2013

Imagery Rehearsal Therapy for Posttraumatic Nightmares: Symptom Severity and Control Appraisal Outcomes

Ashley Kay Rose
rose41@marshall.edu

IMAGERY REHEARSAL THERAPY FOR POSTTRAUMATIC NIGHTMARES: SYMPTOM SEVERITY AND CONTROL APPRAISAL OUTCOMES

A dissertation submitted to the Graduate College of Marshall University

In partial fulfillment

of the requirements for the degree of

Doctor of Psychology

in

The Psy.D. Program

by

Ashley Kay Rose

Approved by

Martin Amerikaner, Ph.D., Committee Chairperson

Paige Muellerleile, Ph.D.

Roslyn E. Feierstein, Ph.D., A.B.P.P

Marshall University

December 2013

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to the members of my dissertation committee for their support, encouragement, and flexibility: committee chairperson Dr. Marty Amerikaner (Professor, Marshall University), study facilitator and on-site principal investigator Dr. Roslyn E. Feierstein, A.B.P. P. (Staff Psychologist, Huntington VA Medical Center), and committee member/statistics advisor Dr. Paige Muellerleile (Associate Professor, Marshall University). I extend particular gratitude to Dr. Roslyn E. Feierstein for her sizable role as sole study facilitator, and also for her mentorship, collaboration, and friendship. This research is the result of work supported with resources, facilities, and patients at the Huntington VA Medical Center. I would like to thank Research Service and Mental Health Service, Huntington VAMC for their support and guidance in completing this project.

I would also like to thank Dr. Barry Krakow for his permission to use the Distressing Dream and Nightmare Severity Index and Dr. Daniel Buysse for permission to use the Pittsburg Sleep Quality Index in this research. Additionally, I also extend my most sincere gratitude to the veterans that took the time to participate in this study without compensation, and for their selfless service to this country. Finally, this dissertation would not have been completed without the constant support and cheerleading of my family, friends, and peers—for your love, humor, and patience, I am most grateful.

This work is dedicated to my beloved mother, Felicia. Thank you for always being by my side through life's many hills and valleys, and for your patience, love, and unwavering support.

Table of Contents

Abstract

This research included a small-scale randomized, controlled trial of IRT (Imagery Rehearsal Therapy) with a sample of military veterans receiving treatment for PTSD from the VAMC in Huntington, WV. Domains assessed included nightmare severity, posttraumatic cognition, general sleep quality, and PTSD symptom severity. The intended purposes were to evaluate the relative contribution of the imagery rehearsal and rescripting component of IRT intervention in isolation from the sleep hygiene component, to assess fluctuations in symptoms across time, and to assess any relative contribution of control appraisals in outcomes. Due to an unexpectedly small sample size, no definitive conclusions can be drawn from the results. However, general trends in participants' symptom fluctuations across time are described, as well as considerations for factors that likely influenced these outcomes.

The Relationship Between Imagery Rehearsal Therapy for Posttraumatic Nightmares and Control Appraisals

In addition to symptoms of heightened arousal, intrusive thoughts, avoidance of stimuli that trigger memory of the traumatic event, and general sleep disturbance, approximately 70% of individuals with Posttraumatic Stress Disorder (PTSD) experience chronic nightmares, and roughly half of those nightmares are exact replications of the traumatic event (Wittmann, Schredl, & Kramer, 2006). Even following the successful completion of trauma-focused treatments, such as prolonged exposure or cognitive processing therapy, many individuals with PTSD continue to struggle with posttraumatic nightmares. Imagery Rehearsal Therapy (IRT) is a therapeutic intervention focused on altering imagery. IRT is used for the alleviation of posttraumatic nightmares, and involves the trauma survivor recalling the nightmare in vivid, explicit terms, and gradually "rewriting" the nightmare into less threatening content. Some of the most remarkable effects of IRT involve the reduction in frequency and severity of nightmares (the target symptom being addressed by this intervention). In addition, the alleviation of other posttraumatic symptoms frequently experienced by individuals with PTSD is also documented after completion of IRT. Gaining understanding of the relationship between IRT and control appraisals of control (referring to an individuals' sense of self-efficacy to address stressors, and perception of the world as generally "safe" or relatively "threatening") in trauma survivors will expand practitioners' insight into evidence-based treatments for trauma survivors and enhance their ability to effectively treat the distressing symptoms experienced by people who are affected by PTSD.

Although there is evidence that IRT serves to alleviate the frequency and severity of nightmares and relieve additional trauma symptoms for many people, little is known about the

mechanisms of action (Moore & Krakow, 2010). One possibility that may explain these improvements is that IRT leads to a modification in cognitive factors that are associated with PTSD symptomology. Specifically, the aforementioned cognitive factors refer to the amount of control an individual perceives about a given situation, and may contribute to the degree to which posttraumatic symptoms are maintained or reduced. Although the reasons for this reduction of symptoms that are not directly nightmare-related are not well understood, they may be partially accounted for by an adjustment in the trauma survivor's perceptions of control.

Locus of control (LOC) has been noted as a predictor of therapeutic efficacy and treatment outcomes (Baker, 1979). Additionally, externalized LOC has been documented as positively correlating with the severity of trauma symptoms for individuals with Posttraumatic Stress Disorder (Noon, 1996). Threat appraisals—including appraisals involving the self as incapable of handling adverse situations, and the world as threatening—have been suggested as contributing factors in the anxiety response for individuals with PTSD (Epstein, 1991). It is possible that IRT assists individuals in establishing a perception of control over disturbing dreams that leads to a sense of control over other areas of their life over time. Failure to gain understanding into the efficacy of psychotherapeutic interventions costs the profession and individuals served by mental health practitioners' valuable time, subjective distress, financial resources, and frustration.

Posttraumatic Stress Disorder (PTSD)

Anxiety is commonly regarded as a normal state of arousal that results from anticipation of threat or danger, and serves the adaptive function of raising awareness of internal and external threats so that they may be addressed or avoided by the individual experiencing a state of anxiety. However, there are many individuals who experience anxiety that is debilitating,

distressing, and contextually inappropriate. Anxiety disorders are some of the most common symptom presentations for Americans. In fact, approximately 10.6-16.6% of people meet criteria for an anxiety disorder at some point in their lives (Somers, Goldner, Waraich, & Hsu, 2006). Of those who are diagnosed with anxiety disorders, some experience PTSD—an anxiety disorder that develops in reaction to exposure to a traumatic event, characterized by distressing and disruptive symptoms that can last a lifetime.

