of the word stimuli were relevant for multiple traumatic events including words such as "hurt, fear, terror." The idiosyncratic list of threat words by trauma type can be found in Appendix F.

Dot-Probe task: threatening versus neutral word stimuli. Consistent with previous AR studies, words stimuli were shown on a standard-size computer monitor (Amir et al., 2003; Amir, et al., 2008; Mathews & MacLeod, 2002). A fixation cross appeared on the screen for 500 ms first to alert the participant that the experiment was about to begin and to orient attention to the center of the screen. Two words, consisting of a threat word (from one of the four categories) and a neutral word, were presented simultaneously for 500 ms. These word pairs were randomly selected by the E-Prime program. Fifty percent of the time, the neutral word appeared on the top part of the screen and for the remaining 50% of the trials, the neutral word appeared below the threatening word. Following the presentation of the word pairs, one threat word and one neutral word, the stimulus words disappeared and the dot-probe appeared on the screen, replacing one of the words. The dot-probe task required participants to press the key corresponding to the position of the word stimuli followed by the dot-probe as soon as the probe was detected (i.e., "1" if the probe replaced the word on top and "2" if the word on the bottom was replaced by the probe).

For each session, 64 threat-neutral word pairs were presented ten times for a total of 640 trials. At the pre-baseline and post-baseline assessment, the dot-probe appeared in place of the neutral word 50% of the time, with no differential reinforcement of neutral words. During CBAR treatment, the dot-probe appeared in place of the neutral word 90% of the time, thus reinforcing attention to the neutral words. Time to complete the task varied across participants, lasting from 19 to 22 minutes. Latency of response to press the corresponding key (reaction time) was recorded by the computer program for each of the 640 trials of words. Reaction time (RT) served as the dependent measure to determine if bias to threat was being reduced in the treatment phase, relative to the baseline phase.

Types of traumatic events. Participants indicated the type(s) of traumatic event(s) experienced per the preliminary screening interview and the SEH administered at the pre-baseline assessment (see Table 2). In the final treatment sample, the targeted traumatic events

included motor vehicle accident (MVA), sexual assault, life-threatening illness and health problems, witness to violence and/or death, and loss of significant other(s) by suicide. Across participants, the SEH revealed that the mean number of traumatic events experienced was 2.8 with 83.3% of the participants (n = 5) having experienced more than one type of traumatic event. The average duration since the targeted traumatic event was 1 year, 7 months (ranging from 2 months to 3 years).

2.4 - Measures

Demographic Information. The Demographic Information Form included name, telephone contact number, email, race/ethnic origin, gender, education, occupation, marital status, occupation status, current treatment, current prescriptions, and drug and alcohol consumption. In the present study, this measure was completed at the pre-baseline intake assessment only.

Stressful Experience History (SEH) (See Appendix G). The SEH (Clum, personal contact) has 19 items, investigating an individual's history of traumatic experience. Individuals were asked to indicate the number of times that specific stressful events have occurred in their lifetime, whether the events were life-threatening, and whether the individual experiencing the event was treated at the time of the event. In addition, individuals are asked to provide a brief description of the traumatic event that produced the symptoms that were targeted via the CBAR treatment. In the present study, the SEH was administered at the pre-baseline intake assessment only.

Structured Clinical Interview for DSM-IV Axis I Disorders: Clinical Version-Posttraumatic Stress Disorder Module (SCID-I-PTSD Module). The SCID-I (First, Spitzer, Gibbon & Williams, 1995) is a semi-structured diagnostic interview designed to determine DSM-IV (APA, 2000) diagnoses. All items in the PTSD section were administered in the current study. The SCID-I PTSD module assesses the presence or absence of each DSM-IV PTSD symptom. Reliability and validity of the PTSD diagnosis in general has been established. Kappas for SCID PTSD range from .68 to .93 (Kulka et al., 1990; Skre, Onsted, Torgerson, & Kringlen, 1991). In addition, Kulka et al., (1990) demonstrated convergent validity with the IES (Horowitz, Wilner, & Alvarez, 1979). This clinical interview was administered to participants in the present study at the pre-baseline, post-baseline, and post-treatment assessments.

Stressful Responses Questionnaire (SRQ) (See Appendix H). The SRQ (Clum, personal contact) has 22 items, designed to measure symptoms associated with PTSD. Individuals indicate the frequency of each symptom and level of distress associated with each symptom in the past month on a 5-point Likert scale (0-4). The frequency scale (SRQF) ranges from "Have not experienced this in the past month" to "Have experienced five or more times a week." The level of distress scale (SRQD) ranges from "Does not upset me" to "Upsets me extremely." Chandler & Clum (personal contact) reported a 3-factor solution for the frequency scale, including subscales of Intrusion (SRQFIN: 6 items), Avoidance (SRQFAV; 5 items), and Arousal (SRQFAR; 11 items). Factor analysis of the Distress Scale revealed a 1-factor solution. The reliability as measured by Cronbach's alpha was .93 for the SRQFIN, .85 for the SRQFAV, .76 for the SRQFAR, and .95 for the SRQD. Higher scores reflect more symptoms and distress. Factor scores for the SRQF were used for analyses in the current study. The SRQ was administered at the pre-baseline, post-baseline, and post-treatment assessments in the present study.

Stressful Responses Questionnaire-Revised (SRQ-R). The SRQ-R (Clum, personal contact) was a modified version of the SRQ designed for self-monitoring of PTSD symptom frequency and distress in the present study. Participants were instructed to provide responses based on the "last three days." The frequency scale (SRQF) consisted of a 5-point Likert scale, ranging from 0 ("Have not experienced this in the last three days) to 4 ("Have experienced four or more times in the last three days") and included the following subscales: Intrusion (SRQFIN: 6 items), Avoidance (SRQFAV; 5 items), and Arousal (SRQFAR; 11 items). The level of distress scale (SRQD) consisted of a 5-point Likert scale, ranging from 0 ("Did not upset me in the last three days") to 4 ("Upset me extremely in the last three days)." The psychometric properties of the scale are assumed to parallel the SRQ from which the measure was derived. In the present study, participants completed the measure throughout the baseline, treatment, and post-treatment phases (see SRQ in Appendix H for items).

State Trait Anxiety Inventory-State Scale (STAI-S): The STAI-S (Spielberger, Gorsuch, & Luschene, Vagg, & Jacobs, 1983): consists of 20-items that evaluate feelings of apprehension, tension, nervousness, and worry "right now, at this moment." Individuals respond to each item on a 4-point Likert scale of 0 (Not at all), 1 (Somewhat), 2 (Moderately), and 3 (Very much so). Strong internal consistency (alpha = .90) was reported by Spielberger et al.

(1983). The STAI-S was administered at the pre-baseline, post-baseline, and post-treatment assessments. In addition, participants in the present study completed the STAI-S every three days throughout the baseline, treatment, and post-treatment phases.

Self-Efficacy Scale (SES) (See Appendix I). The SES (Clum, personal contact) is a 9-item self-report measure designed to assess coping self-efficacy for dealing with trauma-related situations. Participants were asked to rate confidence in the ability to cope with trauma-specific situations on a scale of 0 (Hardly Can Do) to 100 (Certain Can Do), with higher scores suggesting greater self-efficacy for coping. The SES was administered at the pre-baseline, post-baseline, and post-treatment assessments.

Coping Confidence Scale (CCS). The CCS (Clum, personal contact) was a modified version of the SES designed for self-monitoring on a frequent basis in the present study. The 9-item self-report measure assessed coping confidence (coping self-efficacy) in the "last three days." Participants were asked to rate confidence in the ability to cope with trauma-specific situations on a scale of 0 (Hardly Can Do) to 100 (Certain Can Do), with higher scores suggesting greater self-efficacy for coping. In the present study, participants completed the CCS throughout the baseline, treatment, and post-treatment phases (see SES in Appendix I for items).

Impact of Event Scale Revised (IES-R): The IES-R (Weiss & Marmar, 1997) is a self-report measure designed to assess current subjective distress for specific traumatic or stressful life events. The IES-R has 22-items that measure distress levels of Avoidance (IESRA), Intrusions (IESRI), Hyper-arousal (IESRH) and Total PTSD Symptoms (IESRT). Participants were asked to rate each item on the IES-R on a scale of 0 (not at all), 1 (a little bit), 2 (moderately), 3 (quite a bit) and 4 (extremely) according to their experiences during the past 7 days. The internal consistency of the intrusion scale ranges from .87 to .92; of the avoidance scale ranges from .84 to .86; and of the hyper-arousal scale ranges from .79 to .90 (Briere, 1997). In the present study, the IES-R was administered at the pre-baseline, post-baseline, and post-treatment assessments.

Center for Epidemiological Studies – Depression Scale (CES-D). The CES-D (Radloff, 1977) is a 20-item self-report measure designed to measure current level of depressive symptomatology, with emphasis on the affective component and depressed mood. Construct validity revealed four subscales, corresponding to positive affect, depressed affect, somatic symptoms/motor retardation and interpersonal difficulties. Respondents were asked to rate each

item on a scale of 0 (rarely or none of the time) to 3 (most or all of the time) according to their experiences in the past two weeks. Higher scores indicate high levels of distress, with a score greater or equal to 16 suggesting a clinically significant level of depression-related psychological distress. The internal consistency is .85 for the general population and .90 for an inpatient sample. Stability coefficients are moderate and ranges from .59 at eight weeks to .67 at four weeks. In the present study, the CES-D was administered at the pre-baseline, post-baseline, and post-treatment assessments.

Trauma Attention Measure (TAM) (See Appendix J). The TAM (Clum & King, personal contact) was a 2-item self self-report measure designed to assess attention to reminders of the traumatic even for the present study. Specifically, the measure assessed attention to and the amount bothered by external threat cues (i.e., stimuli in the environment such as things and/or people) and internal threat cues (i.e., thoughts and/or ruminations related to the trauma). Participants were asked to indicate the degree to which they are bothered by reminders of the traumatic event in the "last three days" on a 5-point Likert scale (0-4). The scale ranged from 0 ("Not at all attended to and/or been bothered") to 4 ("Completely attended to and/or been bothered"). In the present study, participants completed the TAM every three days throughout the baseline, treatment, and post-treatment phases.

Manipulation Check: Rating Scale for Word Stimuli (WRS). To ensure the validity of the treatment in the present study, the WRS was developed (Clum & King, personal contact). The WRS was a rating scale designed to ensure the threat word stimuli used in the dot-probe task were experienced by participants as threatening. Participants were asked to rate the perceived threat level of the 64 threat and 64 neutral word stimuli for their specific traumatic etiology using a 5-point Likert scale from 0 = "Not at all threatening" to 4 = "Severely threatening." Each participant was presented with an idiosyncratic list of words developed their specific trauma experience (e.g., sexual assault, life-threatening illness/health-related trauma, MVA, loss/death of loved one, and witness to death). At pre-treatment, ratings of threat word stimuli and neutral word stimuli were compared. A significant difference for the group was found between threat ratings of threat and neutral word stimuli, $t(5) = 22.78$, $p < .01$. This finding suggested that threat word stimuli produced a sufficient amount of anxiety (e.g., a rating of moderate to severe) to

elicit an AB for the group (M = 2.96, SD = 0.33) and indicated that neutral word stimuli did not produce anxiety (M = 0.03, SD = 0.05). In the present study, the WRS was administered at the pre-baseline and post-baseline, and post-treatment assessments.

The primary outcome variables (i.e., PTSD symptom distress and frequency, attention to threat, state anxiety, and coping self-efficacy) were monitored every three days across the three-week baseline, four-week treatment, and two-week post-treatment phases. Thus, symptom changes were tracked before, during, and after treatment over the course of the nine-week study with repeated observations at consistent intervals, a fundamental feature of the single-case time-series outcome design (Borckardt & Nash, 2002).

3.0 - Results

3.1 - Summary of Data Analyses

According to Kazdin (1998), treatment changes in single case studies can be determined by comparing baseline and treatment phases, calculating and comparing mean differences between baseline and post-treatment, examining level changes (i.e., whether or not change was stable) and changes in slope (i.e., increase or decrease), and evaluating latency of change (i.e., time period when treatment gains are observed). To examine treatment changes in the present study, graphs of individuals completing treatment were examined for the dependent variables (Parsonson & Baer, 1992, as cited in Kratochwill, et al., 1992). To deal with intra-individual and inter-individual variation and to corroborate conclusions from visual inspection of the data, statistical analyses on both individual and group data were conducted.

First, baseline, treatment, and post-treatment data were evaluated to determine whether they conformed to a normal distribution, and to determine their symmetry, skew, and scatter. Second, histograms and Normal Q-Q Plots were used to investigate homogeneity of variance. Exploratory analyses were conducted to examine group changes across baseline, treatment, and post-treatment using paired t-tests and the Wilcoxon Signed-Rank test (Kazdin, 1998; Richard, Taylor, Ramasamy, & Richards, 1999). These methods can be implemented regardless of the distribution, account for the possibility of both linear and quadratic relationships between variables, and are sensitive to auto-correlation in the data (Barlow, Nock, & Hersen, 2009).

To investigate trends within and between phases, Simulation Modeling Analysis (SMA) was used to test for the significance of change within each participant (Borckardt, Nash, Murphy, Moore et al., 2008). This method tests for rate of improvement (slope), level of between-phase

change, and latency of change in symptoms, while correcting for auto-correlation in time-series data. SMA begins by calculating the effect of phase on the dependent variables and auto-correlations of the data using Pearson correlations (*r*) between scores on each dependent variable and the phase. The effect is calculated as the correlation between the baseline and treatment phases controlling for auto-correlation in the time-series data for each phase (Borckardt et al., 2008). Next, the auto-correlation estimate and number of observations in the baseline and treatment phases of the observed data are used to generate thousands of simulated randomly-drawn data streams. In this study, the number of simulations was set to 5000. Significance criteria were generated by evaluating the simulated data streams resulting in an estimate of the probability of the observed effect occurring by chance (Borckardt et al., 2008).

Also examined were the relationships between attentional bias (AB) scores and symptom ratings on the dependent measures. Analyses were conducted both within individuals and for the treatment sample as a whole. To ensure accuracy of inferences and not overestimate relationships, the more conservative Spearman's correlation coefficient was also calculated (Chen & Popovich, 2002). To investigate the assumption that changes in AB, subsequent to AR, were associated with change in the outcome variables, a change score was created (i.e., post-treatment minus pre-treatment scores) and correlational analyses were conducted.

3.2 - Preliminary Analyses

Pre-treatment data for each participant can be found in the following tables: Table 3 (IESR), Table 4 (SRQ), Table 5 (CES-D, SES, and STAI-S), and Table 7 (CCS and TAM). At pre-treatment, all participants reported moderate to severe levels of PTSD symptoms. On the IES-R, scores for all participants were above the recommended cutoff of 33 for a probable diagnosis of PTSD (M = 47; SD = 10.67; range 34.5 to 65) (Weiss & Marmar, 1997). Scores on the SRQ indicated moderate to severe levels of PTSD symptom frequency and distress (M = 1.70, SD = 0.69, range 0.97 to 2.88). For depression (CES-D), scores indicated clinically significant levels of depression symptoms for five of the six participants (M = 29.8, SD = 13.2, range 7.5 to 47) (Radloff, 1977). For state anxiety (STAI-S), high levels of state anxiety were reported for five of the six participants (M = 61.8, SD = 12.2, range 47.4 to 80.2) (Spielberger et. al, 1983). For coping self-efficacy (SES), participants indicated low to moderate levels of coping

confidence for trauma-related situations (M = 48.5%, SD = 12.0, range 27.5% to 48.1%). For attention to threat cues (TAM), moderate to significant levels of attending to threat cues were reported (M = 2.1, SD = 0.51, range 1.43 to 2.71).

Comparisons between pre- and post-baseline were conducted, using paired t-tests for all dependent measures and AB scores. As shown in Table 9, no significant differences were found, indicating that any changes found during or after treatment were not likely attributable to variables such as repeated assessment, therapist contact, or spontaneous recovery, but rather was attributable to treatment effects (Barlow et al., 2009).

3.3 - Time-Series Phase-Effect Analyses for Each Participant

Repeated assessment of symptoms throughout the baseline, treatment and post-treatment phases provided the opportunity to analyze change over time for each participant. Case-by-case analyses of symptom change on the dependent variables were conducted to examine intra-individual variability and trends in the data both between and within phases using Simulation Modeling Analysis (SMA). To investigate questions of the treatment effect on amount of improvement (i.e., level) and rate of improvement (i.e., slope) during treatment, a two-phase comparison analysis was conducted for baseline versus treatment and baseline versus post-treatment. SMA addresses improvement using the size and direction of the outcome variables to compare symptom level scores during Phase A (baseline, prior to treatment) and during Phase B (after treatment onset) (Borckardt et al., 2008).

SMA results indicated several significant phase effects for amount of improvement (between-phase symptom level changes) and rate of improvement (between-phase change in slope). The effect size computations indicate how much the changes were related to treatment, while controlling for baseline scores and auto-correlation within each phase. Significant slope change was tested consistent with the predicted direction for symptom improvement. For example, symptoms predicted to decrease during treatment (SRQF, SRQD, STAI-S, and TAM), used a comparison analysis that tested the hypothesis of a constant baseline against a decreasing treatment phase. For coping self-efficacy, the comparison analysis tested a constant baseline against an increasing treatment phase. Thus, improvements related to a pattern of decrease are indicated by negative correlations, whereas improvements related to a pattern of increase are indicated by positive correlations (Borckardt et al., 2008).

SMA provided the opportunity to examine trends and to determine if, when, and for whom change occurred. In the present study, only significant level and slope changes were discussed and all changes are shown in Table 10. Summaries of pre- to post-treatment change for each participant for the IES-R, CES-D, STAI-S, SRQ, and SES dependent measures can be seen in Figures 1.1 – 1.6.

Results of SMA for Time-Series Data. The following significant between-phase effects (i.e., level change) and trends (i.e., slope change):

(a) For PTSD symptom frequency changes (SRQF), significant between-phase changes in symptom level were found for all participants (100%) from baseline to post-treatment in the predicted direction. All participants evidence significant effects for amount of symptom improvement (i.e., pre- to post-treatment level change), ranging from –0.55 to –0.83. Significant trends in slope change were found comparing baseline to treatment for five of the six participants (83%). Participants 1, 2, 3, 4, and 5 evidenced significant effect size correlations for rate of improvement (i.e., slope) during treatment, ranging from -0.64 to –0.51. As can be seen in Figure 2.1, reductions in PTSD symptom frequency typically occurred from treatment week 2 through week 4 (See Figure 3.1 for time-series data throughout all phases);

(b) For PTSD symptom distress changes (SRQD), significant between-phase change in symptom level was found for four of the six participants (67%) from baseline to post-treatment in the predicted direction. Significant effects were found for the amount of symptom improvement (i.e., level change) for Participants 2, 3, 5, and 6, ranging from –0.66 to –0.95. Significant trends in rate of improvement (i.e., slope change) were found comparing baseline to treatment for three of the six participants (50%). Participants 2, 3, and 5 evidenced significant effects for rate of improvement (i.e., slope) during treatment that ranged from -0.75 to –0.84. As can be seen in Figure 2.2, reductions in PTSD symptom distress typically occurred from treatment week 2 through week 4 (See Figure 3.2 for time-series data throughout all phases);

(c) For state anxiety changes (STAI-S), significant between-phase change in symptom level was found for three of the six participants (50%) from baseline to post-treatment in the predicted direction. Participants 1, 3, and 5 evidenced significant effects for the amount of symptom improvement (i.e., level change), ranging from –0.55 to –0.96. Participant 6 evidenced a significant change in level that indicated an increase in state anxiety at post-treatment, rather

than the predicted decrease. As can be seen in Figure 2.3, reductions in state anxiety typically occurred from treatment week 3 through week 4 (See Figure 3.3 for time-series data throughout all phases);

(d) For coping self-efficacy changes (CCS), significant between-phase change in level was found for five of the six participants (83%) from baseline to post-treatment in the predicted direction. Participants 1, 2, 3, 5, and 6 evidenced significant effect sizes for the amount of symptom improvement (i.e., level), ranging from 0.67 to 0.94. As can be seen in Figure 2.4, increases in coping self-efficacy generally occurred from treatment week 2 through week 4 (see Figure 3.4 for time-series data throughout all phases); and

(e) For Attention to Threat changes (TAM), significant between-phase change in symptom level was indicated for four of the six participants (67%) from baseline to post-treatment in the predicted direction. Participants 1, 3, 5, and 6 evidenced significant effects for the amount of symptom improvement (i.e., pre- to post-treatment level change), ranging from -0.77 to -0.88. Participant 4 experienced significant level change from baseline through treatment, though this was not maintained at post-treatment. Significant trends in rate of improvement (i.e., slope change) were found comparing baseline to treatment for three of the six participants (50%). Participants 1, 2, and 4 had significant effect size correlations for rate of improvement (i.e., slope) during treatment, ranging from -0.60 to –0.81. As can be seen in Figure 2.5, participants generally experienced reductions in attention to threat by treatment week 2 with substantial reductions by treatment week 4 (see Figure 3.5 for time-series data throughout all phases).

3.4 - Aggregated Analyses of CBAR Treatment Effect on Symptoms

Next evaluated were treatment effects for the group between pre- and post-treatment. To test these effects, both parametric (paired t-test) and non-parametric (Wilcoxon Signed-Rank test) tests were employed (see Table 16).

Hypothesis 1. Hypothesis 1, which predicted, “Participants will experience a significant reduction in trauma-related symptoms from baseline to post-treatment,” was supported. Significant changes were observed from pre-treatment to post-treatment in the predicted direction on both the IES-R and SRQ. As Table 16 indicates, significant within-group change from pre- to post-treatment was found for IES-R-Total, $t(5) = 3.41$, $p < .05$, IES-R-Avoidance, $t(5) = 3.43$, $p < .05$, IES-R-Intrusion, $t(5) = 2.68$, $p < .05$, and IES-R-Hyperarousal, $t(5) = 2.61$,

p< .05. Significant changes were also found from pre-to post-treatment for SRQ-Frequency, $t(5) = 12.01$, $p < .01$, SRQ-Distress, $t(5) = 5.48$, $p < .01$, SRQF-Avoidance, $t(5) = 4.64$, $p < .01$, SRQF-Arousal, $t(5) = 5.77$, $p < .01$, and SRQF-Intrusion, $t(5) = 7.90$, $p < .01$.

Hypothesis 2. Hypothesis 2, which predicted, "Participants will experience a significant reduction in symptoms of state anxiety and depression as a function of the treatment," was supported for some comparisons but not others. Reductions in state anxiety (STAI-S) and depression (CES-D) were found for the group. A significant change was evidenced for state anxiety comparing the baseline mean and treatment mean, $t(5) = 3.10$, $p < .05$. The change in state anxiety was no longer significant comparing the mean at baseline to post-treatment, $t(5) = 1.09$, $p > .05$. Significant change in depression occurred from post-baseline to post-treatment, $t(5) = 2.85$, $p < .05$.

Hypothesis 3. Hypothesis 3, which predicted, "Participants will experience an increase in coping self-efficacy from baseline to post-treatment" was supported for some comparisons but not others. Significant improvements in coping self-efficacy in the predicted direction were found on both the CCS and SES measures (see Table 16). Significant improvement was observed on the CCS from the mean at baseline to post-treatment, $t(5) = -3.07$, $p< .05$ and on the SES from post-baseline to post-treatment, $t(5) = - 2.76$, $p < .05$.

3.5 - Attention Bias Analyses

Prior to analyzing AB data, outliers were eliminated from consideration and replaced with the mean RT for the corresponding session and word stimulus for each participant. Outliers were defined as reaction times more than three standard deviations from the participant's mean response latency for the session, within each word stimulus type (i.e., Threat or Neutral). The number of outliers varied across participants and session, ranging from 2 to 15 and accounting for 0.2% to 2.7% of the 640 trials. RT data are presented in Table 11 for pre-baseline, post-baseline, and post-treatment and Table 12 for within-treatment.

Computation of AB Scores and AB Change Scores. Next, AB scores were computed for each participant consistent with procedures described in previous AR studies (Mogg et al., 1997; Ononaiye et al., 2007). The AB score reflects the threat position x probe position interaction, with positive values indicative of attentional vigilance to threat stimuli and negative scores indicative of attentional vigilance toward neutral stimuli (Mogg et al., 1997). AB scores were calculated for each session by subtracting the mean RT, when the probe is in the same

position as the threat words, from the mean RT, when the probe is in a different position to threat words (Ononaiye et al., 2007; Amir et al., 2008). Attention bias scores were computed using the following formula: 0.5 x ((UpLt – UpUt) + (LpUt – LpLt)), where U = upper position on the computer screen, L = lower position on the computer screen, p = probe, and t = threatening stimuli.

To determine change in AB from pre-treatment to post-treatment, AB change scores were calculated for each participant using the following formula: (Time 1 (post-treatment AB) – Time 1 (pre-treatment AB)). Thus, a positive AB Change score indicated AB to neutral and a negative AB Change score indicated AB to threat at post-treatment. For instance, if a participant exhibits AB to threat at pre-treatment and then learns to attend to neutral stimuli (AB to neutral) subsequent to CBAR, the AB Change score at post-treatment will be positive.

AB to threat at pre-treatment was evidenced by 4 of the 6 participants (66%), with an overall mean AB score of 3.5, SD = 7.6. All participants experienced a change in AB from pre-treatment to post-treatment, though the type of change varied by participant (see Table 13 and Figure 5). Three of six participants (50%) evidenced an AB to neutral at post-treatment, all of whom began treatment with an AB to Threat (Participants 3, 5, and 6). In contrast, two of the six participants demonstrated an AB to threat at post-treatment, with one beginning treatment with AB to threat and one beginning with AB to neutral at pre-treatment. Participant 4 demonstrated marked variability in AB throughout with no clear AB indicated at post-treatment (AB = 0.52). One of the participants (Participant 1) who showed an AB to threat at post-treatment evidenced an AB to neutral throughout treatment (see Figures 4.1 to 4.6 for AB data for each participant).

