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Distress Tolerance in Relation to Treatment Persistence, Engagement, and Improvement in an Exposure-Based Treatment for Sexually Abused Incarcerated Women

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Distress Tolerance in Relation to Treatment Persistence, Engagement, and
Improvement in an Exposure-Based Treatment for Sexually Abused Incarcerated Women

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Abstract

Incarcerated populations are disproportionately affected by traumatic experiences and symptoms of posttraumatic stress disorder (PTSD). Many effective treatments for PTSD utilize exposure-based techniques which require engaging with emotionally distressing content. However, individuals with PTSD and low distress tolerance (DT) are more likely than those with PTSD and higher DT to engage in avoidant coping behaviors and have relatively high treatment attrition rates in general. This study explored relations between DT and treatment persistence, engagement, and improvement in incarcerated women ($N = 85$) enrolled in an 8-week exposure-based sexual assault recovery group at a minimum-security prison. I hypothesized lower baseline levels of DT would be related to lower treatment persistence and engagement with distressing content during treatment. I also hypothesized lower baseline DT would be related to lower treatment gains and higher levels of post-treatment symptoms of PTSD and depression. Finally, I hypothesized completing exposure-based group therapy would be associated with increases in DT post-treatment. Contrary to hypotheses, no significant relation was found between baseline DT and treatment persistence. Furthermore, lower levels of baseline DT were associated with higher levels of emotional engagement during exposure, which was the opposite of what was predicted. Also contrary to expectations, non-linear effects were found for relations between baseline DT and improvements in internalizing symptoms: lower levels of baseline DT were associated with greater symptom improvement than moderate to high levels of baseline DT. Consistent with hypotheses, DT significantly improved from pre- to post-treatment. Qualitative analyses of respondents at post-treatment revealed concerns of dropping out related to fear of sharing (e.g., trust violations, increased symptoms) and motivations for staying related to healing and commitment. Themes did not vary by baseline DT. Overall, findings suggest participants

with lower baseline DT can not only benefit from exposure-based therapy, but were more emotionally engaged in exposure and demonstrated greater internalizing symptoms improvement than those with moderate to high baseline DT.

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Table of Contents

List of Tables

List of Figures

Introduction

Despite evidence supporting the efficacy and effectiveness of exposure-based treatments for posttraumatic stress disorder (PTSD; e.g, Cahill, Rothbaum, Resick, & Follette, 2009; Rothbaum, Meadows, Resick, Foy, 2000), attrition rates are relatively high (Najavits, 2015). Low distress tolerance (DT), operationally defined for this study as "the perceived capacity to withstand negative emotional and/or other aversive states" (Simons & Gaher, 2005), is highly correlated with and a risk factor for development of PTSD (e.g., Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2010). Both PTSD and low DT are implicated in avoidant coping (Marshall-Berenz et al., 2010; Vujanovic, Litz, & Farris, 2015). This avoidance may be problematic for participation in these highly effective treatments for PTSD, which involve exposure. Therefore, we are interested in predicting treatment involvement and outcomes by exploring the predictive power of DT prior to treatment.

Trauma and PTSD

Traumatic experiences are relatively prevalent and potentially problematic. National estimates of exposure to traumatic events in the United States found 89.7% of survey respondents endorsed traumatic event exposure consistent with criteria in the *Diagnostic and Statistical Manual of Mental Disorders – 5th Edition* (DSM-5; American Psychiatric Association [APA], 2013) and exposure to multiple traumatic event types is the norm (Kilpatrick et al., 2013). Some people recover naturally from these experiences whereas others develop clinically significant symptoms of traumatic stress (e.g., Breslau et al 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Perkonigg, Kessler, Storz, & Wittchen, 2000; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993; Tolin & Foa, 2006). Prevalence of PTSD development in crime victims is between 19% and 75%; however, rates up to 80% have been reported for victims of

rape (Javidi & Yadollahie, 2012). In the general population, lifetime prevalence of PTSD is 5.7% with a 10.1% lifetime morbid risk, including predicted future onsets (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012). Nearly 40% of individuals with PTSD experience a chronic course of symptoms (Santiago et al., 2013).

Rates of exposure to traumatic experiences vary both by gender and type of traumatic exposure; for example, compared to men, women report higher rates of experiencing sexual assault (e.g., Kessler et al., 1995; Kilpatrick et al., 2013), a traumatic event type with the highest risk for developing PTSD compared to other trauma types (Creamer, Burgess, & McFarlane, 2001; Kessler et al., 1995; Kessler, 2000). Women also report higher rates of internalizing symptoms and PTSD following exposure to traumatic experiences with demonstrated rates of PTSD more than twice the rate of men (e.g., Breslau, Davis, Andreski, & Peterson, 1991; Kessler et al, 1995; Kessler et al., 2012; Kilpatrick et al., 2013, Norris et al., 1992).

Incarcerated women exhibit higher rates of interpersonal violence and mental health concerns (e.g., Karlsson & Zielinksi, 2018). Trauma exposure has been deemed a risk factor for offending and incarceration for women (Gilfus, 2002; Green et al., 2016; Lynch, DeHart, Belknap, & Green, 2013). Specifically, according to a recent literature review, interpersonal violence is considered a major contributor towards women's incarceration through the development of mental illness and substance use (for a review, see Karlsson & Zielinski, 2018). Rates of incarcerating women have been increasing and outpacing the rate of incarceration of men (e.g., Carson, 2015; Minton, 2012; National Resource Center on Justice Involved Women, 2012). Understandably, incarcerated women report particularly high rates of exposure to traumatic experiences and PTSD, with 56 – 82% of incarcerated women endorsing experiences of lifetime sexual assault (Karlsson & Zielinski, 2018). Most incarcerated women report

experiencing multiple types of adversity and interpersonal violence in their lives (e.g., Lynch, Belknap, & Green, 2013). Incarcerated women also endorse higher rates of PTSD than men (Komarovskaya, Booker Loper, Warren, & Jackson, 2011), with PTSD 4 to 10 times more prevalent in incarcerated women than community samples (Green, Miranda, Daroowalla, & Siddique, 2005; Trestman, Ford, Zhang, & Wiesbrock, 2007; Wolff et al., 2011). Similar to the comorbidity in community populations, self-reported PTSD has been found to be highly co-morbid with symptoms of depression, anxiety, and personality disorders and warrant trauma-informed treatment (Harner, Budescu, Gillihan, Riley, & Foa, 2015; Lynch, Fritch, & Heath, 2012). In a sample of women soon to be released from prison who self-referred for treatment following incarceration, 88% endorsed traumatic event exposure (Wolff et al., 2011). These findings suggest it is imperative to address trauma within prison systems. A review of the literature on trauma-informed treatments for incarcerated women (King, 2017) demonstrated reductions in PTSD symptomology and an additive effect to treatment as usual.

Trauma Treatment

For individuals with PTSD, several of the highly supported evidence-based treatments include exposure-based components. For example, Prolonged Exposure (PE; Foa, Hembree, & Rothbaum, 2007), Cognitive Processing Therapy (CPT; Resick & Schnicke, 1992, 1993), and even adaptations of cognitive behavioral therapy generally require participants to talk, think, and/or write about trauma-related reminders. In fact, the International Society for Traumatic Stress Studies (ISTSS; Foa, Keane, Friedman, & Cohen, 2008) and the Veterans Affairs/Department of Defense (VA/DOD; Bernardy & Friedman, 2012) have identified exposure therapies as first line treatment recommendations for PTSD.

Exposure-based techniques are intentionally utilized in treatments for PTSD because, according to emotional processing theory (Foa & Kozak, 1986), activation of fearful memories within a safe space can alter the pathological fear network associated with PTSD. By re-introducing memories of trauma cues in a non-dangerous situation, participants learn that fear experienced in response to these cues is not inherently dangerous (in contrast to the network created during the time of trauma when these cues were associated with fear). These procedures, by nature, elicit distress. Therefore, the ability to tolerate distress, at least temporarily, is necessary to some extent to engage in these trauma-focused treatments.

Theoretically, engaging in these exposure-based treatments demonstrates to individuals they are capable of experiencing distressing emotions, as they develop a stronger sense of self-competence and control over negative affect and stimuli (Rauch, Eftekhari, & Ruzek, 2012), and therefore may increase their perceived efficacy with tolerating distress. Despite some hesitancy from therapists to provide exposure-based treatment and/or implement them within incarceration settings for fear of patient symptom exacerbation or drop out (Becker, Zayfert & Anderson, 2004; Miller & Najavits, 2012; Richard & Gloster, 2007 for review; van Minnen, Hendricks, & Olff, 2010), there is substantial evidence to support the effectiveness of trauma-related treatment to improve patients' symptoms within correctional settings (Karlsson, 2015; Karlsson, Bridges, Bell, & Petretic, 2014; Karlsson, Zielinski, & Bridges, 2015; King, 2017).

Attrition and Related Concerns

Although exposure-based treatments are considered the gold standard for treating PTSD, not everyone who begins treatment finishes (See Najavits, 2015 for review). Results from a meta-analysis found an average attrition, or dropout, rate of 18% from trauma treatments with wide variability (Imel, Laska, Jakcupcak, & Simpson, 2013). Dropout rate for clinical trials is

approximately 20% (Bradley, Greene, Russ, Dutra, & Westen, 2005; Hembree et al., 2003) compared to randomized clinical trials for CPT and PE which average around 28% dropout (Hembree et al., 2003; Watts et al., 2014). As expected, treatment in real-world conditions have much higher dropout rates than randomized clinical trials (Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008; Zayfert et al., 2005).

Despite expectations that the distressing nature of exposure would be related to greater attrition, a literature review found no difference in dropout rates for exposure therapy compared to other therapies for PTSD (Hembree et al., 2003). This was confirmed and highlighted in the meta-analysis (Imel et al., 2013): within trauma treatments, drop-out rates vary similarly for exposure based treatments (0-41%; McDonagh et al., 2005, Neuner et al., 2008) compared to treatments that do not focus on retelling trauma memories (0 – 48%; Cottraux et al., 2008, Schaal, Elbert, & Neuner, 2009). Drop-out rates from trauma-specific treatments (involving explicit retelling of trauma memories) were not significantly different from trauma-neutral (i.e., did not require sharing trauma memories) or trauma-avoidant treatments (i.e., did not involve trauma memories). Dropout rates from trauma-focused PTSD treatments were only higher than dropout from rates in Present-Centered Therapy (PCT), which was originally intended to be used as control treatments in several studies but is now considered an active treatment for PTSD (Imel et al., 2013).

In this study's particular treatment, research has shown individual differences across participants regarding treatment completion (i.e., completers and non-completers) and symptom improvement (Karlsson, 2015; Karlsson et al., 2014; Karlsson et al., 2015). For example, Karlsson (2015) found demographic differences such that treatment non-completers were significantly younger, had fewer children, were significantly more depressed (according to total

sum score and symptom count), and had higher levels of self-blame at baseline than treatment completers. With regard to symptom improvement, approximately 40% of participants were above the clinical cut-off for PTSD before treatment but below the cut-off after treatment, while approximately 45% of participants remained above the clinical cut-off (Karlsson, 2015).

Distress Tolerance and PTSD

The treatment in the current study utilized imaginal exposure, which involves revisiting trauma reminders and engaging with the emotional content of the memory. Given the potentially distressing nature of this exercise and recognition of individual differences regarding participant completion and symptom improvement in previous research of this treatment (e.g., Karlsson et al., 2015), this study aims to explore these individual differences in treatment completion and treatment improvement, and gain an understanding of the role of participant's perception of their ability to tolerate distress prior to treatment.

Broadly, the term distress tolerance (DT) has been referred to as "the perceived capacity to withstand negative emotional and/or other aversive states" and/or "the behavioral act of withstanding distressing internal states elicited by some type of stressor" (Leyro, Zvolensky, & Bernstein, 2010). Literature has shown different measures (e.g., self-report, behavioral tasks) may be measuring distinct constructs (e.g., Leyro et al., 2010; Ameral, Palm Reed, Cameron, & Armstrong, 2014). For the purpose of this study, I utilize the term distress tolerance (DT) to refer to the distinct conceptualization in the former definition and primarily focus on the self-report methodological literature measuring perceived capacity to withstand aversive states.

From a biosocial perspective, DT is believed to develop as a result of transactions between individuals' biological predispositions and social environments (Crowell et al., 2009; Linehan, 1993; Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). According to this model,

some individuals are inherently more likely to experience more intense affect and heightened emotional reactivity, and therefore may be more likely to fear these emotional responses. Overall, DT is theoretically related to behavior choices and regulation styles (e.g., avoidance, numbing, or healthy coping; Vujanovic et al., 2011). Though high distress tolerance is generally more beneficial than low distress tolerance, moderate levels of DT have been proposed to be the most ideal as there are myriad concerns related to distress intolerance and overtolerance (Lynch & Mizon, 2011).

Individuals who rate themselves as having low DT (or high distress intolerance) generally consider the experience of distress to be unbearable and perceive themselves as unable to handle being distressed (Simons & Gaher, 2005). Endorsement of low DT indicates an individual feels relatively consumed by the experience of negative emotions (e.g., Simons & Gaher, 2005; Zvolensky, Leyro, Bernstein, & Vujanovic, 2011). Given one of the characteristics of low DT is the desire to alleviate distress, individuals with low DT are more likely to engage in escape or avoidance behaviors, often impulsively, as an attempt to suppress or mitigate unwanted emotions (e.g., Anestis, Tull, Bagge, & Gratz, 2012; Simons & Gaher, 2005; Vujanovic, Bonn-Miller, Potter, Marshall, & Zvolensky, 2011). For example, low DT has been associated with over-eating behaviors (Kozak & Faught, 2011), obsessive-compulsive behaviors (Robinson & Freeston 2014), and cigarette smoking (Perkins, Karelitz, Giedgowd, Conklin, & Sayette, 2010; Perkins, Giedgowd, Karelitz, Conklin, & Lerman, 2012). Low DT is also common in individuals diagnosed with borderline personality disorder (Crowell, Beauchaine, Linehan, 2009; Iverson, Folette, Pistorello, & Fruzzetti, 2012).

Low DT is a risk factor for developing a trauma-related disorder that requires treatment and is also associated with greater posttraumatic symptom severity (e.g., Duranceau, Fetzner, &

Carleton, 2013; Fetzner, Peluso, & Asmundson, 2014; Marshall-Berenz, Vujanovic, Bonn-Miller, Bernstein, & Zvolensky, 2010; Vinci, Mota, Berenz, & Connolly, 2017; Vujanovic et al., 2011). Findings have differed with regard to associations with particular PTSD symptom clusters, though several studies have documented an inverse relationship between DT and symptoms of re-experiencing and avoidance above and beyond variance accounted for by other related factors (e.g., number of traumas, trait-level neuroticism, participant sex; Fetzner et al., 2014; Marshall-Berenz et al., 2010; Vujanovic et al., 2011). The nature of relations between these variables is not fully understood and assumed to be interactional (see Vujanovic et al., 2015 for review).

Theoretically, the intrusive and unpredictable nature of PTSD symptoms may be particularly distressing to individuals with low DT (Banducci, Blonigen, Boden, Feldner, & Bonn-Miller, 2016; Vinci et al., 2017). In a recent study, Hancock and Bryant (2018) found PTSD exacerbates sensitivity to loss of control, which further impacts the capacity and desire to approach distressing stimuli. Congruent with the PTSD symptom cluster of avoidance of trauma-related cues, individuals with lower DT would be more likely than those with higher DT to avoid engaging with triggers (e.g., memories, reminders) that induce emotional or physiological arousal (Vujanovic et al., 2011). Avoiding these stressful triggers may reinforce the notion that the individual has limited capacity to tolerate trauma-related affective distress (e.g., Marshall-Berenz et al., 2010). Additionally, many behavioral strategies utilized to alleviate distress (alcohol and substance misuse, non-suicidal self-injury, and binging behaviors) are often unhelpful and can increase symptomology or lead to a greater negative trajectory (see Leyro et al., 2010 for review).

Relatedly, substance use disorders are also relatively common in female inmates (e.g., Staton, Leukefeld, & Webster, 2003; Tripodi & Pettus-Davis, 2013) and may be in part because of the use of substances to cope with traumatic experiences or negative affect intensity (Ullman, Relyea, Peter-Hagene, & Vasquez, 2013; Veilleux, Skinner, Reese, & Shaver, 2014). Individuals with PTSD who also have low DT may be at particularly high risk for developing substance use disorders (Duranceau et al., 2013; Fetzner et al., 2014; Vinci et al., 2017). The distressing nature of PTSD symptoms, combined with a low sense of efficacy to manage these distressing emotions, may drive people to seek substances as a way to cope (e.g., Duranceau et al., 2013; Fetzner et al., 2014). In order to reduce problematic coping, treating the source of distress (that is, the PTSD), is critical.

Unfortunately, gold-standard treatments that require exposure may be unacceptable to people with low DT. Individuals with PTSD and low DT may worry about their ability to openly invite distressing memories and thoughts and may not feel "ready" for exposure-based trauma treatments (Vujanovic et al., 2015). For individuals enrolled in treatment, experiencing extreme anger, emotional numbing, and overwhelming anxiety can impede emotional processing, making it more difficult for individuals to modify the pathological aspects of their trauma memories during imaginal exposures (Jaycox & Foa, 1996).

Notably, individuals with co-morbid PTSD and SUD who enroll in treatments tend to have high drop-out rates from treatment (e.g., Brady, Dansky, Back, Foa, & Carroll, 2001; Coffey et al., 2006), and individuals with lower DT are more likely to drop out from clinical interventions than those with higher levels of DT. This relationship between low DT and attrition has been demonstrated in treatments for substance use (e.g., Daughters et al., 2005), depression (Williams, Thompson, & Andrews, 2013), and mindfulness-based cognitive therapy for patients

with a history of suicidal depression (Crane & Williams, 2010). Further, PTSD, DT, and gender may interact. Among men, those with SUD, PTSD, and low DT completed a significantly lower portion of residential substance use treatment sessions than other men with SUD; for women, there was no pattern between DT and treatment attendance (e.g., Tull, Gratz, Coffrey, Weiss, & McDermott, 2013).

Although the concept of DT has been regarded as having trait-like stability, studies have suggested it may be context-specific (Bernstein, Trafton, Ilgen, & Zvolensky, 2008; Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012; Leyro et al., 2010; Vujanovic et al., 2011). Further, DT has been shown to be amenable to change through interventions and has been targeted in psychological treatments because the ability to tolerate temporary emotional discomfort is considered to be adaptive (Bornovalova et al., 2012; Hayes, Wilson, Gifford, Folette, & Strosahl, 1996; Linehan, 1993; Metz et al., 2013; Roberts et al., 2017). Therefore, skill-based group treatments targeting skill deficits (e.g., distress tolerance) have been recommended as precursors or early intervention strategies for individuals with PTSD (Vujanovic et al., 2015).

With regard to individual differences in PTSD recovery, greater avoidance coping is an important predictor of treatment response in individuals with chronic PTSD. Greater pre-treatment avoidance predicted greater maintenance of PTSD symptom severity (i.e., less improvement) across treatment (Badour, Blonigen, Boden, Feldner, & Bonn-Miller, 2012). Individuals who were relatively highly reliant on avoidant coping strategies and reactive to trauma reminders were particularly at risk for maintaining or increasing PTSD symptoms in the first few months following exposure to trauma (Pineles et al., 2011).

Emotional Stability

A related construct, emotional stability (ES), or neuroticism, is one of the "Big Five" personality traits (Costa & McCrae, 1992). ES refers to an individual's general tendency to experience negative mood states (Costa & McCrae, 1992). Higher ratings of perceived ES have been shown to be related to lower levels of perceived DT (Kaiser, Milich, Lynam, & Charnigo, 2012; Marshall-Berenz et al., 2010). Theoretically, those who consider themselves to be more emotional may perceive these more frequent, intense experiences as distressing and therefore consider themselves as having a lower ability to tolerate emotions than individuals with higher emotional stability. According to the "hyperemotionality" theory of PTSD, individuals with PTSD are more likely to experience higher levels of arousal and emotionality (Flack, Litz, Hsieh, Kaloupek, & Keane, 2000; Litz, 1992; Litz & Keane, 1989; Litz, Litz, & Gray, 2002). Therefore, ratings of perceived emotional stability may also be important to consider in exploring relations between DT and treatment persistence, engagement, and internalizing symptom improvement in this treatment for individuals with histories of sexual abuse.

Current Study

In sum, despite some concerns regarding the distressing nature of exposure, evidence supports exposure therapy as a gold standard treatment for individuals with PTSD (see Rauch et al., 2012 for a review). Individuals with low DT perceive themselves as less likely to be able to cope with negative emotions such as those elicited via treatments for PTSD. Theoretically, individuals with low DT would be more likely to attempt to avoid experiencing distress, even in the context of treatment. In treatment-seeking samples, individuals with lower levels of DT may have the highest need for treatment (i.e., most severe symptoms) but may also be at the greatest risk for not benefitting from treatment.

The current study explored how DT relates to treatment persistence (vs. drop out), engagement (e.g., emotional engagement and detail expressed) during an imaginal exposure to their traumatic memories, and post-treatment outcomes of DT and internalizing (PTSD, depression) symptoms in an 8-week exposure-based treatment for incarcerated women who experienced sexual assault. This project tested four main hypotheses: (H1): Lower baseline levels of DT would be significantly related to lower persistence in treatment as measured by (H1a) lower likelihood to complete treatment, and (H1b) greater likelihood of considering dropping out of treatment; (H2): Lower baseline levels of DT would be significantly related to less engagement in treatment as evidenced by (H2a) lower levels of emotional engagement and (H2b) fewer details shared during exposure; (H3): DT would significantly improve from pre- to post-treatment and (H4): Individuals with lower levels of baseline DT would be more likely to demonstrate higher levels of post-treatment internalizing symptoms (i.e., PTSD, depression) and less symptom improvement from pre- to post-treatment, controlling for internalizing symptoms at baseline. Exploratory qualitative analyses were also conducted to understand motivations for completers' treatment persistence.

Method

Participants

Data were collected from women incarcerated in a minimum-security community correctional facility (the Northwest Arkansas Community Correction Center in Fayetteville, Arkansas) who enrolled in a voluntary eight-session weekly therapy group focused on recovery from sexual trauma that happened prior to their incarceration. All women in the facility where the study was being conducted were incarcerated for non-violent felonies (e.g., selling or using illegal drugs, financial crimes).

12

Data were collected from May 2015 through December 2018 across 17 treatment groups. In total, 100 women were enrolled in these treatment groups. Eight participants who declined consent to have their data used for research purposes and seven who did not complete the primary variable of interest (pre-treatment DT) were excluded. See Figure 1 for flow of participants. Participants included in analysis were 85 women ages 19 – 53 ($m = 31.55$; $SD = 8.19$). See Table 1 for demographics. All participants were functionally literate. Fifteen participants dropped out of treatment and three participants were missing post-treatment data yielding 67 participants with post-treatment data.

Procedure

Recruitment. Research participants were those who began voluntary participation in the exposure-based therapy group, *Survivors Healing from Abuse: Recovery through Exposure* (SHARE; Bridges, Karlsson, Zielinksi, & Calvert, 2017). Participants were routinely recruited via a brief presentation regarding the purpose and content of the group treatment by one of the group leaders during a daily mandatory meeting at the facility. Women were encouraged to make a request with a facility coordinator (e.g., counselor, services director) to join the next available group. Counselors were also encouraged to discuss the group with their clients and encourage eligible participants to enroll.