According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV TR) the following criteria are present when individuals have PTSD. First, the individual experienced a traumatic event, where they were exposed to an event that was highly threatening and they responded with intense feelings of fear, hopelessness, or horror. Second, the individual reexperiences the traumatic event in one or more ways, including intrusive recollections of the event, recurrent nightmares, feeling as if the event were recurring, experiencing intense psychological distress when exposed to cues that remind them of the event, and physiological reactivity to cues that are associated with the event. Third, the individual persistently avoids stimuli associated with the event and experiences reduced general responsiveness following the traumatic event. These symptoms may manifest as efforts to avoid cues that are reminiscent of the trauma, such as thoughts, feelings, places, or people associated with the trauma, failure to remember aspects of the trauma, significantly reduced interest in important activities, feelings of detachment from significant others, restricted affect, and having a sense of a foreshortened future. Fourth, the individual experiences persistent symptoms of heightened arousal, such as sleep disturbance, irritability, poor concentration, hypervigilance, and an exaggerated startle response. To meet diagnostic criteria for PTSD, these symptoms must

have duration exceeding one month and the disturbances must cause clinically significant distress or impairment (American Psychiatric Association, 2000).

Although PTSD affects a relatively small portion of the general population, the distress experienced by those affected can be extreme. The symptom constellation of PTSD can elicit lifelong, detrimental effects for those who develop the disorder via a pattern of ineffectual coping strategies, chronic anxiety, sleep disturbance, and other distressing experiences. A few populations are disproportionately affected by PTSD, such as combat veterans, survivors of natural disasters, and rape survivors (American Psychiatric Association, 2000). People who develop PTSD carry the burden of constant reminders of their traumatic experience, paired with distressing psychological and physiological reactivity to those reminders. The disorder affects multiple dimensions of daily life, including sleep quality, emotional wellbeing, interpersonal relationships, subjective sense of security, and ability to function in work and school settings (American Psychiatric Association, 2000).

Sleep disturbance and nightmares in PTSD. PTSD can develop in reaction to events that are extremely negative, uncontrollable, and sudden, and the resulting symptoms are highly distressing for individuals afflicted with the disorder (Carlson & Dalenberg, 2000). Of the symptoms identified by the DSM-IV TR as diagnostic criteria for the disorder, “sleep disturbance” encompasses a set of symptoms frequently experienced by individuals with PTSD that can be severely disruptive to their general functioning. Sleep disturbances can include a combination of primary insomnia, middle insomnia (awakening during the course of the night), nightmares, and lack of nocturnal behavioral inhibition (including combinations of tossing, turning, kicking, and other unintended motor movements while sleeping). Approximately 70-91% of individuals with PTSD report sleep disturbance, and chronic nightmares are reported by

19-71% of those with PTSD (Maher, Rego, & Asnis, 2006). There is some evidence that chronic nightmares contribute to the severity of other sleep disturbances, and consequently affect the individuals' overall functioning (Rothbaum & Mellman, 2001). For example, people with PTSD often experience nightmares that are very distressing, and have difficulty returning to sleep after waking up during a nightmare. Subjective daytime distress is also related to the amount of sleep disturbance reported by individuals with PTSD, particularly when posttraumatic nightmares are recurrent.

Individuals with PTSD can experience nightmares differently—some report nightmares that are distortions of their trauma, others report nightmares that are apparently unrelated to the traumatic event, and others report nightmares that are direct replications of the trauma. It appears that those with replication-type nightmares experience the greatest distress. In a sample of 94 individuals with PTSD who had nightmares, Davis, Byrd, and colleagues (2007) found that those with trauma replication nightmares displayed the highest intensities of distress. Additionally, Davis and colleagues reported some PTSD symptom severity and psychological distress is predicted by the frequency and severity of nightmares, even after controlling for other PTSD-symptoms. Sleep disturbance—particularly that related to nightmares—appears to be a commonly experienced symptom of PTSD, and also seems to contribute to the severity of PTSD symptoms and psychological distress experienced by the affected individual.

Sleep disturbance as a primary symptom. Although sleep disturbance is considered an associated symptom of PTSD, there is a growing body of evidence that indicates sleep disturbance to be a central symptom of the disorder. Persistent nightmares and other sleep disturbances are often maintained even after successful treatment of PTSD, and the severity of PTSD symptoms tends to be reduced when sleep disturbance is addressed during treatment

(Spoormaker & Montgomery, 2008). Nightmares experienced by individuals with PTSD also appear to be qualitatively different than those experienced by nightmare sufferers without PTSD; individuals with PTSD who experienced frequent nightmares displayed significantly higher rates of nocturnal waking than non-PTSD-related nightmare sufferers and controls (Germain & Nielsen, 2003).

At first glance, it would appear that the frequency of nightmares would predict corresponding symptom severity. However, only the degree of distress associated with nightmares has been systematically found to correlate with the severity of symptoms (Krakow & Zadra, 2006). The frequency of awakening during the night following distressing nightmares and arousal related to the distressing content may also account for some of those individuals' symptom severity. It has been argued that much of the symptom severity of PTSD is influenced by the degree of sleep disturbance experienced by the individual. Wittman (2007) suggested that PTSD could be best described as a disorder of sleep, given the emerging evidence indicating sleep disturbance as a key component of the disorder.

Cognitive Considerations for PTSD and Control Appraisal

For people with PTSD, the symptoms that develop in response to a trauma share an underlying thread: loss of control. Each symptom and experiential aspect of PTSD relate to the individuals' perception that some type of highly distressing, fear-provoking, and life-altering event took place and they were unable to change or control it. For some individuals, there appear to be protective factors that prevent the development of full-blown PTSD, whereas others respond to a traumatic event with lasting symptoms of anxiety, fear, and distress. Cognition plays a primary role in the onset and maintenance of PTSD and is also a target of interventions that are effective in reducing PTSD symptoms.

Schema-based theory. Various theoretical models have been proposed to explain PTSD vulnerability, development, trajectory, and prognosis. One subset of theories focuses on schematic change. According to schema-based theories, PTSD involves two primary mechanisms that result in posttraumatic symptoms. The first component is memory of the traumatic event, and the second is distortion of self- and world-schema (Dalgleish, 2004). Schema-based theories suggest that schematic modifications following a traumatic event reflect a shift toward perceiving the self as incapable, and the world as threatening. These schematic distortions are believed to lead individuals with PTSD to interpret even non-threatening events as potentially dangerous, setting a pattern of anxiety and avoidance in motion (Dalgleish, 2004). Schema-based theories appear to explain the ongoing pattern of intense symptoms experienced by individuals with PTSD, particularly with respect to the cognitive components of the disorder. Two separate but related cognitive constructs have been proposed as factors that explicate the cognitive effects of traumatic events: Threat Appraisal and Locus of Control.