To examine whether AB changed for the group as a whole, change in AB Scores were examined using paired t-tests and the Wilcoxon Signed-Rank test (individual AB scores are presented in Table 13 and illustrated in Figure 5). As predicted, no significant change was found for AB scores between pre-baseline and post-baseline AB scores, $t(5) = -0.66$, $p > .05$.

Hypothesis 4. Hypothesis 4, which predicted, "Participants will experience significant reductions in AB to threat from baseline to post-treatment" was not supported. Significant pre-treatment to post-treatment change in AB was not found for the group, though a shift in AB from threat to neutral was in evidence. A significant reduction in self-reported attention to trauma cues was found (TAM) for the group from baseline to post-treatment, $t(5) = 3.02$, $p < .05$.

To test whether relationships existed between AB levels and symptom levels during treatment, case-by-case analyses of relationships between AB during treatment and symptoms during treatment were conducted. AB Scores during treatment were correlated with dependent measures administered within the treatment phase (see Table 14). Significant correlations were found between AB and some of the symptoms during treatment for three of the six participants (50%). These results suggest that an AB to neutral was correlated with lower symptom levels for three of the participants. Because it was unknown how long it would take for changes in AB to neutral to occur, the correlations that were found were supportive but not determinative of the expected connection between AB change and symptom change.

Within-group analyses of relationships between AB change and symptom change from pre- to post-treatment were conducted to answer the question of the relationship between treatment process and outcome. First, change scores for each dependent variable and AB were computed by subtracting the post-treatment score from the pre-treatment score. Correlations were then computed to assess the association between within-group AB change and change in symptoms at post-treatment (see Table 15). Correlational analyses were one-tailed to assess their hypothesized predictive relationships.

Hypothesis 5. Hypothesis 5, which stated, "For participants who experience symptom reduction, there will be significant correlations between reductions in AB to threat and symptom change" was partially supported. Significant correlations indicative of a relationship between an AB change to neutral and symptom reduction were found between AB and PTSD symptoms, as shown in Figure 6, PTSD symptom distress (SRQD), $r(5) = -.82$, $p < .05$. As shown in Figure 7, total PTSD symptoms (IESRT), $r(5) = -.90$, $p < .01$. As seen in Figure 8, moderate, but non-significant, correlations were found between AB change and change in depression symptoms, attention to threat, and coping self-efficacy, $r(5) = -.44$, $-.66$, and $.63$, respectively.

3.6 - Treatment Effect Sizes

Effect sizes were calculated using Cohen's d, comparing mean change in pre-treatment and post-treatment scores, divided by the pooled standard deviation computed as $SD' = \sqrt{((SDpre^2 + SDpost^2)/2)}$ (Campbell, J.M., 2004; Cohen, J., 1988; Kratochwill et al., 1992). Large treatment effects were indicated for PTSD symptoms on the IES-R scale and subscales, ranging from 1.1 to 1.6 and on the SRQ subscales, ranging from 0.9 to 1.3. Large effect sizes were indicated for depression (0.8), coping self-efficacy (-1.5 on the SES and -1.9 on the CCS), and

attention to threat (1.2). A medium effect size of 0.4 was indicated for state anxiety. Effect sizes are shown in Table 16. Aggregated percentage improvement at post-treatment can be seen in Figure 9.

4.0 - Discussion

4.1 - Principal Findings

The present study developed and evaluated the feasibility of an AR intervention for PTSD. Also examined were the relationships between AB and symptom improvement from pre- to post-treatment. It was predicted that, as a function of the AR treatment, participants would experience a significant reduction in trauma-related symptoms, symptoms of anxiety and depression, and attention to threat along with an increase in coping self-efficacy. The primary hypotheses were supported for reductions in PTSD symptoms and attention to threat, and for increases in coping self-efficacy. Hypotheses that AR would result in significant reductions in anxiety and depression were partially supported. The prediction that there would be significant correlations between change in AB and symptoms change was partially supported. Significant positive correlations between AB and symptom change were found for PTSD symptom distress and total PTSD symptoms and further support was provided by the strong, but non-significant correlations for depression and coping self-efficacy.

As predicted, no significant change was found for the group during the baseline phase for PTSD symptoms, state anxiety, depression, attention to threat, or coping self-efficacy. Further, significant change was not found between pre-baseline and post-baseline for AB scores. A visual inspection of change for each participant indicates that there was some variability during baseline with some participants showing stability and others showing increasing and/or decreasing fluctuations in symptoms. The lack of change during baseline can be interpreted as evidence that change was attributable to treatment effects and unlikely a result of the following factors: repeated assessment, therapist contact, spontaneous recovery, experimenter bias, or participant expectations.

During treatment, a consistent reduction was found in the principle variable targeted, PTSD symptoms, for all participants. Change during treatment was less stable for related dependent measures not central to the primary hypothesis. Although there was intra-individual and inter-individual variability, improvements occurred during the treatment phase for all participants on all dependent measures. Improvement typically occurred from treatment weeks 2

through 4, with the most significant changes occurring by treatment week 3. These data indicate that AR had its strongest effect during treatment week 3 (AR sessions 5 and 6), further evidenced by the change in AB that temporally corresponded to the greatest symptom reductions. Taken together, these findings indicate that, for participants who exhibit AB to threat, a minimum of 6 AR sessions may be needed to modify AB. Theoretically, the successful modification of AB to a neutral bias should lead to symptom reduction. For individuals with more severe symptoms or who do not have an AB to threat, such change may require more sessions.

Simulation Modeling Analyses were conducted for each participant to determine the amount and rate of symptom improvement - when compared with the baseline phase, participants demonstrated significant improvement in symptoms during treatment. Findings indicated that the amount of improvement (i.e., level change) and rate of improvement (i.e., slope change) were directly related to the implementation of treatment, controlling for baseline scores and auto-correlation in both the baseline and treatment phases. All participants experienced significant improvement of PTSD symptom frequency (SRQF) in level from baseline to post-treatment, with five participants exhibiting a significant rate of improvement during treatment. Significant improvement in level of PTSD symptom distress (SRQD) was experienced by four of the six participants from baseline to post-treatment, with three participants demonstrating a significant rate of improvement during treatment. For state anxiety (STAI-S), three of the six participants experienced significant improvement in symptom level from baseline to post-treatment. For attention to threat (TAM), four of the six participants showed significant improvement in symptom level from baseline to post-treatment, with three participants demonstrating a significant rate of improvement during treatment. For coping self-efficacy (CCS), five of the six participants experienced significant improvement in level from baseline to post-treatment.

For the group, significant changes in the predicted direction occurred from pre- to post-treatment. These included significant reductions in measures of frequency and level of distress of PTSD symptoms (i.e., avoidance, hyperarousal, and reexperiencing). At post-treatment, significant reductions for the group were found in depression and attention to threat cues, along with significant improvement in coping self-efficacy. Further, significant reductions were found in state anxiety from baseline to treatment, though these changes were not maintained at post-treatment. Visual inspection of trends for mean group change over the time-series data showed change in the predicted direction and stability of treatment gains at post-treatment. Specifically, a

general downward trend for the group was found for PTSD symptoms, state anxiety, attention to threat, and coping self-efficacy, from pre-treatment through the post-treatment phase with stable treatment gains.

Overall, maintenance of change was demonstrated in the two-week post-treatment phase. Improvement of PTSD symptoms were stable for five of the six participants (83%), while Participant 4 did not maintain treatment gains and evidenced increased symptoms from the treatment phase to post-treatment. Symptom change for the other dependent measures was less stable. For state anxiety, four of the six participants (67%) maintained treatment gains at post-treatment, while two participants evidenced an increase in ratings from both pre-treatment and treatment. For attention to threat cues (TAM), four of the six participants maintained treatment gains, while two participants evidenced a small increase from pre-treatment ratings. For coping self-efficacy (CCS), five of the six participants demonstrate stable improvement at post-treatment, while one participant did not maintain treatment gains. Lastly, four of the six participants (67%) evidenced a decrease in depression at post-treatment, with two participants demonstrating an increase from pre-treatment.

It was hypothesized and found that coping self-efficacy would improve as a function of the treatment. Since treatment targeted AB, the question arises as to why coping self-efficacy would change. Coping self-efficacy, as measured in the present study, assesses an individual's confidence that he/she is able to cope with PTSD symptoms and the situations that trigger these symptoms. As such, confidence in one's ability to deal with such circumstances was expected to improve as symptoms improved.

Taken together, the results from this study support the feasibility of using AR for the treatment of PTSD. The results indicate that targeted PTSD symptoms change most reliably, but that adjunctive symptoms also change. The stability of the baseline phase and significant findings of aggregate and individual analyses for significant treatment effects support this claim. It is unlikely that the findings were due to extraneous factors since treatment effects were replicated across participants reporting moderate to severe symptoms at pre-treatment, along with varying traumatic etiologies, symptom presentations, and duration of PTSD symptoms prior to treatment.

Treatment Response Variability. Variability in treatment response occurred in two different ways: 1) Participants that had AB to threat at pre-treatment and either did not shift to a neutral AB or did not maintain the shift at post-treatment; and 2) Participants that did not have AB to threat at pre-treatment prior to AR.

It was hypothesized that there would be a significant shift in AB for the group and significant relationships between AB change and symptom change from pre- to post-treatment. Significant group change in AB was not found. However, clear evidence emerged of a significant relationship between AB change to neutral and symptom level of PTSD symptom distress (SRQD) and total PTSD symptoms (IESRT). As AB changed from threat to neutral, there was a reduction in PTSD symptoms. Non-significant support was found between AB change and change in depression symptoms, attention to threat, and coping self-efficacy. Attention retraining effectively produced a shift in AB for three of the four participants that exhibited an AB to threat at pre-treatment. These findings support the possibility that the mechanism of change that accounts for symptom improvement in PTSD symptoms is a shift to a neutral bias.

Consistent with Hypothesis 4, participants demonstrating the greatest treatment response experienced AB change in the predicted direction - from threat AB to a neutral AB at post-treatment. These participants also reported only one traumatic event, targeted in the intervention. Given that a shift in AB to neutral in these individuals occurred for their only reported trauma, it might be that such a shift is associated with improvement when the shift occurs for all extant traumatic events. A more general question associated with all CBT and AR treatments for trauma is how symptoms are reduced across the board when only one traumatic event is being targeted. One possibility argued by the present author is that the stimuli used in the dot-probe task to target AB included four different domains of threat words. Several of these domains are generic to all types of threat. This is a very interesting area to be evaluated that has received almost no attention in the literature.

Highly variable responses to AR may be explained in several ways. Although an AB to threat in PTSD has been reliably demonstrated in a number of studies (Buckley et al., 2000; Foa et al., 1989), the percentage of individuals with PTSD who develop an AB to threat is unknown. One possibility is that AB may be present in some but not all individuals with PTSD. Without such a bias prior to treatment a shift to a neutral bias as a consequence of treatment is meaningless. Similar findings of inconsistent AR responses were evidenced in recent studies

using the dot-probe paradigm (e.g., Clark, MacLeod, & Shirazee, 2008; Fox & Damjanovic 2006; MacLeod et al., 2002). These findings suggest that individuals may be differentially prepared to acquire AB to threat, and as such, differentially inclined to respond to contingencies that modify this bias (Clark et al., 2008).

Participants in the present study who had a threat AB and subsequently demonstrated clear and stable AB change also experienced significant symptom improvements. This subgroup has characteristics consistent with the theory of pre-attentive AB to threat. In addition to their AB change, they showed faster reaction times (RT) to the stimuli over time, thus demonstrating learning of the task. A second subgroup exhibited no AB to threat at pre-treatment, did not stably modify AB, and exhibited variable RT throughout the AR task.

Variable RT during AR may be a function of fluctuations in attention control. High trait anxious individuals with high attention control were able to shift attention away from threat, while individuals with low attention control were not (Derryberry & Reed, 2002). For such individuals, priming through explicit instructions to attend to neutral stimuli may ensure participants attend to the task, a strategy not used in the present study.

Another explanation may be offered for how AR produced symptom reduction, viz., repeated exposure to threat words that led to extinction of response to threat. All participants were exposed to threat word stimuli throughout assessment and treatment. Pre- to post-treatment ratings of threat to threat word stimuli used in the dot-probe task dropped throughout treatment. This reduction suggests that exposure may have reduced anxiety generated by threat word stimuli, producing reductions in PTSD symptoms. In support of this explanation, Masia, McNeal, Cohn, and Hope (1999) conducted a study targeting social anxiety using the Stroop test in which the task was equated to imaginal exposure, suggesting that word stimuli had acquired the ability to elicit fear through association with feared situations. Similarly, Amir, Najmi, and Morrison (2009) offered a possible explanation for not finding an AB in recent studies, as related to an attenuation of bias following habituation to threatening words (McKenna & Sharma, 1995; McNally, Kaspi, Reimann, & Zeitlin, 1990). Together, these findings suggest that exposure may reduce the threat of word stimuli, which in turn may impact symptom change. Future studies that have the express purpose of comparing these competing mediation hypotheses will be needed to disentangle these competing interpretations.

4.2 - Limitations

In the current study, the choice of the single case method precluded an examination of moderators and mediators and thus hindered the direct examination of mechanisms of change. A larger sample size and experimental control group would have allowed a more detailed analysis between change in AB and symptom change. Even though the AR procedure was lengthy and presented at eight different sessions, some individuals did not learn the task and change their AB. Future studies could employ procedures, such as priming or induced motivation, to increase the likelihood of participants maintaining their attention throughout the AR task.

Another potential problem was the clinically significant levels of depression for the majority of participants. While AB to threat characterizes PTSD and anxiety, a pattern of attention avoidance has been found for depressed individuals (Williams et al., 1997). These claims were supported in previous studies with findings that depression was not associated with an AB to threat and that threat AB was absent when clinical levels of anxiety and depression co-occur (Mogg, Bradley, Williams, & Matthews, 1998; Williams et al., 1997). Clearly, some individuals in the present study with co-morbid PTSD and self-report of depression also exhibited an AB to threat. Nonetheless, future studies might control for, or at least measure the effect of, depression levels on learning AR tasks.

4.3 - Clinical Implications & Future Directions

The current study sought to extend previous research of AR for anxiety disorders and was, to our knowledge, the first to evaluate AR in the treatment of trauma using more than one treatment session. These findings provide preliminary support for the feasibility of AR in the treatment of PTSD. The prospect of an efficacious, time-limited treatment for trauma with minimal therapist-involvement and effort of the recipient is promising. While there are efficacious treatments for PTSD, a large percentage of individuals fail to seek such treatment or do not respond, suggesting the need for alterative treatment approaches. In addition, AR may have advantages over traditional treatments for PTSD, particularly in light of the need for cost-effective, accessible approaches. The ease of administration and dissemination increases the likelihood for implementation in various treatment modalities, such as internet-based, as a stand-alone treatment or adjunct, and/or utilization in community and primary care settings.

This study raised important questions to be addressed in future research. Although the presence of AB to threat has been widely established in the literature for PTSD, the prevalence

of AB in this population is unknown. Understanding how change in AB relates to symptom change would shed light on the development, nature, and function of trauma and thus has important implications for expanding our current theoretical understanding of PTSD. In order for AR to be efficacious in the treatment of trauma, the disparity found for the acquisition and modification of AB requires further investigation. The deduction that the mechanism of change operating requires modification of pre-attentive AB to threat may be unnecessarily limiting. Future studies may consider assessing AB prior to modification procedures, taking into account individual differences such as symptom presentation, attention control, and comorbidity. Mounting evidence for differential responses to AR suggests the need for highly adaptable AR procedures that can be tailored to the individual or subgroup and that a matching process may be an appropriate first step prior to attention modification.

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Table 1

Participant Characteristics

Participant	Gender	Age	Ethnicity	Education	Employment	Treatment History	Current Medications
1	Female	24	Caucasian	Some College	Unemployed	None Reported	Nexium, Methadone, Celexra
2	Female	19	Caucasian	Some College	Student	None Reported	None Reported
3	Female	48	Caucasian	College Graduate	Employed	Counseling (2 years) - No improvement.	Effexor XR, Valium
4	Male	20	Indian	Some College	Student	None Reported	None Reported
5	Female	19	Asian	Some College	Student	None Reported	None Reported
6	Female	20	Caucasian	Some College	Student and Employed	None Reported	None Reported

Table 2

Self-report of Targeted Traumatic Event and Prior Trauma History at Baseline for Each Participant on the Stressful Events History (SEH)

Participant	Targeted Traumatic Event	Duration Since Targeted Trauma	Prior Traumatic Events Reported
1	Life-threatening Illness	2 years, 4 months	(1) Sexual assault including penetration as a child; and (2) House seriously damaged from natural event (i.e., fire) (age 13).
2	Witness to Suicide (mother)	1 year, 6 months	(1) Sexual assault including penetration; (2) Been seriously physically assaulted as a child, including (3) being threatened with a weapon; and (4) Had close friend or family member be killed (not suicide).
3	Life-threatening Illness	2 years, 1 month	(1) MVA (5 years prior)
4	MVA	3 years, 1 month	(1) Family member killed; and (2) Sexual assault including penetration as a child (age 5).
5	Loss of significant other(s) to murder	2 months	None reported.
6	Sexual Assault	1 year, 2 months	Corresponding with target sexual assault trauma: (1) Been seriously physically assaulted as an adult; and (2) Threatened with a weapon.

Table 3

Subscale and Total Scores for Each Participant and Overall Means on the Impact of Event Scale-Revised (IES-R) Scores at Pre- and Post-treatment

IES-R Subscales	**Total Score**		**Avoidance**		**Intrusion**		**Hyperarousal**	
Participant	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]
1	46.5	33.0	2.46	2.13	2.32	1.25	1.50	1.00
2	65.0	24.0	2.94	0.88	2.88	1.13	3.09	1.33
3	34.5	19.0	1.69	0.88	1.82	1.00	1.08	0.33
4	52.5	55.0	2.13	1.88	2.57	2.88	2.17	2.50
5	45.5	13.0	2.26	0.13	1.50	1.25	2.42	0.33
6	39.5	11.0	2.13	0.75	1.94	0.38	1.17	0.33
Means (SD)	*47.25 (10.67)*	*25.83 (16.35)*	*2.27 (0.41)*	*1.11 (0.75)*	*2.17 (0.51)*	*1.32 (0.83)*	*1.91 (0.79)*	*0.97 (0.86)*

1. Pre= Pre-treatment Scores*; 2. Post* = Post-treatment Scores. *Total Score (*IES-R-T) measures total PTSD symptoms "during the past seven days" and is a composite of the raw scores on the subscales. *The IESR subscales include Avoidance (*IESRA), *Intrusion (*IESRI), *Hyperarousal (*IESRH*).* The scale ranges from 0 = "*Not at all*" to 4 = "*Extremely*" (Briere, 1997)..

Table 4

Subscale Scores for Each Participant and Overall Means on the Stressful Responses Questionnaire (SRQ) Scores at Pre- and Post-Treatment

SRQ Subscales	**Frequency**		**Distress**		**Avoidance**		**Arousal**		**Intrusion**	
Participant	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]	*Pre*[1]	*Post*[2]
1	1.80	0.67	1.90	1.21	1.64	0.20	2.56	1.39	0.93	0.13
2	2.02	0.95	2.26	1.34	2.18	0.44	2.10	1.14	1.76	1.10
3	1.39	0.68	1.60	0.70	0.42	0.00	1.65	1.07	1.52	0.47
4	2.88	2.09	3.02	2.85	2.59	1.24	3.28	2.77	2.46	1.63
5	1.16	0.27	1.41	0.17	0.51	0.00	1.45	0.06	1.07	0.62
6	0.97	0.26	1.34	0.24	1.27	0.52	0.89	0.32	0.83	0.31
Means	*1.70*	*0.91*	*1.92*	*1.09*	*1.44*	*0.43*	*1.99*	*1.12*	*1.43*	*0.75*
(SD)	*(0.69)*	*(0.56)*	*(0.64)*	*(0.86)*	*(0.88)*	*(0.57)*	*(0.85)*	*(0.96)*	*(0.62)*	*(0.50)*

1. Pre= Pre-treatment Scores*; 2. Post* = Post-treatment Scores. The SRQ measures PTSD symptom frequency (e.g., Avoidance, Arousal, and Intrusion) and PTSD symptom distress. The SRQ frequency subscales (SRQF, SRQFAV, SRQFAR, SRQFIN) range from 0 = "*Have not experienced*" to 4 = "*Have experienced this five or more times a week*". The SRQ-Distress (SRQD) subscale ranges from 0 = "*Does not upset me*" to 4 = "*Upsets me extremely*"

Table 5

Scores for Each Participant and Overall Means on the Center for Epidemiological Studies-Depression Scores (CES-D), Self-Efficacy Scale (SES), and State-Trait Anxiety Inventory-State Scale (STAI-S) at Pre- and Post-treatment

Dependent Variable (Measure)	**Depression (CES-D)[1]**		**Coping Self-Efficacy (SES)[2]**		**State Anxiety (STAI-S)[3]**	
Participant	Pre	Post	Pre	Post	Pre	Post
1	37	16	57.6	62.2	65.0	48.6
2	25.5	13	55.0	77.8	57.8	60.0
3	31.5	13	56.7	73.3	69.3	56.8
4	47	48	53.4	43.3	80.2	73.8
5	30	8	35.0	65.6	51.0	35.2
6	7.5	13	27.5	78.9	47.4	63.0
Means (SD)	29.8 (13.2)	18.5 (14.7)	48.5 (12.0)	66.8 (13.3)	61.8 (12.2)	57.5 (15.4)

1. CES-D, measures depression (scores ≥ 16 indicate clinically significant level of psychological distress of depression symptoms), with a scale from 0 = "*Rarely or none of time* (< 1 day)" to 3 "*Most or all of the time* (5-7 days"); *2. SES Scale*, measures coping self-efficacy, with a scale from 0 = "*Can not do at all*"; 30 = "*Hardly can do*"; 70 = "*Probably can do*"; 100 = "*Certain can do*" (Clum, 1999); 3. STAI-S, measures state anxiety and data are presented as standard scores, with a scale that ranges from 1 = "*Not at all*" to 4 "*Very much so*" (Spielberger et al., 1983).

Table 6

Scores for Each Participant on the Stressful Responses Questionnaire- Frequency (SRQF) and Distress (SRQD) Subscales at Baseline, During Treatment, and at Post-treatment

SRQ Subscale and Assessment Point	**Participant**					
PTSD Symptom Frequency (SRQF)[1]	1	2	3	4	5	6
Baseline	1.80	2.02	1.39	2.88	1.16	0.97
Treatment Week 1	1.55	1.39	1.41	2.30	0.57	1.43
Treatment Week 2	1.57	1.30	1.34	2.12	0.66	0.46
Treatment Week 3	1.09	0.98	1.34	1.98	0.66	0.05
Treatment Week 4	0.69	0.55	0.89	1.50	0.35	0.48
Post-treatment	0.67	0.95	0.68	2.09	0.27	0.26
PTSD Symptom Distress (SRQD)[2]	1	2	3	4	5	6
Baseline	1.90	2.26	1.60	3.02	1.41	1.34
Treatment Week 1	1.80	2.20	1.76	2.04	1.16	2.08
Treatment Week 2	2.07	2.00	1.34	2.73	0.93	0.77
Treatment Week 3	1.80	1.52	1.25	3.00	0.80	0.32
Treatment Week 4	1.55	1.09	1.03	2.36	0.28	0.96
Posttreatment	1.21	1.34	0.70	2.85	0.17	0.24

1. SRQF subscale measures PTSD symptom frequency (e.g., Avoidance, Arousal, and Intrusion), with a scale that ranges from 0 = "*Have not experienced*" to 4 = "*Have experienced this five or more times a week*". 2. SRQ-Distress (SRQD) subscale measures PTSD symptom distress, with a scale that ranges from 0 = "*Does not upset me*" to 4 = "*Upsets me extremely.*"

Table 7

Mean Scores for Each Participant on the Dependent Measures for State Anxiety (STAI-S), Coping Self-Efficacy (CCS), and Attention to Threat (TAM) at Baseline, by Treatment Week, and at Post-treatment

Measures and Assessment Point	**Participant**					
State Anxiety (STAI-S)[1]	**1**	**2**	**3**	**4**	**5**	**6**
Baseline	65.0	57.8	69.3	80.2	51.0	47.4
Treatment Week 1	57.5	51.0	64.0	69.0	42.0	52.5
Treatment Week 2	58.0	65.5	58.5	84.0	40.0	50.5
Treatment Week 3	65.9	49.5	57.5	75.5	35.5	42.5
Treatment Week 4	52.0	48.0	57.5	72.5	35.5	45.0
Post-treatment	48.6	60.0	56.8	73.8	35.2	63.0
Coping Self-Efficacy (CCS)[2]	**1**	**2**	**3**	**4**	**5**	**6**
Baseline	45.7	45.2	48.1	45.1	42.6	40.2
Treatment Week 1	46.1	72.8	56.1	45.6	47.2	37.2
Treatment Week 2	51.7	70.6	63.0	47.8	43.3	53.9
Treatment Week 3	46.7	77.2	65.0	57.8	50.6	68.3
Treatment Week 4	43.9	84.5	66.7	50.6	54.5	68.3
Posttreatment	60.0	80.8	65.6	39.5	62.0	77.5
Attention to Threat (TAM)[3]	**1**	**2**	**3**	**4**	**5**	**6**
Baseline	1.79	1.43	2.57	2.71	2.36	1.79
Treatment Week 1	1.00	1.75	2.75	2.25	1.50	2.25
Treatment Week 2	1.00	2.50	2.25	2.00	2.00	0.25
Treatment Week 3	1.00	1.25	2.00	1.75	1.75	0.25
Treatment Week 4	0.50	0.50	1.75	2.00	1.75	1.00
Posttreatment	0.13	1.50	1.38	2.63	1.25	0.13

1. State Anxiety Inventory-State (STAI-S) Standard Scores; 2. Coping Confidence Scale (CCS) Scale: 0-100% where 0="*Cannot do at all*" to 100="*Certain can do*"; and 3. Trauma Attention Measure (TAM) Scale: 0="*Not at all attended/bothered*" to 4="*Completely bothered/attended*".