Inclusion criteria. All women who signed up for the group were invited to participate in the treatment. Inclusion criteria were English language fluency and having a prior experience of sexual violence victimization. As noted above, participants were excluded from data analysis if they did not consent to their data being used for research purposes or did not complete the primary measure of interest for this study (Distress Tolerance Scale [DTS]; Simons & Gaher, 2005).

Data collection and consenting process. This study is part of a larger program of research. Prior to completing study measures, group leaders provided participants with a written description of the study purpose, procedures, potential risks and benefits, and rights. Completion of the study measures was entirely voluntary and conducted via paper and pen prior to the first session of the treatment group for baseline measures and at the end of the last session for post-treatment measures. Women were not compensated for completing the questionnaires and were provided a way to discreetly decline to participate if desired by using a two-point consent process (i.e., consent before and after completion of the measures). Participants must have provided consent at each time point for their responses to be used for research purposes. All study procedures were approved by the University of Arkansas' Institutional Review Board and the Arkansas State Department of Community Corrections.

Treatment. Each therapy group consisted of eight weekly 1.5-hour sessions. Two to three clinical psychology graduate students, supervised by a licensed clinical psychologist, served as group leaders for up to 10 participants at a time. The group format and structure were informed by Foa and colleagues' (2007) prolonged exposure therapy (PE) and concentrated on imaginal exposure, hereby referred to as "exposure" where each participant shared a verbal trauma narrative. Themes common to victimization (e.g., safety, trust, power and control, esteem, intimacy) from the works of McCann, Sakheim, and Abrahamson (1988) and Resick and Schnicke (1993) were also integrated into treatment. Early sessions included discussion of participants' confidentiality. psychoeducation about sexual violence and common consequences of trauma, the role of avoidance in maintaining anxiety, and the rationale for engaging in imaginal exposure. Discussion of coping (e.g., through breathing and grounding exercises) was integrated throughout the remainder of the treatment sessions as well.

14

The majority of treatment (sessions 3-7) emphasized sharing of trauma memories (i.e., imaginal exposure), with one or two individuals who recalled and processed their most salient trauma memory each session based on the PE protocol (Foa et al., 2007). This treatment was particularly unique in several ways. There were no between-session assignments in this treatment. Each participant only shared individually once during the course of the group, for approximately 25-45 minutes of imaginal exposure (as supported by van Minnen and Foa, 2006), led by one of the graduate student clinicians. These imaginal exposures consisted of two components. In the first component, participants were encouraged to recall their most distressing traumatic experience and "re-live" the experience by describing in detail what happened using first-person, present-tense language. After the first telling of the story, the second component involved revisiting the experience again. This time, the leading clinician guided the participant to process her emotions, thoughts, and physiological sensations related to the trauma by asking questions that elicit and gently challenge assumptions, reflect on the participant's earlier perspectives of the experience, and notice physical reactions. Participants were encouraged to share supportive comments following each women's sharing of her story.

Final sessions (sessions 5 – 8) facilitated group conversations integrating the aforementioned victimization themes and other themes that arose from group sessions, tailored to the experiences of the individuals in each group. Later sessions also included further discussion of coping strategies and self-care, psychoeducation about healthy sexual relationships, and provided resources for future support. For a full description of the treatment protocol, see Karlsson, Zielinski, and Bridges (2015).

Measures

Participants completed self-report measures assessing psychological functioning at pre- and post-treatment (i.e., before the first and at the last treatment sessions). Measures included in this study are in the Appendix and described below:

Distress tolerance. Distress tolerance (DT) was measured pre- and post-treatment by the Distress Tolerance Scale (DTS; Simons & Gaher, 2005), a 15-item self-report measure which examines one's perceived ability to tolerance emotion distress and includes questions related to tolerance, appraisal, absorption, and regulation. Participants are directed to think of times they have felt distressed or upset and rate their agreement with each item (e.g., "Feeling distressed or upset is unbearable to me") on a 5-point scale from 1 (*Strongly agree*) to 5 (*Strongly disagree*).

Initial exploratory and confirmatory factor analyses by the measure's authors supported a four-factor model with four subscales (Simon & Gaher, 2005). For the purpose of this study, only the single higher-order distress tolerance factor was used. Total scores were calculated as average scores of responses to all items after reverse-scoring one item (*range*: 1 to 5). Higher scores represent higher tolerance for emotional distress.

In the original development studies for the measure, good internal consistency reliability ($\alpha = .82$) and test-retest reliability over a 6-month period (intra-class $r = .63$) were demonstrated (Simons & Gaher, 2005). As expected, the DTS was negatively associated with measures of affective distress and dysregulation, and positively associated with mood acceptance and mood typicality (Simons & Gaher, 2005). Internal consistency reliability for the sample in the current study was $\alpha = .91$ for pre-treatment scores ($n = 85$) and $\alpha = .90$ for post-treatment ($n = 67$).

Emotional stability. The Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) was used as a brief personality trait measure. Each of the ten items (e.g., "I see

myself as calm, emotionally stable") were rated on a 7-point scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). For this study, only the Emotional Stability (ES) subscale, which is comprised of two items, was used as a control variable. Cronbach alpha for this scale was .73 in the original measure development sample (Gosling et al., 2003). In measure development, the TIPI demonstrated significant convergent correlations with other personality measures; for example, the ES scale was correlated at $r = .81$ with the ES scale of the Big-Five Inventory (BFI; John & Srivastava, 1999). Gosling and colleagues (2003) demonstrated the TIPI had slightly lower correlations than the BFI but was still determined to be a strong indicator of external correlates. The TIPI also demonstrated test-retest reliability over six weeks ($r = .72$ for the entire measure). In the current sample, the two items on the ES subscale were significantly correlated ($r = .345$, $p = .001$) with a Cronbach alpha of .51, ($n = 84$) for the ES subscale score at pre-treatment and remained significantly correlated ($r = .485$, $p < .001$) with a Cronbach alpha of .63 ($n = 67$) at post-treatment.

Treatment persistence. Treatment persistence was measured by records of treatment attendance and completion, and retrospective recall of drop-out intentions. Each is described below. In addition, qualitative data regarding drop-out intentions and motivations for treatment persistence gathered at the end of treatment were analyzed for themes.

Treatment completion. Participants must have shared their own trauma narrative through imaginal exposure and attended at least six of the eight sessions in order to be considered a "treatment completer." Individuals were able to voluntarily leave the treatment group without consequence. Attendance and imaginal exposure records were maintained by graduate student clinicians.

Drop-out intentions. In the post-treatment measures, treatment completers reported on their desires to end treatment early. The measures included a question asking if the participant considered dropping out of the group (*yes/no*). If yes, the participant also indicated via checkmarks at which time points (e.g., before the first session, before sharing their personal trauma narrative) they considered dropping out. Desire to drop out (i.e., not persist) was coded as a sum of number of time-points (0 – 7) the participant considered dropping out. This form regarding drop out considerations was implemented in March 2016 and therefore not available to participants in the first three groups (n = 21) included in this project.

Qualitative data. Two open-ended questions were included in the written assessment packet with regards to personal motivations for persistence: "Why did you consider dropping out?" and "What made you stay in this group?" These data were collected from treatment completers at post-treatment. The readability of these open-ended questions was below a 5th grade reading level.

Engagement. Treatment engagement was measured using two categories of variables: emotional engagement and degree of detailed descriptions of trauma narrations.

Emotional engagement. Emotional engagement was measured in two different ways during the duration of this study. For the first eight groups (*n* = 37) therapists were asked to rate each participant's "level of expressed emotion" during their imaginal exposure, using a 5-point scale (i.e., 1 = *none*, 2 = *low*, 3 = *medium*, 4 = *high*, 5 = *extreme*). For the latter ten groups (*n* = 46), therapists were asked to rate each participant's "average" level of expressed emotion and "highest" level of expressed emotion during their imaginal exposure, using a 5-point scale (i.e., 1 = *none*, 2 = *low*, 3 = *medium*, 4 = *high*, 5 = *extreme*).

Scores for each participant were first averaged across raters. Higher scores indicated greater emotional engagement during exposure sessions. In order to include as many participants as possible, I created a single composite score for each participant. For participants from the first eight groups, average scores across raters from the "level of expressed emotion" variable were used. For participants from the latter 10 groups, the mean of raters' scores on the two newer items ("average" and "highest" level of expressed emotion) were significantly different from the "level of expressed emotion" from the first eight groups. However, these two newer items ("average" and "highest") were correlated with each other at $r = .610$, ($p = <.001$) and averaged to create a single mean score. This mean score derived from the combination of the two newer items from the latter groups was not statistically different from the "level of expressed emotion" from the first groups [t (43.77) = -0.51, $p = .613$]. Therefore, this combination (of "average" and "highest" ratings) was used as a composite score for participants in the latter ten groups. Ratings between the three clinicians were highly consistent ($r = .66 - .83$, $p < .001$).

Trauma narration details. Clinicians also rated the degree of personal details shared by the participant during their trauma narration. Details were rated on a 5-point scale (i.e., 1 = *none*, 2 = *low*, 3 = *medium*, 4 = *high*, 5 = *extreme*). Scores from group leaders were averaged to yield a single rating for each participant, with higher scores indicating greater personal details shared during the exposure. Examination of inter-rater reliability for level of detail amongst all three clinicians revealed low non-significant correlations between Rater 3 and the other two raters ($r = -.12$, $p = .692$; $r = -.19$, $p = .57$), whereas Raters 1 and 2 were highly correlated ($r = .69$, $p < .001$). Therefore, ratings of level of detail shared during exposure used an average of ratings by Raters 1 and 2.

Internalizing symptoms. Two measures of internalizing symptoms (one each for posttraumatic stress and depression) were assessed pre- and post-treatment. Each is described below.

PTSD. Posttraumatic stress symptoms were assessed using the Posttraumatic Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a 20-item self-report questionnaire that assesses symptoms of PTSD. Participants rated the extent to which they have been bothered by each problem (e.g., "repeated, disturbing, and unwanted memories of the stressful experience") on a scale from 0 (*not at all*) to 4 (*extremely*). The PCL-5 yields total symptom severity scores (*range* 0-80) with a preliminary cut-point suggestion for clinical symptomology of 33.

The PCL-5 was adapted from previous versions of the checklist. Bovin and colleagues (2015) validated the current version of the PCL-5 against the Clinician Administered PTSD Scale for DSM-5 (CAPS-5; Weathers, et al., 2013, the gold standard for diagnostic interviews). The PCL-5 has been one of the most widely used self-report measures of PTSD (Blevins, Weathers, Davis, Witte, & Domino, 2015). In studies examining psychometric properties of the PCL-5 with trauma-exposed college students, there was strong internal consistency ($\alpha = .94$) and test-retest reliability over one-week ($r = .82$), as well as convergent validity compared to other measures of PTSD ($rs = .74 - .85$) and discriminant validity compared to depression, antisocial personality features, and mania ($rs = .31 – 60$; Blevins et al., 2015). Confirmatory factor analysis indicated adequate fit with the *DSM-5* four-factor model (Blevins et al., 2015). Reliability in this sample was $\alpha = .94$ (n = 84) for pre-treatment scores and $\alpha = .93$ (n = 63) for post-treatment scores.

Depression. The nine-item Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to assess symptoms of depression experienced during the two weeks

prior to measure administration. Items represent symptom criteria of depressive disorders (e.g., "little interest or pleasure in doing things"). Answer choices range from 0 (*not at all*) to 3 (*nearly every day*). Items are summed to create a total score (*range* 0 – 27) in which higher scores indicate greater levels of depression. Scores of 5, 10, 15, and 20 represent cut-points for mild, moderate, moderately severe, and severe depression, respectively (Spitzer et al., 1994).

Internal reliability of the PHQ-9 is considered excellent (α = .89) in the PHQ Primary Care Study with excellent test-retest reliability (r = .84) across 48 hours (Kroenke et al., 2001). Criterion validity was demonstrated in a sample of 580 primary care patients who underwent an independent diagnostic interview by a mental health professional. Construct validity was established by strong associations between PHQ-9 scores and measures of functional status, disability days, and symptom-related difficulty (Kroenke et al., 2001). Reliability in the current sample was α = .87 (n = 81) for pre-treatment scores and α = .82 (n = 65) for post-treatment scores. Overall, all measures were at or below a 9th grade reading level.

Analytic Approach

Hypothesis 1, examining the relation between DT and persistence, was tested in a few ways. First, logistic regression was utilized, regressing completion status (*yes/no*) on pre-treatment DTS scores, to determine if baseline DT predicted treatment completion status (H1a). Second, logistic regression was utilized again, regressing desire to drop out (*yes/no*) on pre-treatment DTS scores, to determine if baseline DT predicts the desire to drop out (H1b).

For those who indicated yes on the aforementioned item, I computed a correlation between the number of time-points participants considered dropping out and baseline DTS scores, and estimated a Poisson regression model, to test if baseline DT was related to the duration of time participants considered dropping out of treatment (H1c).

Qualitative responses regarding desire to drop out of group and motivations to remain were analyzed using the *Sift & Sort, Think & Shift* qualitative data analysis approach (Maietta, 2007). This iterative process combines tenets and practices from phenomenology, grounded theory, case study, and narrative research (Maietta, Hamilton, Swartout, & Petruzzelli, 2018). The approach emphasizes subjective reports and discourages reporting quantitative statistics on qualitative data. This process involves "diving in" and "stepping back" to engage in analytic shifts to allow data content to define analytic decision-making and directions (see ResearchTalk, 2017 for more information). Although there was no formal hypothesis between participants of varying levels of DT, participants with DTS scores below 3 were considered to have low DT and participants with DTS scores equal to or greater than 3 were considered to have moderate to high levels of DT, in order to explore potential differences. This split was determined by examining bivariate scatterplots between baseline DT and outcome variables.

Engagement-related hypotheses (H2) were explored via regression analyses. Bivariate scatterplots were examined to determine the appropriate terms (e.g., potential transformations) to include in the regression. LOESS (locally estimated scatterplot smoothing) lines fitting 99% of data points were added to bivariate scatterplots to observe potential non-linear patterns in variable relations. Engagement-related variables were entered in two separate equations with across-rater averages of level of emotional engagement (H2a) and level of detail shared (H2b) each regressed on pre-treatment DTS scores.

It is important to note that post-treatment data were unavailable for individuals who did not complete treatment, as assessments were administered at the last session of group treatment. Therefore, analyses including post-treatment and change variables only included data from participants who completed treatment.

A cross-lagged structural equation model was proposed to test hypotheses 3 and 4 to examine the relations between pre- and post-treatment DTS scores and symptom outcome (i.e., PTSD, depression; see Figure 2). The model in Figure 2 assumed PTSD and depression would converge as a unitary factor of internalizing; if PTSD and depression did not load onto a single factor of internalizing in subsequent analyses, the plan was to analyze separately. However, bivariate graphs of baseline DT and several outcome variables (DT, PTSD, depression) post-treatment and change scores demonstrated non-linear relationships (see Figures 3 - 8). Adding a quadratic variable to the proposed model would be too complex and yield an unstable model given the relatively small sample size and increased number of predictors. Therefore, when appropriate, regression equations were modeled to included pre-treatment DTS scores in both linear and quadratic terms. Pre-treatment DT was added independently in step 1 and step 2 included both the linear and quadratic pre-treatment DT scores to statistically examine model fits.

In order to examine the robustness of findings, hierarchical regression analyses were repeated to control for and determine the unique influence of the general trait-like attributes of emotionality. Mean ES subscale score from the TIPI added independently in Step 1. Further, primary analyses exploring relations between pre-treatment DT and outcome change scores were repeated using a last observation carried forward (LOCF) procedure (Xu, 2009) to include all participants (completers and non-completers). LOCF was used to assume no change in symptom scores (change scores = 0) for treatment non-completers given data suggesting the relative stability of DT and chronicity of PTSD and depression, especially across a 2-month period (e.g., Javidi & Yadollahie, 2012). Bivariate scatterplots of baseline DT and outcome variables using

LOCF were examined to determine whether or not quadratic terms would be included in regression analyses.

A priori power analyses were completed using G*Power 3.1.9.2 (Faul, Erdfelder, Buchner & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007). For two-tailed correlations with a bivariate normal model, $\alpha = .05$, power of 0.8, a desired moderate correlation of 0.3 with the null hypothesis correlation of 0, the recommended sample size was 84. Using the same parameters for two-tailed t-tests using point biserial models, the recommended sample size is 82. For linear multiple regressions with a fixed model to determine R^2 deviation from 0, using 4 predictors and the minimal effect size of interest (0.15), a sample size of 85 was recommended. The sample size of 85 enrolled participants meets this minimum recommendation; however, the number of treatment completers with usable data (n = 67) was below this threshold for adequate power.

Descriptive Statistics

Approximately 82% of participants (n = 70) completed treatment. There were no

significant differences (all p values > .05) in demographics for participants who completed

treatment compared to those who dropped out. Relatedly, pre-treatment scores did not

significantly differ for participants who completed treatment compared to those who did not

(Table 2).

On average, participants self-reported moderate levels of DT at baseline ($M = 2.72$) with

wide variability in scores ($SD = 0.89$; Figure 9). Pre-treatment DT scores were not significantly

related to any demographic variables. Pre-treatment PTSD scores ($M = 39.96$; $SD = 19.77$) were

also relatively moderate to high. Approximately 66% of the sample ($n = 56$) met criteria for a

provisional diagnosis of PTSD at baseline according to the PCL-5 cutoff score. Pre-treatment

depression scores ($M = 13.02$; $SD = 6.51$); the mean score fell in the range of "moderate"

depressive symptoms. Approximately 42% of participants (n = 36) scored in the range of

"moderately severe" or "severe" depressive symptoms according to PHQ-9 scoring guidelines

(i.e., scores equal or greater than 15). All pre-treatment scores were significantly correlated ($p <$

.001) with each other; post-treatment scores were also significantly correlated ($p < .01$) with each

other (see correlation matrix in Table 3).

After treatment, overall scores of distress tolerance on the DTS significantly increased

(see Table 4 for comparison of all pre- and post-treatment variables). Average pre-treatment

scores were below the median score of 3, but post-treatment scores were above the median. PCL-

5 scores decreased significantly from pre- to post-treatment. These improvements also reflected

clinical improvement as less than 12% of participants ($n = 10$) remained above the clinical cutoff

for PTSD after treatment. Depression scores on the PHQ-9 decreased significantly pre- to post-

treatment. This symptom reduction was also clinically significant; less than 6% of participants who completed treatment ($n = 5$) indicated scores at or above the moderately severe range after treatment.

Participants endorsed relatively moderate emotional stability (ES) scores, below the median of the range (sum = 4) at pre-treatment and above the median at post-treatment. Contrary to expectations of relative stability, the average decrease on the TIPI ES subscale reflected a statistically significant change in scores from pre- to post-treatment.

Hypothesis 1: DT and Treatment Persistence

Contrary to H1a, baseline DT was not predictive of treatment completion [$\chi^2 (1) = 0.35$, $p = .552$, DT OR = 1.21, 95% CI: 0.64 – 2.31]. See Figure 10 for illustration of DT variability for both groups (i.e., treatment completers vs. non-completers). Mean baseline DT scores for those who completed treatment were not significantly different from those who dropped out of treatment (Table 2).

Hypothesis 1b was also not supported. Of the 41 participants who provided post-treatment responses to this question, over 60% considered dropping out of treatment. Baseline DT was not statistically predictive of whether or not participants who completed treatment had considered dropping out of treatment, $\chi^2 (1) = 0.82$, $p = .365$, DT OR = 1.36, 95% CI: 0.69 – 2.68. Similarly, baseline DT scores were not significantly different between those who had considered dropping out ($m = 2.75$, $SD = 0.80$, $n = 25$) and those who did not ($m = 2.54$, $SD = 0.91$, $n = 24$), t (47) = -0.89, p = .377.

Further exploration of the time periods that treatment completers considered dropping out were explored via H1c. Twenty of the 25 participants who endorsed considering dropping out selected which time-points they considered dropping out. On average, these participants

considered dropping out at two time-points ($m = 2.05$, $SD = 1.54$) of the six discrete time-point

choices offered. Baseline DT was not significantly correlated with the number of time periods

participants considered dropping out ($r = -.31$; $p = .179$). The results did not change and

remained non-significant when explored as a Poisson regression (Baseline DTS was correlated

with number of time points the person considered dropping out at $B = -.164$ [SE = 0.30], 95%

confidence interval for B: -.76, .43, $p = .588$).

      Qualitative findings. Most ($n = 24$) of the 25 participants who considered dropping out

wrote a comment. Individuals' qualitative responses to open-ended questions were relatively

short; most often, responses were one sentence or a sentence fragment.

      Fear was the most commonly endorsed theme for why participants considered dropping

out. This included fear of sharing their story with others (which also highlighted trust, judgment,

and confidentiality issues), fear of re-living the experience, and fear of the emotions imaginal

exposure would elicit. For example, a representative comment was "[I w]as just scared and [it]

was very hard for me because I had to relive it again." Participants with moderate to high levels

of DT also noted fear of emotions, with one participating noting, "It was getting too emotional

for me to handle."

      Participants who considered dropping out of treatment provided reasons why they

persisted and completed the group. Prevalent themes included the desire to recover, heal, or

reduce symptoms; keeping their commitment; encouragement from others; and self-

determination.

Hypothesis 2: Treatment Engagement

      Hypothesis 2a: DT and emotional engagement. An examination of a bivariate

scatterplot for baseline DT and emotional engagement revealed a non-linear relationship, as the

slope appears to flatten before the midpoint (Figure 11); therefore, the regression included both

linear and quadratic terms (i.e., the predictor variable squared), as the lower order variable is also

required in higher order equations). Baseline DT significantly predicted emotional engagement

(see Table 5 for details). Although not represented in a linear trend, participants with lower

levels of DT were rated higher on emotional engagement during their exposure, as compared to

participants with moderate to high levels of DT.

Hypothesis 2b: DT and detail shared. The bivariate scatterplot of baseline DT and level

of detail shared during exposure appeared relatively linear (Figure 12); therefore, a quadratic

term was not included in this model. Baseline DT was a significant predictor of level of detail

shared during the participant's exposure session (see Table 5). Lower DT predicted higher levels

of detail shared.

Treatment Outcomes and Symptom Improvement

Baseline DT was significantly related ($p < .001$) to all outcome change variables (DT,

PTSD, and depression; see Table 3). Regression equations were modeled to included pre-

treatment DTS scores in both linear and quadratic terms with pre-treatment DT in step 1 and both

the linear and quadratic pre-treatment DT scores in step 2.

Hypothesis 3: Distress tolerance improvement. Two hierarchical linear regressions

examined how pre-treatment DT and its quadratic term predicted post-treatment DT and DT

change scores. Pre-treatment DT significantly predicted both post-treatment DT and DT change

scores (see Table 6). The model including the quadratic term of pre-treatment DT accounted for

more total variance than the linear model. With regard to partial correlations, the linear terms

remained significant and the quadratic terms were marginally significant. Overall, lower levels of

pre-treatment DT were significantly associated lower post-treatment DT scores but higher levels of change in DT from pre- to post-treatment.