Threat appraisals. According to O'Donnell, Elliott, Wolfgang, and Creamer (2007), traumatized individuals make an implicit cognitive appraisal of the traumatic event, and those who later develop PTSD appraise the event as threatening. Threat appraisals relate to the individual perceiving the nature of the trauma to be internal or external in nature—if deemed internally threatening, the individual may develop cognition that reflects a belief that they are incapable, helpless, or unable to successfully cope with the trauma. On the other hand, external threat appraisals may lead to the traumatized individual questioning their safety and perceiving the world as threatening and unpredictable. Foa, Ehlers, Clark, Tolin, and Orsillo (1999) outline a similar role of threat appraisals, with a specification that the threat appraisal is negative in nature for these beliefs to develop. In response, the individual's previous belief about the amount

of control they held over their (or others') fates can be altered, creating a series of symptoms that serve as continuous reminders of the event—in addition to the belief that they are helpless and incapable, and experience the world and their future as unpredictable, uncontrollable, and/or threatening (Epstein, 1991). Further, PTSD symptom severity correlates with the degree of threat appraisals, particularly when traumatized individuals' threat appraisals strengthen over time (O'Donnell, Elliott, Wolfgang, & Creamer, 2007). Given a synthesis of the available literature in the area, threat appraisals appear to contribute to the onset, maintenance, and severity of PTSD symptoms experienced by individuals who have survived a traumatic event.

Locus of control. Locus of Control (LOC) is described as a relatively stable subjective tendency to attribute most life events and situations to either relatively *internal* (self-directed, within the person) or relatively *external* (fatalistic, outside the person) forces. An individuals' tendency to attribute events to either mostly internal LOC or mostly external LOC is thought to contribute to their core beliefs about themselves, their competence in the face of danger, and their sense of mastery over challenging events. Those with predominantly internal LOC tend to view themselves as competent and able to produce meaningful change in the face of a difficult situation. Individuals with mostly external LOC tend to view external forces (such as a deity, fate, or the universe) as responsible for their outcomes, and therefore they are less likely to engage in motivated acts to change a situation.

LOC is related to various psychological states, health behaviors, and social interactions. For example, depression severity and external LOC have a significant positive correlation (Benassi, Sweeney, & Dufour, 1988; Presson & Benassi, 1996) and external LOC also correlates with state anxiety, indecision, agoraphobia, and lower social adjustment (Hoehn-Saric & McLeod, 1985). People with more internalized LOC tend to have more proactive approaches to

their health, and also tend to experience less anxiety than those with relatively external LOC (Gale, Batty, & Deary, 2008). LOC perception appears to be associated with the amount of anxiety experienced by the individual regarding self efficacy and future events—central features of PTSD.

Although LOC theorists and researchers largely regard LOC as a relatively stable personality trait, there is considerable evidence that the construct is somewhat malleable. For example, a number of studies have indicated that LOC can be internalized following therapy. From a therapeutic standpoint, modifying LOC (usually from external to a more internalized position) is often a goal; in many outcome studies, movement toward a relatively internalized LOC has been reported when individuals appear to improve post-treatment (Baker, 1979; Foon, 1985; Foon, 1987). In the context of PTSD, it should be considered that even for people who are relatively internal in LOC pre-trauma, the experience of trauma and the consequent development of PTSD is by definition *uncommon*. Therefore, it is possible that the constructs being measured as LOC are somewhat subject to change under certain circumstances, such as following the experience of uncontrollable trauma. It appears that individuals' perceptions of control can be modified with intervention, and would likely correlate with the relative improvement or maintenance of symptoms for individuals with PTSD.

Control appraisals. Given the available research in both threat appraisal for PTSD and LOC, a synthesis of the two concepts may partially explain the onset of PTSD, its maintenance, and the symptoms frequently experienced by individuals who develop the disorder. LOC and threat appraisals appear to relate to PTSD symptoms, and although they differ in duration, are somewhat overlapping concepts. It may be the case that individuals' threat appraisals interact with LOC to modify the individual's schema of self (as incompetent and not capable of coping

with adverse events) and the world (as threatening and uncontrollable). Schema-based theories of PTSD suggest a similar trajectory of trauma appraisal and processing. From this point onward, the term "control appraisal" will be used to describe a synthesis of LOC and threat appraisal. Specifically, control appraisal refers to an individual's tendency to evaluate themself as capable or incapable of addressing future stressors, and the world and future as relatively threatening and uncontrollable or self-determined. The concept of control appraisal is consistent with the trauma appraisals that are described by Foa and colleagues (1999) but somewhat divergently, refer to the long-term products of these negative trauma appraisals.

Compared to LOC and threat appraisals, the defining characteristic of control appraisal is its malleability. LOC has traditionally been viewed as a stable trait that is fairly consistent across time. Threat appraisals, on the other hand, are somewhat situationally-bound, but can also reflect a relative tendency to view external sources as threatening or internal forces as inadequate in the face of threats (Foa et. al., 1999). Control appraisals refer to a relatively stable state of perceptions related to subjective control, perceived threats from the environment, and subjective judgments of personal efficacy—a concept that integrates LOC and threat appraisal. Following an extreme environmental threat and/or perception of a lack of personal capability to address a threatening event, a distortion in control appraisal may take place. Over time, uncorrected distortions in control appraisals could generalize into even non-threatening situations, introducing a shift in schema of "self" and "the world" as incapable and dangerous, respectively. The aforementioned process is parallel to the progression of traumatic cognition that can result from negative threat appraisals, as outlined by Foa and colleagues (1999). Without intervention or contradictory information to prevent this deeper processing, control appraisals may become increasingly integrated into schema, contributing to the development and maintenance of PTSD

symptoms. This position appears consistent with the trajectories described by Foa and colleagues (1999) and Epstein (1991).

There is some support for such factors leading to a schema-level modification taking place for individuals who develop PTSD. The assertion that cognitive modifications regarding control appraisal occur for individuals with PTSD is supported by Elsesser and Sartory's (2007) report that recent trauma victims display dysfunctional cognition that is similar to control subjects, but PTSD patients demonstrated increases in negative appraisal and externality over time. The phenomenon of increasingly negative appraisal following a trauma for individuals with PTSD is also reflected in the disparity between individuals who develop Acute Stress Disorder (a symptom cluster that is parallel to PTSD, but has duration of less than one month) following a trauma, but do not develop PTSD after the one-month duration criterion is met. In such cases, some individuals' resilience following a traumatic experience may be explained by their relative appraisals of the situation and their personal efficacy. Additionally, those who develop PTSD may be generalizing the threat appraisal into self- and future- evaluations (Foa et. al., 1999). Those who do not develop PTSD may be better equipped to discriminate the trauma from other appraisals, allowing them to focus on contrary information regarding their appraisals of self-adequacy and external threats. This position is supported by the report of Frazier, Steward, and Mortensen (2004), who found perceived control of present events to predict better posttraumatic adjustment than individuals' perception of past control of the trauma itself.