Table 8

Ratings for Each Participant on the Word Rating Scale (WRS) for Dot-Probe Task Stimuli at Pre-baseline, Post-baseline, and Post-treatment

Word Stimuli Ratings and Assessment Point	**Participant**					
Threat Word Ratings	**1**	**2**	**3**	**4**	**5**	**6**
Pre-baseline	2.46	3.33	3.02	2.96	2.78	3.09
Post-baseline	2.50	3.26	2.85	3.22	2.58	3.43
Post-treatment	2.20	2.85	1.38	3.06	2.59	2.13
Neutral Word Ratings	**1**	**2**	**3**	**4**	**5**	**6**
Pre-baseline	0.00	0.03	0.00	0.12	0.00	0.00
Post-baseline	0.00	0.00	0.00	0.15	0.00	0.00
Post-treatment	0.00	0.00	0.00	0.20	0.00	0.00

WRS Scale: 0="*Not at all threatening*"; 1="*A little bit threatening*"; 2="*Mildly threatening*"; 3="*Moderately Threatening*"; 4="*Severely threatening*"

Table 9

Paired Samples T-Test Examining Baseline Phase Change by Comparing Pre-baseline to Post-baseline Group Means on All Dependent Measures (n = 6)

Dependent Variable (Dependent Measure)	**Mean (SD)**	***t***
PTSD Symptom Total (IESRT)	-4.83 (7.47)	*-1.58*
Avoidance Factor (IESRA)	-0.02 (0.31)	*-0.12*
Intrusion Factor (IESRI)	-0.42 (0.51)	*-2.01*
Hyperarousal Factor (IESRH)	-0.36 (0.68)	*-1.31*
Depression (CES-D)	-0.17 (5.27)	*-0.08*
PTSD Symptom Frequency (SRQF)	-0.25 (1.04)	*-0.59*
PTSD Symptom Distress (SRQD)	-0.09 (0.45)	*-0.49*
Frequency of Avoidance Symptoms (SRQFAV)	0.07 (1.39)	*0.12*
Frequency of Arousal Symptoms (SRQFAR)	-0.36 (1.15)	*-0.77*
Frequency of Intrusion Symptoms (SRQFIN)	-0.22 (0.77)	*-0.69*
State Anxiety (STAI-S)	6.67 (13.34)	*1.22*
Coping Self-Efficacy (SES)	-5.63 (20.06)	*-0.69*
Coping Self-Efficacy (CCS)	-9.07 (18.38)	*-1.21*
Attention to Threat (TAM)	0.33 (0.82)	*1.00*
Threat Word Rating Scale (WRS-T)	-0.03 (0.22)	*-0.36*
Attention Bias Score (AB Score)	-1.85 (6.87)	*-0.66*
Reaction Time to Threat Words (RT to Threat)	20.28 (33.50)	*1.48*
Reaction Time to Neutral Words (RT to Neutral)	18.44 (37.18)	*1.22*

*[Significance Level = * p<.05, **p< .01].*
Note: *No significant changes* are indicated from pre-baseline to post-baseline.

Table 10

Between-Phase Effects of Simulation Modeling Analysis (SMA) for Level and Slope Effect Sizes and Autocorrelations (r (Lag 1)) for Dependent Measures Administered throughout Baseline, Treatment, and Post-treatment Phases for Each Participant

Participant	DV	Analysis 1: Baseline vs. Treatment			Analysis 2: Baseline vs. Post-treatment		
		Level	*Slope*	*r(Lag1)*	*Level*	*Slope*	*r(Lag 1)*
Participant 1	*SRQF*	-0.56	-0.72*	0.21	-0.77*	-0.74*	0.30
	SRQD	-0.23	0.10	-0.20	-0.68*	-0.68*	0.34
	TAM	-0.76*	-0.73*	0.47	-0.88*	-0.82*	0.65
	STAI-S	-0.56	-0.19	0.55	-0.89*	-0.50	0.92
	CCS	0.10	0.04	-0.14	0.67*	0.14	0.34
Participant 2		*Level*	*Slope*	*r(Lag1)*	*Level*	*Slope*	*r(Lag 1)*
	SRQF	-0.78*	- 0.93**	0.64	-0.80*	-0.91**	0.60
	SRQD	-0.68*	-0.84*	0.47	-0.66*	-0.61	0.56
	TAM	0.05	-0.60*	0.03	0.07	-0.17	-0.01
	STAI-S	-0.29	-0.04	0.16	0.16	-0.16	-0.11
	CCS	0.88**	0.95**	0.73	0.90**	0.95**	0.70
Participant 3		*Level*	*Slope*	*r(Lag 1)*	*Level*	*Slope*	*r(Lag 1)*
	SRQF	-0.29	-0.64 *	0.32	-0.77*	-0.74**	0.31
	SRQD	-0.45	-0.75*	0.59	-0.95**	-0.81*	0.68
	TAM	-0.38	-0.58	0.29	-0.81*	-0.82*	0.50
	STAI-S	-0.85*	0.13	0.87	-0.96**	-0.29	0.84
	CCS	0.86*	0.89**	0.70	0.94**	0.89**	0.68
Participant 4		*Level*	*Slope*	*r(Lag 1)*	*Level*	*Slope*	*r(Lag 1)*
	SRQF	-0.79*	-0.76*	0.66	-0.64*	-0.59*	0.04
	SRQD	-0.42	-0.46	0.21	-0.24	0.26	-0.16
	TAM	-0.76*	-0.81*	0.54	-0.11	0.18	-0.21
	STAI-S	-0.39	0.15	-0.01	-0.55	-0.04	0.15
	CCS	0.42	0.54	0.57	-0.35	-0.37	0.09
Participant 5		*Level*	*Slope*	*r(Lag 1)*	*Level*	*Slope*	*r(Lag 1)*
	SRQF	-0.74	-0.87*	0.54	-0.83*	-0.89**	0.55
	SRQD	-0.72*	-0.79**	0.43	-0.89*	-0.80*	0.55
	TAM	-0.57	0.18	-0.01	-0.77*	-0.72*	0.27
	STAI-S	-0.69	-0.42	0.72	-0.76*	-0.96**	0.73
	CCS	0.48	0.71*	0.24	0.85*	0.88*	0.65
Participant 6		*Level*	*Slope*	*r(Lag 1)*	*Level*	*Slope*	*r(Lag 1)*
	SRQF	-0.23	0.37	0.28	-0.55*	-0.51*	-0.27
	SRQD	-0.33	0.30	0.06	-0.82**	-0.75*	0.51
	TAM	-0.38	0.29	0.18	-0.88*	-0.78*	0.46
	STAI-S	0.01	-0.22	-0.16	0.78*	0.09	0.53
	CCS	0.51	0.76*	0.38	0.89**	0.85*	0.55

Significance Level = **p<.05, **p< .01.*
Level and slope = *Pearson's Correlation* for treatment effect and r (*Lag 1) = Autocorrelation Statistic*.
Note: Number of observations varied by dependent measure and phase included the following: 1. Stressful Responses Questionnaire-Frequency *(SRQF),* Stressful Responses Questionnaire-Distress *(SRQD),* State-Trait Anxiety Inventory *(STAI-S)* BL (n=9), T (n=8), and PT (n=5); Coping Self-Efficacy *(CCS)* and Trauma Attention Measure *(TAM)* BL (n=9), T (n=8), and Post-treatment (n=4).

Table 11

Reaction Time (RT) to Threat and Neutral Word Stimuli for Each Participant and Overall Means on Dot-probe Task with 50% Reinforcement Rate Pre- and Post-treatment

RT Pre and Post Retraining	**Participant**													
	1		**2**		**3**		**4**		**5**		**6**		*Overall Means (SD)*	
Word Type	T	N	T	N	T	N	T	N	T	N	T	N	*T*	*N*
Pre-treatment	448	451	419	412	407	416	341	338	455	470	377	381	*408 (43)*	*411 (48)*
Posttreatment	174	180	392	397	534	532	351	352	375	363	371	357	*366 (115)*	*364 (113)*

[*RT* = milliseconds, *T*= Reaction Time to Threat Word Stimuli; *N* = Reaction Time to Neutral Word Stimuli]

Table 12

Reaction Time (RT) to Threat and Neutral Word Stimuli for Each Participant and Overall Means with 90% Reinforcement Rate during CBAR Treatment Sessions

Treatment Session	**Participant**													
	1		**2**		**3**		**4**		**5**		**6**		*Overall Means (SD)*	
Word Type	*T*	*N*	*T*	*N*	*T*	*N*	*T*	*N*	*T*	*N*	*T*	*N*	*T*	*N*
Session 1	355	341	420	410	392	387	316	323	418	457	380	386	*380 (40)*	*384 (48)*
Session 2	256	247	438	435	376	364	314	309	376	380	374	386	*356 (63)*	*353 (66)*
Session 3	197	189	419	404	410	423	357	351	341	338	368	372	*349 (80)*	*346 (83)*
Session 4	174	162	421	420	401	397	358	374	356	362	374	365	*347 (89)*	*347 (93)*
Session 5	167	151	400	391	391	378	413	510	359	348	353	357	*347 (91)*	*356 (116)*
Session 6	136	126	362	365	484	523	361	362	360	358	344	327	*341 (113)*	*343 (127)*
Session 7	122	109	392	371	618	615	380	376	375	359	345	331	*372 (157)*	*360 (161)*
Session 8	138	125	376	383	380	376	379	398	368	362	352	348	*354 (120)*	*357 (130)*

[*RT* = milliseconds; *T* = Reaction Time to Threat Word Stimuli; *N* = Reaction Time to Neutral Word Stimuli]

Table 13

Attention Bias (AB) and AB Change Scores for Each Participant and Overall Means at Pre-treatment, Across Attention Retraining Treatment Session, and Post-treatment

AB Scores and AB Change Scores		**Participant**						*Overall Means (SD)*
Assessment Point	***Reinforcement Rate***	**1**	**2**	**3**	**4**	**5**	**6**	
Pre-treatment	50/50	2.7	-6.4	9.1	-2.7	14.7	3.4	*3.5 (7.6)*
Treatment Session 1	90/10	-14.1	-9.7	-4.6	7.1	38.9	5.9	*3.9 (19.1)*
Treatment Session 2	90/10	-9.2	-3.1	-12.2	-5.3	3.7	11.8	*-2.4 (8.8)*
Treatment Session 3	90/10	-8.7	-14.5	12.9	-5.6	-3.5	4.3	*-2.5 (9.8)*
Treatment Session 4	90/10	-12.1	-0.65	-4.3	16.2	6.6	-8.1	*-0.4 (10.4)*
Treatment Session 5	90/10	-15.7	-9.8	-12.3	97.1	-11.4	3.5	*8.6 (43.9)*
Treatment Session 6	90/10	-9.8	3.3	38.5	0.82	-1.7	-17.3	*2.3 (19.3)*
Treatment Session 7	90/10	-13.6	-20.2	-2.3	-3.9	-15.1	-14.3	*-11.6 (6.9)*
Treatment Session 8	90/10	-3.8	6.6	15.6	18.8	-6.3	-3.9	*4.5 (10.8)*
Post-treatment	50/50	5.3	5.8	-10.8	0.52	-11.4	-14.3	*-2.6 (8.5)*
AB Change Score at Post-treatment		-2.6	-12.2	10.8	-3.83	26.1	17.6	6.0 (14.6)

1. **Sign of AB Score** = *Positive AB Score* = **Threat Bias**; *Negative AB Score* = **Neutral Bias**
2. **Sign of AB Change Score** = *Positive AB Change Score* = Attention Bias Change to Neutral at post-treatment; *Negative AB Change Score* = Attention Bias Change to Threat at post-treatment.

Table 14

Case-by-Case Within-Treatment Correlations between Attention Bias (AB) and Dependent Variables using Spearman's Rho and Pearson's Coefficients

	Participant	1	2	3	4	5	6
Spearman's Rho Correlation Coefficient							
Dependent Measure	SRQF	.02	-.10	-.69*	-.43	.43	.65*
	SRQD	.07	-.14	-.80**	.11	.59	.43
	SRQFAV	.09	.05	-.12	-.22	.66*	.56
	SRQFAR	.09	-.07	-.71*	-.50	.47	.55
	SRQFIN	-.06	-.19	-.64*	-.23	.45	.45
	STAI-S	.06	-.32	-.30	.14	.80**	.04
	CCS	-.38	.54	.31	.53	-.47	-.65*
	TAM	-.25	-.17	-.79**	.11	-.23	.45

	Participant	1	2	3	4	5	6
Pearson's Correlation Coefficient							
Dependent Measure	SRQF	-.16	-.10	-.60	-.11	.24	.42
	SRQD	-.38	-.19	-.65*	.30	.45	.32
	SRQFAV	-.09	-.04	-.02	.07	.89**	.45
	SRQFAR	-.19	-.03	-.58	-.09	.29	.42
	SRQFIN	-.09	-.20	-.46	-.06	.23	.35
	STAI-S	-.07	-.17	-.24	.38	.81**	.13
	CCS	-.52	.55	.32	.13	-.44	-.57
	TAM	-.36	-.22	-.73*	.05	-.22	.27

*Significant Correlations = *p<.05, **p< .01 1. Spearman's Rank Coefficient (non-parametric tests)* and *2. Pearson's Correlation Coefficient (parametric test).*

Table 15

Correlation Matrices of Group AB Change Scores and Symptom Change Scores on all Dependent Measures at Post-treatment using Spearman's Rho (Non-Parametric) and Pearson's Correlation (Parametric) Coefficients

Spearman's Rho Correlations of AB Change and Change in Symptoms at Post-treatment															
Dependent Measure	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***	***(9)***	***(10)***	***(11)***	***(12)***	***(13)***	***(14)***	***(15)***
(1)AB	1.0														
(2) SRQF	.03	1.0													
(3) SRQD	-.77*	-1.5	1.0												
(4) SRQFAV	.43	.73	-.31	1.0											
(5) SRQFAR	-.60	.64	.49	.03	1.0										
(6) SRQFIN	.71	-.20	-.83	-.09	-.49	1.0									
(7) IESRT	-.93**	-.29	.83*	-.66	.49	-.60	1.0								
(8) IESRA	-.60	.06	.98**	-.14	.60	-.77*	.66	1.0							
(9) IESRI	-.09	.20	.31	.49	.14	-.26	.03	.37	1.0						
(10) IESRH	-.43	-.12	.89**	-.20	.37	-.71	.54	.94**	.20	1.0					
(11) CES-D	-.43	.52	.20	-.20	.89**	-.14	.37	.31	-.26	.14	1.0				
(12) TAM	-.58	-.19	.06	-.32	.06	-.03	.49	-.20	.12	-.41	.03	1.0			
(13) STAI-S	-.26	.52	-.20	-.14	.66	.14	.14	-.14	-.43	-.31	.89*	.23	1.0		
(14) CCS	.49	-.23	-.83*	- .29	-.26	-.66	-.54	-.83*	-.71	-.71	- .25	-.09	-.06	1.0	
(15) SES	.71	-.29	-.94**	-.36	-.14	-.77*	-.77*	-.77*	-.49	-.77*	-.09	-.20	-.09	.94**	1.0

Pearson's Correlations of AB Change and Change in Symptoms at Post-treatment															
Dependent Measure	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(7)***	***(8)***	***(9)***	***(10)***	***(11)***	***(12)***	***(13)***	***(14)***	***(15)***
(1) *AB*	1.0														
(2) *SRQF*	-.13	1.0													
(3) *SRQD*	-.82*	-.04	1.0												
(4) *SRQFAV*	.49	.72	-.52	1.0											
(5) *SRQFAR*	-.72	.69	.46	.06	1.0										
(6) *SRQFIN*	. 65	-.13	-.56	.03	-.49	1.0									
(7) *IESRT*	-.90**	-.30	.80*	-.77*	.36	-.53	1.0								
(8) *IESRA*	-.53	.10	.70*	-.15	.46	-.70	.39	1.0							
(9) *IESRI*	-.17	.29	.52	.23	.03	-.18	.09	.39	1.0						
(10) *IESRH*	-.49	-.03	.78*	-.30	.40	-.57	.40	.97**	.28	1.0					
(11) *CES-D*	-.44	.51	.33	-.14	.74*	.17	.17	.17	-.02	.25	1.0				
(12) *TAM*	-.66	-.14	.46	-.55	.17	-.10	.78*	-.16	.22	-.17	. 18	1.0			
(13) *STAI-S*	-.16	.33	-.16	-.13	.52	.38	-.02	-.27	-.55	-.16	.82*	.07	1.0		
(14) *CCS*	.42	-.09	-.80*	.06	-.14	-.48	-.39	-.71	-.90**	-.62	.04	-.23	.61	1.0	
(15) *SES*	. 63	.27	-.87*	-.45	-.09	-.64	-.73	-.69	-.60	-.64	.17	-.44	.60	.87*	1.0

Significant Correlations = *p<.05, **p< .01 and in italics.

Measures: 1. AB Change Score; Stressful Responses Questionnaire (SRQ)-Subscales: 2. SRQF-Frequency, 3. SRQD-Distress Subscale, 4. SRQFAV-Avoidance Factor, 5. SRQFAR-Arousal Factor, 6. SRQFIN-Intrusion Factor; Impact of Events Scale-Revised (IESR)-Subscales: 7. IEST-Total Score, 8. IESRA-Avoidance, 9. IESRI-Intrusion, 10. IESRH-Hyperarousal; 11. Center for Epidemiological Studies-Depression Scale (CES-D); 12. TAM-Trauma Attention Measure; 13. State Anxiety Inventory-State Scale (STAI-S); 14. Self-Efficacy Scale (SES); and 15. Coping Confidence Scale (CCS)

Table 16

Aggregated Treatment Outcome Data for all Dependent Measures from Pretreatment through Posttreatment - Mean Scores, Standard Deviations, Paired t-tests, Percentage Change, and Effect Sizes (n = 6)

Dependent Measure	Assessment Point	Mean	SD	Wilcoxon-Signed Rank Test[1]	Paired t-test[2]	Mean % Change[3]	Effect Size
PTSD Symptom Measures				*(Z)*	*(t)*	*%*	*d*
IES-R-Total	Pre-treatment	47.25	10.7				
	Post-treatment	25.83	16.4	-1.99*	3.35*	45%	1.6
IES-R-Avoidance	Pre-treatment	2.27	0.4				
	Post-treatment	1.11	0.7	-2.20*	3.43*	38%	1.9
IES-R- Intrusion	Pre-treatment	2.17	0.5				
	Post-treatment	1.32	0.8	-1.78	2.68*	40%	1.2
IES-R-Hyperarousal	Pre-treatment	1.91	0.8				
	Post-treatment	0.97	0.9	-1.99*	2.61*	53%	1.1
SRQ-Frequency	Baseline	1.70	0.7				
	Treatment	1.09	0.5	-2.20*	4.81**	55%	1.0
	Post-treatment	0.82	0.7	-2.20*	12.01**	57%	1.3
SRQ-Distress	Baseline	1.92	0.6				
	Treatment	1.53	0.7	-2.20*	3.96*	23%	0.6
	Post-treatment	1.09	0.9	-2.20*	5.48**	52%	1.3
SRQ-F-Avoidance	Baseline	1.44	0.8				
	Treatment	0.59	0.5	-2.20*	3.71*	59%	1.2
	Post-treatment	0.40	0.5	-2.20*	4.64**	87%	1.5
SRQ-F-Arousal Factor	Baseline	1.99	0.9				
	Treatment	1.41	0.8	-2.20*	4.79**	30%	0.7
	Post-treatment	1.12	0.9	-2.20*	5.77**	50%	0.9
SRQ-F-Intrusion Factor	Baseline	1.43	0.6				
	Treatment	0.87	0.4	-2.20*	4.48**	40%	1.1
	Post-treatment	0.71	0.6	-2.20*	7.90**	55%	1.2
Depression							
CES-D	Baseline	29.75	13.2				
	Post-treatment	18.5	14.7	-1.57	2.34	27%	0.8
Coping Self-Efficacy							
SES	Pretreatment	48.45	12.0				
	Posttreatment	66.84	13.3	-1.78	-2.17	58%	-1.5
CCS	Baseline	44.48	2.7				
	Treatment	58.40	13.9	-2.20*	-2.61*	31%	-1.4
	Post-treatment	64.21	14.8	-1.99*	-3.07*	50%	-1.9
State Anxiety							
STAI-S	Baseline	61.79	12.2				
	Treatment	55.56	12.3	-1.99*	3.10*	9%	0.5
	Post-treatment	56.23	13.2	-1.15	1.09	9%	0.4
Attention to Threat							
TAM	Baseline	2.11	0.5				
	Treatment	1.79	0.6	-1.78	2.08	15%	0.6
	Post-treatment	1.17	0.9	-1.99*	3.02*	46%	1.2

Significance Level = * $p < .05$, ** $p < .01$

Wilcoxon- Signed Rank Test (Z) –non-parametric test for change at Treatment from Baseline and at Post-treatment from Baseline*; 2. Paired T-test (t)* – parametric test for change at Treatment from Baseline and at Post-treatment from Baseline; 3. *Mean Baseline Reduction (MBR)* for Mean Percentage Change (%) (See Figure 9 for aggregated % improvement); and 4. *Cohen's d* computed as Mean Pre-treatment- Mean Post-treatment divided by the pooled standard deviation SD' = sqrt((SDpre² + SDpost²)/2.