Hypothesis 4: DT and internalizing symptoms. For PTSD and depression equations, pre-treatment scores for the outcome variable were controlled for in Step 1, the linear pre-treatment DT term was included in Step 2, and Step 3 added the quadratic pre-treatment DT term to examine predictions of symptom change or post-treatment scores as the dependent variables.

PTSD. Pre-treatment DT significantly predicted post-treatment scores and change in PTSD symptoms, controlling for pre-treatment PTSD symptoms (see Table 7). Pre-treatment DT was independently significant in both models; pre-treatment PTSD was only a significant predictor in models of PTSD change, but not post-treatment scores.

Depression. Pre-treatment DT significantly predicted post-treatment scores and change in depression symptoms, controlling for pre-treatment depression symptoms (see Table 8). Pre-treatment DT was independently significant in both models; pre-treatment depression was only a significant predictor in models of depression change, but not post-treatment scores.

Robustness Checks

Emotional stability. To explore the impact of neuroticism, or emotional stability (ES) on symptom change, the ES subscale from the TIPI was entered into the first step of each of the models. When ES was entered into the models, they all remained significant. ES was not a significant predictor of any model, even when entered alone in step 1; however, with regard to partial correlations, predictor terms for DT (linear and quadratic) remained significant predictors at similar levels of significance or marginal significance, unaffected by the addition of ES into the model (see Tables 9-12). Overall, the inclusion of ES in these models does not account for change.

LOCF. LOCF procedures explored the robustness of findings by including all participants, as opposed to only treatment completers. Bivariate graphs of pre-treatment DT and DT change scores using LOCF appeared to be linear (see Figure 13). A variable of DT change scores using LOCF was regressed on pre-treatment DT scores. This model was significant ($p <$ .001) and pre-treatment DT significantly predicted DT change including all participants using LOCF (see Table 10).

Bivariate graphs of pre-treatment DT and outcome variable change using LOCF did not appear to be linear (see Figures 14 and 15). Similar to the regression models run between baseline DT and outcome variables, a hierarchical regression was run with the LOCF change variable as the outcome, pre-treatment symptom scores were entered in Step 1, linear term for DT added in Step 2, and quadratic term added in Step 3.

With regard to PTSD, the regression models including pre-treatment DT variables and PTSD as predictors remained significant ($p < .001$; see Table 11). However, change in PTSD score using LOCF was only significantly predicted by pre-treatment PTSD scores; neither variable of pre-treatment DT was significantly predictive. Similar relations were shown when predicting change in depression scores from pre- to post-treatment. The model including pre-treatment DT variables and depression as predictors was significant ($p < .001$; see Table 12). Pre-treatment depression predicted change in depression scores using LOCF; however, neither pre-treatment DT variable was a significant predictor.

Discussion

Incarcerated women have extremely high rates of sexual violence and post-traumatic stress, especially compared to the general population. These individuals would likely benefit from trauma treatments. Gold standard trauma treatments utilize imaginal exposure, though some

professionals and clients worry may be too distressing for individuals with low levels of DT. This study explored relations between DT and individual differences in treatment persistence, engagement during exposures, and symptom improvement in response to an exposure-based group treatment for incarcerated women who experienced sexual assault. I predicted individuals with lower DT would be less likely to complete treatment, less engaged during exposures, and demonstrate less improvement in internalizing symptoms of PTSD and depression.

Consistent with previous literature of incarcerated women highly affected by trauma exposure (Karlsson & Zielinski, 2018), participants in this study demonstrated high rates of untreated psychiatric symptomology. For instance, 66% of the sample endorsed clinical pre-treatment symptoms of PTSD and 42% endorsed clinical symptoms of depression. Approximately half of the sample indicated pre-treatment DT scores below the mid-point; participants demonstrated a wide range of variability in baseline levels of DT. PTSD symptoms in this sample were still significantly related to low pre-treatment DT, consistent with prior literature (e.g., Fetzner et al., 2014). Participants also demonstrated high variability in ES scores at pre-treatment with the average scores below the mid-point.

Treatment Persistence versus Drop Out

Seventy of the 85 participants with pre-treatment data completed treatment, which constitutes a 17.6% attrition rate. This is on par for the overall average rate of attrition from trauma treatments (about 20%), but is relatively lower than attrition rates for individual trauma treatments in community samples or those offered in group format (up to 40%; Imel et al., 2013). One plausible reason for this difference is the short-term nature of this 8-week study. For example, in a study examining exposure utilization and completion in a clinical setting, participants completed an average of 16 sessions prior to dropout (Zayfert et al., 2005).

31

Although actual drop-out was low, more than 60% of participants who completed treatment endorsed *having considered* dropping out of treatment at some point. This rate seems consistent with general attitudes about exposure-related therapy in the literature (e.g., Becker et al., 2004; Richard & Gloster, 2007; van Minnen et al., 2010). The fact that more than half of treatment completers had considered dropping out but ultimately did not do so suggests concerns were likely assuaged by participating in therapy. As suggested by qualitative comments, participants may have been influenced to remain in group by increased trust built within the group, increased confidence in themselves and their own abilities, persistence, or the passing of time (i.e., not worth dropping out after the majority of sessions completed).

Indeed, all participants who completed an exposure completed the group treatment (that is, no one completed an exposure and then dropped out of group). This statistic is consistent with prior literature that initiating exposure therapy is associated with greater likelihood of completing treatment (Zayfert et al., 2005). Given that many participants who cited a reason for considering dropping out indicated fear related to the exposure process, this finding is not surprising. Once participants completed the exposure, the most emotionally distressing component of treatment was finished.

Themes highlighted in qualitative findings regarding considerations of dropping out of treatment were similar to cognitive sequelae of traumatic experiences. For example, patterns of fear and issues related to trust are common post-traumatic responses (e.g., APA, 2013; McCann et al., 1998; Resick & Schnicke, 1993) and appeared often in participants' qualitative responses to questions. As expected, some of the concerns expressed were fears directly related to the imaginal exposure component of the treatment and often were realistic fears, including the potential for their confidentiality to be broken within their living environment by other group

members or fears of experiencing increased symptoms after exposure (e.g., nightmares, increased anxiety and hypervigilance). Other fears related to the imaginal exposure were also logical but less likely to be realistic, including being negatively judged by other group members, fear of their emotions escalating without relief, and worries about substance use relapse (within the prison-setting where they did not have access to substances). Many reasons appeared to relate directly to the concept of DT, including a participant who described the treatment as "too emotional for me to handle." Participants' rationales for remaining in the treatment group included a desire to commit for their own benefit and/or other group participants. The majority of comments mentioned something related to helping, healing, or recovery. This further supports this notion that participants' level of commitment was relatively high at baseline, even if they contemplated dropping out.

It is important to note the prison setting itself may be related to the relatively low treatment attrition rate observed in this study. First, offering treatment within prison may have increased participation due to fewer competing responsibilities or activities available to them. In contrast to traditional outpatient settings, there were fewer logistic barriers to receiving treatment (e.g., transportation, child care) that often interfere with community participation in treatment groups. Second, participants were adequately informed of the nature of the group and its requirements (e.g., sharing a story of their traumatic experience) and had the opportunity to speak with their counselors prior to enrolling in group. This fully informed consent prior to the beginning of group, coupled with the fact that participants voluntarily chose to enroll in this treatment group prior to completing baseline measures, may indicate that this sample had a higher level of commitment than a general sample enrolling in a community treatment group. Third, participants were usually acquainted with the other group participants due to co-living

33

arrangements within the facility. This may have contributed to a sense of familiarity, collegiality, and potentially comfort with the other group members and therefore may have further contributed to the participants' sense of commitment to the group. These notions of participant commitment to peers and their own recovery are supported by some of the qualitative comments provided by participants who considered dropping out of the group but ultimately completed treatment. On the other hand, as noted in qualitative comments, it is also possible that living on-site with other group members may have dis-incentivized some participants to enroll in group or contributed to dropout, especially if there was a prior history of interpersonal conflict or low levels of trust between potential group members.

Hypothesis 1: DT and Treatment Persistence

Contrary to my hypothesis, baseline DT did not predict treatment persistence (i.e., completion versus drop out). On the whole, this indicates individuals with lower DT did not systematically, intentionally leave the group to avoid the exposure exercise. Baseline DT also did not predict consideration of drop out in treatment completers. For those who considered dropping out, baseline DT also did not predict the number of time periods participants held these concerns. Qualitative comments about reasons for considering dropping out or motivations to stay in the group also did not differ by DT.

Non-significant relations between DT and treatment persistence contrast previous literature which demonstrates high rates of treatment attrition from individuals with low levels of DT (e.g., Daughters et al., 2005). Based on the construct of DT (Simons & Gaher, 2005) comments regarding fear of increased symptoms and inability to manage difficult emotions were not expected from participants with higher levels of DT, but were reported in qualitative comments.

Several explanations are offered for why this hypothesis was not supported. First, this study involved a voluntary commitment following descriptions of the treatment protocol. Therefore, although there was no comparison to methods of treatment in other studies, individuals with lower levels of DT may have been more aware than usual of treatment expectations in this study. As supported by qualitative comments, once participants decided to sign up for treatment, they were less likely to leave after forming relationships with other participants in the treatment group. It is possible that many eligible participants (women affected by histories of sexual assault experiences) with very low DT declined enrollment and participation in this exposure-based treatment and therefore did not complete pre-treatment measures.

Secondly, since DT has been shown to be context-specific (see Leyro et al., 2010), it is possible the general measure of DT was not a good predictor of treatment-specific state-level DT (the self-perceived ability to tolerate telling a personal trauma narrative via exposure). Baseline DT ratings were intended to be general, and not specifically related to completion of treatment or the endurance of a trauma-related exposure activity. However, participants' perceptions of their ability to complete the exposure and treatment was not assessed, and may have varied from an overall level of general DT. By enrolling in treatment, these participants indicated a desire and some level of belief in their capabilities to engage in treatment. It is also possible their willingness to sign up was influenced by the knowledge they would have the support of clinicians and other group members and therefore DT in the context of treatment may be higher than general perceptions.

Third, levels of self-reported DT varied widely in completers and non-completers, with both groups having participants spanning the range from low to high levels of baseline DT

(Figure 10). This non-significant finding between baseline DT and treatment persistence suggests motivations for dropping out of treatment may not be related to level of DT. This is further supported by the similarity of comments amongst treatment completers with a range of baseline DT. A comment from an individual with relatively low baseline DT, "I am strong and a survivor," indicated a greater hope and capacity in their own self-efficacy than would have been predicted by baseline DT score. Participants with low baseline DT also cited the utility of the imaginal exposure, "I need it to help me tell me story," and "because I felt like it would help me feel better by getting it off my chest." These comments indicated a recognition throughout the group of the rationale for exposure, which they may or may not have been aware of or interested in prior to the first few sessions of treatment.

Fourth, prior work (Tull et al., 2013) suggested relations between DT and attrition in substance use recovery may be moderated by gender and only present for men, who generally exhibit more externalizing symptoms of PSTD than women. Perhaps the relation between baseline DT and treatment persistence is more complex and affected by gender, trauma victimization, substance use, or incarceration.

Given the finding that baseline DT did not predict treatment dropout, I would have further expected it to predict consideration of dropout. In other words, I would have expected the reason for lack of significant findings between baseline DT and dropout to be that participants with lower levels of DT may have remained in treatment but at least considered dropping out prematurely. However, since the majority (60%) of completers considered dropping out, it makes sense these participants spanned a variety of baseline DT scores.

This study attempted to identify participants who might be more likely to drop out based on baseline DT scores and related fears of exposure in order to identify and potentially target

these individuals (e.g., pre-treatment sessions to bolster DT) to increase their likelihood of treatment completion. However, baseline DT was not significantly associated with treatment persistence, considerations of dropping out, nor differences in qualitative comments. Therefore, these findings do not implicate implementation of DT-skills booster sessions prior to beginning treatment as suggested in the literature (Vujanovic et al., 2015). Instead, these results suggest participants with low baseline DT are just as capable of completing treatment as those with moderate to high levels of DT (at least if they are provided with information about treatment up front and enroll voluntarily).

Treatment Engagement

Emotional engagement. Therapist ratings for emotional engagement shared were mostly centered around average with wide variability across participants. This suggests some participants were highly emotionally engaged with their exposure while others were not. Scores on emotional engagement during exposure were between the values of 2-5 (full possible range of values 1-5). This indicates that no participant was rated as expressing the lowest possible level of emotion, on average. Although this is likely an accurately representation of the experiences and due to the nature of the imaginal exposure activity, it is possible the lack of low ratings could be due to a bias on the part of all clinicians. If these reduced scores were a result of bias, it would mean these results and the strength of any findings could be over-inflated. However, they are more likely to have been influenced by the clinician who led the exposure appropriately eliciting emotions from under-engaged participants during exposure.

The therapist guidance during the exposure-based activity might contribute to the generally higher levels of emotional engagement. Therapists specifically coached participants during their exposure to elicit emotions and details related to their traumatic experience. It is

likely they provided more guidance for participants who may have naturally presented as emotionally under-engaged. Relatedly, therapists occasionally encouraged participants to share during sessions when they were already evincing emotional reactivity or expression of overwhelming emotion (that may otherwise be "shut down" or suppressed between sessions). Overall, it appeared participants who completed an exposure were active participants in the exercise, demonstrating emotional responses.

Hypothesis 2a: DT and emotional engagement. For participants who completed an exposure, baseline DT was significantly related to emotional engagement during the exposure, but in the opposite direction than predicted. It was hypothesized that individuals who rated themselves as having lower ability to tolerate distress would be less likely to engage emotionally. However, lower baseline DT was related to higher level of emotional engagement during exposure.

The relationship between baseline DT and emotional engagement was non-linear, demonstrating a negative slope for participants with relatively low baseline DT. Emotional engagement ratings began to level off towards a horizontal trending line as baseline DT scores neared the midpoint of 3 (on a scale from 1-5). Emotional engagement ratings were higher (score of approximately 4) for participants with low baseline DT than for participants with moderate to high ratings of perceived baseline DT (emotional engagement scores slightly above 3). This trend suggests individuals with the lowest perceived DT at baseline were the most likely to be emotionally engaged in their own exposures.

Literature suggested individuals with low DT, who have low confidence in their perceived ability to tolerate distress, would actively avoid and attempt to suppress distressing emotional experiences (e.g., Vujanovic et al., 2011). The finding that individuals with lower

levels of DT were most likely to be emotionally engaged in their exposures contradicts this prediction, at least in the context of the exposure. Similarly, in accordance with the theory of distress overtolerance (Lynch & Mizon, 2011), I would have expected individuals with the highest baseline ratings of DT to be the most emotionally engaged in their exposures. Instead, it seemed as though participants with low baseline ratings of DT appeared the most emotionally affected by these distressing experiences.

In fact, high levels of emotional engagement may be reflective of emotional dysregulation or less control of emotions, both of which are characteristic of individuals with low DT (e.g., Zvolensky et al., 2010). Displaying higher average levels of emotion could also represent emotional flooding and the sensation of being overwhelmed by distressing emotions. Participants with lower levels of DT may have perceived the exposure as an emotionally overwhelming experience, which they might typically attempt to avoid. However, they were not able to circumvent emotional engagement due to the nature of the clinician-guided exposure. The display of intense emotions may be part of what these participants with lower levels of DT were concerned about experiencing and generally attempt to avoid.

This externally-rated variable of emotional engagement is intended to be an objective rating of level of emotion expressed during exposure. This variable does not attempt to describe how well the participant appears to be tolerating the emotions elicited during their exposure or regulating their emotional responses. Similarly, this variable does not give us information about the participants' perceptions of the experience (e.g., how uncomfortable or distressed they felt internally or physiologically). This means, regardless of the rated level of emotional engagement, the participant could have been highly uncomfortable during the experience (congruent with low DT) or felt confident in their ability to experience those emotions. It was unanticipated that

individuals who rated themselves as uncomfortable with highly emotional experiences were the ones who demonstrated the most emotionality, regardless how they felt during the experience.

The ratings of emotional engagement addressed the *level* of emotion expressed without acknowledging, distinguishing, or labeling the emotion(s) expressed. It is not known whether the emotions expressed reflected sadness, anger, fear, or grief. Relatedly, expressing higher levels of emotion does not necessarily reflect processing of emotion or the level of utility (e.g., how constructive it is to express said emotion) of emotional expression. Jaycox and Foa (1996) described how some emotional responses (e.g., anger, overwhelming anxiety) can interfere with fear activation during exposures (and impede recovery). Anger, for instance, emerges in the context of injustice, and is included in the defining symptoms of PTSD. In contrast, (re-)experiencing fear and grief during exposures are theorized to be integral to fear extinction and habituation (Foa et al., 2007; Foa & Kozak, 1986; Jaycox & Foa, 1996). According to DT theories, I would have expected individuals with lower levels of DT to attempt to suppress all distressing emotions, helpful or not.

Levels of emotional engagement were rated by clinicians whereas baseline DT was self-rated by the participant. Since ratings (of DT and emotional engagement) were conducted by different people, we might expect discrepancies in perceptions. However, even from varying perspectives, self-rated DT was moderately and significantly related to therapist-rated emotional engagement during exposure. This suggests a robust relationship, which could be potentially be stronger if both variables were rated by the same person.

I would have initially predicted individuals with lower baseline DT would be more likely to have lower ratings (e.g., scores of 1 or 2), but these results indicate all participants who completed an exposure expressed at least a moderate level of emotion. Therefore, no participants

demonstrated a minimal level of engagement, or "under-engagement" that could be considered insufficient participation. This means regardless of baseline DT no participants appeared to be fully impeded by emotional suppression or avoidance during their exposure. Across the span of baseline DT, all participants who completed an exposure demonstrated an ability, at least in the moment with guidance, to tolerate distressing emotions and persist with the experience of imaginal exposure.

Hypothesis 2b: DT and details shared. Contrary to what was hypothesized, lower levels of DT were significantly related to higher levels of detail shared during exposure. This indicates participants with lower DT did not appear to be less open when sharing their experiences. Instead, results suggested once these participants started to share their trauma narration via exposure, they were more likely to describe all of the potentially overwhelming details in their memories.

An alternative explanation for the relation between low baseline DT and higher levels of detail shared could be participants with lower DT were less likely to filter out relatively unimportant details related to the traumatic memory. Remembering and reliving details of the traumatic experiences are theorized to be survival mechanisms as individuals remember details to protect themselves against future traumatic experiences (McNally, 2005). Given the moderate and significant correlation between emotional engagement and level of detail shared in exposure, retaining a multitude of details could potentially contribute to individuals' perceptions of feeling unable to handle such distressing emotions. One of the purposes of the imaginal exposure exercise is to "re-live" the experiences, recall the details, to associate them with less traumatic experiences through the safe environment of the group. Therefore, these findings demonstrated that individuals with lower DT were *not* less likely to engage in this critical exposure exercise.

Instead, these individuals were *more* likely to engage by sharing a higher level of details, which is indicative of engaged participation in the exposure exercise. Theoretically, it is possible those who share more detail are inclined to greater opportunity for re-learning experiences by beginning to associate previously feared trauma-related cues with a safer environment.

Internalizing Symptom Outcomes

Hypothesis 3a: DT improvement. As expected, DT increased from pre- to post-treatment. Lower levels of DT were also associated with greater improvement in DT from pre- to post-treatment. This may be partly explained by those with lower levels of DT having more "room to grow" in terms of DT scores. In other words, individuals with lower scores on the DTS had more potential to improve these low scores.

It is also possible that those with lower DT who initially doubted their abilities to manage distressing emotions, but persisted in treatment were more surprised by their treatment completion than participants with higher DT. According to the self-efficacy theory (Bandura, 2010), these experiences may have been more novel for participants with lower baseline DT. Theoretically, individuals with lower DT generally avoid engaging in distressing experiences (e.g., Vujanovic et al., 2011). This would make the in-group exposure a more novel (newer) experience than for individuals with higher perceived DT.

Emotional distress tolerance is often considered a "trait" variable. Given the changes in DT from pre- to post-treatment, results suggest DT may be malleable via intervention, or is at least associated with decreases in response to an exposure-based treatment.

Another considerable interpretation of these findings is that ratings of low DT could be reflective of people who are "unsuccessful" at avoiding. For example, an individual may attempt to evade their distress but have difficulty doing so. In contrast, individuals who can utilize

avoidance as a coping strategy may rate themselves as having higher levels of DT, but this perception may not be indicative of healthier coping strategies or true abilities to tolerate distress. According to this potential interpretation, increases in DT from pre- to post-treatment could still indicate growth during intervention in coping skills to tolerate distress.

Hypothesis 3b: **DT and internalizing symptoms (PTSD & depression).** Relations between baseline DT and symptom outcomes (PTSD, depression) were not linear. Bivariate scatterplots of both relations indicated similar patterns with a curve, or inflection point (i.e., slope changed direction) approximately at the midpoint (mean sum = 3) of the DTS scale. As illustrated in Figures 6 and 8, the greatest improvement (highest change scores) were associated with the lowest baseline DT scores. As baseline DT increased, the level of symptom improvement decreased, until about the midpoint of the DT scale, when the growth appeared to reach an asymptote, or level out. This phenomenon of non-linear relations between baseline DT and symptom improvement, statistically modeled by linear and quadratic equations, was statistically significant, and is hereby referred to as a "room to grow" model. Similar to the pattern of improvement in DT, it appears the potency of engaging in a distressing experience/exercise of exposure in treatment allows for a more unique learning experience for individuals with lower DT. It is likely the level of engagement during exposure directly contributed to symptom improvement.

For symptom improvement, change scores were most important since the focus of this study is on treatment improvement. As demonstrated in Tables 6-8, post-treatment scores demonstrated the same relations. Although change scores are influenced by pre-treatment symptom scores, these were included and accounted for within the regression models. Therefore,

the fact that pre-treatment DT still significantly and independently predicted change scores is clinically important.

An alternative explanation for participant improvements could be regression to the mean; However, we would not expect these variables to spontaneously change over time (e.g., untreated PTSD is typically chronic). Another explanation for improvements could be demand effects, where participants rate post-treatment outcomes more favorably want to give the clinicians and researchers positive feedback about the program; however, post-treatment responses were not entirely favorable and participants were informed their responses would remain anonymous and used for the benefit of future participants.

Robustness Checks

LOCF. Post-treatment scores were only available for participants who completed treatment. Pre-treatment scores did not significantly differ for participants who completed treatment compared to those who dropped out (Table 4). I used a Last Observation Carried Forward (LOCF) model to explore if baseline DT remained significantly related to outcomes when assuming no change for the participants who dropped out of treatment.

Pre-treatment DT significantly predicted change in DT using LOCF for all participants. Pre-treatment DT did not significantly predict drop-out, but did predict DT change scores for treatment completers. The initial hypotheses would have supported the notion that pre-treatment DT could predict change in DT when the model included treatment completers (most of whom increased in DT) and non-completers who were assumed to not change in DT. Given non-significant findings between baseline DT and dropout rates, this finding was actually unexpected. Therefore, these results could suggest baseline DT is a highly powerful predictor of its own change in treatment.