Cognition and therapies for PTSD. Most of the empirically-supported psychological treatments for PTSD involve modifications of cognitive components. As mentioned earlier, PTSD is classified as an anxiety disorder, according to DSM-IV TR. One of the most prominent features of the disorder is an extreme response of anxiety when an individual with PTSD is

reminded of the traumatic event. Anxiety is a psychological and physiological response to anticipated threat from either internal or external sources; one must first appraise some form of threat to experience the sensation of anxiety (Stein & Nesse, 2011). The objective of psychological treatments for PTSD is primarily to reduce the anxiety level of a person with PTSD through exposure to previously avoided trauma stimuli and clarification of distorted beliefs about the trauma, self, future, and world. Measurement of improvement during PTSD treatment often involves some means of monitoring cognition, such as worksheets traditionally used in cognitive-behavioral treatments. It is likely that a large portion of factors initiating and maintaining PTSD involve appraisals of control and personal efficacy in the face of danger.

Treatments for PTSD

Avoidance of stimuli associated with the traumatic event is thought to maintain PTSD symptoms. After a person experiences a traumatic event, he or she may develop an extraordinarily strong association between the traumatic event and the feelings of intense anxiety and/or fear they experienced at the time of the trauma. Consequently, when the individual is again exposed to "trigger" stimuli—anything that the individual has come to associate with the trauma, such as a location, person, or scent reminiscent of the traumatic setting—the stimulus evokes memory of the traumatic event, leading to the experience of intense anxiety. Over time, the individual learns that they can minimize the distressing experience of posttraumatic anxiety by avoiding stimuli that they have associated with the trauma. It is within the avoidance of traumatic stimuli that PTSD maintains its power, and reducing avoidance is a major focus of empirically-supported treatments for PTSD.

When an individual with PTSD avoids "trigger" trauma stimuli, anxiety is temporarily evaded; however, complete avoidance of all traumatic stimuli is impossible and the individual is

inevitably exposed to something that reminds them of the trauma, leading them to experience an inundation of anxiety. Many times, individuals with PTSD will implicitly learn to actively avoid anything that could potentially trigger their memory of the event (including people, places, and objects). Alternatively, they endure situations where trauma memories are triggered with great distress, often to an extent that causes them functional impairment. Treatment for PTSD generally includes a component of exposure to the trauma to address this avoidance pattern, where the individual is able to face their traumatic experience in a safe environment and eventually gain control of their symptoms.

Cognitive-behavioral therapy for PTSD. Although a wide variety of psychological and psychiatric interventions have been applied to the treatment of PTSD, some of the most supported interventions are those from the Cognitive-Behavioral Therapy camp. Specifically, interventions that are trauma-focused in nature, such as Cognitive Processing Therapy and Prolonged Exposure are extensively studied, deemed largely effective, and have been adopted by the Veterans Administration (VA) system as evidence-based treatments for PTSD (Karlin et al., 2010). Cognitive Processing Therapy involves both cognitive components and exposure to the traumatic event, and is established as an effective treatment for alleviating PTSD severity (Monson et al., 2006). Prolonged Exposure can be offered as a manualized treatment for PTSD, and consists of multiple sessions of imagined exposure to the traumatic event and desensitization to stimuli that serve as anxiety-provoking reminders of the event, and is highly effective in the reduction of PTSD symptoms (Powers, Halpern, Ferenshcack, Gillihan, & Foa, 2010). Both Cognitive Processing Therapy and Prolonged Exposure are supported as effective therapies for the treatment of PTSD (Reisick, Nishith, Weaver, Astin, and Feuer, 2002).

Cognitive-Behavioral Therapy for Sleep Disturbance

Depending on the symptom presentation of clients with PTSD, available resources, and treatment goals, treatments for PTSD are sometimes used in conjunction with other models. For individuals with PTSD who report symptoms primarily centered around sleep (such as primary insomnia, middle insomnia, or chronic nightmares) cognitive-behavioral therapies that focus on sleep symptoms have gained clinical and empirical support. Cognitive-Behavioral Therapy for Insomnia (CBT-I) is a treatment model that integrates components of sleep hygiene, behavioral modification, and cognitive restructuring to assist individuals who experience insomnia with initiating and maintaining sleep. Cognitive-Behavioral Therapy for sleep disturbance is offered in both individual and group formats, and has considerable support as an effective treatment for sleep disturbance (Okajima, Komada, & Inoue, 2011).

Imagery Rehearsal Therapy (IRT)

One variant of the aforementioned cognitive-behavioral treatments that focuses on addressing chronic nightmares is a cognitive-behavioral technique commonly called Imagery Rehearsal Therapy (IRT). IRT is a manualized treatment that involves sleep hygiene, relaxation training, exposure to nightmare content, gradual rewriting of the nightmare content into less distressing terms, and rehearsal of the rewritten nightmare content over time (Davis & Wright, 2006; Krakow, 2002; Moore & Krakow, 2010). Many PTSD treatments—including Prolonged Exposure—focus on habituating and desensitizing the individual to the trauma. Somewhat divergently, imagery rehearsal techniques concentrate on activation of the traumatic memory so that distressing aspects of a nightmare can be identified, processed, and modified across time (Grunert, Smucker, Weis, & Rusch, 2003). Moreover, IRT can be applied in both individual and

group settings and is a relatively short-term intervention, frequently implemented in four- to six-week formats.

Empirical support for IRT. In recent years, IRT has established limited empirical support as a conjunctive technique in reducing the severity and distress of chronic nightmares for individuals with PTSD. Successful completion of IRT led to meaningful reductions in nightmare distress for approximately 70% of participants (Krakow & Zadra, 2006). Following IRT treatment, Nappi, Drummond, Thorp, and McQuaid (2010) reported that people with PTSD displayed significant reductions in the intensity and frequency of nightmares, insomnia, and subjective evaluations of daytime PTSD symptoms; furthermore, these symptoms were not only reduced for many participants—they were reduced to subclinical levels. In a randomized controlled trial of IRT for sexual assault survivors, IRT decreased PTSD symptom severity, frequency of distressing dreams, and improved overall sleep quality (Krakow et al., 2001). Clinically significant decreases in nightmare frequency, subjective distress, and improved self-evaluated sleep quality were reported for a sample of chronic nightmare sufferers (Krakow, Kellner, Pathak, & Lambert, 1995). These researchers also reported nightmare reduction as a significant predictor of improvement in overall sleep quality.

Long-term outcome studies of IRT. It appears that the improvements noted after successful IRT completion are maintained over time for many individuals. In a study of long-term effects of IRT intervention for a sample of combat veterans with chronic PTSD, reductions in nightmare intensity, overall PTSD symptom severity, anxiety, depression, and broad psychiatric symptoms are reported by Forbes, Phelps, McHugh, Debenham, Hopwood, and Creamer (2003) at 3-month and 12-month follow-up. For a sample of veterans who completed IRT for residual nightmares after trauma-focused PTSD treatment, Lu, Wagner, Van Male,

Whitehead, and Boehnlein (2009) reported that although no immediate symptom reduction was noted post-IRT intervention, there was a significant decrease in trauma-related nightmare recurrence and overall PTSD symptoms at 3- and 9-month follow-up. Krakow, Kellner, Neidhardt, and Pathak (1993) reported that IRT completion lead to a significant reduction in nightmare frequency and subjective posttraumatic distress at 3- and 30-month follow-up for clients presenting with chronic nightmares. Improvements obtained by IRT completion appear to be retained long-term, but little is known of the reason(s) for improvements appearing delayed in some studies. It is possible that the improvements appear delayed because indirect factors, such as modified cognition, do not occur immediately and are integrated over time.