Figure 1

Participant Flow through Study

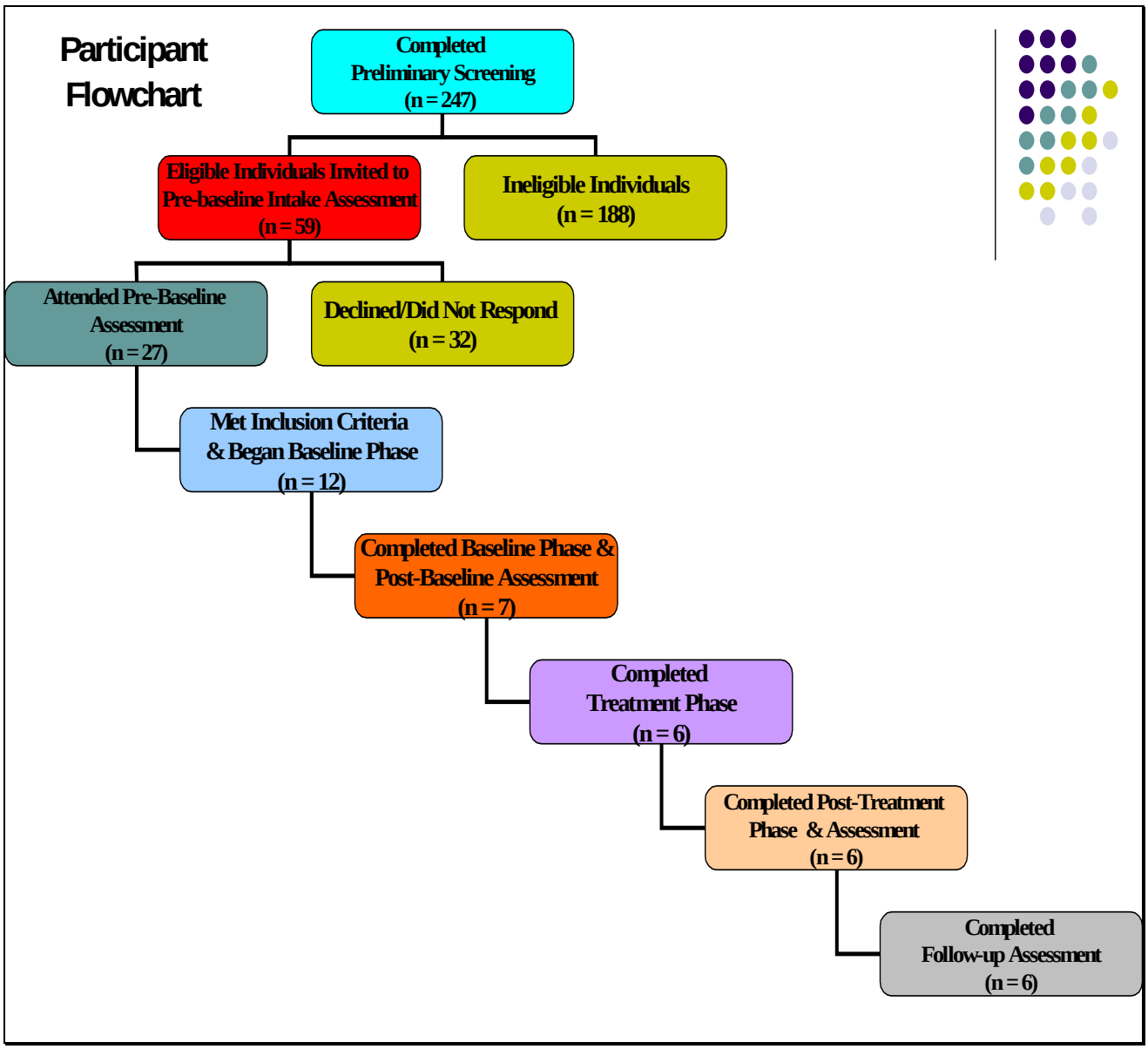


Figure 1.1

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 1

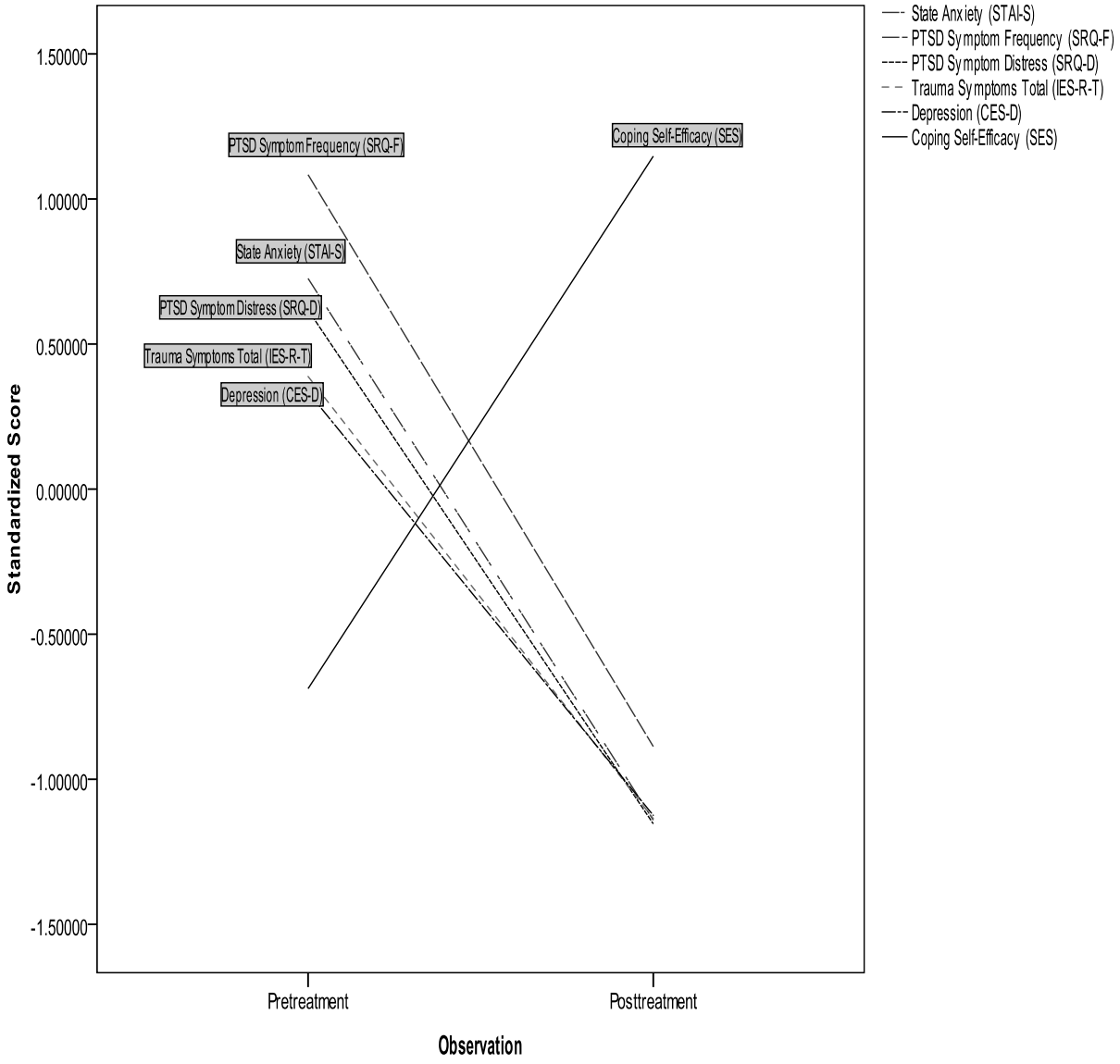


Figure 1.2

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 2

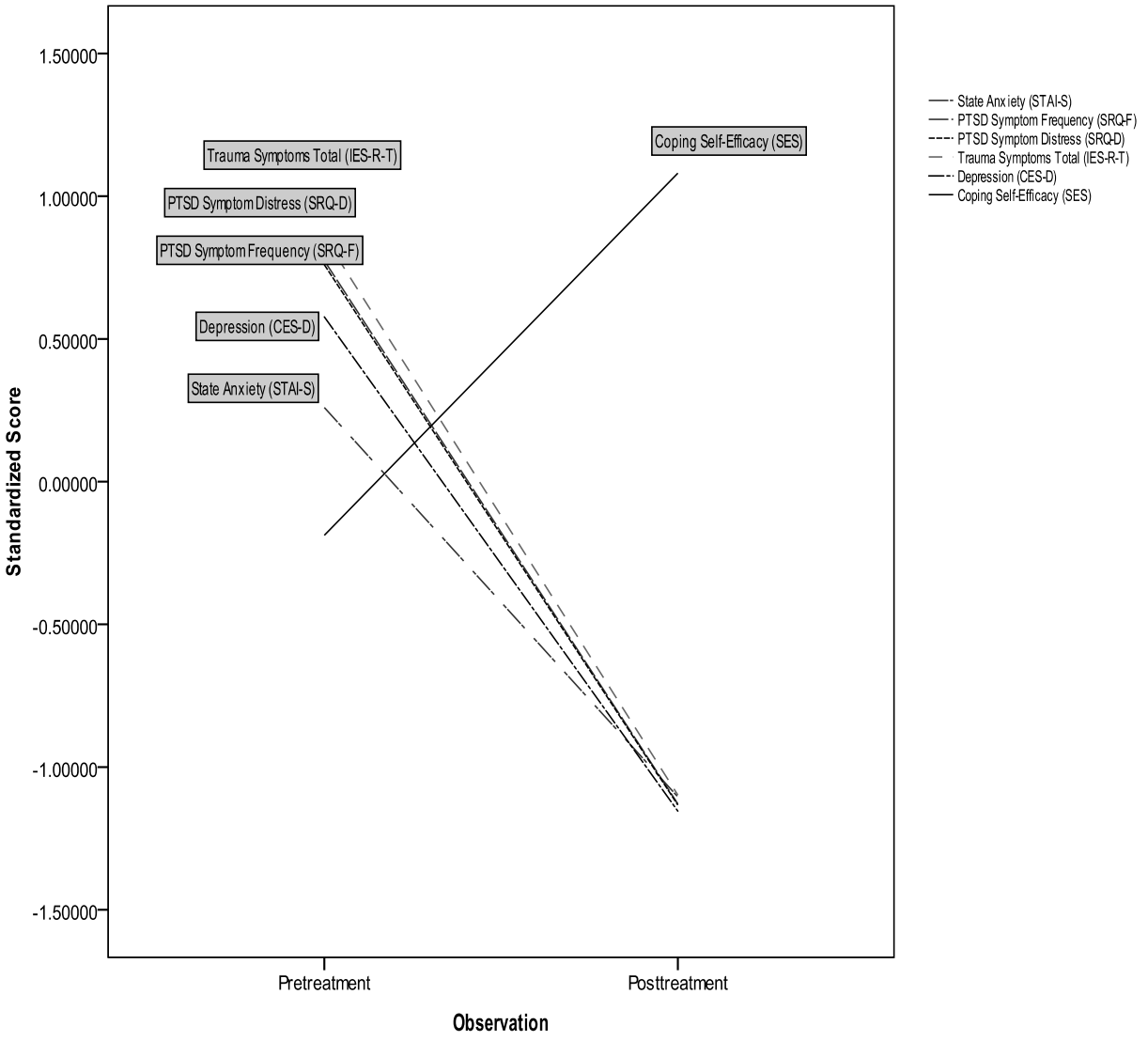


Figure 1.3

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 3

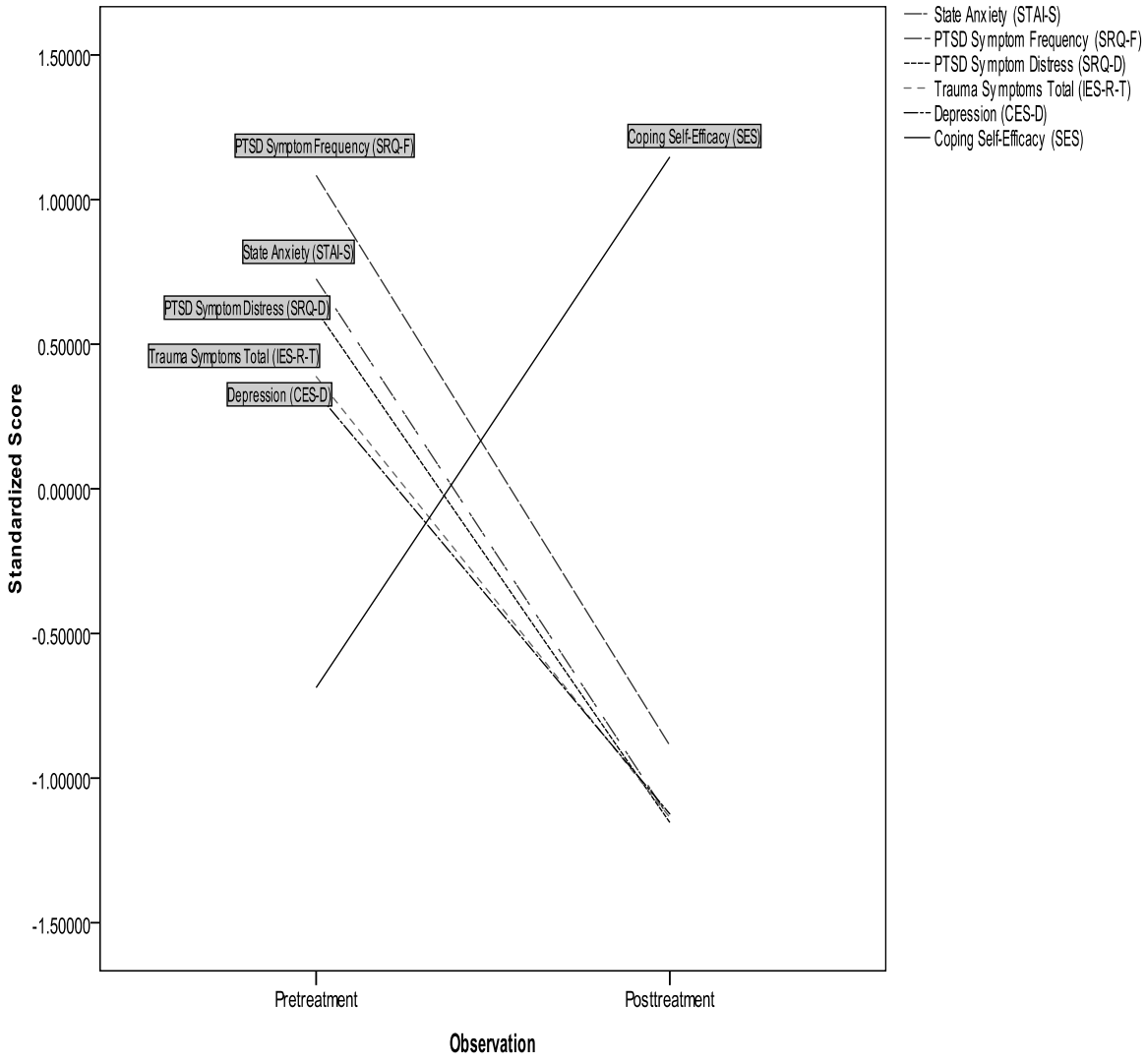


Figure 1.4

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 4

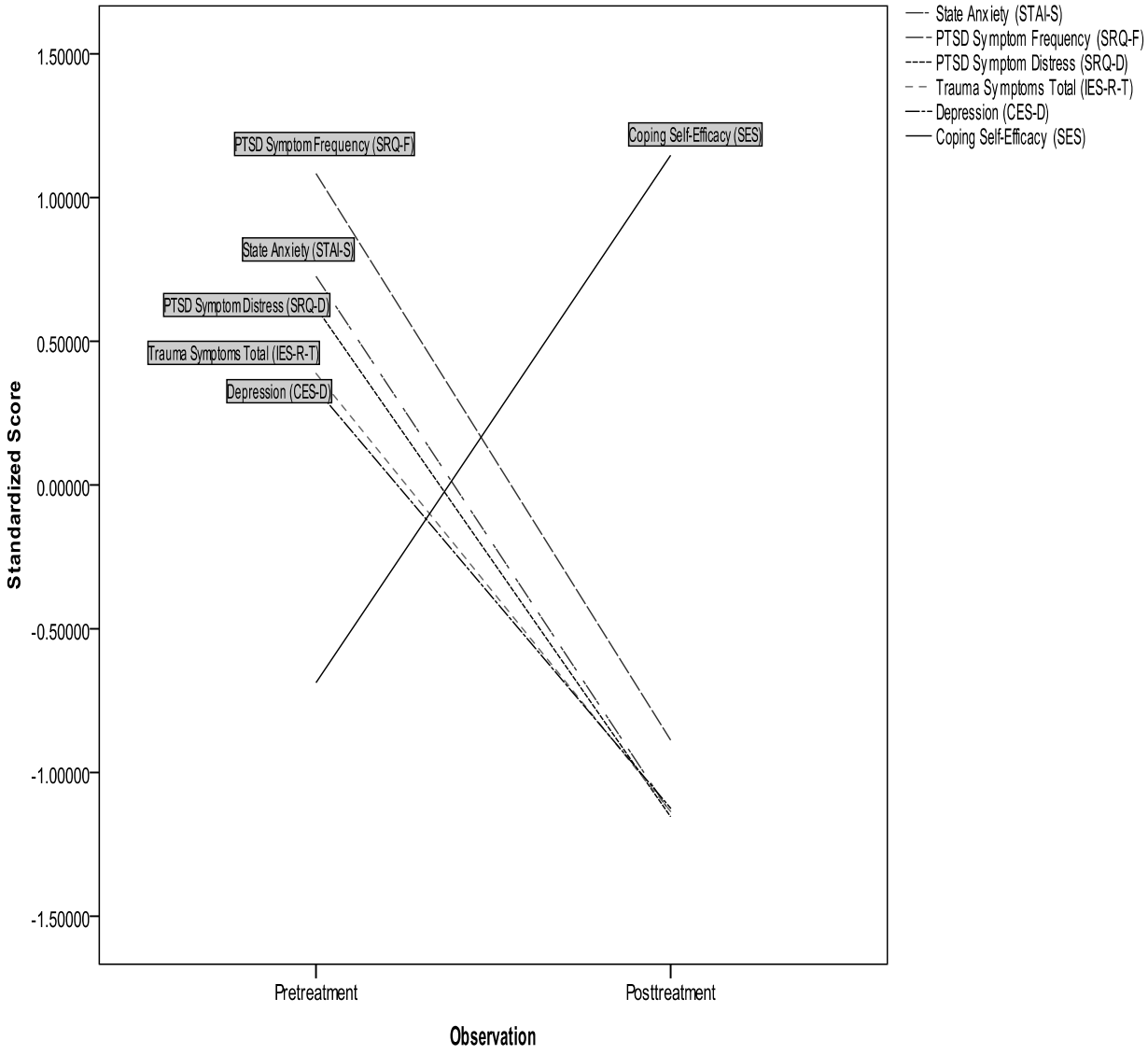


Figure 1.5

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 5

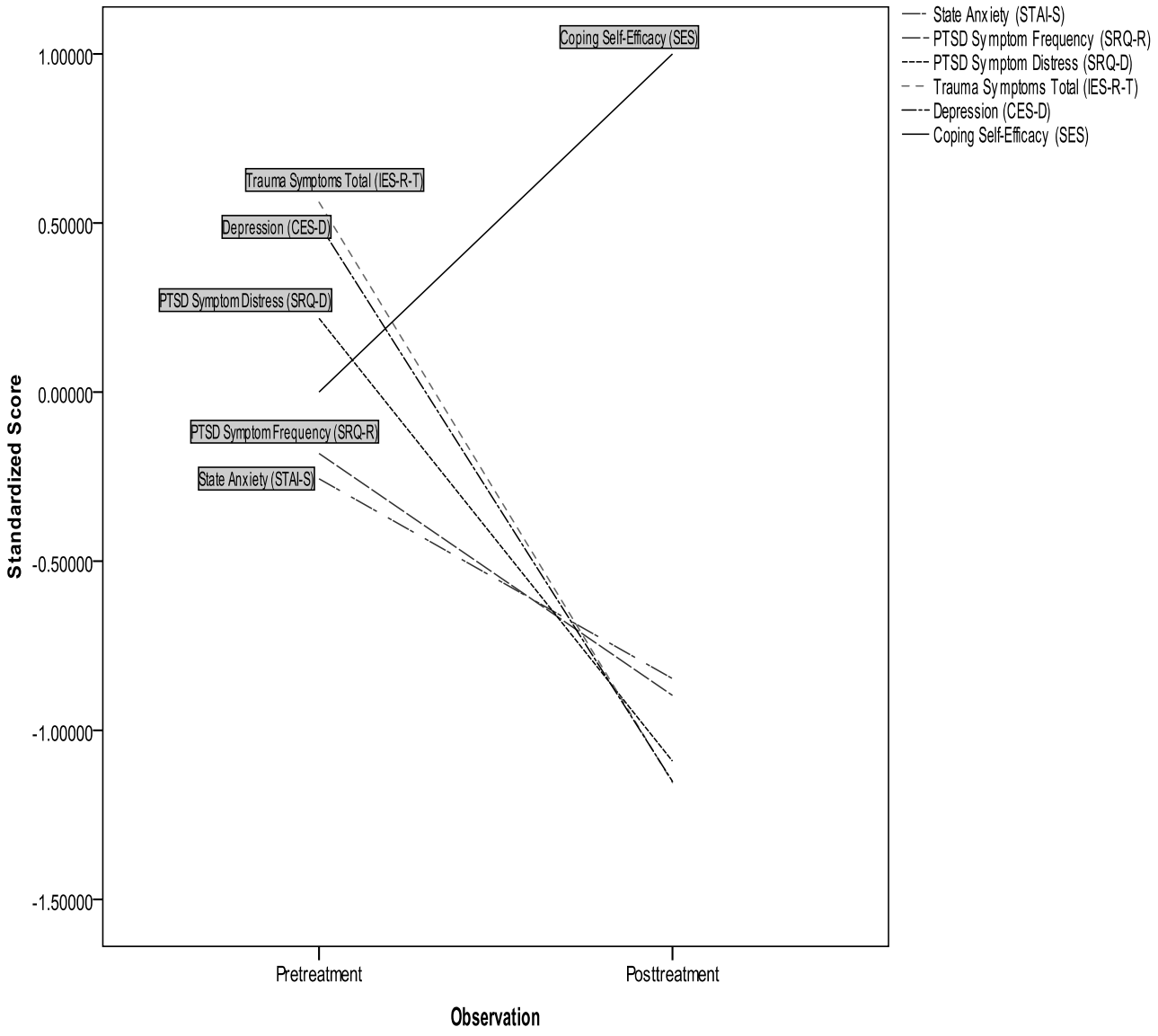


Figure 1.6

Changes on Dependent Measures from Pre-treatment to Post-treatment for Participant 6

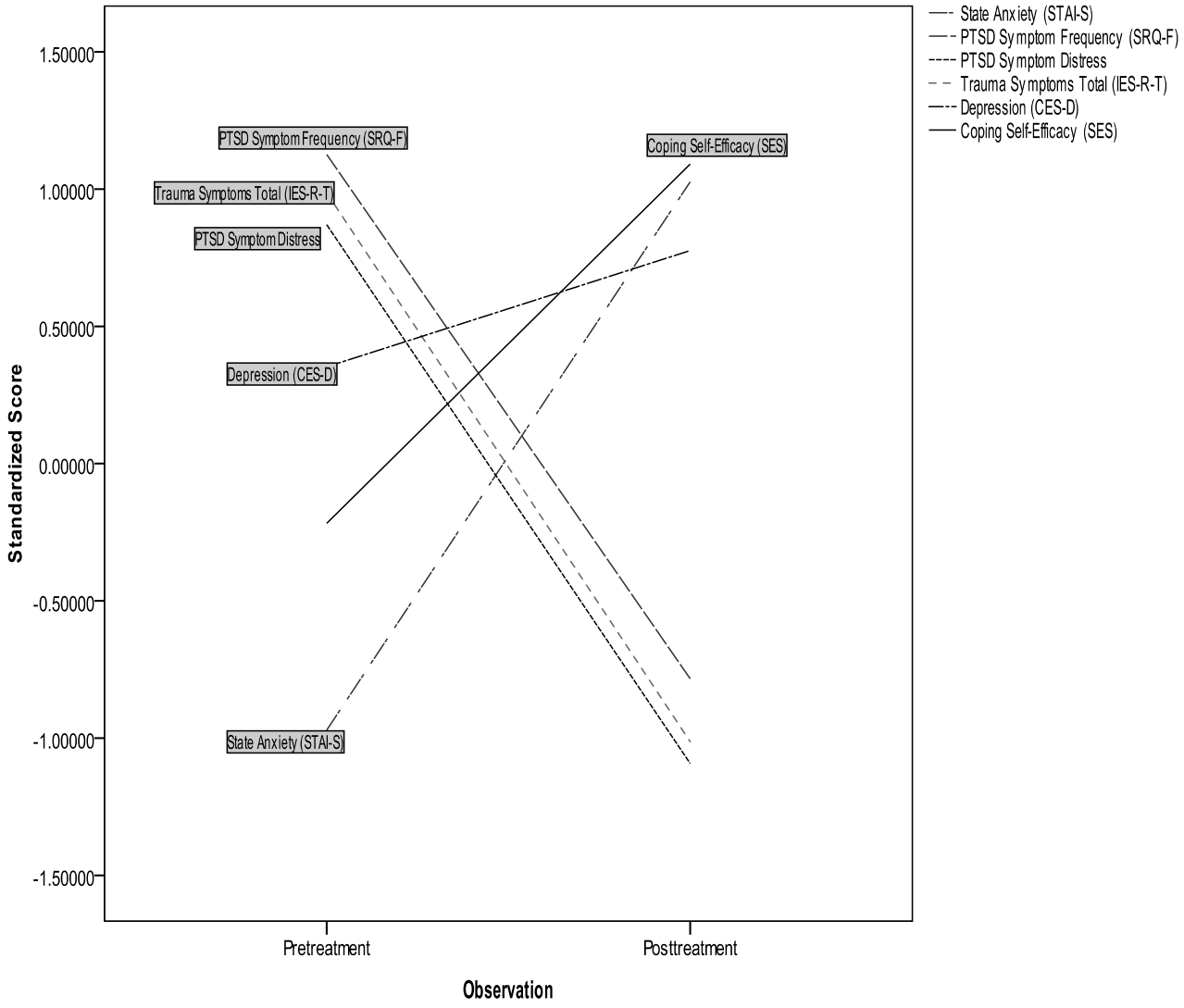


Figure 2.1

Ratings of PTSD Symptom Frequency during Treatment on the Stressful Responses Questionnaire-Frequency Subscale (SRQ-F) for Each Participant

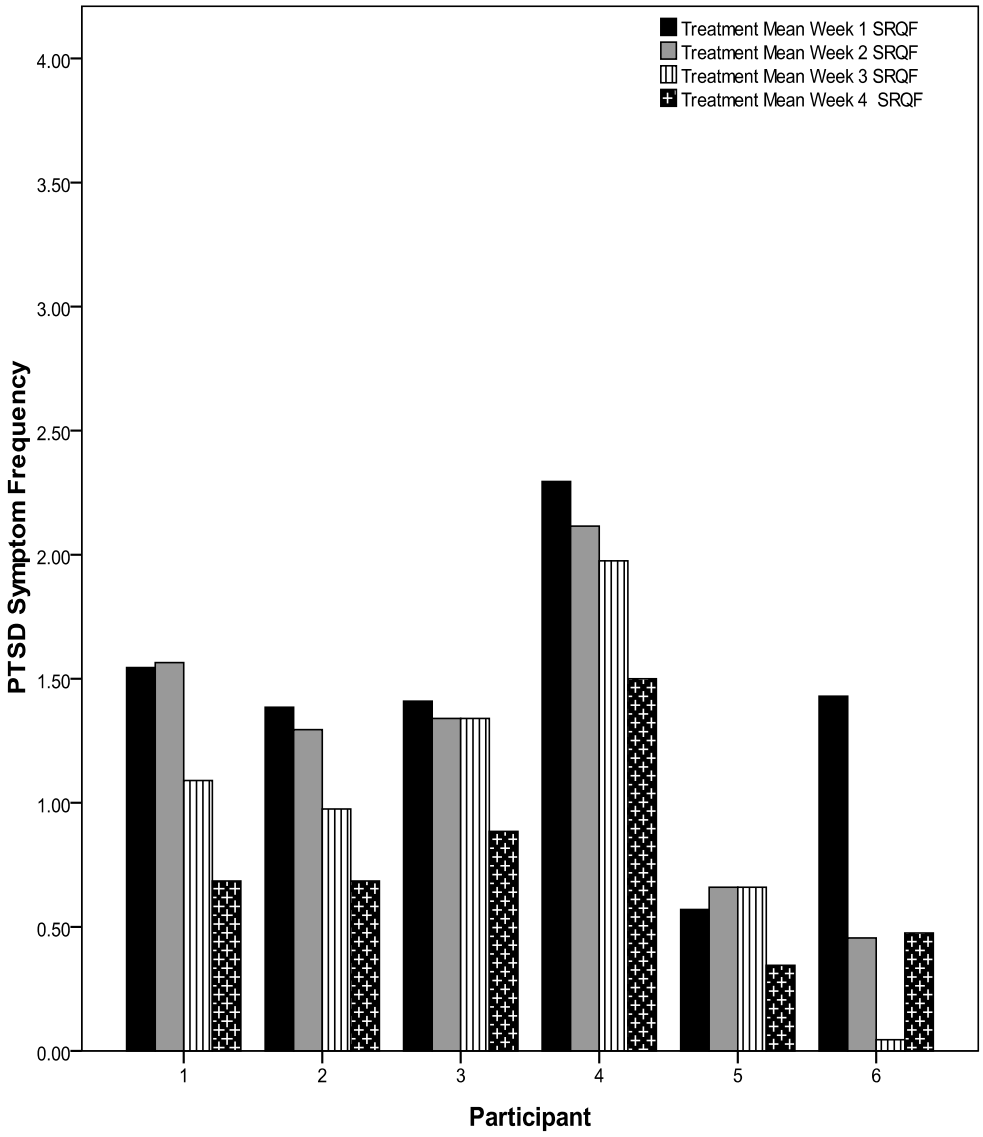


Figure 2.2

Ratings of PTSD Symptom Distress during Treatment on the Stressful Responses Questionnaire-Distress Subscale (SRQ-D) for Each Participant