For PTSD and depression change scores using LOCF, the models remained significant. However, baseline DT did not significantly uniquely predict LOCF change scores for either internalizing outcome variable after controlling for pre-treatment scores. Instead, pre-treatment scores were predictive of all participants' change scores. Although the lack of significance between baseline DT and change scores for all participants was contrary to my hypothesis, this finding is in line with the results from my first hypothesis, wherein baseline DT did not predict drop-out. Given the lack of relation between baseline DT and participant completion, it is logical that baseline DT would not predict change scores of 0 for participants who did not complete treatment.

   Emotional stability. In this study, on average ES increased from pre- to post-treatment. The standard deviation for ES change was greater than the average change score. This reflects that although the average change in ES was statistically significant, some participants' ES remained stable or decreased from pre- to post-treatment. The general trend of significant increase in ES from pre- to post-treatment was not hypothesized given it is a measure of a trait-like characteristic of personality. However, these findings are consistent with previous literature which demonstrated that personality characteristics, especially ES, can be altered as a result treatment (Roberts et al., 2017). Although we did not have a control group for comparison, it appears that completing the treatment likely contributed to an increase in perception of ES.

   When ES was entered into the models of baseline DT and internalizing symptom outcomes, the models remained significant. However, ES was not considered an independent predictor of symptom change. This indicates that although ES may be a related and important construct to consider when examining DT, the relation between baseline DT and symptom changes in this study cannot be attributed to variability in personality level emotional stability, or

neuroticism. Therefore, significant findings in the regression models can appropriately be attributed to baseline DT.

Limitations and Future Directions

Of the 100 women who began this treatment, eight did not consent to the use of their data, seven were missing pre-treatment data, and an additional three participants who completed group were missing post-treatment data. Therefore, conclusions could only be drawn from participants from whom we had data. Statistically, data appeared to be missing at random, but we do not know if there was a unified theme amongst participants who decided not to consent for their data to be used or those who were unavailable for post-treatment data collection. Additionally, although the number of participants who began treatment met the pre-determined recommendation for sample size (n = 85), the number of treatment completers with usable data (n = 67) was less than recommended for adequate power. There were also analyses which contained fewer participants. For example, less than 60% of the treatment completers (*n* = 41) were surveyed about their desire to drop out of treatment. Therefore, this study is relatively underpowered. Although findings should be reproduced due to the relatively low number of participants, the relative lack of power may provide further support for the significance of the findings, detected with this small sample size. Replication studies are recommended.

Given the treatment characteristics of providing services within a prison population, results may not be generalizable to community treatment settings. However, these findings may be generalizable to other correctional, rehabilitation, or institutional settings. Further research is warranted within outpatient community settings. One concern related to exposure-based treatment is the potential for increased substance use as symptoms may increase following exposure (Ullman et al., 2013), which could potentially interfere with a client's ability to

successfully complete treatment and/or experience symptom reduction. Clients in this study did not have the potential to relapse with substance use because of restricted access of substances in a controlled environment. Therefore, this study was unable to draw conclusions about the use of substances as coping strategies following exposure.

Other factors considered as variables to control for included demographics and trauma history. Given this was an entirely female sample, there was no a priori hypothesis that any demographic variable might impact these findings, especially since DT was not significantly related to any demographic variables in this study. Given previous research suggesting an interaction between gender and treatment completion (Tull et al., 2013) and the effectiveness demonstrated by this short-term exposure-based therapy in a prison setting, this treatment and related research should be replicated within incarceration facilities for men.

Although several other studies often explore characteristics of trauma exposure (e.g., frequency, duration, trauma type) and brief measures of trauma history were administered for later groups of participants, anecdotally, the majority of participants endorsed a complex and cumulative trauma history. Therefore, it was not expected that characteristics of trauma exposure (e.g., trauma type, frequency, duration) would affect these results. However, future studies may want to consider the relation between trauma exposure, DT, and treatment outcomes.

Future research would likely benefit from collecting data from participants who did not complete treatment, including their motivations for dropping out of group. It would also be beneficial to collect data from individuals who were eligible for treatment (e.g., incarcerated women affected by histories of trauma) who opted to not enroll in the group treatment to serve as a control group and further understand their motivations for not participating. Utilizing and comparing results to a control group without a treatment could also account for demand

47

characteristics and natural changes in responses due to time passage within the prison environment. The current study did not obtain information about length of time in incarceration prior to treatment. Studies have shown that adjusting to life in prison may be destabilizing and symptoms may improve over time (e.g., Bridges et al., 2020). Therefore, it may be useful to include length of time incarcerated in future studies to examine the intersection of other setting-related factors.

As described in Results, qualitative responses were short and limited, which may be attributable to space allotted, time commitment, or interest in elaborating. It is also important to note that the qualitative descriptions of considerations for dropping out of the group were only collected from individuals who completed treatment and were retrospective accounts of what participants were thinking at an earlier time. It is possible that participants under-reported their doubts and concerns regarding treatment and imaginal exposure after they completed treatment and their fears subsided. There may have been more qualitative richness and elaboration of concerns if they were assessed in real-time, before and during treatment. Future studies may want to collect and explore qualitative responses from participants throughout the treatment process to capture their fears and doubts while they are still active in treatment.

The research team responsible for the implementation of this treatment group theorized a distinction between average level of emotion expressed and highest/peak level of emotion. However, the new variable of average level of emotion expressed was marginally significantly different from the old measurement of this variable and the peak emotion variable was highly distinct from the previous variable. Given the high correlation of the two new variables, and lack of statistical significance between this combination and the former variable, the new variables were re-combined into a single category of emotional engagement. It is still possible that the two

new variables could be representative of different constructs and therefore analyzed separately in future studies when more participants have been rated using these new variables. Given the small sample size, it was important to utilize as many ratings of emotional expression during the exposures as possible.

Future studies may want to explore the participants' subjective units of distress (SUDs) during their exposures. Participants may have perceived their ability to tolerate emotional distress during the exposure (i.e., state-level DT) during group differently than their baseline ratings of general trait-level DT. There may also be a difference between clinician ratings of emotion and client experiences, which may be warranted to explore.

Exposure is theorized to be the active mechanism of exposure-related trauma treatments (e.g., Foa et al., 2007). Therefore, this study was exploring participants' engagement in this activity in relation to pre-treatment DT. It is recommended that future analyses explore if level of engagement in exposure differentially relates to or predicts symptom improvement.

Similar to the theoretical confound in the literature, a temporal relationship between trauma exposure and DT was not established in this study. It is unclear if those with pre-existing low perceptions of DT relate to the development and maintenance of PTSD symptoms, or if experiencing traumatic events could potentially impact a person's perception of their DT, especially as traumatic reactions may naturally increase (e.g., intrusive thoughts, flashbacks). There were individual differences in baseline DT ratings, regardless of PTSD symptoms. This indicates variability in the development of both PTSD and DT. While this study demonstrated the predictive ability of DT in treatment outcome, it did not speculate about factors that may impact the development or lack thereof of DT skills. Future studies may want to explore the temporal relations between DT and PTSD.

Clinical Implications

Overall, participants' perceptions of DT prior to treatment may be meaningful in predicting outcomes for those who complete treatment. Although baseline DT did not predict treatment completion in this study, lower levels of DT were significantly related to higher emotional engagement during exposure and greater symptom improvement from pre- to post-treatment, as compared to those with moderate to high levels of DT. This pattern of findings indicates a "room to grow" model: Those with low levels of DT may have the most potential and opportunity to benefit from this novel experience of exposure-based treatment, which may increase self-efficacy in addition to reduce internalizing symptoms. Participants with moderate to high levels of DT at baseline still significantly improved in internalizing symptoms of PTSD and depression from pre- to post-treatment, but not to the extent those with lower levels of DT did.

I predicted individuals with DT would be less likely to be able to engage in treatment. Instead, they were *more* emotionally engaged, shared *higher* levels of detail, and demonstrated the *most* symptom improvement. This is consistent with the notion that exposure therapies provide "corrective" experiences for re-learning (e.g., Foa & Kozak, 1986). Most participants, but especially individuals with lower levels of DT, were able to benefit from social learning in this exposure-based group treatment. Social learning theory (Bandura, 1977, 2010) posits individuals learn from complex interactions of social and environmental influences. In this group treatment setting, participants with lower levels of DT could learn from other group participants, who served as models. By witnessing other participants successfully engage in exposures, participants could learn by example.

Individuals are most likely to learn from social modeling when they are attending to the processes (Bandura, 1977, 2000); ratings of engagement during their own exposures suggest high

levels of treatment engagement. They were able to witness reinforcing processes (e.g., participants experiencing relief, praise from therapists) and therefore engagement in exposure was reinforced. Social learning has also been shown to be most powerful in the context of models who have been successful (e.g., participants who complete exposures), have status or power (e.g., therapists), and when the individual observing may lack self-esteem (e.g., low perception of their own abilities, perhaps low DT) and therefore seek alternative models of behavior. Bandura (1977, 2010) also emphasizes the function of motivation and self-reinforcement, which was demonstrated by the qualitative responses that participants had a strong desire to reduce their internalizing symptoms.

It is also important to note these findings remained significant after controlling for general emotionality (ES). This robustness highlights DT as a unique concept beyond everyday levels of emotions, especially as baseline DT predicted more intense levels of emotional engagement during the context of exposures in treatment. Although I initially hypothesized participants with lower DT would be least likely to engage in and therefore experience symptom reduction from treatment, it appeared they were the participants who were the most emotionally expressive during exposure and (most likely relatedly) benefitted the most from completing treatment.

Most notably, this study demonstrates exposure-based therapies are acceptable to individuals with symptoms of PTSD, depression, and low levels of DT. These findings directly address concerns from clients and therapists about traumatized clients' ability to handle the distressing experience of exposure-related exercises. This study provided evidence of a relatively low dropout rate from this exposure-based treatment. Even in the context of prison, participants with low levels of DT who opted to enroll in and complete treatment were highly engaged in the

treatment and demonstrated significant improvements in symptom reduction within 8-weeks. Therefore, those theoretically most at risk for not benefitting from treatment demonstrated the greatest gains from participating in treatment. This study provides support for offering exposure-based treatments to incarcerated women with a wide range of baseline DT.

References

Ameral, V., Palm Reed, K. M., Cameron, A., & Armstrong, J. L. (2014). What are measures of distress tolerance really capturing? A mixed methods analysis. *Psychology of Consciousness: Theory, Research, and Practice, 1*, 357-369. doi:10.1037/cns0000024

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Anestis, M. D., Tull, M. T., Bagge, C. L., & Gratz, K. L. (2012). The moderating role of distress tolerance in the relationship between posttraumatic stress disorder symptom clusters and suicidal behavior among trauma-exposed substance users in residential treatment. *Arch Suicide Res, 16,* 196-211. doi:10.1080/13811118.2012.695269

Badour, C. L., Blonigen, D. M., Boden, M. T., Feldner, M. T., & Bonn-Miller, M. O. (2012). A longitudinal test of the bi-directional relations between avoidance coping and PTSD severity during and after PTSD treatment. *Behavioral Research Therapy, 50,* 610-616. doi:10.1016/j.brat.2012.06.006.

Banducci, A. N., Bujarski, S. J., Bonn-Miller, M. O., Patel, A., & Connolly, K. M. (2016). The impact of intolerance of emotional distress and uncertainty on veterans with co-occurring PTSD and substance use disorders. *Journal of Anxiety Disorders, 41,* 73-81. doi:10.1016/j.janxdis.2016.03.003

Bandura, A. (1977). Self-efficacy: Towards a unifying theory of behavioral change. *Psychological Review, 84*, 191-215. doi:10.1037/0033-295X.84.2.191

Bandura, A. (2010). Self-efficacy. *The Corsini Encyclopedia of Psychology*, 1-3. doi: 10.1002/9780470479216.corpsy0836

Becker, C., Zayfert, C., & Anderson, E. (2004). A survey of psychologists' attitudes towards utilization of exposure therapy for PTSD. *Behavior Research and Therapy, 24,* 277-292.

Bernardy, N. C., & Friedman, M. J. (2012). 2010 VA/DOD Clinical Practice Guideline for Management of Post-Traumatic Stress: How busy clinicians can best adopt updated recommendations. *Journal of Rehabilitation Research and Development, 49*, vii-viii. doi:10.1682/JRRD.2012.02.0036

Bernstein, A., Trafton, J., Ilgen, M., & Zvolensky, M. J. (2008). An evaluation of the role of smoking context on a biobehavioral index of distress tolerance. *Addictive Behaviors, 33*, 1409-1415. doi:10.1016/j.addbeh.2008.06.003

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and Initial Psychometric Evaluation. *Journal of Traumatic Stress, 28*, 489-498. doi:10.1002/jts.22059

Bornovalova, M. A., Gratz, K. L., Daughters, S. B., Hunt, E. D., & Lejuez, C. W. (2012) Initial RCT of a distress tolerance treatment for individuals with substance use disorders. *Drug and Alcohol Dependence, 122,* 70-76. doi:10.1016/j.drugalcdep.2011.09.012

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2015, December 14). Psychometric Properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in Veterans. Psychological Assessment. Advance online publication. http://dx.doi.org/10.1037/pas0000254

Bradley, R., Greene, J., Russ, E., Dutra, L., & Westen, D. (2005). A multidimensional meta-analysis of psychotherapy for PTSD. *American Journal of Psychiatry, 162*, 214-227. doi:10.1176/appi.ajp.162.2.214

Brady, K. T., Dansky, B. S., Back, S. E., Foa, E. B., & Carroll, K. M. (2001). Exposure therapy in the treatment of PTSD among cocaine-dependent individuals: Preliminary findings. *Journal of Substance Abuse Treatment, 21*, 47-54.

Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry, 48,* 216-222. doi:10.1001/archpsyc.1991.01810270028003

Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L.R., Davis G. C., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community: The 1996 Detroit area survey of trauma. *Arch Gen Psychiatry, 55,* 626-32.

Bridges, A. J., Baker, D. E., Hurd, L. E., Chamberlain, K. D., Hill, M. A., Karlsson, M., & Zielinski, M. J. (2020). How does timing affect trauma treatment for women who are incarcerated? An empirical analysis. *Criminal Justice and Behavior, 47*, 631-648.

Bridges, A., Karlsson, M., Zielinski, M., & Calvert, M. (2017, June). *Changes in trauma cognitions following group treatment for PTSD in sexually victimized incarcerated women.* Paper presented at the 15th annual meeting of European Society for Traumatic Stress Studies annual conference, Odense, Denmark.

Carson, E.A. (2015). *Prisoners in 2014*. Washington, D.C.: Bureau of Justice Statistics. Retrieved from: http://www.bjs.gov/content/pub/pdf/p14. pdf.

Cahill, S. P., Rothbaum, B. O., Resick, P. A., & Follette, V. M. (2009). Cognitive-behavioral therapy for adults. In E. B. Foa, T. M. Keane, M. J. Friedman, & J. A. Cohen (Eds.), *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (pp. 139-222). New York, NY, US: Guilford Press.

Coffey, S. F., Stasiewicz, P. R., Hughes, P. M., & Brimo, M. L. (2006). Trauma-focused imaginal exposure for individuals with comorbid posttraumatic stress disorder and alcohol dependence: Revealing mechanisms of alcohol craving in a cue reactivity paradigm. *Psychology of Addictive Behaviors, 20*, 425. doi:10.1037/0893-164X.20.4.425

Costa, P. T. Jr., & McCrae, R. R. (1992). The five-factor model of personality and its relevance to personality disorders. *Journal of Personality Disorders, 6,* 343-359.

Cottraux, J., Note, I., Yao, S. N., de Mey-Guillard, C., Bonasse, F., . . .Chen, Y. (2008). Randomized controlled comparison of cognitive behavior therapy with Rogerian supportive therapy in chronic post-traumatic stress disorder: A 2-year follow-up. *Psychotherapy and Psychosomatics, 77*, 101–110. doi:10.1159/000112887

Crane, C., & Williams, J. M. G. (2010). Factors associated with attrition from mindfulness-based cognitive therapy in patients with a history of suicidal depression. *Mindfulness, 1*, 10-20.

Creamer, M., Burgess, P., & McFarlane, A. C. (2001). Post-traumatic stress disorder: findings from the Australian National Survey of Mental Health and Well-being. *Psychological Medicine, 31*, 1237-1247. doi: 10.1017/S0033291701004287

Crowell, S. E., Beauchaine, T. P., & Linehan, M. M. (2009). A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. Psychological Bulletin, 135(3), 495-510. doi.10.1037/a0015616

Daughters, S. B., Lejuez, C. W., Bornovalova, M. A., Kahler, C. W., Strong, D. R., & Brown, R. A. (2005). Distress tolerance as a predictor of early treatment dropout in a residential substance abuse treatment facility. *Journal of Abnormal Psychology, 114,* 729-734.

Duranceau, S., Fetzner, M. G., & Carleton, R. N. (2014). Low distress tolerance and hyperarousal posttraumatic stress disorder symptoms: a pathway to alcohol use?. *Cognitive Therapy and Research, 38*, 280-290.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods,* 39, 175-191.

Fetzner, M. G., Peluso, D. L., & Asmundson, G. J. (2014). Tolerating distress after trauma: differential associations between distress tolerance and posttraumatic stress symptoms. *Journal of Psychopathology and Behavioral Assessment, 36*, 475-484.

Flack, W. F. Jr., Litz, B. T., Hsieh, F. Y., Kaloupek, D. G., & Keane, T. M. (2000). Predictors of emotional numbing, revisited: A replication and extension. *Journal of Traumatic Stress, 13,* 611 – 618.

Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (2007). Prolonged exposure therapy for PTSD. New York: Oxford University.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: exposure to corrective information. *Psychological Bulletin, 99,* 20.

Foa, E. B., Keane, T. M., Friedman, M. J., & Cohen, J. A. (Eds.). (2008). *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies*. Guilford Press.

Gilfus, M. E. (2002). Women's experiences of abuse as a risk factor for incarceration. *Harrisburg, PA: VAWnet, a project of the National Resource Center on Domestic Violence/Pennsylvania Coalition Against Domestic Violence.* Retrieved from: https://vawnet.org/sites/default/files/assets/files/2017-08/AR_Incarceration.pdf

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. Jr. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37,* 504-528. doi:10.1016/S0092-6566(03)00046-1

Green, B. L., Dass-Brailsford, P., Hurtado de Mendoza, A., Mete, M., Lynch, S. M., DeHart, D. D., & Belknap, J. (2016). Trauma experiences and mental health among incarcerated women. *Psychological Trauma: Theory, Research, Practice, and Policy, 8*, 455-463. doi:10.1037/tra0000113

Green, B., Miranda, J., Daroowalla, A. & Siddique, J. (2005). Trauma exposure, mental health functioning, and program needs of women in jail. *Crime and Delinquency, 51,* 133–151

Hancock, L., & Bryant, R. A. (2018). Posttraumatic stress, uncontrollability, and emotional distress tolerance. *Depression and Anxiety, 35*, 1040-1047. doi:10.1002/da.22783

Harner, H. M., Budescu, M., Gillihan, S. J., Riley, S., & Foa, E. B. (2015). Posttraumatic stress disorder in incarcerated women: A call for evidence-based treatment. *Psychological Trauma: Theory, Research, Practice, and Policy, 7*, 58-66. doi:10.1037/a0032508

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*, 1152.

Hembree, E. A., Foa, E. B., Dorfan, N. M., Street, G. P., Kowalski, J., & Tu, X. (2003). Do patients drop out prematurely from exposure therapy for PTSD? *Journal of Traumatic Stress, 16,* 555–62. doi:10.1023/B:JOTS.0000004078.93012.7d

Imel, Z. E., Laska, K., Jakupcak, M., & Simpson, T. L. (2013). Meta-analysis of dropout in treatments for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 81*, 394-404. doi:10.1037/a0031474

Iverson, K. M., Follette, V. M., Pistorello, J., & Fruzzetti, A. E. (2012). An investigation of experiential avoidance, emotion dysregulation, and distress tolerance in young adult outpatients with borderline personality disorder symptoms. Personality Disorders: Theory, Research, and Treatment, 3, 415-422. doi: 10.1037/a0023703

Javidi, H., & Yadollahie, M. (2012). Post-traumatic stress disorder. *The International Journal of Occupational and Environmental Medicine, 3,* 2-9.

Jaycox, L. H., & Foa, E. B. (1996). Obstacles in implementing exposure therapy for PTSD: Case discussions and practical solutions. *Clinical Psychology & Psychotherapy: An International Journal of Theory and Practice, 3*, 176-184.

John, O. P., & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 102-138). New York, NY, US: Guilford Press.

Kaiser, A. J., Milich, R., Lynam, D. R., & Charnigo, R. J. (2012). Negative urgency, distress tolerance, and substance abuse among college students. *Addictive Behaviors, 37,* 1075-1083. doi:10.1016/j.addbeh.2012.04.017

Karlsson, M. E. (2015). Evaluating a Brief Sexual Violence Therapy Group for Incarcerated Women. (Unpublished doctoral dissertation). University of Arkansas, Fayetteville, AR. http://scholarworks.uark.edu/etd/2169

Karlsson, M. E., Bridges, A. J., Bell, J., & Petretic, P. (2014). Sexual violence therapy group in a women's correctional facility: A preliminary evaluation. *Journal of Traumatic Stress, 27,* 361-364. doi:10.1002/jts.21911

Karlsson, M. E., & Zielinski, M. J. (2018). Sexual victimization and mental illness prevalence rates among incarcerated women: A literature review. *Trauma, Violence, & Abuse,* Advance online publication. doi:10.1177/1524838018767933

Karlsson, M. E., Zielinski, M. J., & Bridges, A. J. (2015). Expanding research on a brief exposure-based group treatment with incarcerated women. *Journal of Offender Rehabilitation, 54*, 599-617. doi:10.1080/10509674.2015.1088918

Kessler, R. C. (2000). Posttraumatic stress disorder: the burden to the individual and to society. *The Journal of Clinical Psychiatry, 6*, 4-14.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. Archives of general psychiatry, 52, 1048-1060. doi:10.1001/archpsyc.1995.03950240066012

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H. U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International Journal of Methods in Psychiatric Research, 21*, 169-184. doi:10.1002/mpr.1359

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress, 26.* doi:10.1002/jts.21848

King, E. A. (2017). Outcomes of trauma-informed interventions for incarcerated women: A review. *International Journal of Offender Therapy and Comparative Criminology, 61*, 667-688. doi:10.1177/0306624X15603082

Komarovskaya, I. A., Booker Loper, A., Warren, J., & Jackson, S. (2011). Exploring gender differences in trauma exposure and the emergence of symptoms of PTSD among incarcerated men and women. *Journal of Forensic Psychiatry & Psychology, 22*, 395-410. doi:10.1080/14789949.2011.572989

Kozak, A. T., & Fought, A. (2011). Beyond alcohol and drug addiction. Does the negative trait of low distress tolerance have an association with overeating? *Appetite, 57*, 578-581.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16,* 606-613.

Lejuez, C.W., Kahler, C.W., & Brown, R. A. (2003). A modified computer version of the Paced Auditory Serial Addition Task (PASAT) as a laboratory-based stressor. The *Behavior Therapist, 26*, 290−293.

Leyro, T. M., Zvolensky, M. J., & Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: a review of the empirical literature among adults. *Psychological Bulletin, 136*, 576–600. doi: 10.1037/a0019712.