Proposed mechanisms of change in IRT. Although promising research is emerging in support of using IRT, the mechanisms of action leading to a reduction in symptoms—including nightmare intensity, and other PTSD symptoms that are not directly targeted—are not well understood. One possible explanation is that the quality of sleep is affected by chronic nightmares, and the distressing nature of those nightmares leads to avoidance of sleep, more frequent awakenings during the night, and higher levels of arousal associated with the act of sleeping. Chronic sleep disturbance, in turn, may exacerbate existing daytime symptoms of PTSD. Successfully "rescripting" (modifying the narrative content to be less distressing) nightmares in IRT reduces the distressing quality of those nightmares, and may lead to improvement in the sleep disturbances commonly experienced by individuals with PTSD. Additionally, it is possible that gaining a sense of control over the nightmare that has historically seemed out of the individual's power could generalize into a greater sense of control over other symptoms, and lead to eventual gains in beliefs about intrinsic fortitude and ability to address external stressors.

Proposed mechanisms of action in IRT for PTSD. Combinations of cognitive and behavioral factors appear to contribute to the onset of PTSD, and its maintenance. Of the symptoms noted as diagnostic criteria for PTSD, sleep disturbance—particularly nightmares—appear to contribute significantly to the severity of PTSD symptoms. Although cognitive-behavioral treatments such as Prolonged Exposure and Cognitive Processing Therapy have strong support as effective treatments for PTSD, some individuals do not appear to respond fully to the interventions and retain chronic, distressing dreams. IRT has demonstrated limited support as an efficacious treatment for chronic nightmares, but the mechanisms of change are not well understood, nor the reasons for reductions in PTSD symptoms aside from the nightmares.

IRT may intervene in nightmares by modifying cognitive factors associated with the trauma and the subsequent control appraisals of people who complete IRT. IRT may assist individuals with PTSD in countering unsupported threat appraisals and internalizing LOC, leading to a reduction in fear response and enhancement of self-efficacy and sense of control. In turn, the newly learned control over historically distressing nightmares would lead to a generalization of sense of control over other symptoms, resulting in a reduction in avoidance, anxiety, and symptom intensity. Specifically, this research seeks to determine if successful IRT intervention would lead to a newly balanced control appraisal post-treatment, and PTSD symptom reduction (other than nightmares) would be partially accounted for by the newly internal control appraisal.

Hypotheses

The present study aims to answer the following main hypotheses:

H1: IRT intervention for posttraumatic nightmares will significantly reduce veteran participants' nightmare distress and frequency.

H2: Posttraumatic control appraisals will be modified by completing IRT.

H3: Sleep disturbance symptoms will improve in response to IRT intervention.

H4: Subjective symptoms of PTSD will be improved by completing IRT.

H5: Gains obtained from IRT treatment will be retained long-term.

Method

Participants

Participants included adult veterans who were existing patients in the Veterans Administration Medical Center (VAMC) receiving treatment in the PTSD Clinical Team (PCT). Referrals for participation included self-referral and referral from treatment providers. Participants were included based on the following criteria: successful completion of a VAMC cognitive-behavioral sleep therapy group or individual treatment and self-report of chronic nightmares. Exclusion criteria included the following: failure to complete the Phase I (cognitive-behavioral) sleep therapy treatment or displaying active psychotic processes. A total of 16-20 participants was the target number of participants to be included, but only 8 were involved in the study. Participants varied in age from 32 to over 70 and only males volunteered to participate. Females were also invited to participate, but no referrals for female participants were received.

Materials and Procedure

The Posttraumatic Cognitions Inventory (PTCI) was developed by Foa, Ehlers, Clark, et. al (1999) as a measure of cognitions and beliefs associated with PTSD. The PTCI is a 33 item Likert-type scale measure that assesses core beliefs centered around posttraumatic symptoms. Specifically, the PTCI evaluates negative cognitions about Self, the World, and Self-Blame. The PTCI total score will be used as a measure of control appraisals. The Pittsburgh Sleep Quality Index (PSQI) is a measure of sleep quality and disturbance over a one-month period, and was

developed by Buysse, Reynolds, Monk, Berman and Kupfer (1989). The PSQI is composed of a total of nineteen individual items that are used to generate scores on indexes of sleep quality, latency, duration, disturbance, habitual sleep efficiency, use of sleeping medication and daytime dysfunction (Buysse, Reynolds, Monk, Berman and Kupfer, 1989). Scores on individual indexes are used to calculate a global sleep quality index. The PSQI global index score will be used as a measure of general sleep quality and disturbance. The PTSD Checklist (PCL) is a seventeen-item self-report scale developed by Weathers and colleagues (1994) as a subjective measure of Posttraumatic Stress Disorder (PTSD) symptom severity. Although a number of variations on the PCL have been developed, such as military and civilian versions, the PCL-Military version (PCL-M) was selected because the participants are specifically military veterans. The PCL-M is to be used as a general self-report measure of PTSD symptom severity. Throughout the course of treatment, all participants completed the Disturbing Dream and Nightmare Severity Index (DDNSI) developed by Krakow (2002). Completion of the DDNSI was essential for treatment purposes, but also served as a running log of relative progress during the course of treatment for this research, and will be used as measures of nightmare-specific treatment efficacy for each group.

Procedure

Deidentified files of each members' core batteries and weekly logs were maintained in a quadruple-locked location within a filing cabinet in the Veterans Administration Medical Center. No personally identifiable information was included on the forms or file. Following informed consent for participation in IRT group and obtaining consent to participate in the research, participants who had completed the initial phase of sleep therapy (e.g. have completed either individual or group-based cognitive-behavioral therapy for sleep, provided by a board-certified

Clinical Psychologist) were randomized into immediate and delayed treatment groups. Baseline measures were obtained in an IRT orientation group meeting for all participants in the study. Participants assigned to the immediate treatment group engaged in four one and one-half hour weekly sessions of manualized group therapy for IRT, and the waitlist group started treatment upon the initial group's completion. The IRT group was led by a board-certified Clinical Psychologist, who assumed responsibility for collecting data. All participants were to complete the core battery outlined above at pre-treatment, post-treatment, and 3-month follow-up. However, unforeseen time constraints led to a reduced follow-up time of one-month (rather than the originally proposed 3-month follow-up). After completion of the group, the core battery was collected, and participants were asked to return for a sleep group booster meeting. Reminders were distributed for the booster session.