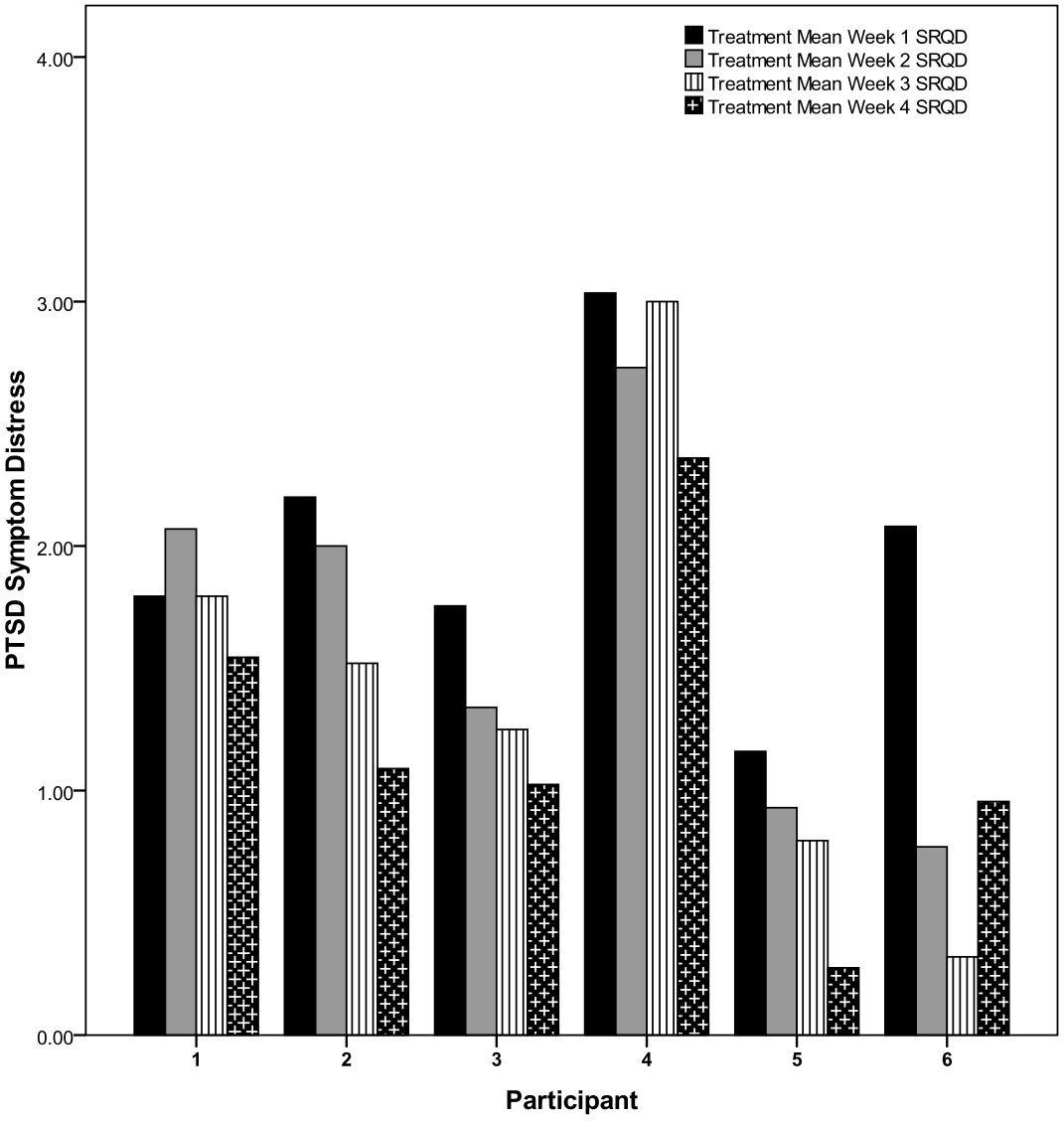


Figure 2.3

Ratings on the State-Trait Anxiety Inventory-State Scale (STAI-S) during Treatment for Each Participant

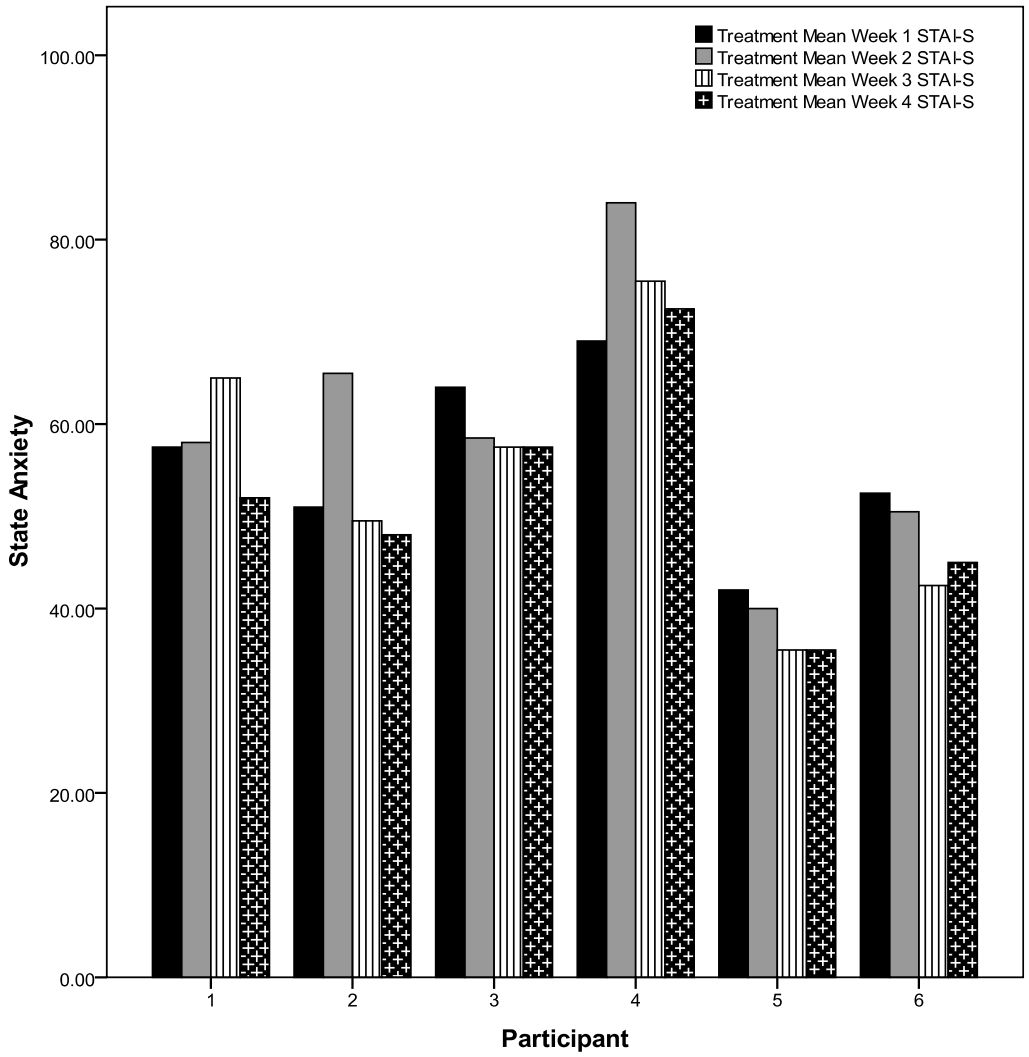


Figure 2.4

Ratings on the Coping Self-Efficacy Scale (CCSS) during Treatment for Each Participant

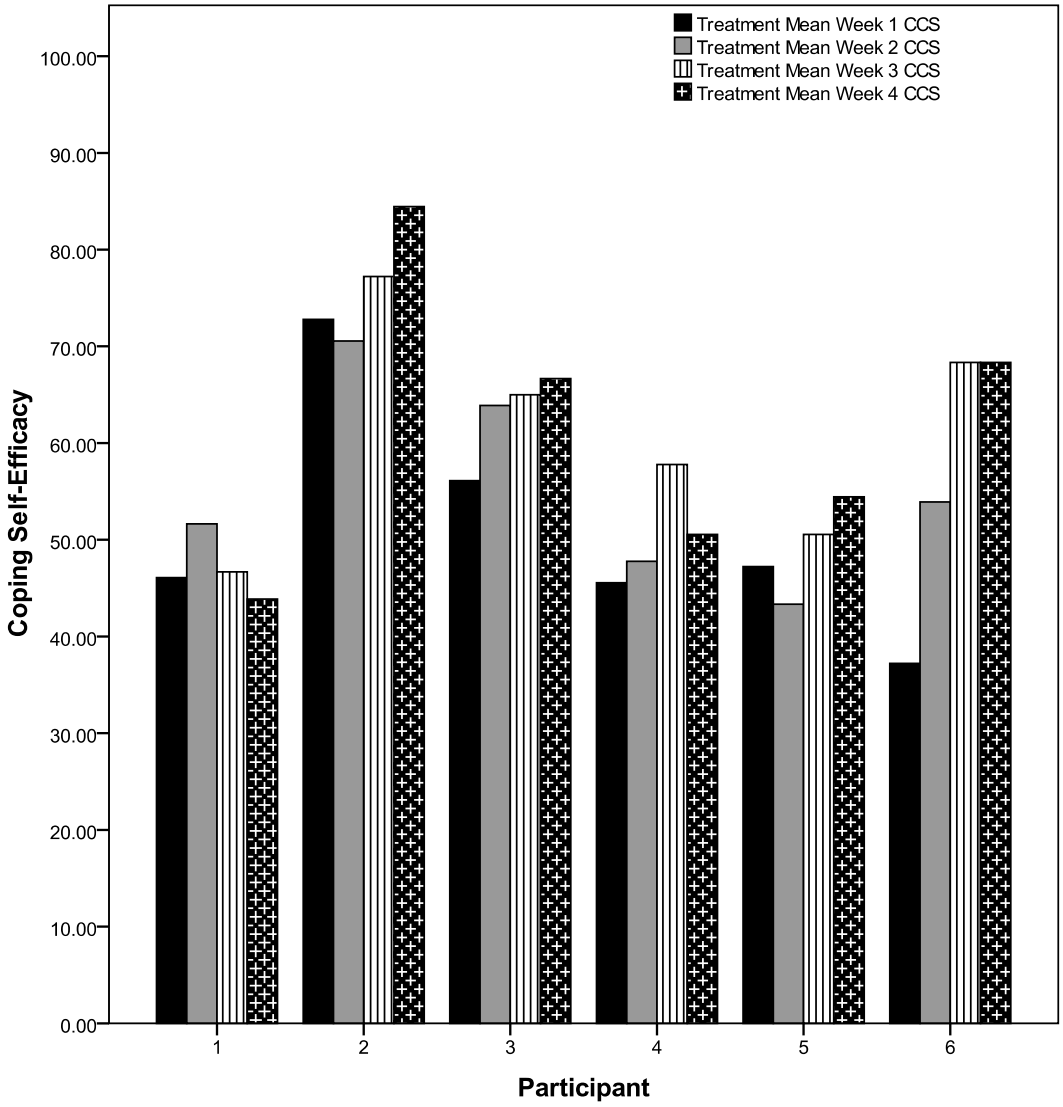


Figure 2.5

Ratings on the Trauma Attention Measure (TAM) during Treatment for Each Participant

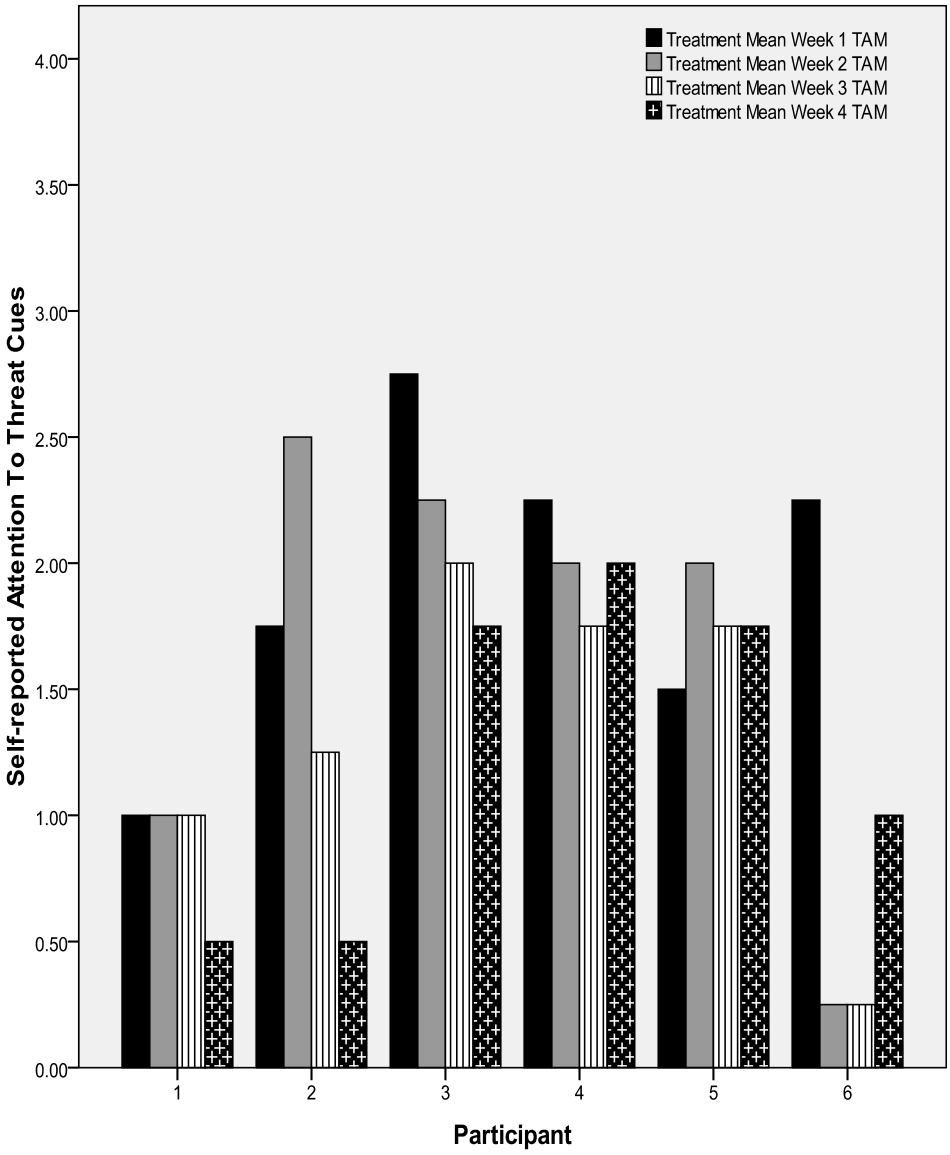


Figure 3.1

PTSD Symptom Frequency for Each Participant during the Baseline, Treatment, and Post-treatment Phases (SRQ-R-F)

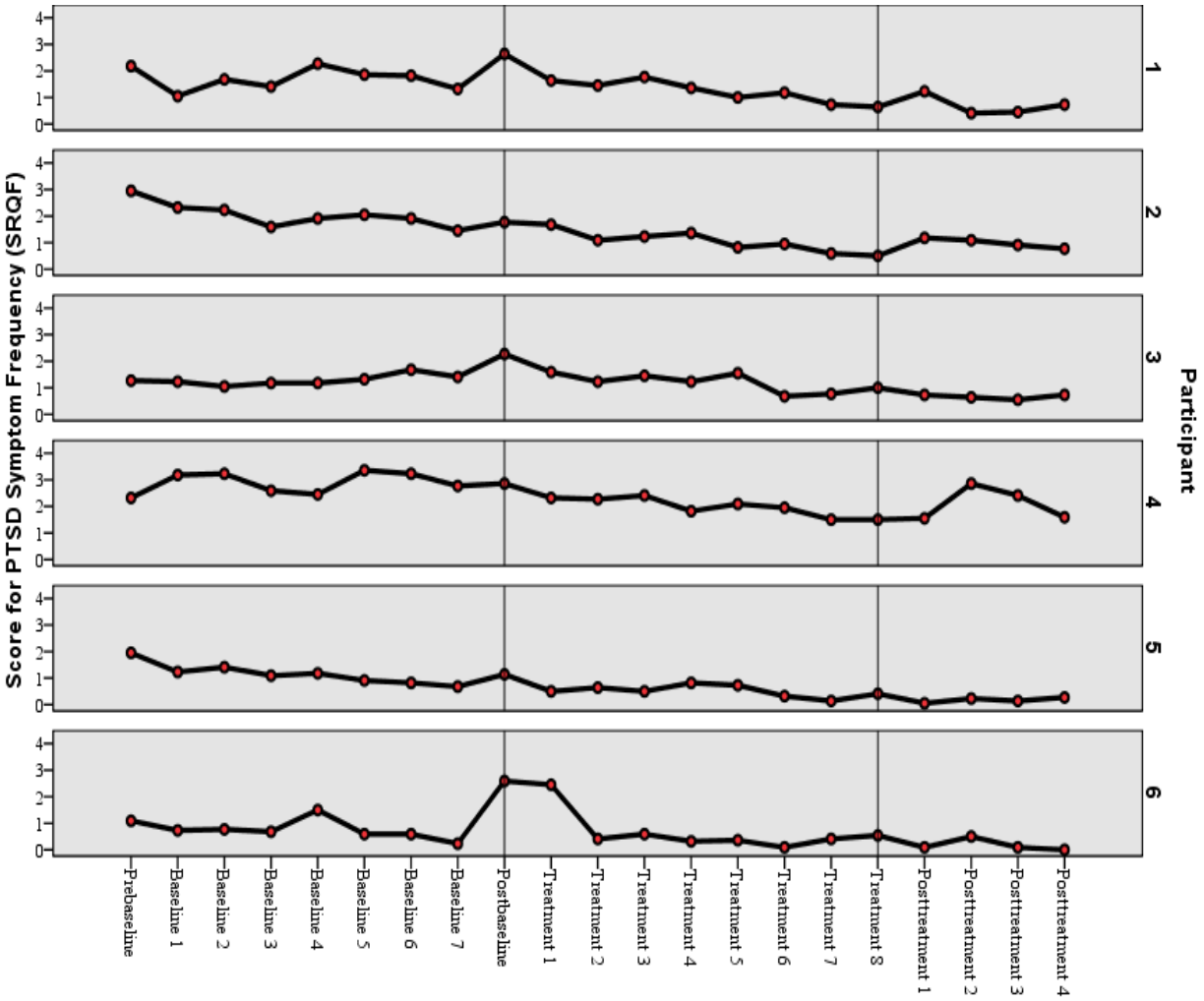


Figure 3.2

PTSD Symptom Distress for Each Participant during the Baseline, Treatment, and Post-treatment Phases (SRQR-D)

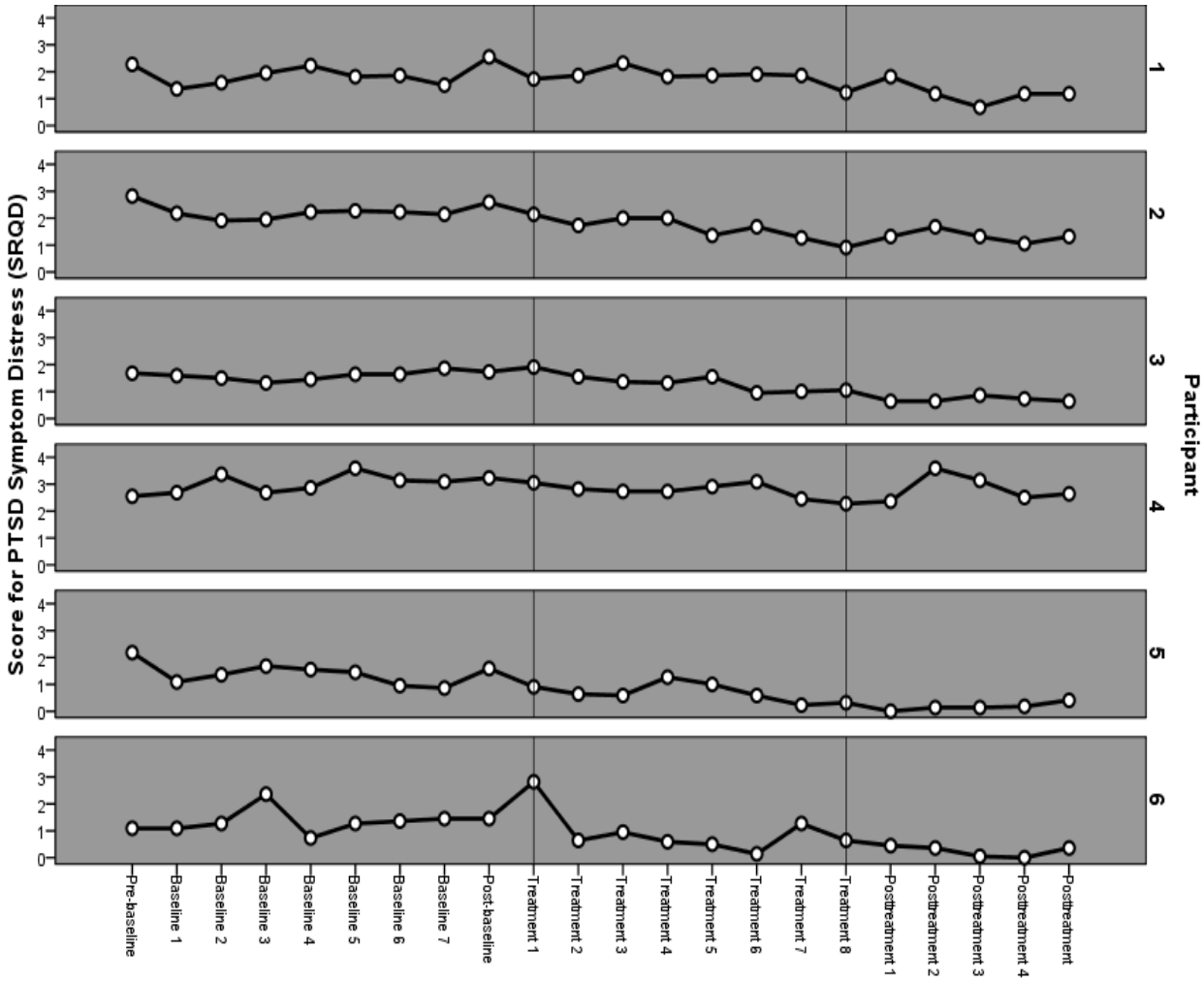


Figure 3.3

State-Trait Anxiety Inventory-State Scale for Each Participant through Baseline, Treatment, and Post-treatment

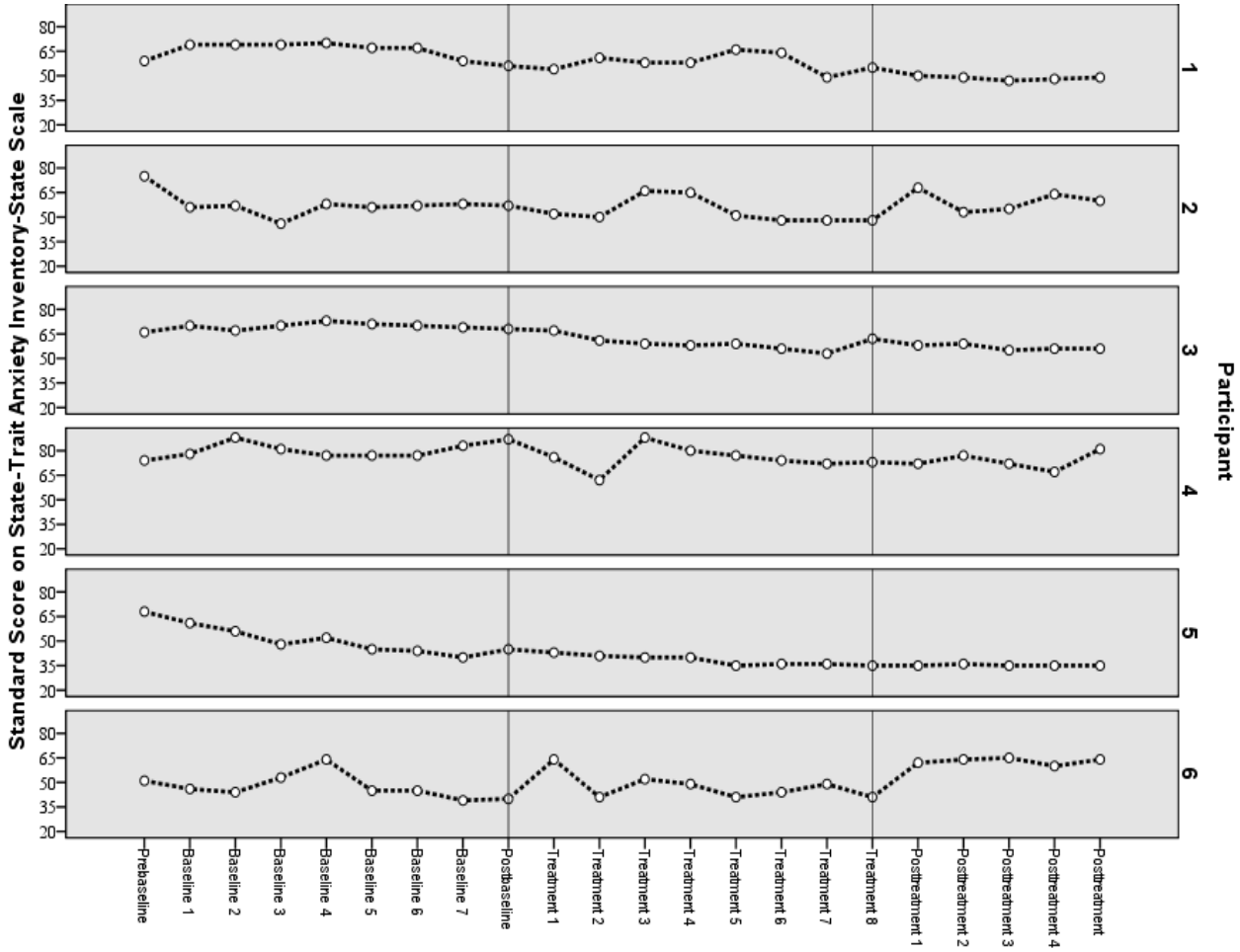


Figure 3.4

Coping Self-Efficacy for Each Participant through Baseline, Treatment, and Post-treatment