Linehan, M. (1993). *Cognitive-behavioral Treatment of Borderline Personality Disorder.* Guilford Press: New York.

Litz, B. T. (1992). Emotional numbing in combat-related post-traumatic stress disorder: A critical review and reformulation. *Clinical Psychology Review, 12*, 417-432.

Litz, B. T., & Keane, T. M. (1989). Information processing in anxiety disorders: Application to the understanding of post-traumatic stress disorder. *Clinical Psychology Review, 9*, 243-257.

Litz, B. T., Litz, B. T., & Gray, M. J. (2002). Emotional numbing in posttraumatic stress disorder: Current and future research directions. *Australian and New Zealand Journal of Psychiatry, 36*, 198-204.

Lynch, S. M., DeHart, D. D., Belknap, J., & Green, B. L. (2013). Women's pathways to jail: Examining mental health, trauma, and substance use. *NCJ, 241045.*

Lynch, S. M., Fritch, A., & Heath, N. M. (2012). Looking beneath the surface: The nature of incarcerated women's experiences of interpersonal violence, treatment needs, and mental health. *Feminist Criminology, 7,* 381-400. doi:10.1177/1557085112439224

Lynch, T. R., & Mizon, G. A. (2011). Distress overtolerance and distress intolerance: A behavioral perspective. In M. J. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance: Theory, research, and clinical applications* (pp. 52-79). New York, NY, US: Guilford Press.

Maietta, R. (2007). Sort & sift, think & shift: Multidimensional qualitative analysis. Unpublished manuscript.

Maietta, R. C., Hamilton, A., Swartout, K. & Petruzzelli, J. (2018, April). *Sort and Sift, Think and Shift: A Multidimensional Approach to Qualitative Data Analysis.* Presented at ResearchTalk Qualitative Analysis Data Camp, Carrboro, NC.

Marshall-Berenz, E. C., Vujanovic, A. A., Bonn-Miller, M. O., Bernstein, A., & Zvolensky, M. J. (2010). Multimethod study of distress tolerance and PTSD symptom severity in a trauma-exposed community sample. *Journal of Traumatic Stress, 23,* 623-630. doi:10.1002/jts.20568.

McCann, I. L., Sakheim, D. K., & Abrahamson, D. J. (1988). Trauma and victimization: A model of psychological adaptation. *The Counseling Psychologist, 16*, 531-594.

McDonagh, A., Friedman, M., McHugo, G., Ford, J., Sengupta, A., Mueser, K., . . .Descamps, M. (2005). Randomized trial of cognitive-behavioral therapy for chronic posttraumatic stress disorder in adult female survivors of childhood sexual abuse. *Journal of Consulting and Clinical Psychology, 73*, 515–524. doi:10.1037/0022-006X.73.3.515

Metz, S. M., Frank, J. L., Reibel, D., Cantrell, T., Sanders, R., & Broderick, P. C. (2013). The effectiveness of learning to BREATHE program on adolescent emotion regulation. *Research in Human Development, 10,* 252-272. doi:10.1080/15427609.2013.818488

Miller, N. A., & Najavits, L. M. (2012). Creating trauma-informed correctional care: A balance of goals and environment. *European Journal of Psychotraumatology, 3,* 1-8. doi: 10.3402/ejpt.v3i0.17246

Minton, T.D. (2012). Jail Inmates at Midyear 2011—Statistical tables. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics.

Najavits, L. M. (2015). The problem of dropout from "gold standard" PTSD therapies. *F1000Prime Reports, 7.* doi:10.12703/P7-43

National Resource Center on Justice Involved Women. (2016). Fact sheet on justice involved women in 2016. Retrieved from: https://cjinvolvedwomen.org/wp-content/uploads/2016/06/Fact-Sheet.pdf

Neuner, F., Onyut, P. L., Ertl, V., Odenwald, M., Schauer, E., & Elbert, T. (2008). Treatment of posttraumatic stress disorder by trained lay counselors in an African refugee settlement: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 76*, 686–694. doi:10.1037/0022-006X.76.4.686

Norris, F. H. (1992). Epidemiology of trauma: Frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting and Clinical Psychology, 60,* 409-418.

Otto, M. W., Safren, S. A., Pollack, M. H. (2004). Internal cue exposure and the treatment of substance use disorders: lessons from the treatment of panic disorder. *Journal of Anxiety Disorders, 18,* 69-87. doi:10.1016/j.janxdis.2003.07.007

Perkins, K. A., Giedgowd, G. E., Karelitz, J. L., Conklin, C. A., & Lerman, C. (2012). Smoking in response to negative mood in men versus women as a function of distress tolerance. *Nicotine & Tobacco Research, 14*, 1418-1425.

Perkins, K. A., Karelitz, J. L., Giedgowd, G. E., Conklin, C. A., & Sayette, M. A. (2010). Differences in negative mood-induced smoking reinforcement due to distress tolerance, anxiety sensitivity, and depression history. *Psychopharmacology, 210*, 25-34.

Perkonigg, A., Kessler, R. C., Storz, S., Wittchen, H.-U. (2000). Traumatic events and post-traumatic stress disorder in the community: prevalence, risk, and comorbidity. *Acta Psychiatr Scand, 10,* 46-59.

Pineles, S. L., Mostoufi, S. M., Ready, C. B., Street, A. E., Griffin, M. G., & Resick, P. A. (2011). Trauma reactivity, avoidant coping, and PTSD symptoms: A moderating relationship? *Journal of Abnormal Psychology, 120,* 240-246. doi:10.1037/a0022123

Rauch, S. A., Eftekhari, A., & Ruzek, J. I. (2012). Review of exposure therapy: a gold standard for PTSD treatment. *Journal of Rehabilitation Research and Development, 49,* 679-688.

ResearchTalk, Inc. (2017). *Qualitative Analysis: Using the 'Sort and Sift, Think and Shift' Toolkit*. Retrieved from: http://www.researchtalk.com/qrsi-2017-course-descriptions/#qualitative-analysis-sort-sift

Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of consulting and clinical psychology, 60,* 748.

Resick, P. A., & Schnicke, M. (1993). *Cognitive processing therapy for rape victims: A treatment manual* (Vol. 4). Sage.

Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology, 61,* 984.

Richard, D. C. S., & Gloster, A. T. (2007). Exposure therapy has a public relations problem: A dearth of litigation amid a wealth of concern. In *Handbook of Exposure Therapies,* Richards & Lauterbach, Eds.. *409-425. 10.1016/B978-012587421-2/50019-3*

Roberts, B. W., Luo, J., Briley, D. A., Chow, P. I., Su, R., & Hill, P. L. (2017). A systematic review of personality trait change through intervention. *Psychological Bulletin, 143*, 117. doi: 10.1037/bul0000088

Robinson, L. J., & Freeston, M. H. (2014). Emotion and internal experience in obsessive compulsive disorder: reviewing the role of alexithymia, anxiety sensitivity and distress tolerance. *Clinical Psychology Review, 34*, 256-271. doi:10.1016/j.cpr.2014.03.003

Rothbaum, B. O., Meadows, E. A., Resick, P., & Foy, D. W. (2000). Cognitive-behavioral therapy. In E. B. Foa, T. M. Keane, & M. J. Friedman (Eds.), *Effective treatments for*

PTSD: Practice guidelines from the International Society for Traumatic Stress Studies (pp. 320-325). New York, NY, US: Guilford Press.

Santiago, P. N., Ursano, R. J., Gray, C. L., Pynoos, R. S., Spiegel, D., Lewis-Fernandez, R., Friedman, M. J., & Fullerton, C. S. (2013). A systematic review of PTSD prevalence and trajectories in DSM-5 defined trauma exposure populations: Intentional and non-intentional traumatic events. *PLoS one, 8.* doi:10.1371/journal.pone.0059236

Schaal, S., Elbert, T., & Neuner, F. (2009). Narrative exposure therapy versus interpersonal psychotherapy. *Psychotherapy and Psychosomatics, 78*, 298–306. doi:10.1159/000229768

Schottenbauer, M. A., Glass, C. R., Arnkoff, D. B., Tendick, V., & Gray, S. H. (2008). Nonresponse and dropout rates in outcome studies on PTSD: review and methodological considerations. *Psychiatry, 71*, 134–68. doi: 10.1521/psyc.2008.71.2.134.

Simons, J. S., & Gaher, R. M. (2005). The distress tolerance scale: development and validation of a self-report measure. *Motivation and Emotion, 29*, 83–102. doi: 10.1007/s11031-005-7955-3.

Spitzer, R.L., Williams, J.B.W., Kroenke, K., Linzer, M., deGruy III, F.V., Hahn, S.R., …Hohnson, J.J.G. (1994). Utility of a new procedure for diagnosing mental disorders in primary care: The PRIME-MD 1000 Study. *Journal of the American Medical Association, 272*, 1749-1756.

Staton, M., Leukefeld, C. & Webster, J. M. (2003). Substance use, health, and mental health: Problems and service utilization among incarcerated women. *International Journal of Offender Therapy and Comparative Criminology, 47*, 224-239. doi:10.1177/0306624X03251120

Tolin, D. F. & Foa, E. B. (2006). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin, 132,* 959-992. doi: 10.1037/0033-2909.132.6.959

Trestman, R. L., Ford, J., Zhang, W, & Wiesbrock, V. (2007). Current and lifetime psychiatric illness among inmates not identified as acutely mentally ill at intake in Connecticut's jails. *J Am Acad Psychiatry Law, 35,* 490-500.

Tripodi, S. J. & Pettus-Davis, C. (2013). Histories of childhood victimization and subsequent mental health problems, substance use, and sexual victimization for a sample of incarcerated women in the US. *International Journal of Law and Psychiatry, 36,* 30-40. doi:10.1016/j.ijlp.2012.11.005

Tull, M. T., Gratz, K. L., Coffey, S. F., Weiss, N. H., & McDermott, M. J. (2013). Examining the interactive effect of posttraumatic stress disorder, distress tolerance, and gender on residential substance use disorder treatment retention. *Psychology of Addictive Behaviors*, *27*, 763. doi:10.1037/a0029911

Ullman, S. E., Relyea, M., Peter-Hagene, L., & Vasquez, A. L. (2013). Trauma histories, substance use coping, PTSD, and problem substance use among sexual assault victims. *Addictive Behaviors, 38,* 2219-2223. doi:10.1016/j.addbeh.2013.01.027

van Minnen, A., & Foa, E. B. (2006). The effect of imaginal exposure length on outcome of treatment for PTSD. *Journal of Traumatic Stress, 19*, 427-438. doi: 10.1002/jts.20146

van Minnen, A., Hendriks, L., & Olff, M. (2010). When do trauma experts choose exposure therapy for PTSD patients? A controlled study of therapist and patient factors. *Behaviour Research and Therapy, 48,* 312-320. doi:10.1016/j.brat.2009.12.003

Veilleux, J. C., Pollert, G. A., Zielinski, M. J., Shaver, J. A., & Hill, M. A. (2017). Behavioral assessment of the negative emotion aspect of distress tolerance: Tolerance to emotional images. *Assessment*. doi:10.1177/1073191116689819

Veilleux, J. C., Skinner, K. A., Reese, E. D., & Shaver, J. A. (2014). Negative affect intensity influences drinking to cope through facets of emotion dysregulation. *Personality and Individual Differences, 59,* 96-101. doi: 10.1016/j.paid.2013.11.012

Vinci, C., Mota, N., Berenz, E., & Connolly, K. (2017). Examination of the relationship between PTSD and distress tolerance in a sample of male veterans with comorbid substance use disorders. *Mil Psychol, 28*, 104-114. doi:10.1037/mil0000100

Vujanovic, A. A., Bonn-Miller, M. O., Potter, C. M., Marshall, E. C., & Zvolensky, M. J. (2011). An evaluation of the relation between distress tolerance and posttraumatic stress within a trauma-exposed sample. *Journal of Psychopathology and Behavioral Assessment, 33,* 129-135. doi:10.1007/s10862-010-9209-2

Vujanovic, A. A., Litz, B. T., & Farris, S. G. (2014). Distress tolerance as risk and maintenance factor for PTSD: Empirical and clinical implications. *Comprehensive Guide to Post-Traumatic Stress Disorder*, 1-13. doi: 10.1007/978-3-319-08613-2_66-1

Watts, B.V., Shiner, B., Zubkoff, L., Carpenter-Song, E., Ronconi, J. M., & Coldwell, C. M. (2014). Implementation of evidence-based psychotherapies for posttraumatic stress disorder in VA specialty clinics. *Psychiatr Serv, 65*, 648–53. doi:10.1176/appi.ps.201300176.

Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013). *Clinician-Administered PTSD Scale for DSM–5 (CAPS-5).* Boston, MA: National Center for PTSD.

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5).* Scale available from the National Center for PTSD at www.ptsd.va.gov

Williams, A. D., Thompson, J., & Andrews, G. (2013). The impact of psychological distress tolerance in the treatment of depression. *Behaviour research and therapy, 51*, 469-475

Wolff, N., Frueh, C., Shi, J., Gerardi, D., Fabrikant, N., & Schumann, B. E. (2011). Trauma exposure and mental health characteristics of incarcerated females self-referred to specialty PTSD treatment. *Psychiatric Services, 62,* 954-958. doi:10.1176/ps.62.8.pss6208_0954

Xu, H. (2009, September). LOCF method and application in clinical data analysis. Poster presented the annual meeting of the Northeast SAS Users Group (NESUG), Burlington VT. Retrieved from: https://www.lexjansen.com/nesug/nesug09/po/PO12.pdf

Zayfert, C., DeViva, J. C., Becker, C. B., Pike, J. L., Gillock, K. L., & Hayes, S. A. (2005). Exposure utilization and completion of cognitive behavioral therapy for PTSD in a "real world" clinical practice. *Journal of Traumatic Stress, 18*, 637-645.

Zvolensky, M. J., Leyro, T., Bernstein, A., & Vujanovic, A. A. (2011). Distress tolerance: Historical perspectives, theory, and measurement. In M. J. Zvolensky, A. Bernstein, & A. A. Vujanovic (Eds.), *Distress tolerance*. New York: Guilford.

Zvolensky, M. J., Vujanovic, A. A. Bernstein, A., & Leyro, T. (2010). Distress tolerance: Theory, Measurement, and Relations to Psychopathology. *Current Directions in Psychological Science, 19,* 406-410. doi:10.1177/0963721410388642

Tables

Table 1
Demographics

Variable	*M* (*SD*) or *n* (%)	Test Statistic for Completers v. Non-Completers
Age	31.55 (8.19)	$t(82) = -1.41, p = .163$
Ethnicity		$\chi^2(1) = 0.45, p = .505$
Hispanic/Latina	2 (2.4%)	
Not Hispanic/Latina	82 (96.5%)	
Race		$\chi^2(3) = 1.36, p = .714$
White	70 (82.4%)	
African American	3 (3.5%)	
Native American	7 (8.2%)	
Other	4 (4.7%)	
Marital status		$\chi^2(4) = 3.87, p = .424$
Married	23 (27.1%)	
Divorced	21 (24.7%)	
Single	23 (27.1%)	
Dating, not married	11 (12.9%)	
Other	7 (8.2%)	
Number of children	2.55 (1.67)	$t(83) = -0.05, p = .960$
Previous therapy		
Yes	62 (74.1%)	$\chi^2(2) = 0.01, p = .939$
No	22 (24.9%)	

Note: n = 85

Table 2

Descriptive Statistics for Pre-treatment Variables

	Total Sample N = 85 M (SD) or n (%)	Completers n = 70 m (SD) or n (%)	Non-Completers n = 15 m (SD) or n (%)	Test Statistic for Completers v. Non- Completers
Pre-Treatment				
DT	2.72 (0.89)	2.74 (0.88)	2.60 (0.97)	$t(83) = -0.59$, $p = .559$
ES	3.07 (1.54)	3.13 (1.56)	2.79 (1.46)	$t(82) = -0.76$, $p = .451$
PTSD	39.96 (19.77)	39.64 (19.74)	41.47 (20.56)	$t(83) = 0.32$, $p = .747$
PTSD - Clinical	56 (66%)	47 (67%)	9 (60%)	$\chi^2(1) = 0.28$, $p = .596$
Depression	13.02 (6.51)	12.84 (6.43)	13.87 (7.05)	$t(83) = 0.55$, $p = .584$
Depression Clinical	36 (42%)	29 (41%)	7 (47%)	$\chi^2(1) = 0.14$, $p = .709$

Note: DT = Distress tolerance; ES = Emotional stability; Clinical = Percentage of participants above the clinical cut-off scores (PTSD: PCL-5 $\geq$ 33; Depression: PHQ $\geq$ 15)

Table 3

Correlation Matrix of Pre- and Post-treatment and Change Scores for Predictor and Outcome Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. DT Pre	--												
2. PTSD Pre	-.421 ***	--											
3. Dep Pre	-.402 ***	.743 ***	--										
4. ES Pre	.582 ***	-.616 ***	-.567 ***	--									
5. Emotion	-.359 **	.280 *	.292 *	-.326 **	--								
6. Detail	-.244 *	-.026	-.008	-.094	.406 ***	--							
7. DT Post	.356 **	-.019	-.043	.343 **	-.154	-.229	--						
8. PTSD Post	-.175	.195	.265*	-.202	-.013	-.081	-.391 **	--					
9. Dep Post	-.181	.228	.273*	-.208	.089	.227	-.470 ***	.680 ***	--				
10. ES Post	.265 *	-.255 *	-.287 *	.499 ***	-.040	-.033	.460 ***	-.540 ***	-.346 **	--			
11. DT Change	-.598 ***	.483 ***	.390 **	-.295 *	.201	-.006	.536 ***	-.177	-.239	.156	--		
12. PTSD Change	-.397 **	.794 ***	.497 ***	-.493 ***	.285 *	.023	.225	-.442 ***	-.213	.102	.552 ***	--	
13. Dep Change	-.320 **	.525 ***	.754 ***	-.404 **	.210	-.177	.281 *	-.215	-.426 ***	-.033	.530 ***	.613 ***	--
14. ES Change	.432 ***	-.466 ***	-.337 **	.575 ***	-.257 *	.009	-.075	.299 *	.109	-.422 ***	-.455 ***	-.611 ***	-.391 **

Note: $*p < .05$; $**p < .01$, $***p < .001$; DT = Distress Tolerance; Dep = Depression; ES = Emotional Stability; Emotion = Level of emotional engagement during exposure; Detail = Level of detail shared during exposure; $n = 85$ for $1 - 4$; $n = 67$ for $5 - 14$.

Table 4

Comparing Pre- and Post-treatment Scores Among Program Completers

Variable	Pre-treatment *M (SD)*	Post-treatment *M (SD)*	Change *M (SD)*	Test Statistic for Pre- to Post-Treatment
DT	2.71 (0.88)	3.53 (0.84)	0.82 (0.97)	t (66) = -6.86, p < .001
PTSD	39.79 (20.06)	15.36 (13.60)	-24.43 (21.93)	t (66) = 9.12, p < .001
Dep	12.94 (6.52)	5.79 (4.73)	-7.15 (6.93)	t (66) = 8.44, p < .001
ES	3.05 (1.54)	4.48 (1.39)	1.43 (1.47)	t (66) = -7.94, p < .001

Note: n = 70; DT = Distress Tolerance; PTSD = Posttraumatic Stress Disorder; Dep = Depression; ES = Emotional Stability

Table 5

Regression Models of Pre-treatment DT and Treatment Engagement Variables

Outcome	Predictor	B (SE)	β, p	Model F, R^2
Emotional engagement				
Step 1				F (1, 68) = 10.06, p = .002, R^2 = .129
	DT pre	-0.25 (0.08)	-0.36, p = .002	
Step 2				F (2, 67) = 8.66, p < .001, R^2 = .21
	DT pre	-1.38 (0.45)	-1.97, p = .003	
	DT pre squared	0.20 (0.08)	1.63, p = .013	
Details shared				F (1, 52) = 4.11, p = .048, R^2 = .07
	DT pre	-0.22 (0.10)	-0.27, p = .048	

Note: n = 69; DT = Distress Tolerance; pre = pre-treatment; ES = Emotional Stability

Table 6

Regression Models of Pre-treatment DT and DT Post-treatment and Change Scores

Outcome	Predictor	B (SE)	β, p	Model F, R^2
DT post				
Step 1				F (1, 65) = 9.43, p = .003, R^2 = .13
	DT pre	0.34 (0.11)	0.36, p = .003	
Step 2				F (2, 64) = 6.80, p = .002, R^2 = .18
	DT pre	-0.86 (0.62)	-0.90, p = .175	
	DT pre squared	0.21 (0.11)	1.28, p = .057	
DT change				
Step 1				F (1, 65) = 36.25, p < .001, R^2 = .36
	DT pre	-0.66 (0.11)	-0.60, p < .001	
Step 2				F (2, 64) = 20.78, p < .001, R^2 = .39
	DT pre	-1.86 (0.62)	-1.68, p = .004	
	DT pre squared	0.21 (0.11)	1.10, p = .057	

Note: n = 66; DT = Distress Tolerance; Pre = pre-treatment; ES = Emotional Stability

Table 7

Regression Models of Pre-treatment DT and PTSD Post-treatment and Change Scores

Outcome	Predictor	*B* (*SE*)	β (*p*)	Model *F*, R^2
PCL post				
Step 1				$F(1, 65) = 2.56, p = .114, R^2 = .04$
	PCL pre	0.13 (0.08)	0.20, *p* =.114)	
Step 2				$F(2, 64) = 1.49, p = .234, R^2 = .04$
	PCL pre	0.10 (0.10)	0.14, *p* = .338	
	DT pre	-1.49 (2.27)	-0.10, *p* = .512	
Step 3				$F(3, 63) = 2.63, p = .058, R^2 = .11$
	PCL pre	0.11 (0.10)	0.17, *p* = .253	
	DT pre	21.56 (10.83)	1.40, *p* = .051	
	DT pre squared	-4.08 (1.88)	-1.50, *p* = .033	
PCL change				
Step 1				$F(1, 65) = 110.84, p < .001, R^2 = .63$
	PCL pre	0.87 (0.08)	0.79, *p* < .001	
Step 2				$F(2, 64) = 55.16, p < .001, R^2 = .63$
	PCL pre	0.90 (0.10)	0.83, *p* < .001	
	DT pre	1.49 (2.27)	0.06, *p* = .512	
Step 3				$F(3, 63) = 40.49, p < .001, R^2 = .66$
	PCL pre	0.89 (0.10)	0.81, *p* = .382	
	DT pre	-21.56 (10.82)	-0.87, *p* = .051	
	DT pre squared	4.08 (1.88)	0.93, *p* = .033	

Note: n = 66; DT = Distress Tolerance; PCL = Posttraumatic Checklist for DSM-5; Pre = pre-treatment; ES = Emotional Stability

Table 8

Regression Models of Pre-treatment DT and Depression Post-treatment and Change Scores