The delayed treatment group acted as a waitlist group to establish that effects of the IRT group are not due to generalization of principles learned in cognitive-behavioral sleep group or another function of time. Those participants assigned to the waitlist group continued with treatment as usual (existing treatments that do not directly target nightmare reduction or insomnia) and were informed in advance of the potential for delayed participation in IRT group during the informed consent process. Delayed treatment (waitlist) participants completed the batteries during orientation, when their groups' treatment began (two weeks following completion of the initial group's 4-week treatment), at post-test, and at one-month "booster" sleep group meeting.

The collected data was to be analyzed using SPSS Version 19. Two analyses planned to be conducted on the pre-, post-, and follow-up data. First, a MANOVA of repeated-measures between the same factors was to be analyzed. Second, a series of three one-way ANOVAS were

to be completed to analyze the univariate mixed-design measures for sleep quality, PTSD symptomology, and posttraumatic cognition (PSQI, PCL-M, and PTCI, respectively), and were to be controlled using bonferroni correction. Establishing sufficient power for MANOVA depended on the variation between pre-, post-, and follow-up scores, as well as the actual number of participants involved in the study. In the event that sufficient power was not established, single-case analyses were to be included. Due to the small number of participants and missing data, single-case analyses were included. The weekly DDNSI measures were to be analyzed using a single-subject longitudinal design to graph changes in scores across time.

Participant Characteristics

Due to a small number of participants involved in this study, demographic information presented here is intentionally limited to protect participants' identities. A total of eight participants volunteered to be involved in this study. All participants are male veterans that were existing patients in the PTSD treatment clinic (PCT) at the Veterans Affairs Medical Center in Huntington, West Virginia. Seven of eight participants identified as Caucasian. Five participants are married, remarried, or in long-term dating relationships, one is single, and two are divorced. Participant ages range from 32 to >75 years of age, with an average age of 48.12 years. Veteran participants' service eras ranged from Korean War Era to Operation Enduring Freedom.

There is considerable variability in the amount of time that had passed since the participants experienced the traumatic event identified as the initial cause of PTSD. The amount of time varied from >50 years to <4 years, and most participants indicated that the primary trauma took place over 10 years ago. One participant also experienced a second, non-military related trauma. Participants have a primary mental health diagnosis of PTSD or Anxiety Disorder Not Otherwise Specified. With regard to comorbid diagnoses, some participants also have

diagnoses of depressive disorders, alcohol-related disorders, chronic pain problems, Somatoform Disorder, personality disorder, or mild traumatic brain injury (mTBI).

In terms of mental health treatment, five participants previously completed an Evidence-Based Psychotherapy for PTSD (either Prolonged Exposure Therapy or Cognitive Processing Therapy). Some participants also completed alcohol-focused treatment or sleep-focused group psychotherapy treatment, and some participants are involved in ongoing individual therapy services. Regarding psychotropic medication, most participants have prescriptions for medications, such as a variety of antidepressant or anxiolytic medications. Additionally, some participants are prescribed non-opiate pain medication, or have health problems for which they receive non-psychotropic medications. Existing mental health treatment(s) continued during the course of this study, in order to minimize risk of harm to participants' wellbeing.

Results

Upon completion of the study a total of eight participants were involved, but there was an unanticipated trend of inconsistency in attending sessions. Of the eight participants, four completed the core pre-test, post-test, and follow-up batteries. One participant dropped out after the first session and an additional three did not attend the follow-up session. As for active IRT treatment sessions, six participants attended all of the three weekly IRT intervention sessions, one dropped out of the treatment after the first session, and one was absent for the second treatment session. In light of the inconsistency of available data, as well as the small sample size, a degree of caution should be exercised in generalizing the results.

This study originally proposed an anticipated *n* of 20, and the proposed statistical analyses of MANOVA or a series of one-way ANOVAs were contingent upon obtaining an *n* approximating 20, as well as the change scores reported by participants across the study duration.

However, due largely to the constraints inherent in an unfunded, time-limited treatment study, only 8 participants were involved. Further, of the eight participants involved in this research, only three presented to each session (including pre-testing, active IRT treatment sessions, post-testing, and follow-up). Inconsistent attendance resulted in a number of missing values, lack of follow-up data, and created a data set that would be impossible to evaluate though the originally proposed statistical analyses, or any other form of statistic. As a result, the study's observed outcomes may only be described through graphical and descriptive means.

Interpretation of change scores for each measure is considered in light of test developers' determination of cut-off scores for "clinical" significance. DDNSI (Krakow, 2002) total scores range from 0-37, and Krakow suggests scores of 20 or above are suggestive of presence of clinically significant nightmare disorder. The PTCI (Foa, et. al., 1999) total score has a range of 37-231, with higher values reflecting increased posttraumatic cognition. PSQI (Buysse, 1989) total scores range from 0-21, with scores above 5 suggesting possible clinical sleep impairment. Scores on the PCL-M (Weathers et. al., 1993) vary from 17-85, and scores at or above the 45-50 range are typically regarded as suggestive of possible presence of PTSD. In treatment settings, a reduction of 5 points is considered reliable, and a reduction of 10 points on the PCL-M is typically regarded as clinically significant improvement (Monson, et al., 2008). Consequently, each measure's respective score range is used in the data figures to allow for interpretation, rather than translating scores into a unified system of measure.

The hypotheses proposed for this study cannot be empirically evaluated, nor definitively supported or unsupported, due to the aforementioned constraints of the study. The causal phrasings of the hypotheses, in particular, render them inappropriate for a descriptive analysis. However, a general overview of anecdotally observed trends in relation to the spirit of these

hypotheses will be addressed. Trends should be considered in context of this study including very few participants and having limited generalizability, but relevant information can still be obtained about self-reported symptom severity and posttraumatic cognition for these individuals during their treatment and follow-up.

All Available Data

Figures 1.1-1.4 include the available data in the form of individual scores across the study duration for the DDNSI, PTCI, PSQI, and PCL-M, respectively. Both groups were included in this aggregate, although they completed the measures at different times. Additionally, the columns labeled with the measure acronym followed by "PRE" (e.g., "PTCI PRE") denote the initial pre-test scores of both A and B group participants during the initial pre-testing session. Participants in the delayed treatment group completed a second pre-test immediately preceding their course of active IRT treatment (displayed in Figures 2.1-2.4 and 3.1-3.4) that the immediate treatment group did not complete, and these scores are not included in Figures 1.1-1.4. The columns with a measure acronym followed by "POST" (e.g., "PTCI POST") indicate post-test scores for participants, but the measures were completed at different times for Group A participants than Group B participants. Also, the columns labeled with a measure acronym and "F/U" (e.g., "PTCI F/U") include follow-up data as available, and were completed at the same time for both groups. Figure 1.1. includes all available participants' DDNSI scores during the three sessions of active IRT treatment and at follow-up, with a range of 0-37. DDNSI scores above 20 imply presence of severe nightmare disorder. With respect to the PTCI, Figure 1.2. includes each participant's available total scores across administrations (pre-test, post-test, and follow-up) with a range of 33-231. Higher scores on the PTCI reflect intensifying posttraumatic cognitions. Figure 1.3. denotes each participant's available PSQI scores across study

administrations, with a range of 0-21. Scores above 5 are considered suggestive of poor sleep quality. Participants' PCL-M scores (with a range of 17-85) across administrations are included in Figure 1.4. Scores above 45-50 are suggestive of possible presence of PTSD. Reductions of 10 points or more on the PCL-M are typically regarded as indicating clinically significant change.