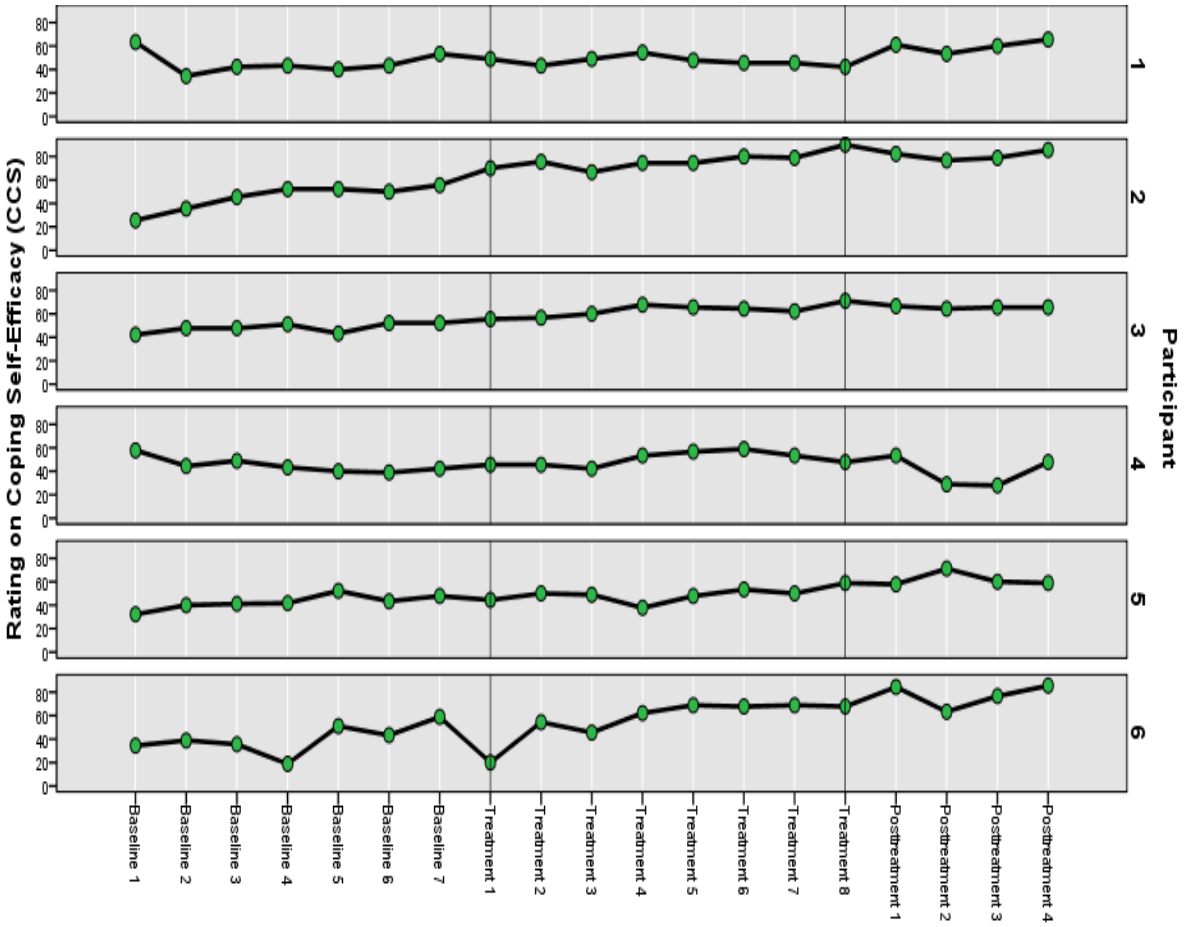


Figure 3.5

Trauma Attention Measure for Each Participant throughout Baseline, Treatment, and Post-treatment Phases