Outcome	Predictor	*B* (*SE*)	β (*p*)	Model *F*, R^2
PHQ post				
Step 1				$F (1, 65) = 5.24, p = .025, R^2 = .08$
	PHQ pre	0.20 (0.09)	0.27, *p* = .025	
Step 2				$F (2, 64) = 2.71, p = .074, R^2 = .08$
	PHQ pre	0.18 (0.10)	0.24, *p* = .081	
	DT pre	-0.36 (0.73)	-0.07, *p* = .623	
Step 3				$F (3, 63) = 4.38, p = .007, R^2 = .17$
	PHQ pre	0.22 (0.10)	0.30, *p* = .026	
	DT pre	9.37 (3.70)	1.74, *p* = .014	
	DT pre squared	-1.71 (0.64)	-1.81, *p* = .009	
PHQ change				
Step 1				$F (1, 65) = 85.77, p < .001, R^2 = .57$
	PHQ pre	0.80 (0.09)	0.75, *p* < .001	
Step 2				$F (2, 64) = 42.51, p = < .001, R^2 = .57$
	PHQ pre	0.83 (0.10)	0.78, *p* < .001	
	DT pre	0.36 (0.73)	0.05, *p* = .623	
Step 3				$F (3, 63) = 33.48, p < .001, R^2 = .62$
	PHQ pre	0.78 (0.10)	0.74, *p* < .001	
	DT pre	-9.37 (3.70)	-1.19, *p* = .014	
	DT pre squared	1.71 (0.64)	1.24, *p* = .009	

Note: n = 66; *n* = 65; *n* LOCF = 84; DT = Distress Tolerance; PHQ = Patient Health Questionnaire-9; Pre = pre-treatment; ES = Emotional Stability

Table 9

Robustness Checks of Pre-treatment DT and Treatment Engagement Variables

Outcome	Predictor	B (*SE*)	β, *p*	Model F, R^2
Emotional engagement				
Step 1				$F (1, 68) = 8.06, p = .006, R^2 = .21$
	ES pre	-0.12 (0.05)	-0.33, $p = .006$	
Step 2				$F (2, 67) = 5.54, p = .006, R^2 = .14$
	ES pre	-0.06 (0.06)	-0.15, $p = .316$	
	DT pre	-0.18 (0.11)	-0.26, $p = .098$	
Step 3				$F (3, 66) = 5.95, p = .001, R^2 = .21$
	ES pre	-0.05 (0.06)	-0.12, $p = .432$	
	DT pre	-1.29 (0.47)	-1.84, $p = .007$	
	DT pre squared	0.19 (0.08)	1.58, $p = .018$	
Details shared				
Step 1				$F (1, 52) = 0.21, p = .648, R^2 = .00$
	ES pre	-0.03 (0.07)	-0.06, $p = .648$	
Step 2				$F (2, 51) = 2.77, p = .072, R^2 = .10$
	ES pre	0.10 (0.09)	0.21, $p = .241$	
	DT pre	-0.34 (0.15)	-0.41, $p = .025$	

Note: n = 69; DT = Distress Tolerance; Pre = pre-treatment; ES = Emotional Stability

Table 10

Robustness Checks of Pre-treatment DT and DT Post-treatment and Change Scores

Outcome	Predictor	B (SE)	β, p	Model F, R^2
DT post				
Step 1				$F(1, 65) = 8.69$, $p = .004$, $R^2 = .12$
	ES pre	0.19 (0.06)	0.34, $p = .004$	
Step 2				$F(2, 64) = 5.57$, $p = .006$, $R^2 = .15$
	ES pre	0.11 (0.08)	0.19, $p = .207$	
	DT pre	0.22 (0.14)	0.23, $p = .136$	
Step 3				$F(3, 63) = 5.12$, $p = .003$, $R^2 = .20$
	ES pre	0.10 (0.08)	0.19, $p = .206$	
	DT pre	-0.96 (0.63)	-1.02, $p = .129$	
	DT pre squared	0.21 (0.11)	1.27, $p = .057$	
DT change				
Step 1				$F(1, 65) = 6.18$, $p = .016$, $R^2 = .09$
	ES pre	-0.19 (0.08)	-0.30, $p = .016$	
Step 2				$F(2, 64) = 19.11$, $p < .001$, $R^2 = .37$
	ES pre	0.11 (0.08)	0.17, $p = .207$	
	DT pre	-0.78 (0.14)	-0.71, $p < .001$	
Step 3				$F(3, 63) = 14.53$, $p < .001$, $R^2 = .41$
	ES pre	0.10 (0.08)	0.16, $p = .206$	
	DT pre	-1.96 (0.63)	-1.78, $p = .003$	
	DT pre squared	0.21 (0.11)	1.09, $p = .057$	
DT Change (LOCF)				
	DT pre	-0.51 (0.10)	-0.49, $p < .001$	$F(1, 83) = 26.60$, $p < .001$, R2 = .24

Note: $n = 66$; DT = Distress Tolerance; Pre = pre-treatment; ES = Emotional Stability

Table 11

Robustness Checks for Pre-treatment DT and PTSD Post-treatment and Change Scores

Outcome	Predictor	*B* (*SE*)	β (*p*)	Model *F*, R^2
PCL post				
Step 1				$F(2, 64) = 1.58, p = .214, R^2 = .05$
	ES pre	-1.15 (1.46)	-0.13, *p* = .436	
	PCL pre	0.07 (0.11)	0.11, *p* = .519	
Step 2				$F(3, 63) = 1.08, p = .365, R^2 = .05$
	ES pre	-0.89 (1.65)	-0.10, *p* = .592	
	PCL pre	0.07 (0.12)	0.10, *p* = .576	
	DT pre	-0.87 (2.56)	-0.06, *p* = .735	
Step 3				$F(4, 62) = 1.99, p = .107, R^2 = .11$
	ES pre	-0.69 (1.61)	-0.08, *p* =.669	
	PCL pre	0.09 (0.11)	0.13, *p* = .441	
	DT pre	21.78 (10.91)	1.41, *p* = .050	
	DT pre squared	-4.034 (1.89)	-1.49, *p* = .037	
PCL change				
Step 1				$F(2, 64) = 55.40, p = < .001, R^2 = .63$
	ES pre	1.15 (1.46)	0.08, *p* = .436	
	PCL pre	0.93 (0.11)	0.85, *p* < .001	
Step 2				$F(3, 63) = 36.46, p < .001, R^2 = .64$
	ES pre	0.89 (1.65)	0.06, *p* = .592	
	PCL pre	0.94 (0.12)	0.86, *p* < .001	
	DT pre	0.87 (2.56)	0.04, *p* = .735	
Step 3				$F(4, 62) = 30.02, p < .001, R^2 = .66$
	ES pre	0.69 (1.61)	0.05, *p* = .669	
	PCL pre	0.91 (0.11)	0.84, *p* < .001	
	DT pre	-21.78 (10.91)	-0.87, *p* = .050	
	DT pre squared	4.03 (1.89)	0.92, *p* = .037	

Table 11 (Cont.)

Outcome	Predictor	B (SE)	β (p)	Model F, R^2
PCL change (LOCF)				
Step 1				$F (1, 83) = 53.69, p < .001, R^2 = .39$
	PCL pre	0.69 (0.10)	0.63, $p < .001$	
Step 2				$F (2, 82) = 26.86, p = < .001, R^2 = .40$
	PCL pre	0.67 (0.11)	0.60, $p < .001$	
	DT pre	-1.50 (2.33)	-0.06, $p = .522$	
Step 3				$F (3, 81) = 17.76, p < .001, R^2 = .40$
	PCL pre	0.66 (0.11)	0.59, $p < .001$	
	DT pre	-6.08 (13.03)	-0.25, $p = .642$	
	DT pre squared	0.80 (2.24)	0.19, $p = .722$	

Note: n = 66 for PCL post and change, n = 84 for LOCF; DT = Distress Tolerance; PCL = Posttraumatic Checklist for DSM-5; Pre = pre-treatment; ES = Emotional Stability

Table 12

Robustness Checks for Pre-treatment DT and PTSD Post-treatment and Change Scores

Outcome	Predictor	B (*SE*)	β (*p*)	Model F, R^2
PHQ Post				
Step 1				$F (2, 64) = 2.72, p = .074, R^2 = .08$
	ES pre	-0.23 (0.45)	-0.08, *p* = .613	
	PHQ pre	0.17 (0.11)	0.23, *p* = .125	
Step 2				$F (3, 63) = 1.81, p = .155, R^2 = .08$
	ES pre	-0.16 (0.54)	-0.05, *p* = .773	
	PHQ pre	0.16 (0.11)	0.22, *p* = .142	
	DT pre	-0.23 (0.87)	-0.04, *p* = .792	
Step 3				$F (4, 62) = 3.23, p = .018, R^2 = .17$
	ES pre	-0.03 (0.52)	-0.01, *p* = .952	
	PHQ pre	0.22 (0.11)	0.30, *p* = .046	
	DT pre	9.38 (3.73)	1.74, *p* = .014	
	DT pre squared	-1.71 (0.65)	-1.81, *p* = .010	
PHQ change				
Step 1				$F (2, 64) = 42.52, p < .001, R^2 = .57$
	ES pre	0.23 (0.45)	0.05, *p* = .613	
	PHQ pre	0.83 (0.11)	0.78, *p* < .001	
Step 2				$F (3, 63) = 27.96, p < .001, R^2 = .57$
	ES pre	0.16 (0.54)	0.04, *p* = .773	
	PHQ pre	0.84 (0.11)	0.79, *p* < .001	
	DT pre	0.23 (0.87)	0.03, *p* = .792	
Step 3				$F (4, 62) = 24.72, p < .001, R^2 = .62$
	ES pre	0.03 (0.52)	0.01, *p* = .952	
	PHQ pre	0.78 (0.11)	0.74, *p* < .001	
	DT pre	-9.38 (3.73)	-1.19, *p* = .014	
	DT pre squared	1.71 (0.65)	1.23, *p* = .010	

Table 12 (Cont.)

Outcome	Predictor	B (SE)	β (p)	Model F, R^2
PHQ change (LOCF)				
Step 1				F (1, 83) = 45.06, p < .001, R^2 = .35
	PHQ pre	0.62 (0.09)	0.59, p < .001	
Step 2				F (2, 82) = 22.30, p = < .001, R^2 = .35
	PHQ pre	0.61 (0.10)	0.58, p < .001	
	DT pre	-0.18 (0.74)	-0.02, p = .814	
Step 3				F (3, 81) = 15.10, p < .001, R^2 = .36
	PHQ pre	0.58 (0.11)	0.56, p < .001	
	DT pre	-3.97 (4.32)	-0.52, p = .316	
	DT pre squared	0.66 (0.74)	0.49, p = .375	

Note: n = 65; n LOCF = 84; DT = Distress Tolerance; PHQ = Patient Health Questionnaire-9; Pre = pre-treatment; ES = Emotional Stability

Figures

100 eligible
treatment
participants

8 did not
consent

92 consented

7 missing pre-
treatment data

85 pre-treatment
data

15 dropped out

70 completed
treatment

3 missing post-
treatment data

67 in pre-post
analyses
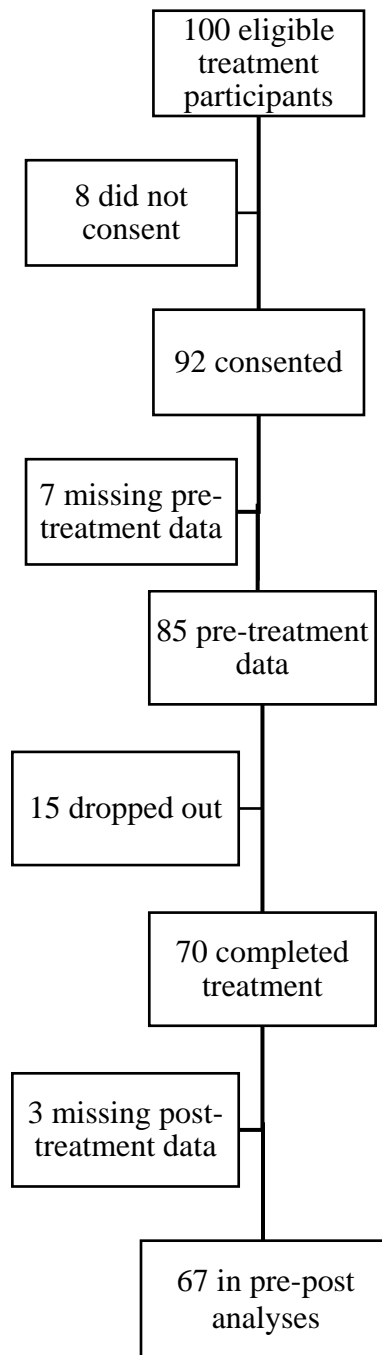
Figure 1. Progression chart of participant flow.
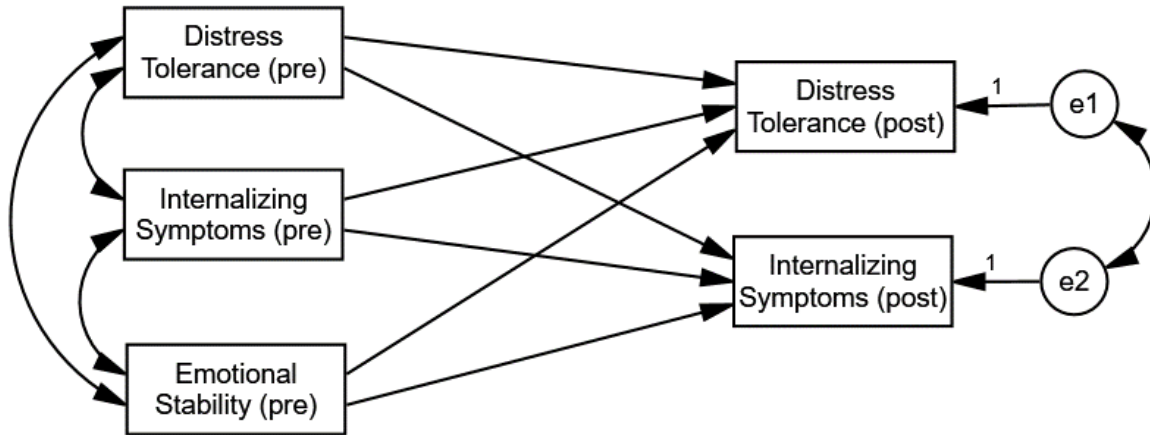
Figure 2. Proposed model of pre- and post-treatment relations between predictor and outcome variables. A cross-lagged structural equation model was originally proposed to explore the predictive power of pre-treatment distress tolerance on post-treatment distress tolerance and post-treatment internalizing symptoms (PTSD, depression), controlling for pre-treatment internalizing symptoms and emotional stability.
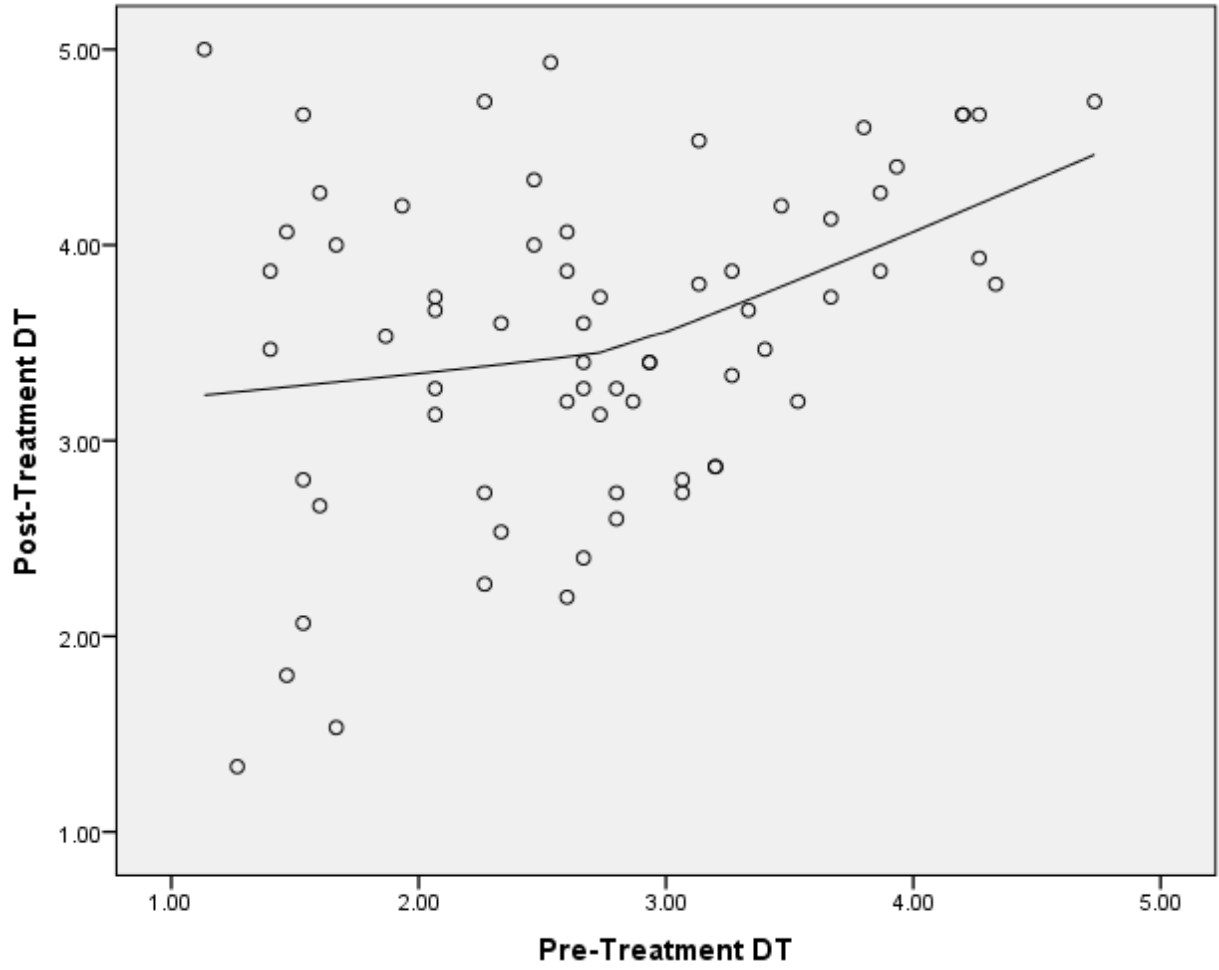
Figure 3. Pre- and post-treatment DT Scores. A LOESS line was added to fit 99% of data points.
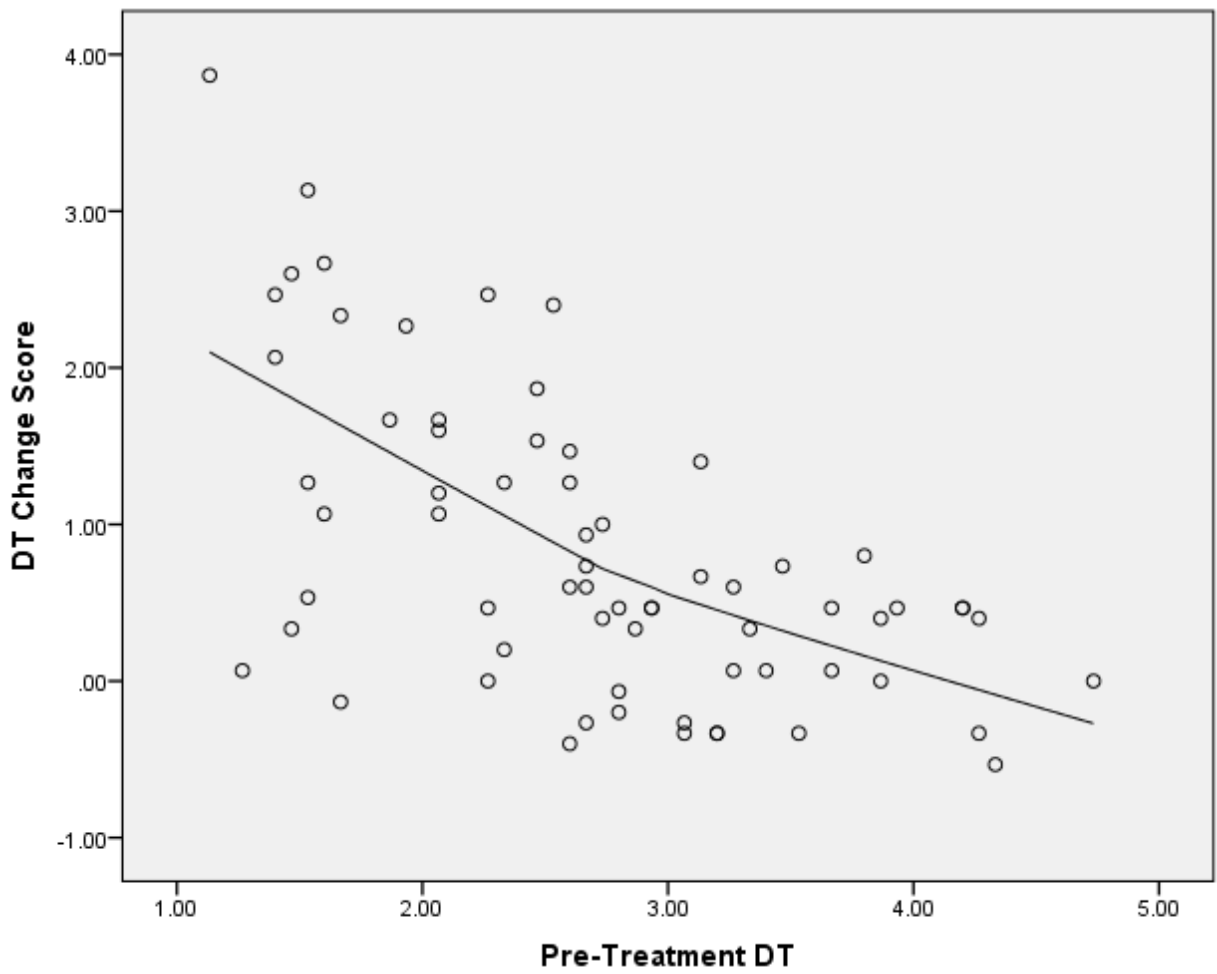
Figure 4. Pre-treatment DT and DT change scores. A LOESS line was added to fit 99% of data points.
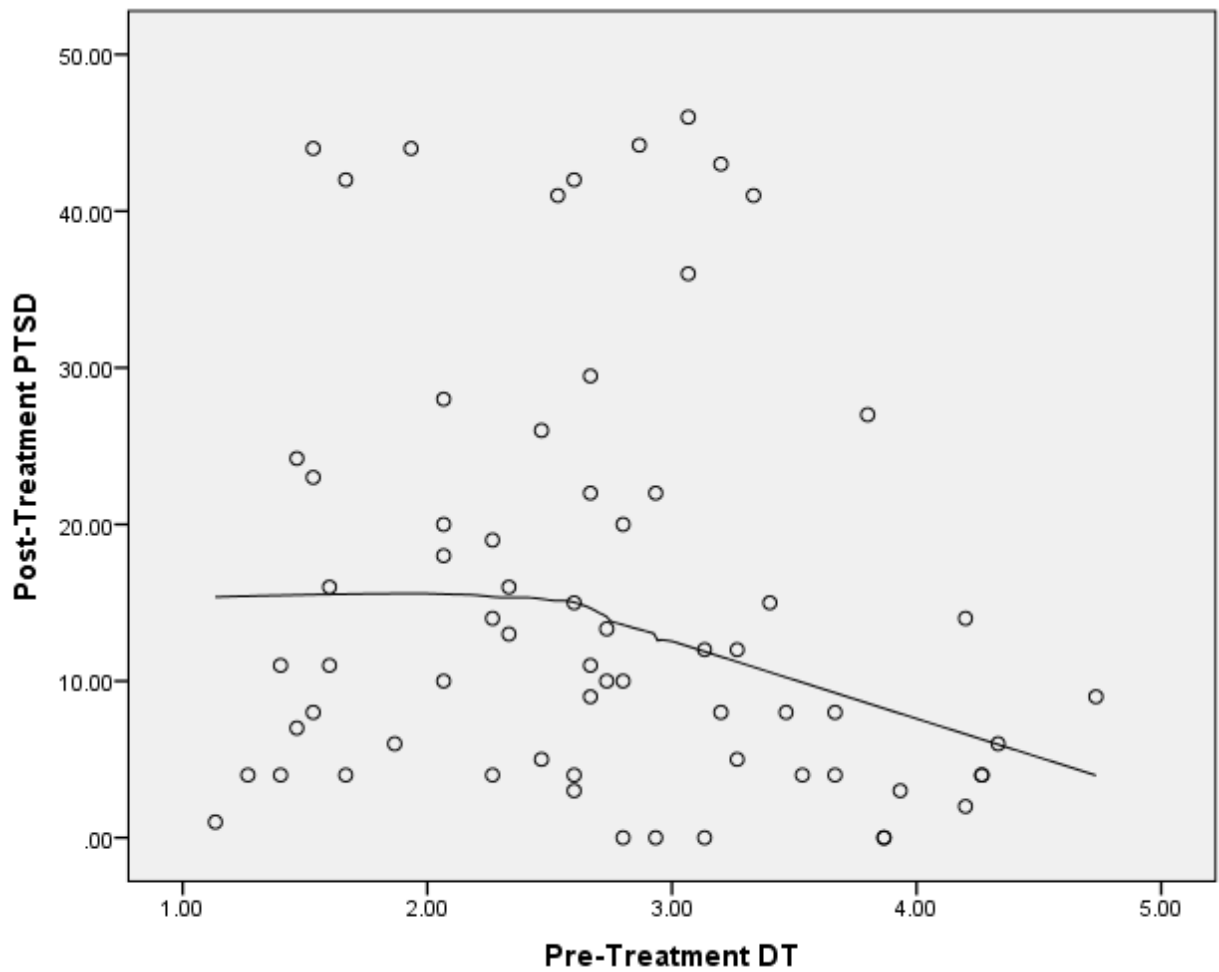
Figure 5. Pre-treatment DT and post-treatment PTSD. A LOESS line was added to fit 99% of data points.
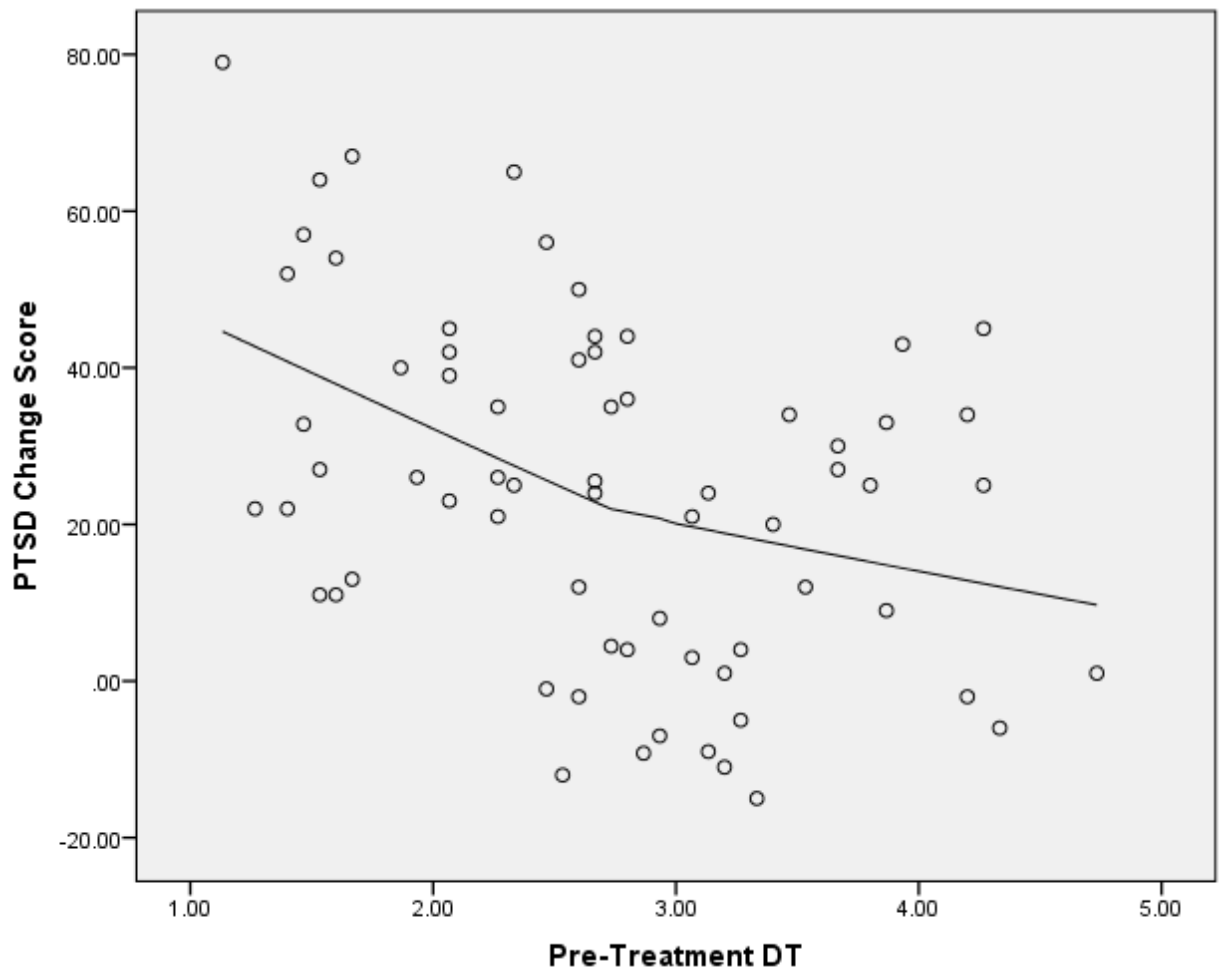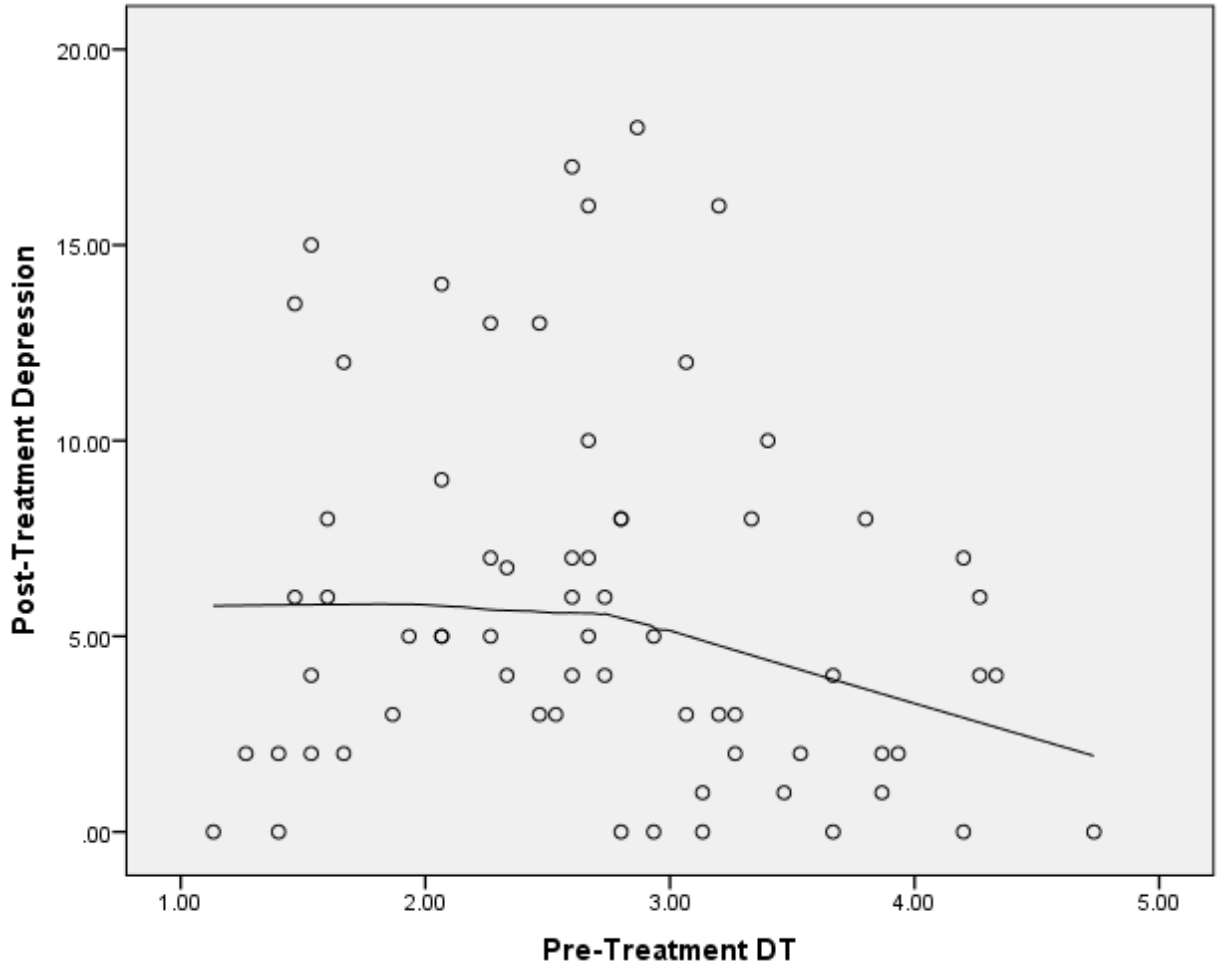
Figure 6. Pre-treatment DT and PTSD change scores. A LOESS line was added to fit 99% of data points.