Figures 2.1-2.4 also include all available data for the participants in Group A and Group B, along with inclusion of the second administration of pre-testing for Group B that immediately preceded active IRT treatment. Here, the columns labeled with a measure acronym and "PRE" (e.g., "PTCI PRE") and those labeled with a measure acronym and "F/U" (e.g., "PTCI F/U") were completed at the same time by both groups. Columns labeled with a measure acronym and "PRE2" ("PTCI PRE2") indicate scores for B Group participants for pre-testing immediately preceding their course of active IRT treatment. Columns with a measure acronym and "POST" (e.g., "PTCI POST") include post-test data for participants, but were completed at different times for Group A than Group B. The aforementioned metric for cutoff scores is denoted in Figures 2.1-2.4 Figure 2.1 includes DDNSI scores for all participants at each active IRT session and at follow-up, as available. Figure 2.2 includes all available data points for the PTCI. This figure includes initial pre-test scores for both groups, the second pre-test completed by Group B participants immediately preceding active IRT treatment, post-test, and follow-up. All available participant data for the PSQI is presented in Figure 2.3. Raw scores at pre-test, the second pre-test for Group B participants, post-test, and follow-up are included. Figure 2.4 includes all available data for the PCL-M at pre-test, pre-test 2 for Group B participants, post-test, and follow-up.

Participants' scores on each of the four measures across the study's 12-week duration are presented in Figures 3.1-3.4. Here, the study's timeline in its entirety may be examined.

Participants in the A Group (immediate treatment) initiated their course of active IRT treatment immediately following pre-testing (Week 1-Week 3), and returned for follow-up on Week 12. Participants in Group B (delayed treatment) completed an initial session of pre-testing, and then served as a waitlist until after Group A had completed their course of IRT. In Week 6 of the study, Group B participants completed a second pre-testing, immediately preceding their course of active IRT treatment (Weeks 6-8). Group B participants returned for follow-up during Week 12 of the study. Of note, these figures include all available data, and do not exclude data for participants who dropped out or did not return for follow-up. Figure 3.1 includes DDNSI scores for participants during their active IRT treatment sessions, as well as follow-up (when available). Figure 3.2 includes each participant's available scores on the PTCI, across the 12-week duration. Individuals' scores on the PSQI are included in Figure 3.3, across study duration. Finally, Figure 3.4 presents participants' scores on the PCL-M during the 12 weeks.

Individual Cases

Due to the lack of alternative means of analyzing these findings, the following sections will discuss the progression of symptom reporting for each of the eight individuals involved in the study. Limited information may be available, as one participant dropped out after the first session, and three others did not return for the follow-up session. However, symptom trends at an individual level will be discussed to illustrate fluctuations in participants' self-report of symptoms during the study. Change scores will be presented in raw score format, as well as percentage change. Percentages are included to more fully illustrate fluctuations in self-reported symptom severity, as the DDNSI, PTCI, PSQI, and PCL-M are all on divergent scales. In other words, a relatively small fluctuation in raw score may reflect a minute change on one measure, or a clinically significant change on another. These sections will also outline any apparent

interactions between the measures on a case-by-case basis, pending availability of longitudinal information.

A1. Participant A1 was present for pre-testing, active IRT treatment sessions, and post-testing, but did not attend the follow-up session. Despite a series of follow-up phone calls, the study facilitator was unable to reach Participant A1 to assess his reason(s) for discontinuing participation. Figures 4.1-4.4 include all available data points for Participant A1 on the DDNSI, PTCI, PSQI, and PCL-M, respectively.

With respect to nightmares specifically, Participant A1 obtained a score of 23 at the first session of active IRT treatment. Krakow suggests a cut-off score of 20 for determining possible presence of a severe nightmare disorder, and Participant A1's scores meet the criterion (Figure 4.1). From the first to second sessions of active IRT treatment, Participant A1 obtained an 8-point (43.78%) increase on the DDNSI. His DDNSI scores dropped from the second to third session by 6 points (-16.13%). Although follow-up data on this measure is not available to form a coherent trajectory for Participant A1's nightmare severity, the existing data suggests that he experienced an increase in nightmare severity from Session 1 to Session 3. Here, it is important to note that other individuals completing IRT treatment often report increased severity of nightmares when they first begin the treatment, likely due to the seemingly paradoxical focus on nightmares (typically, avoided stimuli) and effects of increased awareness of nightmare presence, then tend to report decreases with time and practice. There is relatively little time for full effect of the imagery rescripting and rehearsal to take place at post-testing, as the participants do not initiate the intervention for their own nightmare until later IRT sessions. Thus, it is quite possible that any objective gains might not be present until the follow-up session. It is unclear if

Participant A1's subjective nightmare severity continued to decrease beyond Session 3 of active IRT treatment, or if the course varied.

This participant's scores on the PTCI are outlined in Figure 4.2. Participant A1's pre-test score on the PTCI was 146, and at post-test, Participant A1 obtained a score of 134 on the PTCI (a 12-point decrease in score, or -8.22%). It appears that Participant A1 experienced fewer subjective indicators of posttraumatic cognition from the pre-test session to post-test. Information about long-term trajectory of posttraumatic cognition is not available.

As for sleep quality, Participant A1's scores on the PSQI are denoted in Figure 4.3. At pre-test, Participant A1 obtained a score of 15 on the PSQI, well above the cut-off score of 5 suggested by Bussey as indicative of presence of clinically significant symptoms of sleep disturbance. By post-test, Participant A1 obtained a score of 17 on the PSQI (a 2-point increase, or +13.33%), suggesting this individual experienced increased subjective symptoms of sleep disturbance from pre-test to post-test.

Participant A1's scores on the PCL-M are included in Figure 4.4. At pre-test, he obtained a score of 73, suggesting he was experiencing subjective PTSD symptoms above the recommended cut-off of 40-45 (Weathers et. al.). At post-test, Participant A1's score on the PCL-M was 71 (a 2-point decrease, or -2.74%), suggesting slight improvement in subjective PTSD symptom severity from pre-test to post-test.