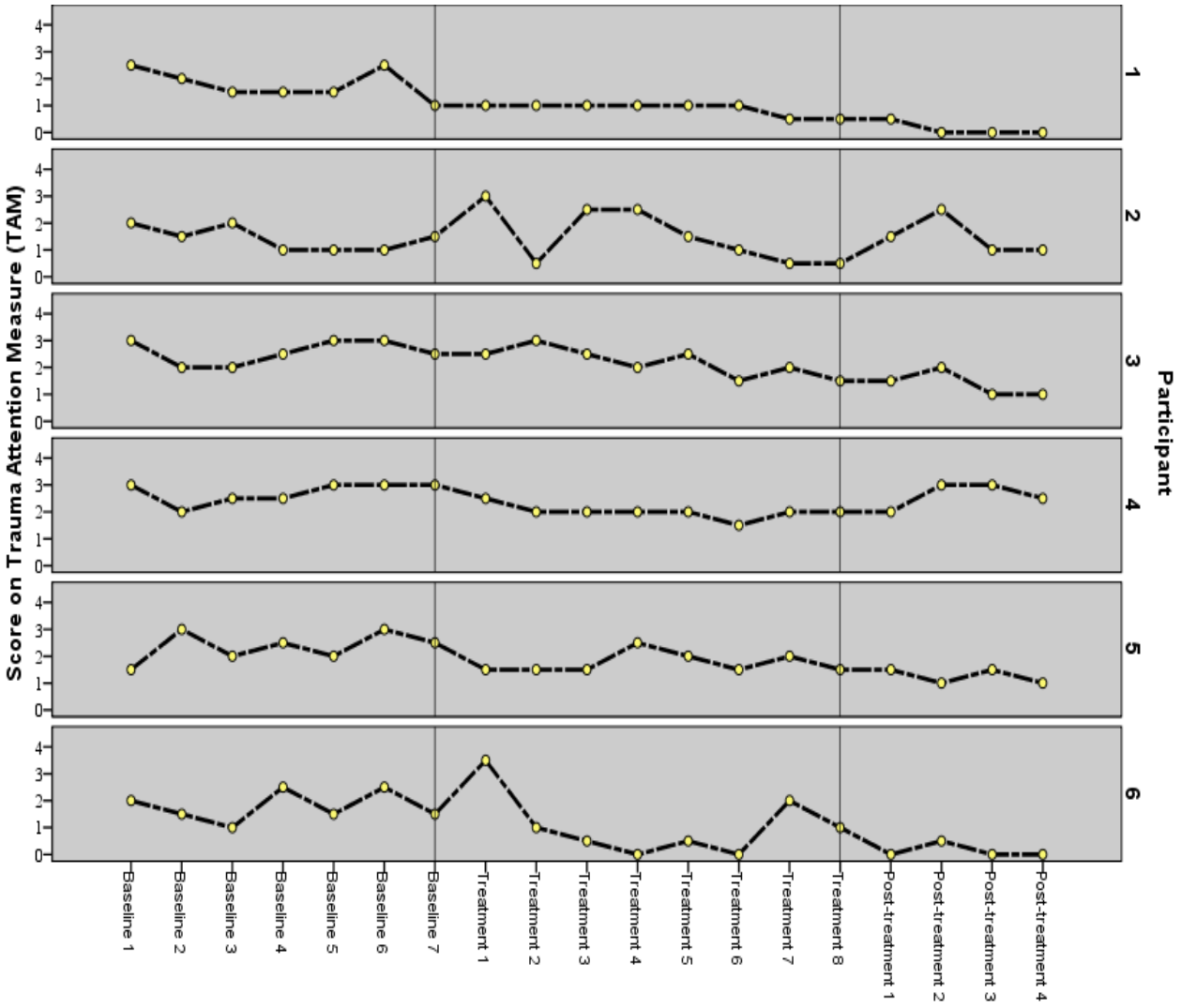


Figure 4.1

CBAR Reaction Time on Dot-probe Task for Participant 1

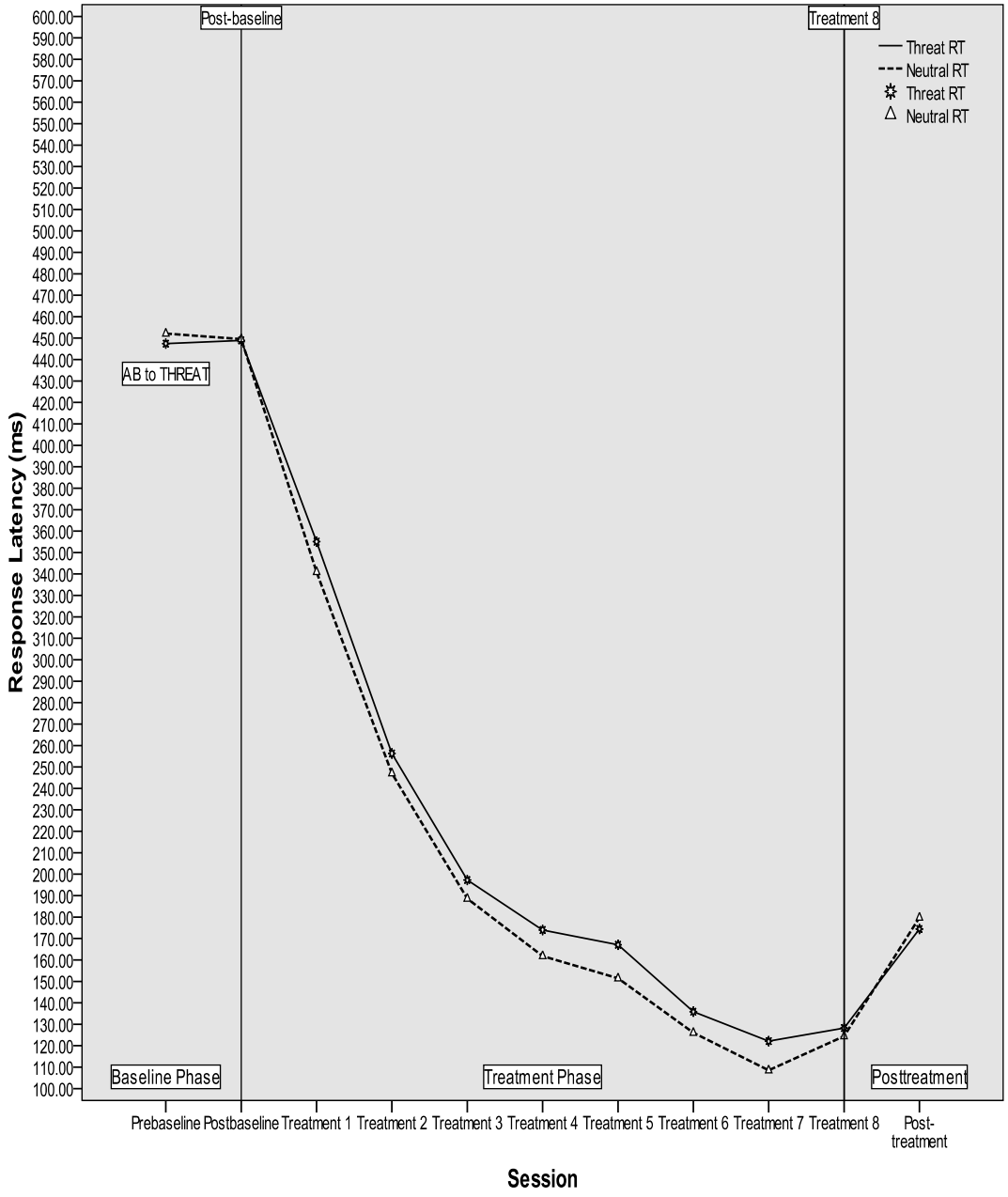


Figure 4.2

CBAR Reaction Time on Dot-probe Task for Participant 2

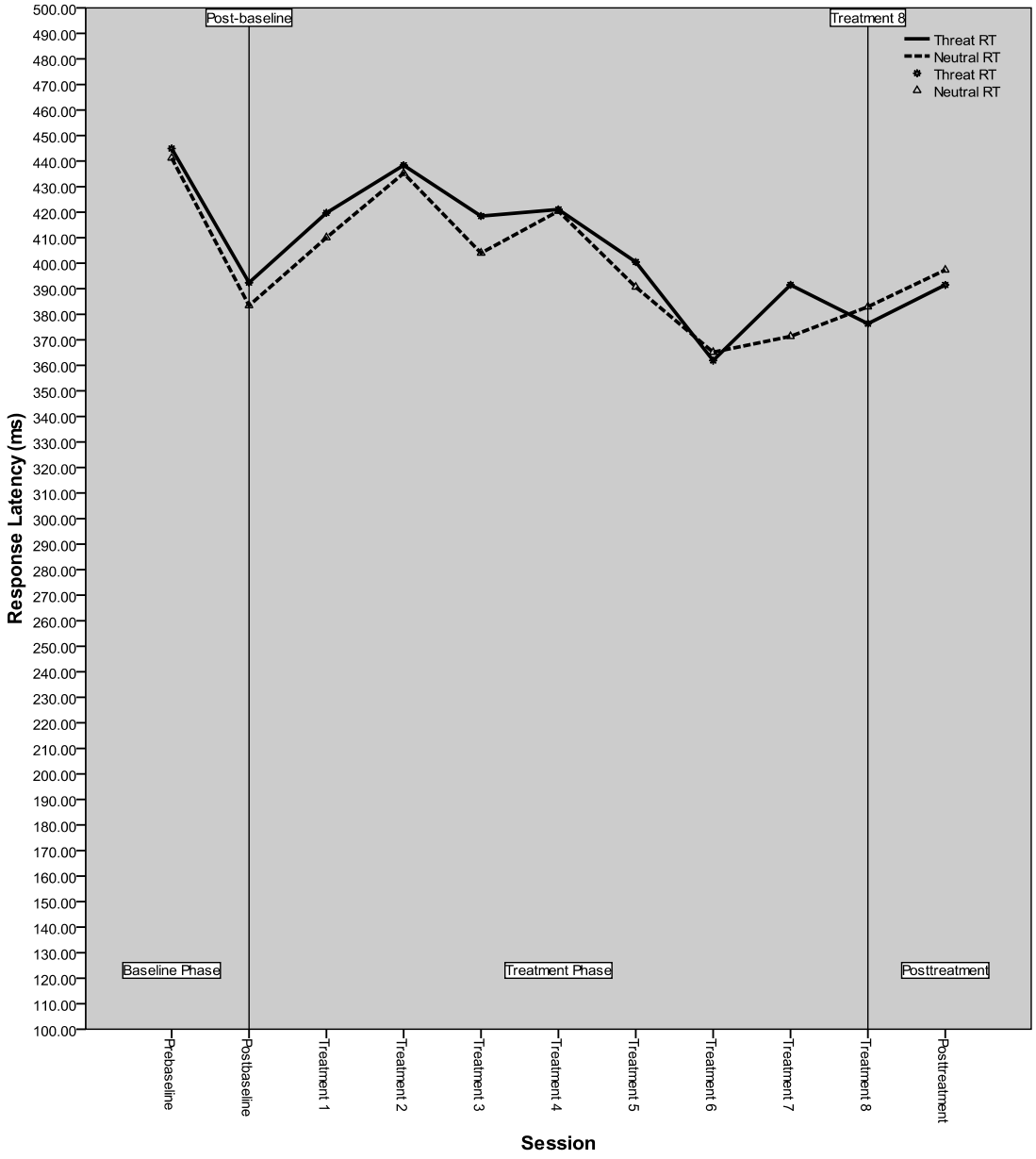


Figure 4.3

CBAR Reaction Time on Dot-probe Task for Participant 3

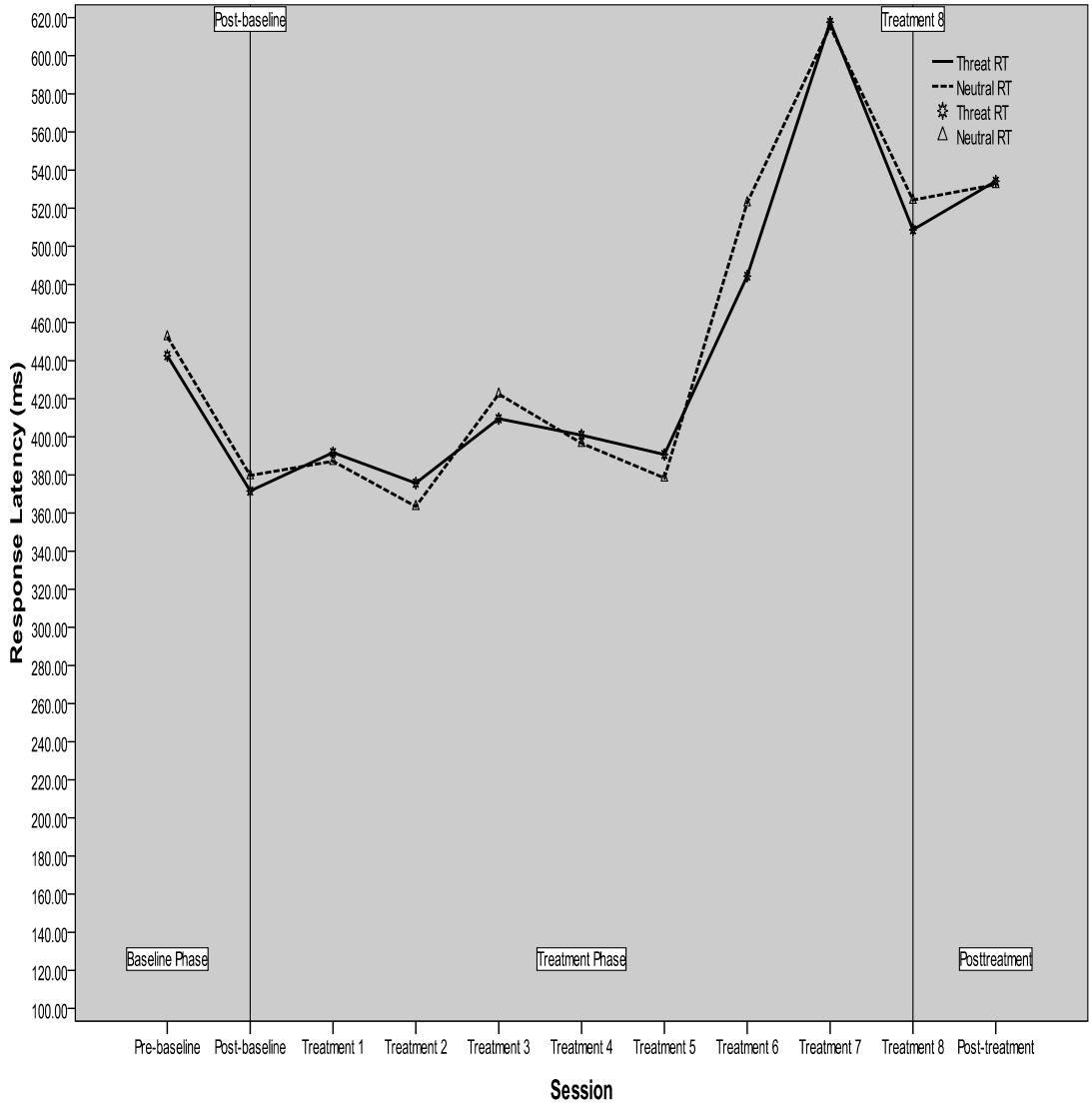


Figure 4.4

CBAR Reaction Time on Dot-probe Task for Participant 4

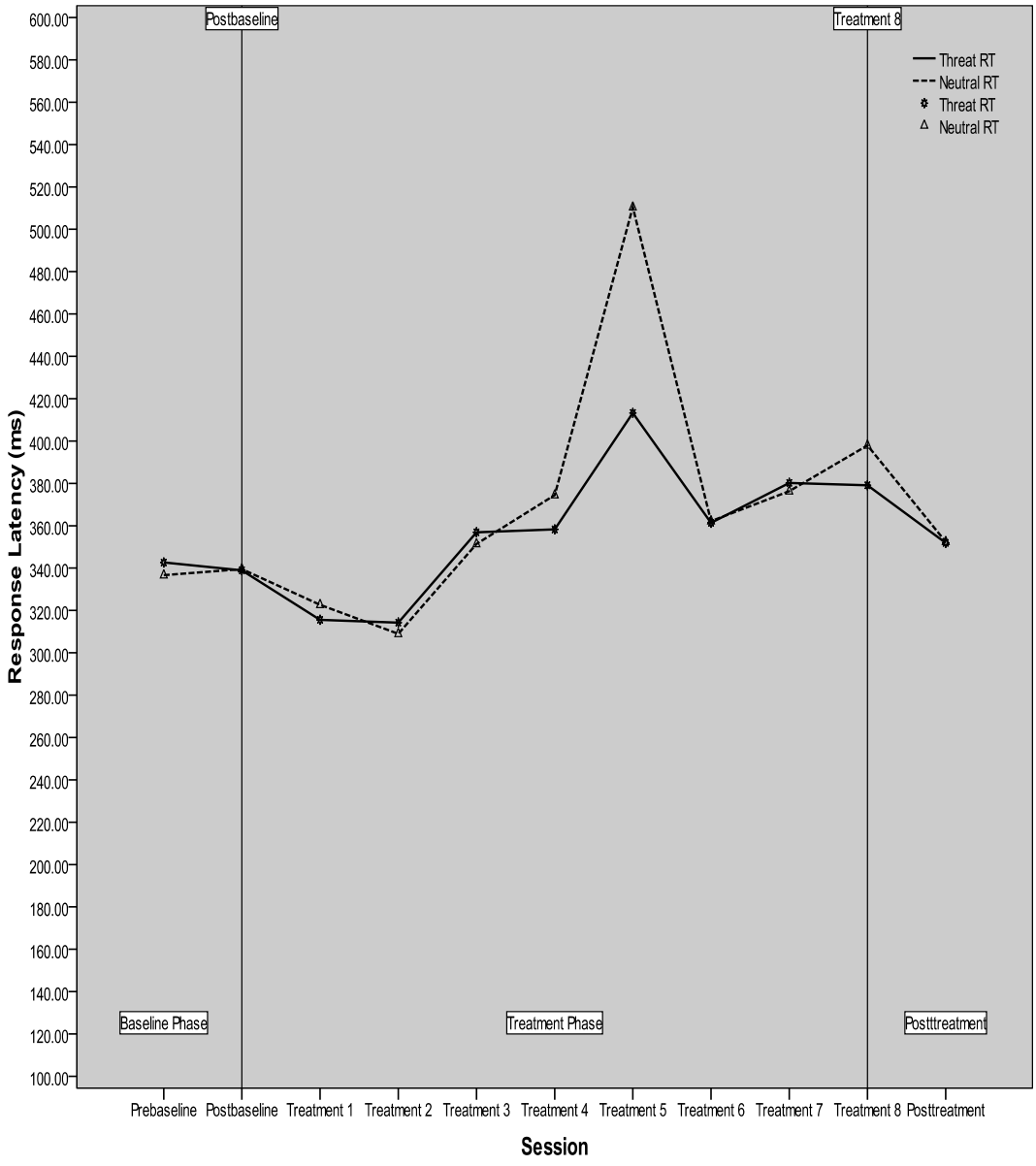


Figure 4.5

CBAR Reaction Time on Dot-probe Task for Participant 5

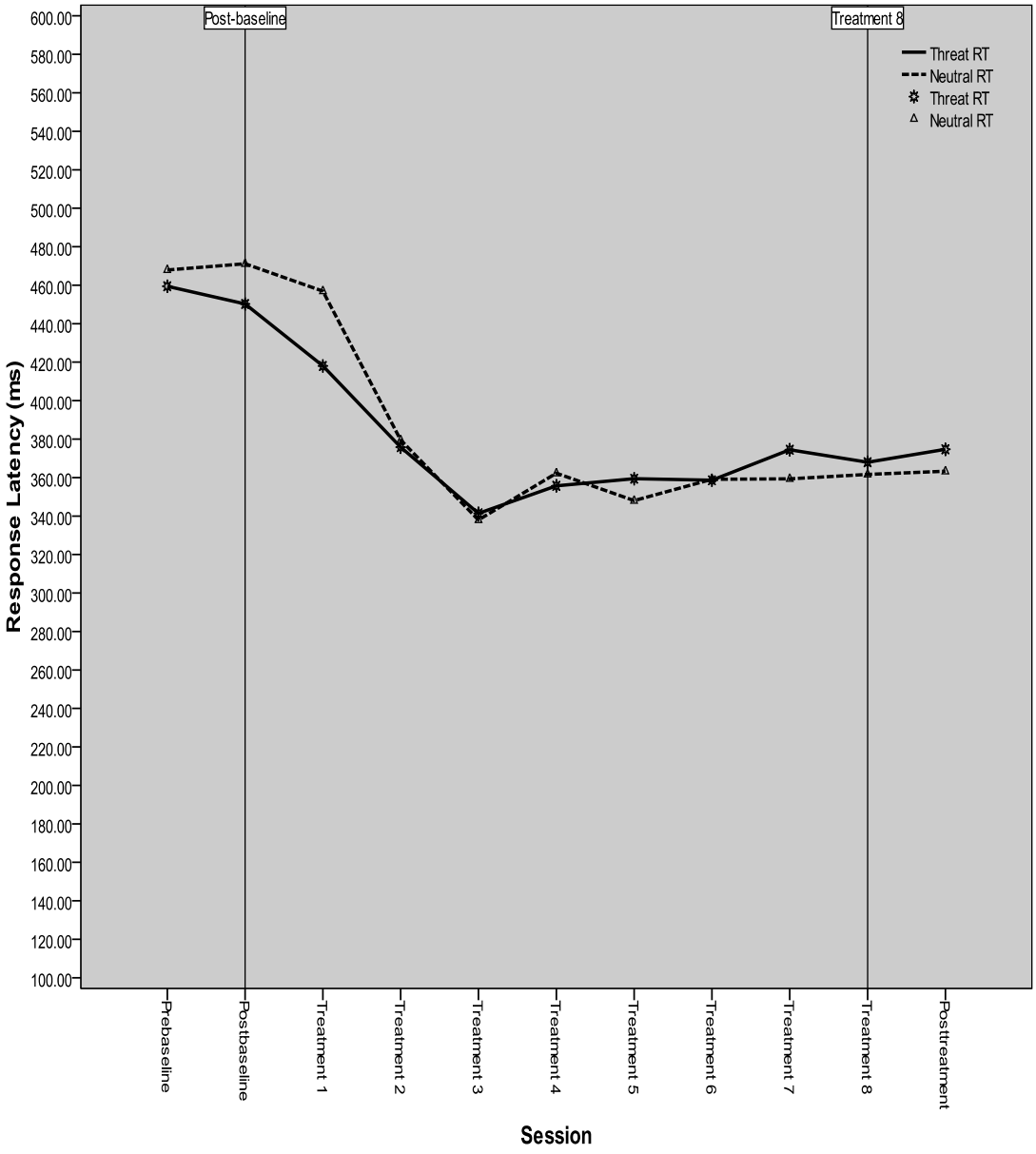


Figure 4.6

CBAR Reaction Time on Dot-probe Task for Participant 6

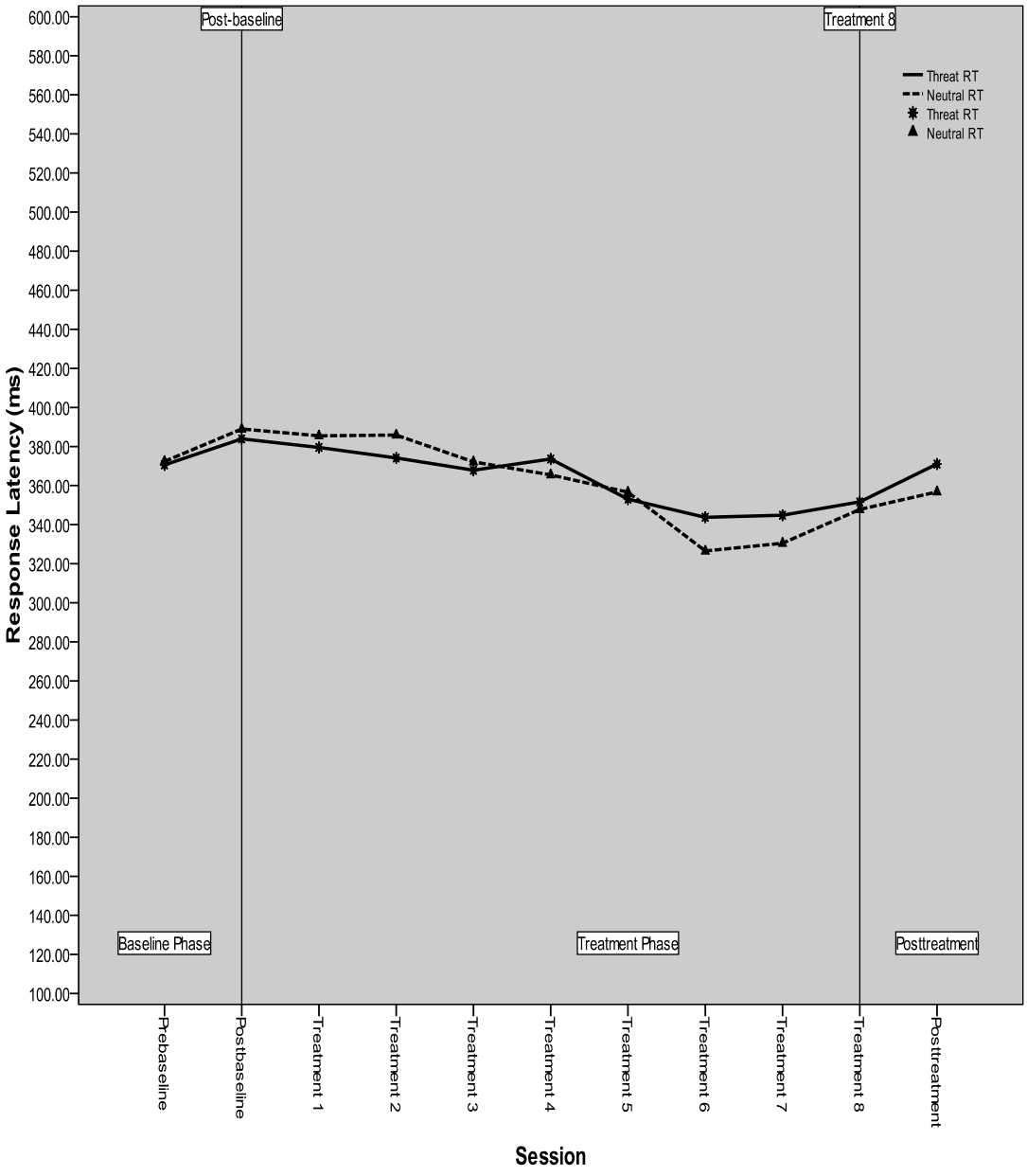


Figure 5

Attention Bias (AB) Change Pretreatment to Posttreatment

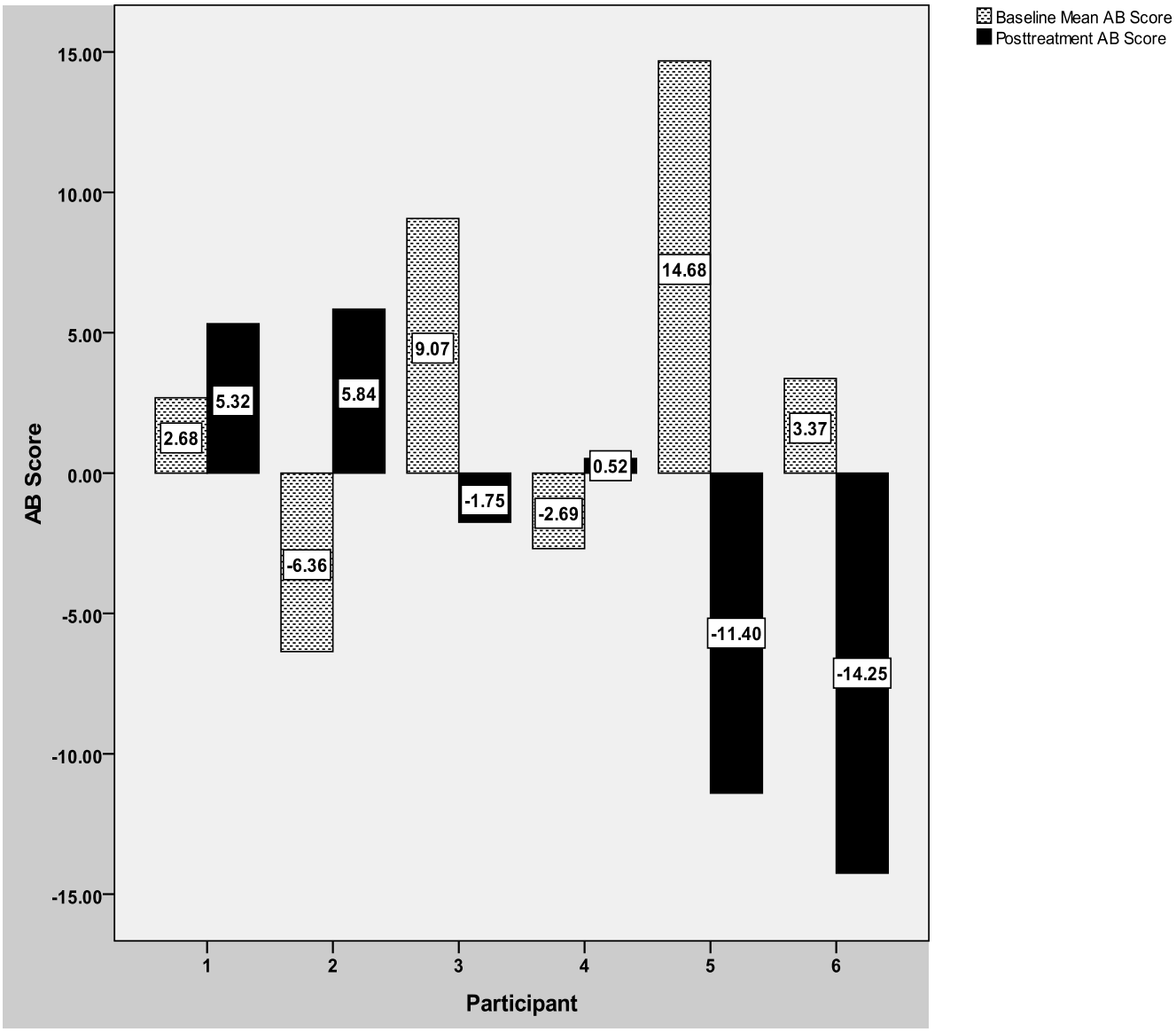


Figure 6

Scatterplot of AB Change with PTSD Symptom Distress Change on the Stressful Responses Questionnaire (SRQ-D) at Post-treatment (n = 6)

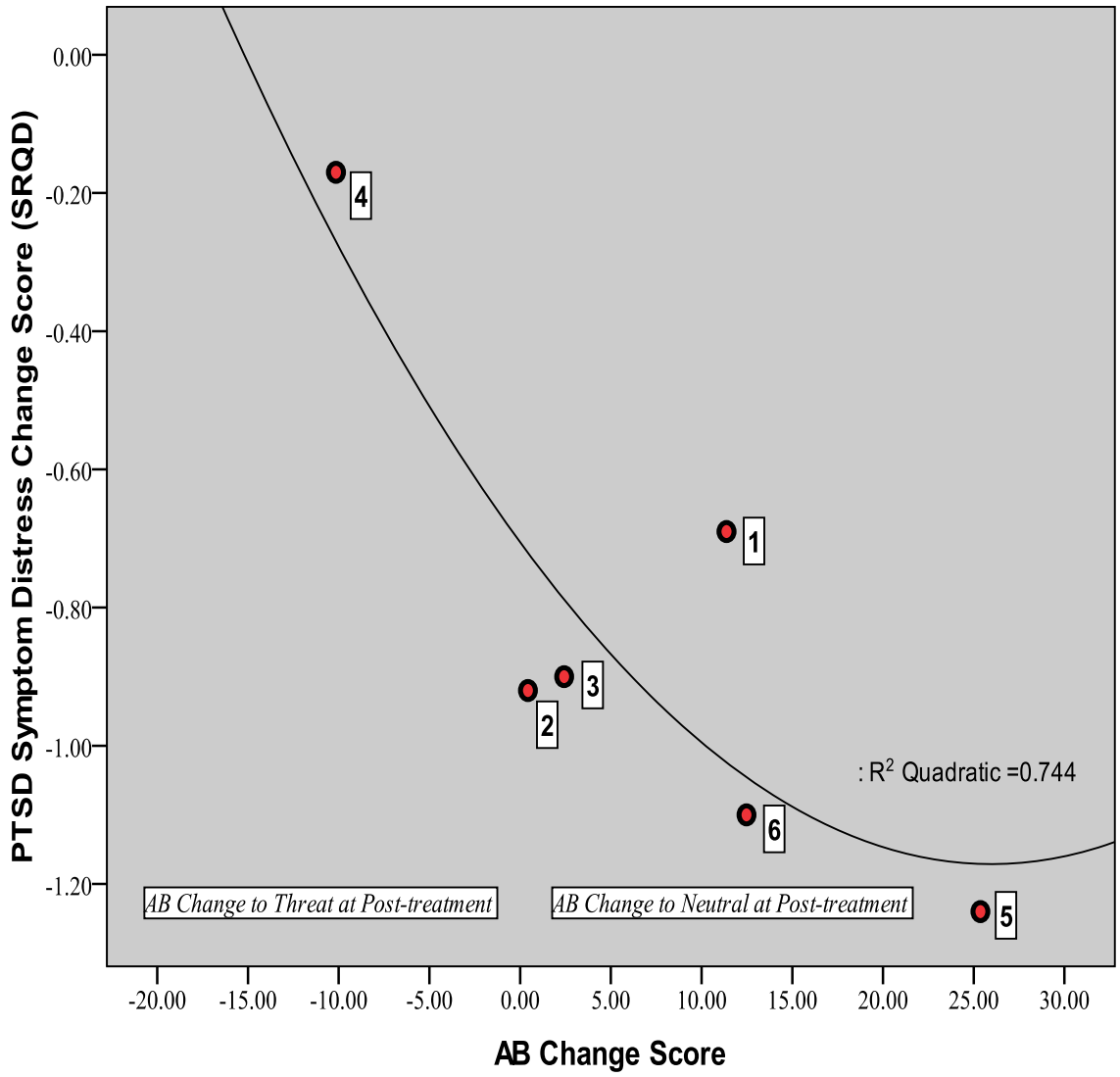


Figure 7

Scatterplot of AB Change with Total PTSD Symptom Change on the Impact of Events Scale-Revised (IES-R) at Post-treatment (n = 6)

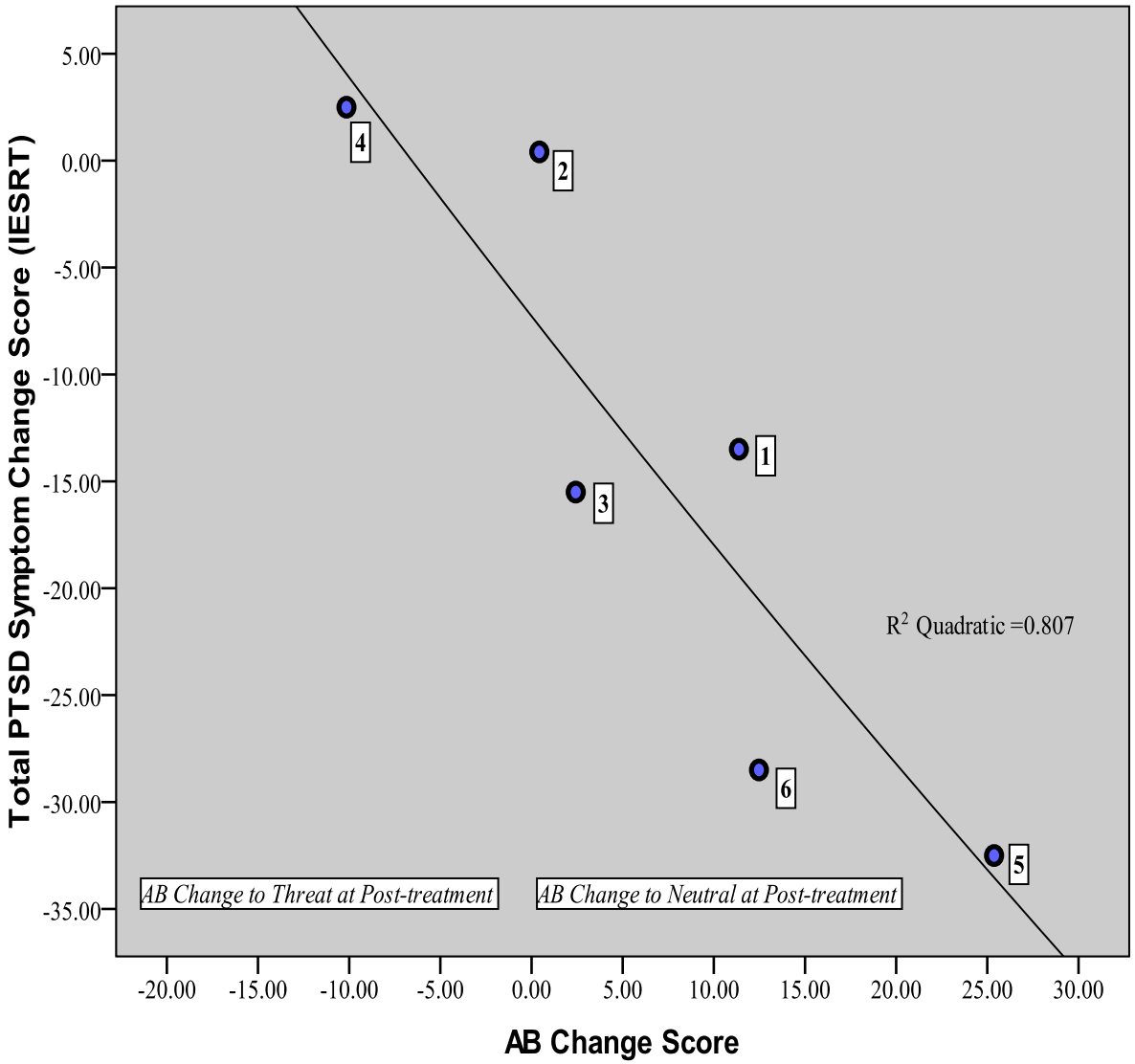


Figure 8

Scatterplot Matrices of AB Change with Total PTSD Symptom Change on the PTSD Symptom Distress (SRQD), Total PTSD Symptoms (IESRT), Depression (CES-D), Attention to Threat Cues (TAM), State Anxiety (STAI-S), and Coping Self-Efficacy (CCS) at Post-treatment (n = 6)

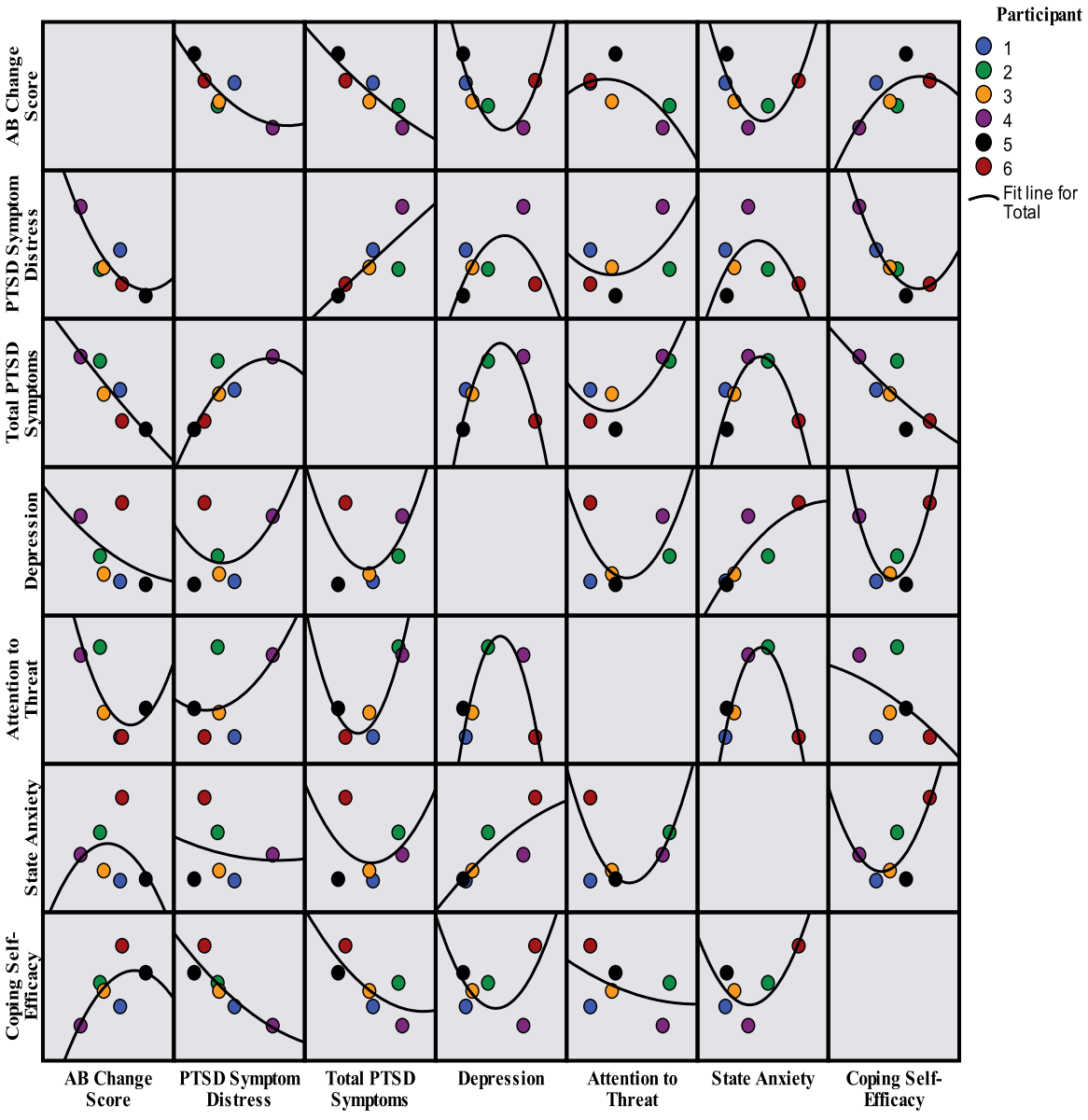
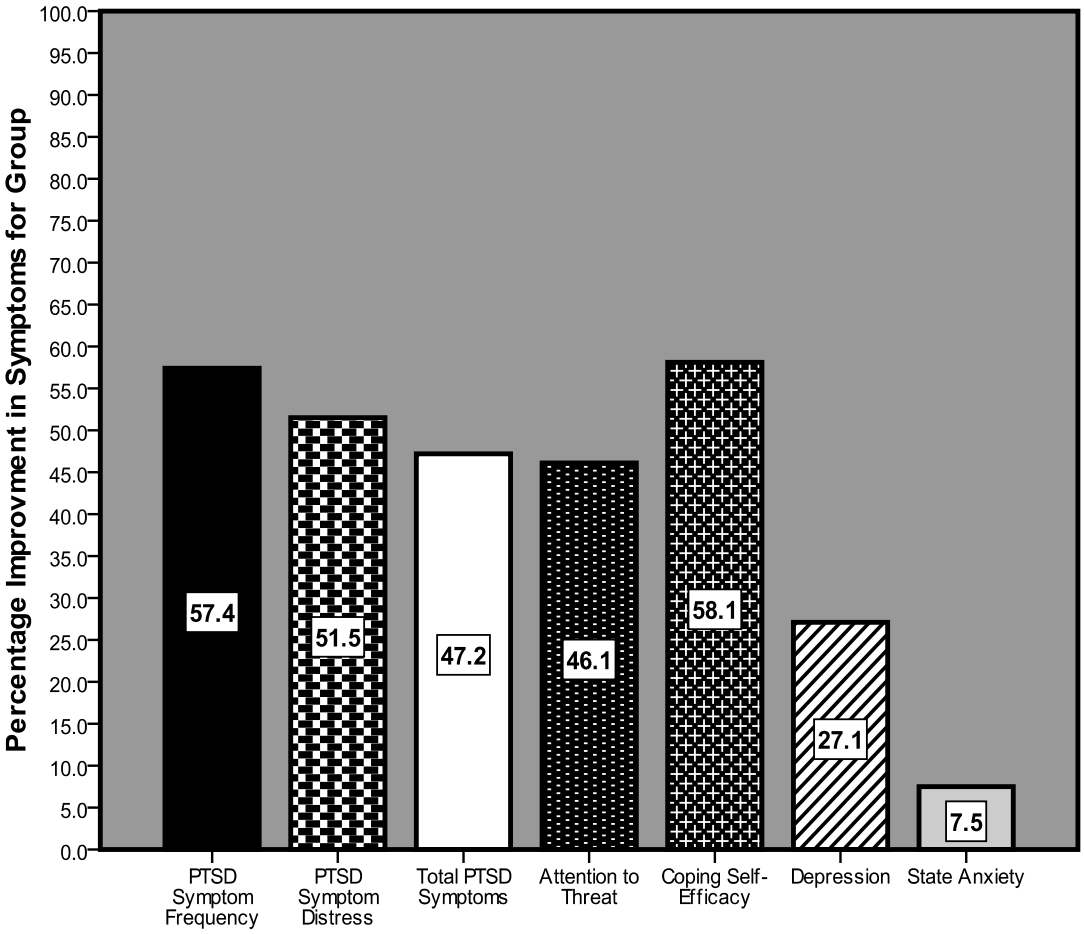


Figure 9

Aggregated Treatment Outcome Data - Percentage Improvements for Group on PTSD Symptoms (IESR and SRQ), Attention to Threat (TAM), Coping Self-Efficacy (SES), Depression (CES-D), and State Anxiety (STAI-S) at Post-treatment (n=6)



Appendix A

Flyer/Advertisement

Attention: Free Experimental Treatment Study for Trauma

Seeking Individuals (ages 18 and older), at Virginia Tech and in the community, who are experiencing psychological problems after trauma, to participate in a free, 5-6 week experimental treatment program.

Have you experienced any of the following?
❖ Physical Assault
❖ Sexual Assault
❖ Witness to Violence/Death
❖ Motor Vehicle Accident
❖ Natural Disaster
❖ Any event that involved actual or threatened death or serious injury to yourself or others

- ❖ This research examines the effectiveness of an Attention Retraining program for trauma.

- ❖ **Potential Benefits** of this study may include:
  - Reducing your trauma-related symptoms
  - Reducing symptoms of depression
  - Improving your coping strategies

You are eligible for this study if:

1.) You would like to work on your current symptoms and difficulties associated with a traumatic experience
2.) You are 18 years of age or older
3.) You have experienced the trauma since age 12

You are NOT eligible for this study if:

1.) You have a current diagnosis of Bipolar I Disorder and/or Psychosis
2.) You have not been stabilized on psychotropic medication for one month or longer
3.) You are experiencing current problems with substance abuse/dependence

For more information or to register, please email kvking@vt.edu

Appendix B

Study Description

Title of Study: A Treatment Feasibility Study of an Attention Retraining Approach for Clinical and Sub-Clinical Levels of Post-traumatic Stress Disorder

Investigators: George Clum, Ph.D., Principal Investigator, & Kristine King, B.S.

Purpose of the Study: The attention retraining intervention is based on an experimental approach for treating anxiety disorders, and has not yet been evaluated for the treatment of trauma. The following study will evaluate the effectiveness of a treatment designed to change how you attend to threatening cues related to your traumatic event. Information processing research has established that anxiety and trauma-related symptoms develop and are maintained by attention bias, defined as preferential attention to threatening information in the environment. The intervention consists of a computerized program designed to modify this attention bias with the aim of reducing anxiety and posttraumatic stress symptoms. In the present research we will examine whether the experimental treatment will: 1) reduce trauma-related symptoms and emotional distress; 2) reduce symptoms of anxiety and depression; and 3) improve attention bias to threatening environmental and personal cues.

Eligibility: You are eligible for this study if: 1) you are 18 or older and have experienced a traumatic event since age 12; 2) you are currently experiencing symptoms, related to this event, of Post-Traumatic Stress Disorder, including such things as flashbacks, nightmares, avoidance of situations that remind you of the trauma and increased tension; and 3 you would like to use an experimental treatment approach to reduce your current symptoms associated with the trauma. **You are not eligible for this study if** 1) you have a current diagnosis of Bipolar I Disorder and/or Psychosis; 2) are on medication for psychological problems but have not been stably taking your current dose for one month or longer 3) are receiving psychological treatment for Post Traumatic Stress disorder or Acute Stress Disorder, and have experienced significant symptom improvement in the last month; 4) are actively suicidal; 5) have current self-reported problems with substance abuse/dependence.