Figure 7. Pre-treatment DT and post-treatment depression scores. A LOESS line was added to fit 99% of data points.
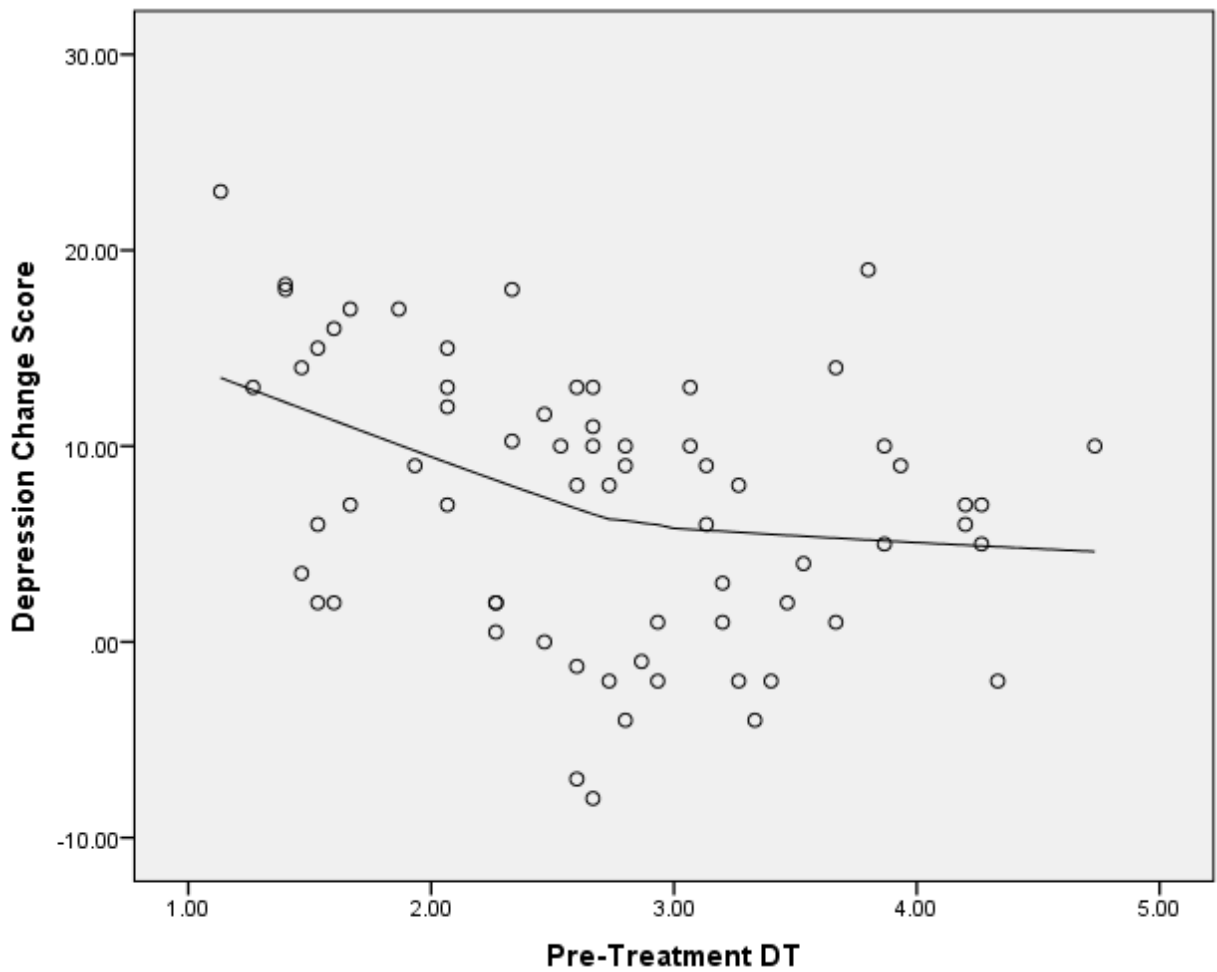
Figure 8. Pre-treatment DT and depression change scores. A LOESS line was added to fit 99% of data points.
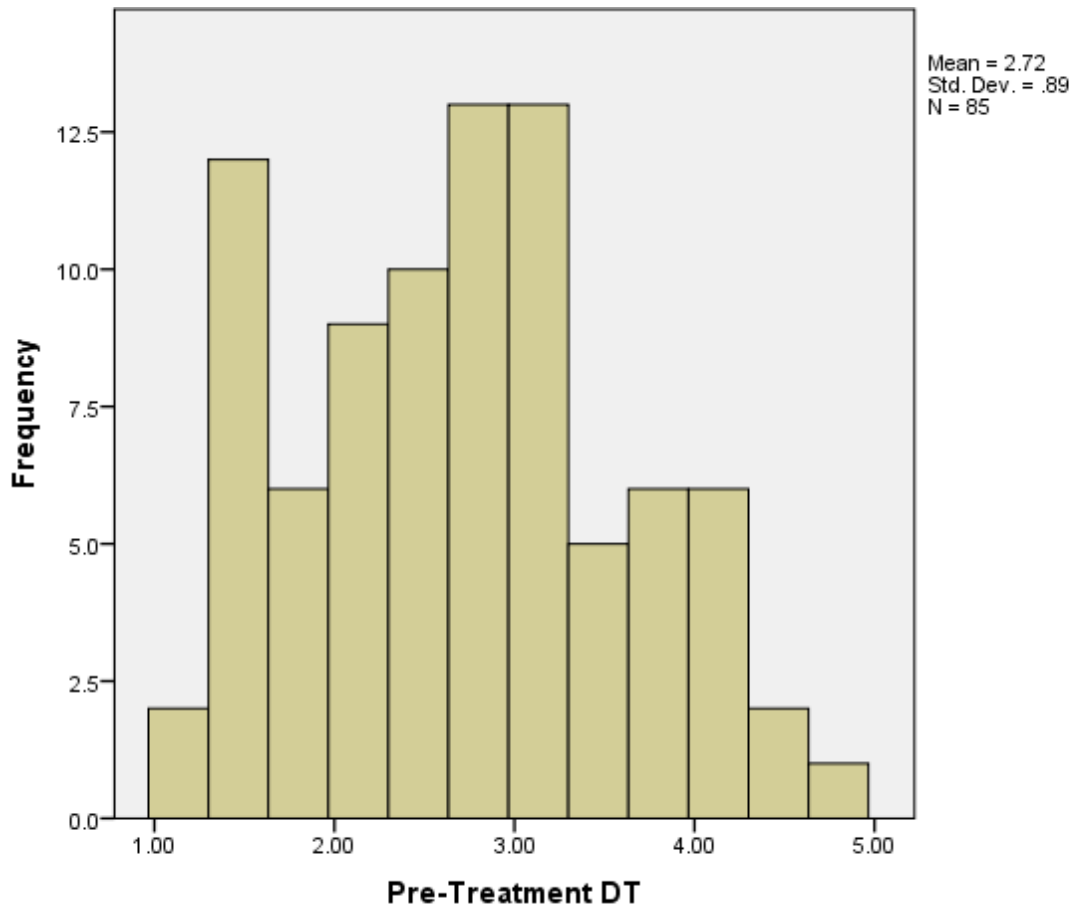
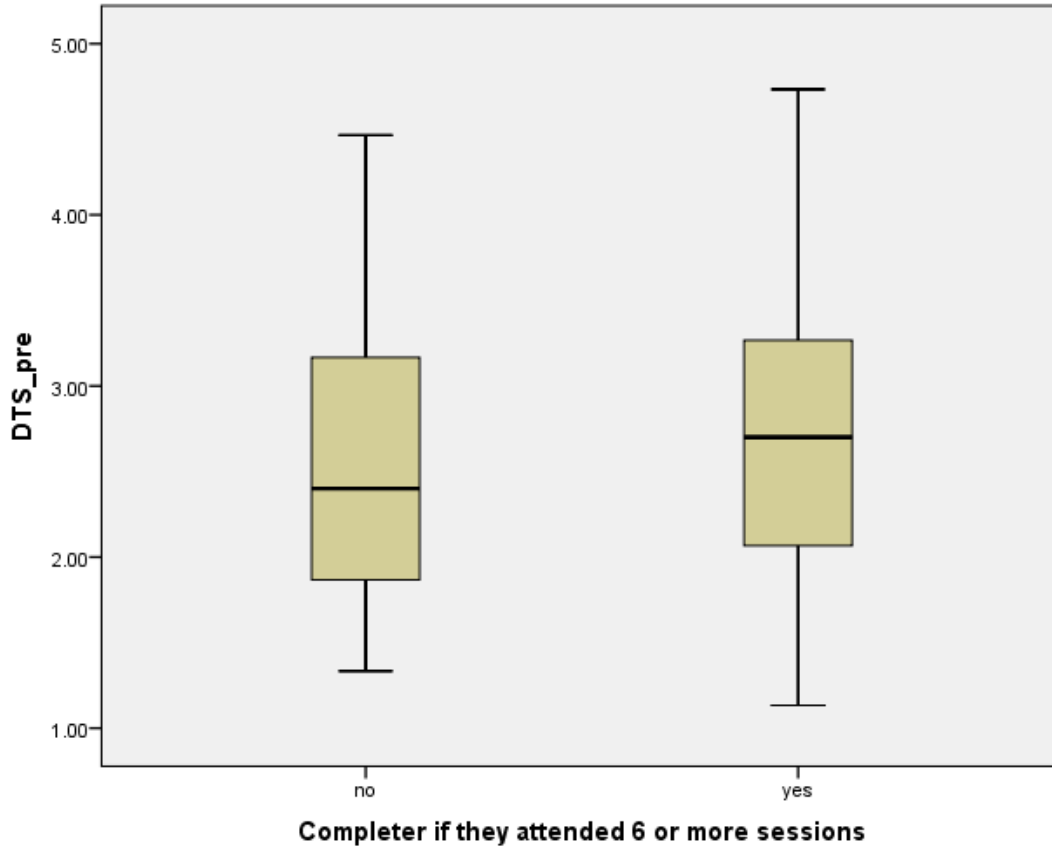*Figure 9.* Distribution of baseline DT scores.

Figure 10. Baseline DT and completion status. A box-and-whiskers-plot displays the distribution of pre-treatment baseline scores for participants who completed treatment and those who did not.
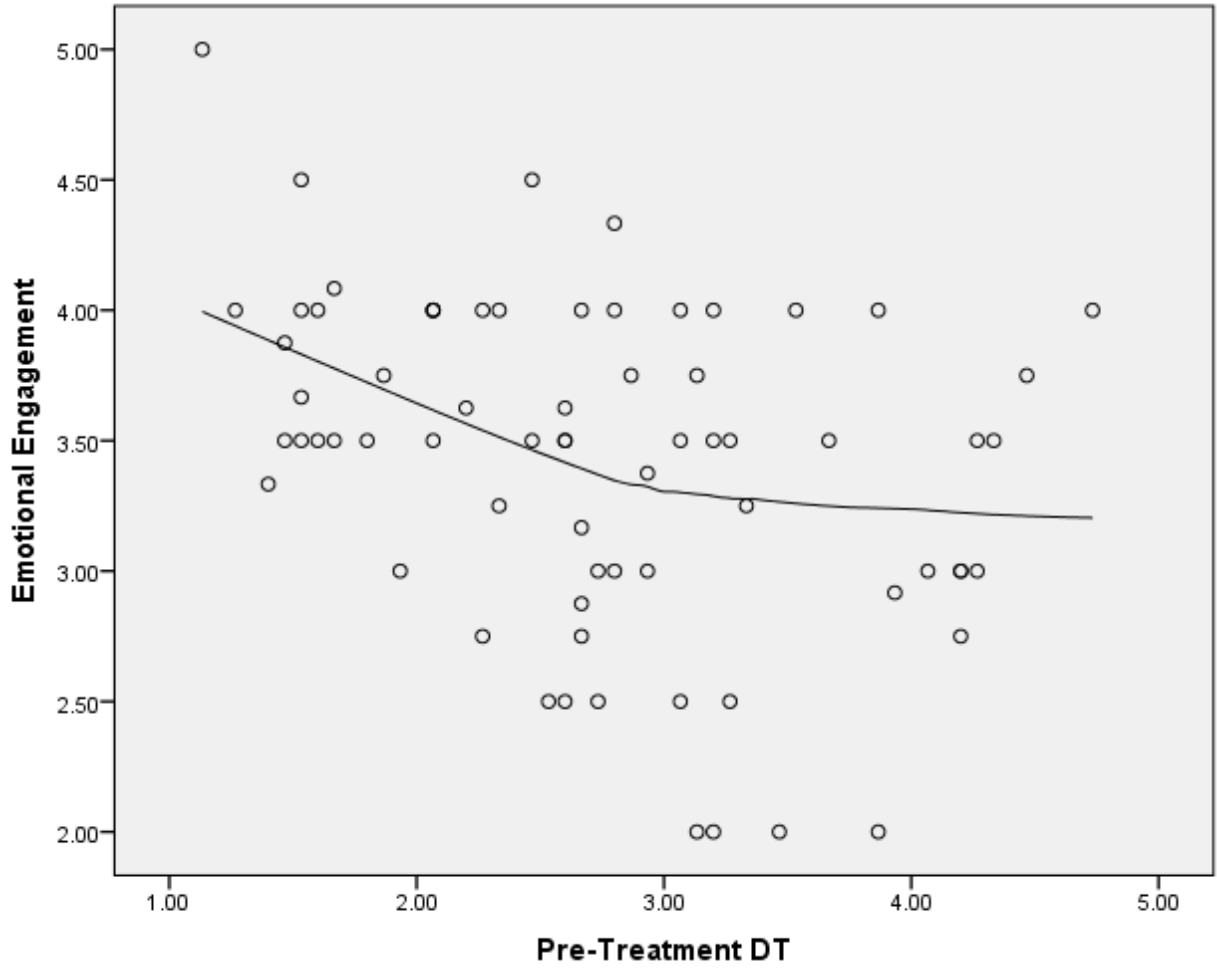
Figure 11. Pre-treatment DT & emotional engagement during exposure. This bivariate scatterplot displays pre-treatment distress tolerance scores from the DTS and the level of emotional engagement during the participant's exposure. A LOESS line was added through 99% of points.