Study Procedures: Prior to engaging in the attention retraining treatment, you will be asked to participate in a diagnostic interview and complete several questionnaires measuring common reactions to the traumatic event, social support, and coping skills. You will also be asked to complete these assessment measures at the end of the baseline and treatment phases of the study. The diagnostic interview will further help identify whether you are eligible to participate in the treatment phase of the study. You will also be asked to rate the words presented in the attention retraining treatment on a scale from extremely threatening to not at all threatening. If eligible, and you decide to participate in the treatment phase, you will begin either a two-week or three-week baseline assessment phase in which you will be asked to complete and return to us by mail a set of assessment measures. Completing these will require approximately 10 minutes three times/week. Following the baseline phase you will begin treatment sessions that will last approximately 45 minutes, including completion of the questionnaires. Treatment will be conducted 3 times/week for three weeks. The attention retraining treatment will involve the visual presentation of words on a computer screen that will be either neutral or threatening. The treatment is not a test of accuracy or ability; rather, the computer will measure the speed you process the neutral words versus threatening words.

Appendix C

Internet Informed Consent (IIC)

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Internet Informed Consent for Participants

In order to decide whether or not you should agree to be part of this study, you should understand enough of its risks and benefits to make an informed judgment. This process is known as informed consent. This consent form gives you detailed information about the research study. Once you understand the study, if you still wish to participate, you will be asked to electronically sign this informed consent form. You will be asked to answer preliminary screening questions to determine eligibility for participation in this study. You are completely free to choose whether or not to participate in this study.

Title of Study: A Treatment Feasibility Study of an Attention Retraining Approach for Clinical and Sub-Clinical Levels of Post-traumatic Stress Disorder

Investigators: George Clum, Ph.D., Principal Investigator, & Kristine King, B.S.

Purpose of the Study: The purpose of this research is to examine the effectiveness of an experimental treatment approach for victims of trauma, defined as the experience of a traumatic event involving actual or threatened death, serious injury, or a threat to the physical integrity of yourself or others, in which your response included fear, helplessness, or horror.

Study Procedures: Individuals who have experienced a trauma since adolescence (age 12), and are suffering symptoms that may be related to that traumatic event, will be assessed both online and during an in-person interview to determine eligibility for the study. Eligible participants will be assigned to a 3-week baseline phase prior to beginning treatment. The intervention consists of a computerized program designed to modify attention bias with the aim of reducing anxiety and posttraumatic stress symptoms.

Risks of Participation: There are risks in this study. It is possible that completing the assessment instruments may cause distress. It is also possible that the treatment approach will not change your attention bias to threat and may not reduce your symptoms. Since we will monitor your improvement or lack of improvement, we will be able to recommend other treatment options at the end of the study. We will also respond to any request you may have to terminate your participation and help you find an alternative treatment (kvking@vt.edu). If you are a student, you may want to seek help at the Virginia Tech Counseling Center (540-231-6557). If you need our help, we would be happy to help you contact them. If you are outside of the Blacksburg, Virginia area and wish to contact a mental health professional, inform us of your wish by phone, e-mail, or in-person and we will initiate a search for an appropriate professional and contact you with his/her name and contact number. The cost of external mental health counseling services will be at your own expense, as neither the researchers nor Virginia Tech have money set aside to pay for those services.

Benefits of Participation: The benefits of this study are that you may 1) experience a reduction in your trauma-related symptoms; 2) experience a reduction in your symptoms of anxiety and depression; 3) experience an increase in coping and attention control.

Extent of Confidentiality and Anonymity: All personal information given online in this study will be stored in an encrypted host computer and backup devices (i.e., floppy disks, zip disks) and will be kept confidential. All information stored in backup devices (i.e., floppy disks, zip disks), the informed consent forms, and paper-and-pencil assessment instruments will be kept in locked files that only the researcher and the advisor will be able to access. No information will be shared orally or in writing with anyone but the researcher and the advisor. All information connecting you to this study will be destroyed after three years. Results may be published or presented for scientific purposes, but your identity will not be revealed in any description on publication of this research. If you were to express the intent to do harm either to yourself or to others, the researchers may break confidentiality and report this to appropriate authorities.

Freedom to Withdraw: You are free to withdraw from the study at any time for any reason without penalty. If you are receiving extra credit for participation you will be given credit for your participation up to the point of withdrawal from the study.

Should I have any pertinent questions about this research or its conduct, a researcher participant's rights, and whom to contact in the even of a research-related injury to the participant, I may contact:

George A. Clum Principal Investigator	(540) 231-5701 /gclum@vt.edu Telephone / e-mail
Kristine King Investigator	(540) 231-6914, (225) 954-9825 /kvking@vt.edu Telephone / e-mail
David M. Moore Chair, Virginia Tech Institutional Review	(540) 231-4991 / moored@vt.edu Telephone / e-mail
David W. Harrison Chair Human Subjects Committee Psychology Department, Virginia Tech	(540) 231-4422 / dwh@vt.edu Telephone/e-mail

If you want to participate in the study after reading the study description and consent form, you will complete a brief online assessment to help determine your eligibility. At this time, you are being asked to participate in an online component in which you will be requested to complete preliminary screening questions. This process will take approximately 10 minutes to complete.

By typing the words "I AGREE" in the space below, I am indicating that I have fully read and understand the statement, have printed a copy for my files, and am giving my consent to participate in the study. All of my questions regarding this form or this study have been answered to complete satisfaction. I accept and understand that personal information will be electronically supplied to the researcher to document my participation (e-mail address and date). Upon giving consent to participate, you will be directed to a page where you will be asked to complete preliminary screening questions.

Appendix D

Online/Telephone Screening Questionnaire for Preliminary Screening

Please read and answer the following preliminary screening questions carefully:

INCLUSION

TRAUMATIC EVENT & SYMPTOMS

1) Have you experienced a traumatic event that is associated with your current symptoms? Y N

2) What type of traumatic event have you experienced?
____ Motor vehicle accident
____ Sexual assault
____ Physical/Nonsexual assault (e.g., interpersonal violence, robbery, burglary)
____ Natural Disaster (e.g., hurricane, fire, tornado, flood, earthquake, etc.)
____ Witness to Violence/Death
____ Other – Please identify _____

3) Symptoms Y N

a. Repeated recollections of the event, including images, thoughts, or perceptions Y N
b. Repeated nightmares of the event Y N
c. Repeated flashbacks of the event Y N
d. Fear or anxiety when you encounter things that remind you of the event Y N
e. Increased heart rate, dizziness, sweating, or other physiological reactions to things that remind you of the event Y N
f. Avoiding thoughts or feelings associated with the event Y N
g. Avoiding things, places, activities, or people that remind you of the event Y N
h. Other – specify _____ Y N

EXCLUSION

1) Are you currently experiencing organic brain disorders, such as severe problems of memory, or thought processes that affect your daily life? Y N
2) Are you currently having psychotic symptoms, believing that others are out to get you, thoughts are broadcasted, being abducted by aliens, hearing vivid voices or sounds that control you, experiencing seeing or hearing things that others do not? Y N
3) Have been receiving treatment for your emotional problem(s) and experienced significant improvement in the last month? Y N
4) Are you currently experiencing difficulties related to substance abuse and/or dependence Y N

Appendix E

Comprehensive Informed Consent (CIC) Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Comprehensive Informed Consent for Participants
In Research Projects Involving Human Subjects

Title of Project: A Treatment Feasibility Study of an Attention Retraining Approach for Clinical and Sub-clinical Levels of Post-traumatic Stress Disorder

Investigator: George Clum, Ph.D., Principal Investigator, & Kristine King, B.S.

I. Introduction

This consent form describes a research study that is being conducted at Virginia Tech and what you may expect if you decide to participate in it. You are encouraged to read this consent form carefully and to ask the person presenting it to you any further questions you may have before making a decision about whether or not to participate. This form describes the known possible risks and benefits of taking part in this study. You are completely free to choose whether or not to participate in this study.

II. Purpose of This Research

The purpose of this research is to examine the effectiveness of an experimental treatment approach for victims of trauma, defined as the experience of a traumatic event involving actual or threatened death, serious injury, or a threat to the physical integrity of yourself or others, in which your response included fear, helplessness, or horror. To this end, individuals who have experienced a trauma since adolescence (age 12) and are suffering symptoms that may be related to that traumatic event will be assessed both online and during an in-person interview to determine eligibility for the study. Eligible participants will be assigned to a 3-week baseline phase prior to beginning treatment.

The attention retraining intervention is based on an experimental approach for treating anxiety disorders, and has not yet been well established for the treatment of trauma. The following study will evaluate the effectiveness of a treatment designed to change how you attend to threatening cues related to your traumatic event. Information processing research has established that anxiety and trauma-related symptoms develop and are maintained by attentional bias, defined as preferential attention to threatening information. The intervention used in the present study consists of a computerized program designed to modify attention bias with the aim of reducing anxiety and posttraumatic stress symptoms. In the present research we will examine whether the experimental treatment will: 1) reduce trauma-related symptoms and emotional distress; 2) reduce symptoms of anxiety and depression; and 3) improve attentional bias to threatening environmental and personal cues.

III. Eligibility

You are eligible for this study if: 1) you are 18 or older and have experienced a traumatic event since age 12; 2) you are currently experiencing symptoms, related to this event, of Post-Traumatic Stress Disorder, including such things as flashbacks, nightmares, avoidance of situations that remind you of the trauma and increased tension; and 3) you would like to use an experimental treatment approach to reduce your current symptoms associated with the trauma.

You are not eligible for this study if 1) you have a current diagnosis of Bipolar I Disorder and/or Psychosis; 2) are on medication for psychological problems but have not been stably taking your current dose for one month or longer 3) are receiving psychological treatment for Post Traumatic Stress disorder or Acute Stress Disorder, and have experienced significant symptom improvement in the last month; and 4) have current self-reported problems with substance abuse/dependence.

IV. Description of Study Procedures

If you want to participate in the study after reading this study description and consent form, you will be asked to participate in a diagnostic interview and complete several questionnaires measuring common reactions to the traumatic event, social support, and coping skills. This interview will further help identify whether you are eligible to participate in the treatment phase of the study. You will also be asked to rate the words presented in the attention retraining treatment on a scale from extremely threatening to not at all threatening. If eligible, and you decide to participate in the treatment phase, you will begin a three-week baseline assessment phase in which you will be asked to complete assessment measures. Completing these will require approximately 10 minutes every three days. Following the baseline phase you will begin treatment sessions that will last approximately 45 minutes, including completion of the questionnaires. Treatment will be conducted 2 times a week for a consecutive four week period.

The attention retraining treatment will involve the visual presentation of words on a computer screen that will be either neutral/positive or threatening. The treatment is not a test of accuracy or ability; rather, the computer will measure the speed at which you process the neutral words versus threatening words.

V. Risks of Participation

There are several risks in this study. It is possible that completing the assessment instruments may cause distress. The instruments may bring up recollections and distressing memories from the past. It is also possible that the treatment approach will not change your attention bias to threat and may not reduce your symptoms. Since we will monitor your improvement or lack of improvement, we will be able to recommend other treatment options at the end of the study. We will also respond to any request you may have to terminate your participation and help you find an alternative treatment (kvking@vt.edu). If you are a student, you may want to seek help at the Virginia Tech Counseling Center (540-231-6557). If you need our help, we would be happy to help you contact them. If you are outside of the Blacksburg, Virginia area and wish to contact a mental health professional, inform us of your wish by e-mail and we will initiate a search for an appropriate professional and contact you with his/her name and contact number.

During the course of the study, there is a possibility that you will be dropped as a result of meeting the exit criteria described below. The possible reasons for being dropped from the study include the following: 1) not meeting diagnostic criteria during the assessment phase, and 3) the development of suicidal or homicidal risk.

If, as a result of the diagnostic interview, you do not meet inclusion diagnostic criteria, you will not be included in the current study. If you do not meet diagnostic criteria, you will be told if your symptoms may warrant attention and your specific concerns will be addressed. Appropriate facilities within the university or in the community will be identified. Those who do not meet diagnostic criteria will be assisted in contacting these facilities and in making an appointment for treatment.

If you express intent to harm or kill yourself or someone else during treatment, we will first evaluate whether or not you are at risk. If we think you are at risk, we will inform you that you need to seek adequate help at the Psychological Services Center (540-231-6914), the Counseling Center (540-231-6557) or other facility of your choice. We will then follow-up to make sure that you have accessed some treatment facility. Confidentiality will be broken, as required by law, to notify appropriate local

authorities of the stated intent to do harm to self or others. For an emergency situation, we strongly encourage you to call RAFT (540-961-8400) or the Psychological Services Center of the Department of Psychology (PSC). The PSC charges you for treatment. Fees at the PSC are determined based on your income level. The maximum charge is $10 regardless of whether or not you have insurance. The cost of external mental health counseling services will be at your own expense, as neither the researchers nor Virginia Tech have money set aside to pay for those services.

If you become suicidal and reside outside the Blacksburg community, and you express an intent to harm or kill yourself during treatment, we will immediately initiate a search to find a competent therapist in your geographical area and provide you with that information. You are also informed of the availability of the National Mental Health Association (1-800-969-6642) as a referral source in the United States for respected mental health professionals, where you are able to search the nearest National Mental Health Association affiliate to find specific mental health services or support programs in your community. For an emergency situation, we encourage you to call the National Hopeline Network (1-800-SUICIDE or 1-800-784-2433) to reach a certified crisis center 24 hours a day, seven days a week.

VI. Benefits of Participation

The benefits of this study are that you may 1) experience a reduction in your trauma-related symptoms; 2) experience a reduction in your symptoms of anxiety and depression; 3) experience an increase in coping and attention control of threatening personal and environmental cues.

VII. Extent of Confidentiality and Anonymity

All personal information given online in this study will be stored in an encrypted host computer and backup devices (i.e., floppy disks, zip disks) and will be kept confidential. The security of data in the host computer and confidentiality will be maintained by the webmaster. All information stored in backup devices (i.e., floppy disks, zip disks), written informed consent forms, and paper-and-pencil assessment instruments will be kept in locked files that only the researcher and the advisor will be able to access. No information will be shared orally or in writing with anyone but the researcher and the advisor. All information connecting you to this study will be destroyed after three years.

Results may be published or presented for scientific purposes, but your identity will not be revealed in any description on publication of this research. If you were to express the intent to do harm either to yourself or to others, the researchers may break confidentiality and report this to appropriate authorities.

VIII. Freedom to Withdraw

You are free to withdraw from the study at any time for any reason without penalty. If you are receiving extra credit for participation you will be given credit for your participation up to the point of withdrawal from the study.

IX. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University, by the Department of Department of Psychology.
IRB Approval Date Approval Expiration Date: _____

Should you have any pertinent questions about this research or its conduct, a researcher participant's rights, and whom to contact in the even of a research-related injury to the participant, you may contact:

George A. Clum, Ph.D.	(540) 231-5701 /gclum@vt.edu
Principal Investigator	Telephone / e-mail

Kristine King	(540) 231-6914, (225) 954-9825 /kvking@vt.edu
Investigator	Telephone / e-mail

David M. Moore	(540) 231-4991 / moored@vt.edu
Chair, Virginia Tech Institutional Review Board for the Protection of Human Subjects Office of Research Compliance 1880 Pratt Drive, Suite 2006 (0497) Blacksburg, VA 24061	Telephone / e-mail

X. Investigator/Research Staff Consent

I have verbally presented the consent to the participant and/or the participant has read this form. An explanation of the research has been given and questions from the participant were solicited and answered to the participant's satisfaction. In my judgment, the participant has demonstrated comprehension of the information. I have given the participant a signed copy of this form.

_____ SIGNATURE

_____DATE

_____NAME AND TITLE (print)

X. Subject Responsibilities

I voluntarily agree to participate in this project. I agree that I am responsible for answering questions on the assessment instruments and to participate in the computer task during the experimental treatment sessions.

XI. Subjects Permission

I have read and understand the Informed Consent and the conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

Name: _____
(Print)
Signed: _____ Date: _____

Appendix F

Idiosyncratic Threat Word List used for Dot-probe Task

Traumatic Experience	**Physical/Somatic Responses**	**Interpersonal Cues/Situations**	**Negative Emotional Evaluation to Trauma**	**External Trauma Situations**
Sexual Assault	Sweating	Date	Helpless	Intercourse
	Nauseated	Party	Distress	Assault
	Pain	Alone	Panic	Rape
	Hurt	Drugged	Danger	Stalk
	Injury	Acquaintance	Guilt	Molest
	STD	Stranger	Shame	Fuck
	AIDS	Male	Weak	Sex
	Shock	Policemen	Pathetic	Touch
	Numb	Crime	Embarrassed	Penetrate
	Tremble	Victim	Violated	Fondle
	Scream	Nightmare	Fear	Physical
	Cry	Molester	Terrified	Contact
	Dirty	Isolated	Anger	Harassment
	Bruise	Darkness	Rage	Threaten
	Bleeding	Struggle	Sadness	Dying
	Breathless	Incest	Mistrust	Escape
Physical Assault	Injury	Abuse	Anger	Hit
	Sweating	Fight	Terrified	Strangle
	Nauseated	Beating	Rage	Injure
	Pain	Spouse	Distress	Slapped
	Hurt	Partner	Helpless	Beating
	Injury	Struggle	Hopeless	Violence
	Faint	Police	Weak	Attack
	Denial	Crime	Depressed	Kicked
	Shock	Ambulance	Scared	Punched
	Numb	Bodies	Worried	Abused
	Tremble	Hospital	Anxious	Help
	Scream	Emergency	Fear	Murder
	Cry	Policemen	Sadness	Touch
	Depression	Bars	Panic	Physical
	Bruise	Nightmare	Ashamed	Escape
	Bleeding	Campus	Upset	Runaway
Motor Vehicle Accident	Heartbeat	Traffic	Anger	Crash
	Sweating	Hospital	Terrified	Accident
	Nauseated	Pile up	Rage	Speed
	Pain	Policemen	Distress	Injure
	Hurt	Emergency	Helpless	Driving
	Injury	Ambulance	Guilty	Fast
	Nightmare	Fault	Weak	Dying
	Irritability	Road	Blame	Physical
	Shock	Stretcher	Scared	Smash
	Numb	Bodies	Worried	Survive
	Tremble	Doctor	Anxious	Steer
	Scream	Nightmare	Fear	Control
	Cry	Intersection	Sadness	Screech
	Faint	Driver	Panic	Break
	Bruise	Passenger	Startle	Shatter
	Bleeding	Seatbelt	Upset	Damage

Witness to Death/Violence	Heartbeat Sweating Nauseated Pain Suffocating Injury Nightmare Faint Shock Hurt Numb Tremble Scream Cry Apathy Bleeding	Funeral Murder Shooting Killer Massacre Execution Attack Massacre Slaughter Invader Danger Aggressive Lethal Assailant Victim Emergency	Anger Terrified Trauma Distress Helpless Danger Blame Scared Worried Anxious Fear Sadness Panic Startle Upset Struggle	Gun Weapon Threat Danger Death Shooting Slaughter Crime Stab Gunshot Trapped Escape Unsafe Fatality Survive Injure
Threat to Life – Surgery/Medical-related Trauma	Heartbeat Sweating Nauseated Pain Suffocating Hurt Nightmare Irritability Shock Numb Tremble Scream Cry Faint Bruise Bleeding	Hospital Emergency Ambulance Doctor Funeral Victim Danger Lethal Medical Surgery Failure Operation Damage Destroy Mutilate Alone	Anger Terrified Rage Distress Helpless Distrust Hopeless Blame Scared Worried Anxious Fear Sadness Panic Startle Upset	Dying Death Survive Injure Harm Hurting Injured Sick Unhealthy Scalpel Stitches Deadly Threaten Trauma Surgical Cut
Hospitalization-Illness/Health Problems	Heartbeat Sweating Nauseated Pain Suffocating Hurt Nightmare Irritability Shock Numb Tremble Scream Cry Faint Hurting Ache	Hospital Emergency Ambulance Doctor Danger Lethal Alone Psychiatric Hospitalized Nurse Inpatient Victim Lunatic Maniac Psychotic Involuntary	Anger Terrified Nervous Distress Helpless Distrust Hopeless Crazy Scared Worried Anxious Fear Sadness Panic Startle Upset	Dying Death Hurt Sick Threaten Trauma Breakdown Unhealthy Restrain Arrest Pathology Trapped Desperate Broken Confinement Uncontrolled

Note: Threat word type modified from Ononaiye, Turpin, & Reidy, 2007; Idiosyncratic threat word set by trauma consistent with the specificity hypotheses for threat stimuli relevance (Mogg & Bradley, 1998; Reimann, Amir, & Louro, 1994; Reimann & McNally, 1995; Heinrichs & Hofmann, 2001).

Appendix G

Stressful Event History (SEH)

Instructions: In the space next to each stressful event, please indicate as precisely as you can the number of times that event has occurred *in your lifetime*. If you experienced the event, respond to the two questions following each item by circling Y (yes) or N (no).

Number of times occurred in my lifetime	Did you *think* that you might die or be seriously injured?	Did you suffer serious injury (required doctor's care?)
_____1. Been robbed in person/mugged.	Y N	Y N
_____2. Been in a combat situation.	Y N	Y N
_____3. Watched someone get killed.	Y N	Y N
_____4. Been in a life-threatening automobile accident.	Y N	Y N
_____5. Had a serious illness, for example, cancer, meningitis, etc.	Y N	Y N
_____6. Been sexually assaulted including penetration.	Y N	Y N
_____7. Had a close friend or family member be killed (not suicide).	Y N	Y N
_____8. Watched someone be seriously injured (required a doctor's care).	Y N	Y N
_____9. Been seriously physically assaulted as a child	Y N	Y N
_____10. Been sexually assaulted (not penetrated).	Y N	Y N
_____11. Had my house seriously damaged by some natural event (hurricane, fire, flood, tornado)	Y N	Y N
_____12. Been in a serious accident (other than automobile).	Y N	Y N
_____13. Had a relative I lived with die by suicide.	Y N	Y N
_____14. Been seriously physically assaulted as an adult.	Y N	Y N
_____15. Been threatened with a weapon.	Y N	Y N
_____16. Been in a hurricane, fire, flood, tornado, etc. where my life was in danger.	Y N	Y N
_____17. Been a hostage or prisoner of war.	Y N	Y N
_____18. Been tortured to the point that you feared for your life.	Y N	Y N
_____19. Been responsible for serious injury of another person.	Y N	Y N

Please provide a brief description of the stressful event associated with your current symptoms that you want to work on through this program.

_____
_____
_____
_____
_____
_____

Appendix H

Stressful Responses Questionnaire

Instructions: The purpose of this scale is to measure your response to the most traumatic event of your life that you briefly described earlier. This event could have occurred once, several times, or repeatedly. Using the scales below, respond to the questions *with your most traumatic event* in mind. Please respond to the questions with regard to your experiences *in the past month*.

Frequency
0 = Have not experienced this in the past month
1 = Have experienced this less than once a week
2 = Have experienced this once or twice a week
3 = Have experienced this three or four times a week
4 = Have experienced this five or more times a week

Level of Distress
0 = Does not upset me
1 = Upsets me a little
2 = Upsets me moderately
3 = Upsets me a lot
4 = Upsets me extremely

	Frequency	Distress
1.	Have thoughts that enter my mind about the event.	_____
2.	Have avoided situations that remind me of the event.	_____
3.	Have detached feelings about the event from my memory of it.	_____
4.	Have felt emotionally upset when reminded of the event.	_____
5.	Feel like I'm in a state of over-alertness.	_____
6.	Have had nightmares or dreams about the event.	_____
7.	Have blocked out thoughts and feelings associated with the event.	_____
8.	Have felt numb when thinking about or being reminded of the event .	_____
9.	Have felt very anxious when reminded of the event.	_____
10.	Have felt generally tense.	_____
11.	Have left situations where I was being reminded of the event.	_____
12.	Have had blank spots in my memory when thinking of the event.	_____
13.	Have felt angry when reminded of the event.	_____
14.	Have had difficulty falling or staying asleep.	_____
15.	Have in general felt like I did not want to be around people.	_____
16.	Have felt like the event was happening to me again.	_____
17.	Have felt in danger, like something bad was going to happen.	_____
18.	Have felt like I was not really me.	_____
19.	Have been easily startled or easily upset by things happening around me.	_____
20.	Have been unable to keep my mind on important tasks.	_____
21.	Have felt like I've been unable to care about things the way I used to.	_____
22.	Have had flashbacks in which it seemed I was reliving the event.	_____

Appendix I

Self-Efficacy Scale (SES)

Instructions: Using the scale below rate was your level of confidence that you could use effective coping strategies to deal with the situations identified below.

Rate your level of confidence for each situation using the scale below.

0	10	20	30	40	50	60	70	80	90	100
Cannot Do at All			Hardly Can Do			Probably Can Do			Certain Can Do	

Rating

1. Listening to people talking about a traumatic event similar to my own event. _____

2. Listening to a radio program in which traumatic events like mine are discussed. _____

3. Viewing television programs/movies in which traumatic events like mine are shown. _____

4. Reading books about traumatic events like mine. _____

5. Remembering my traumatic event. _____

6. Experiencing a vivid picture of the traumatic event. _____

7. Having a nightmare of the traumatic event. _____

8. Going to places that are similar to the place where I experienced the traumatic event. _____

9. Entering the place where the traumatic event happened. _____

Appendix J

Trauma Attention Measure (TAM)

Instructions: Please read and answer the following questions. Using the following scale, please rate how much you were bothered by reminders of the traumatic event in the ***last three days***.

0	**1**	**2**	**3**	**4**
Not at all Bothered	A little Bothered	Moderately Bothered	Considerably Bothered	Completely Bothered

1. In the last three days have you attended to and/or been bothered by things/people in your environment that have reminded you of your traumatic event? _____

2. In the last three days have you attended to and/or been bothered by thoughts or ruminations about your traumatic event? _____