Figure 12. Pre-treatment DT & detail shared. This bivariate scatterplot displays pre-treatment distress tolerance scores from the DTS and the level of detail shared during the participant's exposure. A LOESS line was added to fit 99% of points.

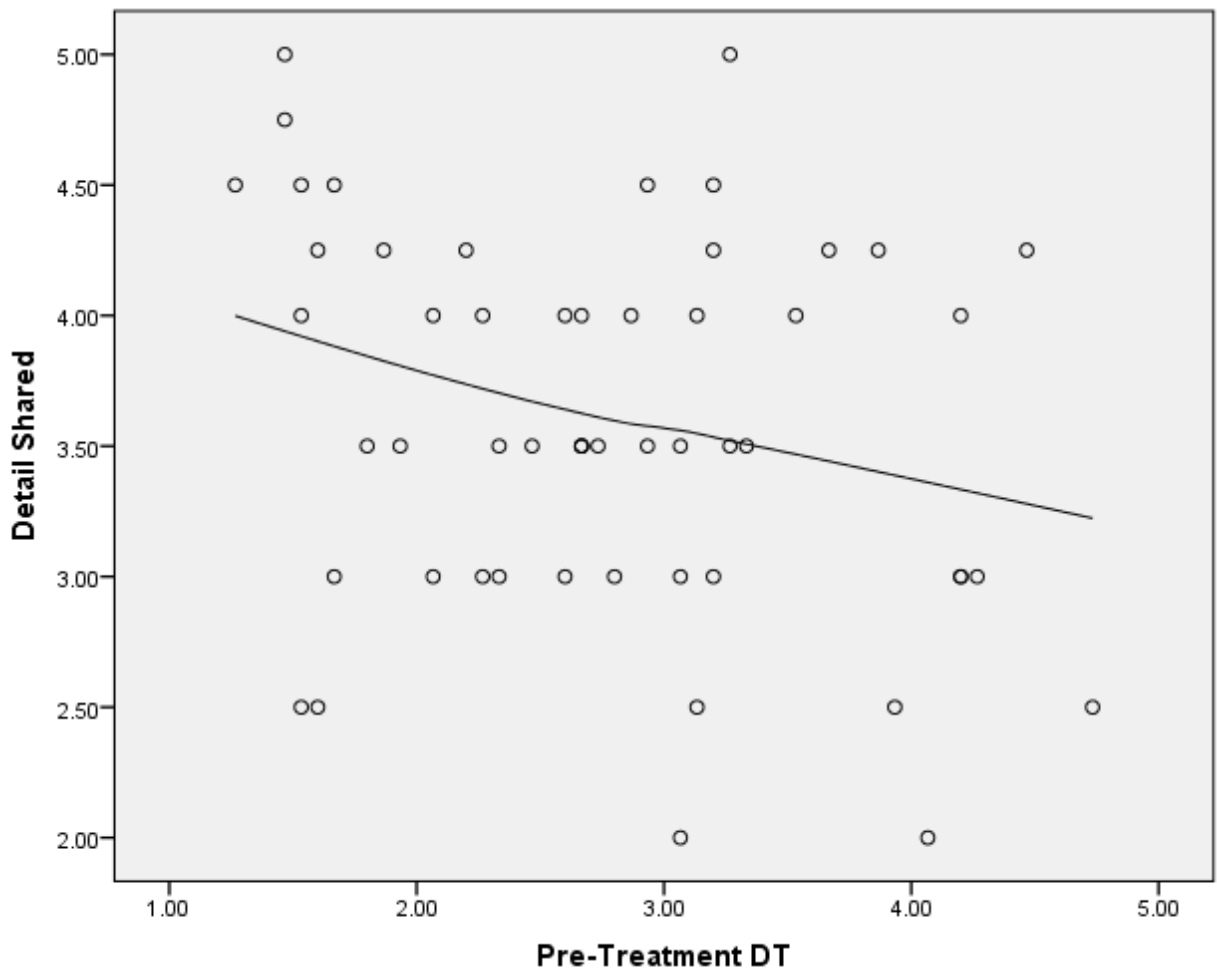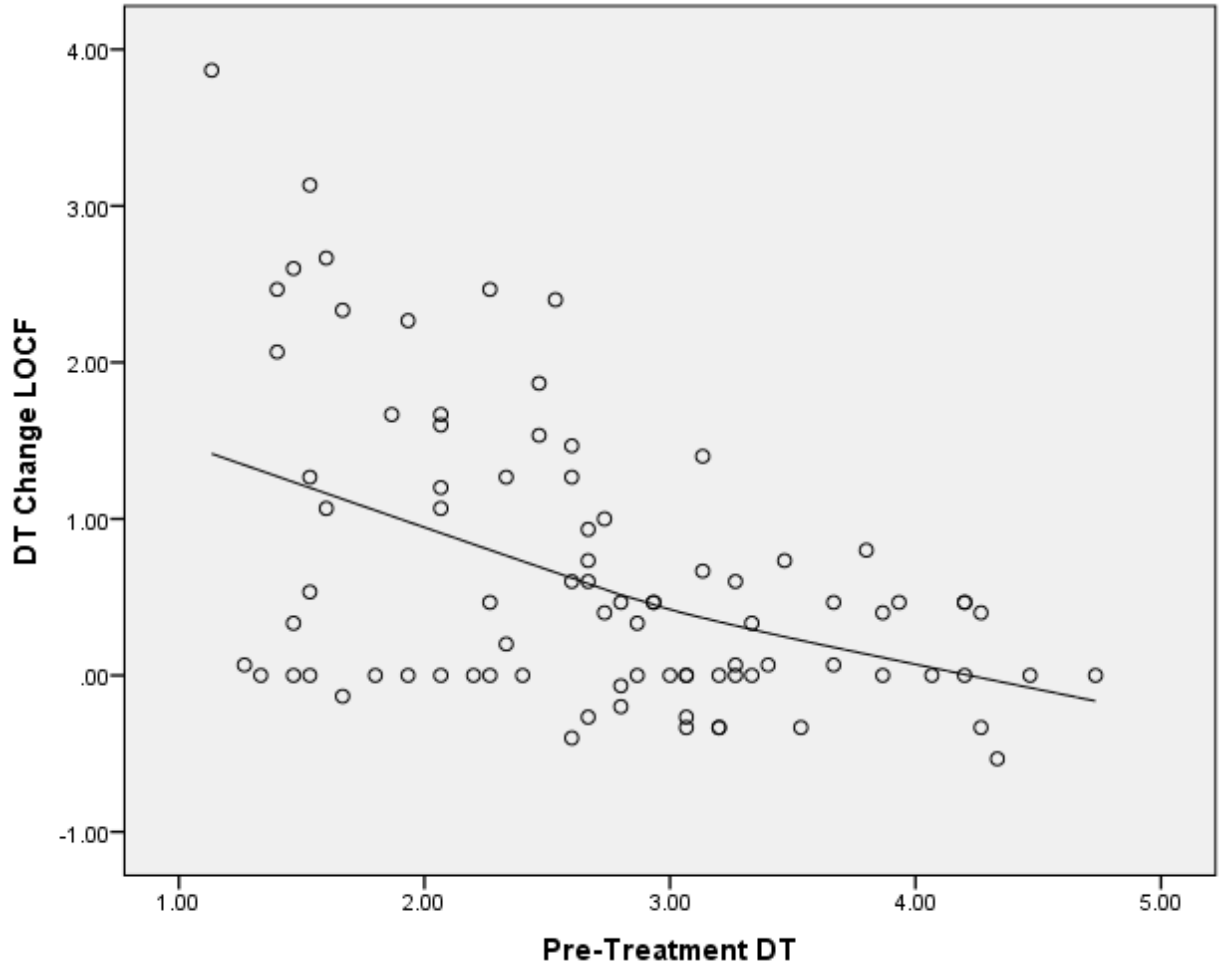*Figure 13.* Pre-treatment DT and DT change scores using LOCF. A LOESS line was added to fit 99% of data points.
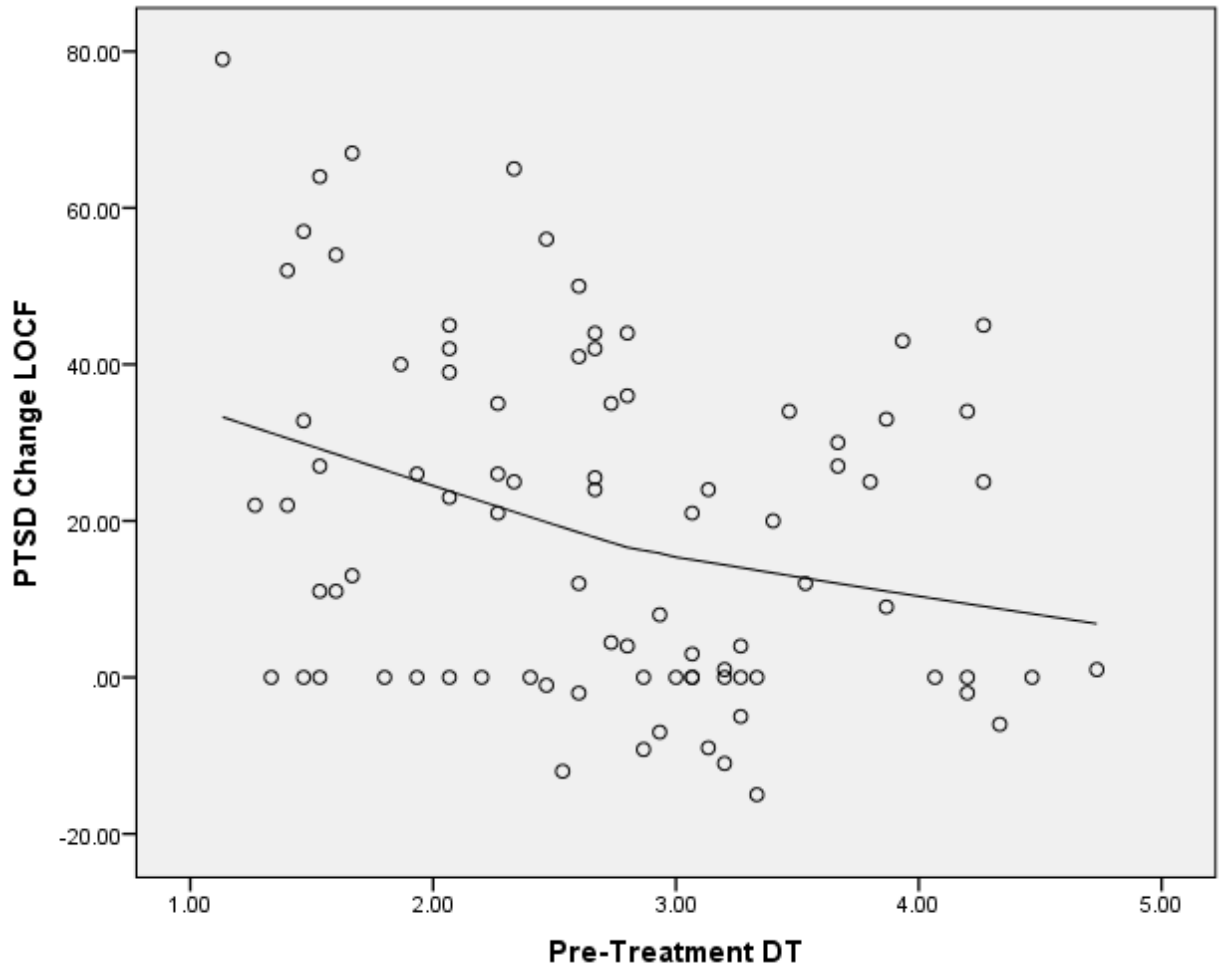
Figure 14. Pre-treatment DT and PTSD change scores using LOCF. A LOESS line was added to fit 99% of data points.
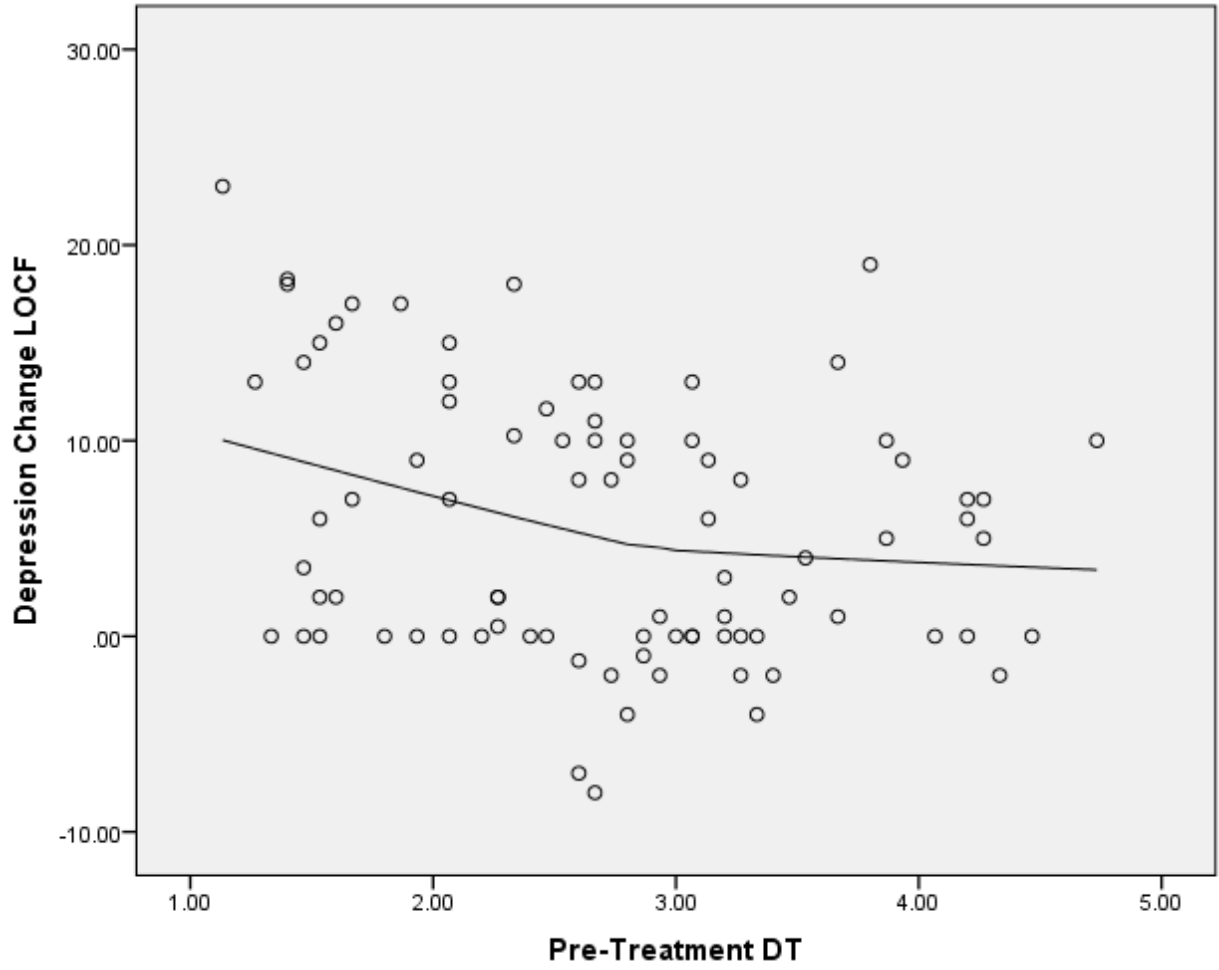
Figure 15. Pre-treatment DT and depression change scores using LOCF. A LOESS line was added to fit 99% of data points.

January 11, 2012

MEMORANDUM

TO: Ana Bridges
                      Marie Karlsson

FROM: Ro Windwalker
                      IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   11-12-377

Protocol Title: *Evaluating a Sexual Violence Therapy Group with Incarcerated Women*

Review Type: ☐ EXEMPT ☐ EXPEDITED ☒ FULL IRB

Approved Project Period: Start Date: 01/11/2012 Expiration Date: 01/08/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 70 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

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Voice (479) 575-2208 • Fax (479) 575-3846 • Email irb@uark.edu

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Office of Research Compliance
Institutional Review Board

March 27, 2017

MEMORANDUM

TO:	Ana Bridges	Elizabeth Anastasia
	Maegan Calvert	Sarah Bilsky
	Ilana Berman	Marie Karlsson
	Melissa Zielinski	

FROM: Ro Windwalker
IRB Coordinator

RE: PROJECT MODIFICATION

IRB Protocol #: 11-12-377

Protocol Title: *Evaluating a Sexual Violence Therapy Group with Incarcerated Women*

Review Type: ☐ EXEMPT ☒ EXPEDITED ☐ FULL IRB

Approved Project Period: Start Date: 03/22/2017 Expiration Date: 11/10/2017

Your request to modify the referenced protocol has been approved by the IRB. **This protocol is currently approved for 300 total participants.** If you wish to make any further modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

Please note that this approval does not extend the Approved Project Period. Should you wish to extend your project beyond the current expiration date, you must submit a request for continuation using the UAF IRB form "Continuing Review for IRB Approved Projects." The request should be sent to the IRB Coordinator, 109 MLKG Building.

For protocols requiring FULL IRB review, please submit your request at least one month prior to the current expiration date. (High-risk protocols may require even more time for approval.) For protocols requiring an EXPEDITED or EXEMPT review, submit your request at least two weeks prior to the current expiration date. Failure to obtain approval for a continuation *on or prior to* the currently approved expiration date will result in termination of the protocol and you will be required to submit a new protocol to the IRB before continuing the project. Data collected past the protocol expiration date may need to be eliminated from the dataset should you wish to publish. Only data collected under a currently approved protocol can be certified by the IRB for any purpose.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

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93

Measures

Distress Tolerance: DTS.

Please indicate the level to which you agree with each of the following statements.

1	2	3	4	5
Strongly agree	Mildly agree	Agree and disagree equally	Mildly disagree	Strongly disagree

1. _____ Feeling distressed or upset is unbearable to me.

2. _____ When I feel distressed or upset, all I can think about is how bad I feel.

3. _____ I can't handle feeling distressed or upset.

4. _____ My feelings of distress are so intense that they completely take over.

5. _____ There's nothing worse than feeling distressed or upset.

6. _____ I can tolerate being distressed or upset as well as most people.

7. _____ My feelings of distress or being upset are not acceptable.

8. _____ I'll do anything to avoid feeling distressed or upset
.
9. _____ Other people seem to be able to tolerate feeling distressed or upset better than I can.

10. _____ Being distressed or upset is always a major ordeal for me.

11. _____ I am ashamed of myself when I feel distressed or upset.

12. _____ My feelings of distress or being upset scare me.

13. _____ I'll do anything to stop feeling distressed or upset.

14. _____ When I feel distressed or upset, I must do something about it immediately.

15.   When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

Emotional Stability (ES): TIPI.

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which *you agree or disagree with that statement*. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

Disagree Strongly	Disagree Moderately	Disagree A Little	Neither Agree or Disagree	Agree	Agree A Little	Agree Moderately
1	2	3	4	5	6	7

I see myself as:

1. _____   Extraverted, enthusiastic
2. _____   Critical, quarrelsome
3. _____   Dependable, self-disciplined
4. _____   Anxious, easily upset
5. _____   Open to new experiences, complex
6. _____   Reserved, quiet
7. _____   Sympathetic, warm
8. _____   Disorganized, careless
9. _____   Calm, emotionally stable
10. ___   Conventional, uncreative

Engagement: Clinician Rating Form.

Date:_____ Group #: _____ ID #: _____   Rater initials: _____

Participant initials:	1	2	3	4	5	6	7	8
Attended session? (yes/no)								

Shared this session?
(yes/no)

Total # participants this
session

Degree of group cohesion
this session
  1 = none
  2 = low
  3 = med.
  4 = high
  5 = extreme

Degree of participant's
average expressed emotion
this session
  1 = none
  2 = low
  3 = med.
  4 = high
  5 = extreme

Degree of participant's
highest expressed emotion
this session
  1 = none
  2 = low
  3 = med.
  4 = high
  5 = extreme

Degree of personal details
shared by the participant
this session
  1 = none
  2 = low
  3 = med.
  4 = high
  5 = extreme

PTSD: PCL-5.

Below is a list of problems that people sometimes have in response to a very stressful experience. Please read each problem carefully and then put a number from 1 (*not at all*) to 5 (*extremely*) in the box to indicate how much you have been bothered by that problem *in the last week*.

Not at all	A little bit	Moderately	Quite a bit	Extremely
1	2	3	4	5

In the past week, how much were you bothered by:

1. Repeated, disturbing, and unwanted memories of stressful experience?

2. Repeated, disturbing dreams the stressful experience?

3. Suddenly feeling or acting as if the stressful experience were happening again (as if you were actually back there reliving it)?

4. Feeling very upset when something reminded you of the stressful experience?

5. Having strong physical reactions when something reminded you of the stressful experience (*for example, heart pounding, trouble breathing, sweating)*

6. Avoiding memories, thoughts, or feelings related to the stressful experience?

7. Avoiding external reminders of the stressful experience (*for example, people, places, conversations, activities, objects or situations)*?

8. Trouble remembering important parts of the stressful experience?

9. Having strong negative beliefs about yourself, other people, or the world (*for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)*?

10. Blaming yourself or someone else for the stressful experience or what happened after it?

11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?

12. Loss of interest in activities that you used to enjoy?

13. Feeling distant or cut off from other people?

14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)*?

15. Irritable behavior, angry outbursts or acting aggressively?

16. Taking too many risks or doing things that could cause you harm?

17. Being "superalert" or watchful or on guard?

18. Feeling jumpy or easily startled?

19. Having difficulty concentrating?

20. Trouble falling or staying asleep?

Depression: PHQ-9.

Over the *last week*, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

If you checked off *any* problems, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Participant Post-Treatment Feedback.

Did you consider dropping out of the group?

     _____Yes

     _____No

If Yes:

When did you consider dropping out (Select all that apply)?

     _____Before the first session

     _____After the first session

     _____After the second session (before we started sharing stories)

     _____Right after session 3 (first time sharing stories)

     _____Half way through (sessions 3-5)

     _____Towards the end (sessions 6-8)

     _____Other: Please specify: _____

Why did you consider dropping out?

What made you stay in this group?