Overall, Participant A1 obtained mixed results during his IRT treatment phase. On one hand, he did endorse fewer indicators of posttraumatic cognitions and slightly fewer symptoms of PTSD by post-test. However, he indicated increased symptoms of overall sleep disturbance, as well as increased presence of nightmares at post-test. A number of factors could potentially account for these changes, including variables in the external environment, difficulty

implementing the IRT procedures, etc., but no specific identifiable factor(s) can be attributed without undue speculation. In general, this individual appeared to experience some subjective changes in symptom presentation, both for better and worse, during his time in IRT treatment.

A2. There is very limited data available for Participant A2, as he dropped out of the study after the first session. The study facilitator was unable to reach Participant A2 by phone to assess his reason(s) for not following up with the treatment. Figures 5.1-5.4 include the available pre-testing data for Participant A2.

Figure 5.1 includes Participant A2's score of 21 on the DDNSI, obtained during the first treatment session. Here, this individual indicated nightmare severity above the clinical cutoff recommended by Krakow, but the severity of his nightmares appears to be less prominent than his self-reported general sleep disturbance (PSQI) or PTSD symptom severity (PCL-M). Participant A2's pre-testing score on the PTCI was 119 (Figure 5.2). With regard to subjective sleep impairment, Participant A2's PSQI score is included in Figure 5.3. He obtained a score of 17 on the PSQI, suggesting he was experiencing considerable problems with his sleep quality at the time of pre-testing. Participant A2 obtained a score of 73 on the PCL-M at pre-testing—well above the standard cutoff score of 45 used to identify possible presence of PTSD (Figure 5.4).

Although no clear information is available from Participant A2 as to why he dropped out of the treatment after the first session, his scores on the aforementioned measures may reflect that his concerns with symptoms of PTSD or generalized sleep impairment were more prominent than his problems with nightmares. It is possible that his decision to drop out of IRT treatment may relate to a preference for addressing other PTSD symptoms, rather than focusing his treatment on nightmares at the time. However, this hypothesis cannot be verified as definitive rationale for Participant A2 dropping out.

A3. Participant A3 completed the active IRT treatment phase of the study, but did not return for follow-up. As was the case for other individuals that missed the follow-up session, Participant A3 could not be reached by the study facilitator to assess his reason(s) for discontinuing the study. However, data is available for this participant's self-reported functioning at pre-test and post-test, as well as during the active IRT treatment. Figures 6.1-6.4 include Participant A3's available scores on the DDNSI, PTCI, PSQI, PCL-M, respectively.

Participant A3's scores on the DDNSI during his active IRT treatment phase are included in Figure 6.1. At pre-test, Participant A3 obtained a score of 23 on the DDNSI, indicating that he perceived chronic nightmare impairments above the cutoff recommended for determining possible presence of severe nightmare disorders. During the second active IRT treatment session, Participant A3 obtained a DDNSI score of 20, suggesting slight decrease (-3 points, or -13.04%) in nightmare severity. Participant A3's DDNSI score during the third session was 21, reflecting a slight increase (1 point, or 5% increase) from the second session. Overall, Participant A3's DDNSI scores decreased during treatment (-2 points, or 8.68% decrease), suggesting that he experienced fewer symptoms of nightmares from the first session of active IRT treatment to the last. It is unclear if this small reduction in nightmare severity was maintained across time, however.

Scores at pre-test and post-test on the PTCI are presented for Participant A3 in Figure 6.2. This individual scored 166 on the PTCI at pre-test. At the time of post-test, Participant A3 obtained a score of 183 on the PTCI, indicating that he experienced a higher number of items reflecting posttraumatic cognition (+17 points, or a 10.24% increase).

Participant A3's scores on the PSQI are included in Figure 6.3. With respect to sleep impairment, Participant A3 obtained a score of 17 at pre-test, suggesting presence of clinically

significant sleep disturbance. He also obtained a score of 17 at post-test, indicating no perceived change in sleep quality at that time. This individual endorsed items in a manner that suggested problematic sleep function, even beyond the impairments expected for individuals with chronic nightmares.

As for PTSD symptom severity, Participant A3's scores on the PCL-M are presented in Figure 6.4. At pre-test Participant A3 obtained a score of 76, a score well above the standard cutoff score for determining possible presence of PTSD. At post-test, Participant A3's PCL-M score was 82, signifying a subjective increase in PTSD symptoms (+6 points, or 7.89% increase). Here, it appears that Participant A3 was experiencing more severe symptoms of PTSD at the time of post-testing. It is unclear what factor(s) contributed to this increase, although fluctuations in scores are commonplace due to environmental and temperamental factors.

In general, Participant A3 appeared to have some relative improvements during his treatment phase, as well as some intensifying symptoms. Although Participant A3 indicated increased posttraumatic cognitions and PTSD symptoms from pre-test to post-test, he also indicated decreased sleep disturbance and nightmare severity. Taken together, it appears that Participant A3's intensified posttraumatic cognitions and PTSD symptoms are not likely due to an increase in nightmares or sleep disturbance secondary to his involvement in IRT treatment. It is possible that Participant A3 encountered external factors (such as an anniversary date, financial or interpersonal strain, etc.) that contributed to an intensification of some PTSD symptoms, despite simultaneously experiencing some improvement in nightmares and general sleep quality.

A4. Participant A4 is one of four individuals that completed the active IRT treatment and follow-up in its entirety. Additional information about subjective long-term improvement or

deterioration is available for Participant A4, and lends valuable insight into his symptom trajectory. Participant A4's scores on the DDNSI, PTCI, PSQI, and PCL-M are presented in Figures 7.1-7.4, respectively.

As for nightmare-specific concerns, Participant A4's scores on the DDNSI are included in Figure 7.1. During the first session of active IRT treatment, Participant A4 obtained a score of 19 on the DDNSI. Although slightly below the cutoff score of 20 proposed by Krakow to identify possible presence of severe nightmare disorder, Participant A4 was reporting considerable difficulty with nightmares at treatment onset. By the second session of active IRT treatment, his score on the DDNSI dropped to 13—a 6-point, or 31.58% decrease from the first session. His score on the DDNSI increased slightly to 14 (+7.69%) at the third session. Participant A4's DDNSI score rose considerably from the third session of active IRT treatment to follow-up, as he obtained a score of 24 (a 10 point, or 71.43% increase). Overall, Participant A4 indicated increased nightmare severity from Session 1 of active IRT treatment to follow-up (a 5-point, or 26.32% increase).

Figure 7.2 includes Participant A4's scores on the PTCI at pre-test, post-test, and follow-up intervals. At pre-test, Participant A4 obtained a score of 116. However, at post-test, this participant endorsed a higher proportion of items, and obtained a score of 142 (a 26-point or 22.41% increase). By follow-up, Participant A4 obtained a score of 134, a 9-point or 5.63% decrease from post-test. Overall, this individual indicated a higher proportion of posttraumatic cognitions from pre-test to follow-up (a 18 point, or 15.52% increase).

Participant A4's scores on the PSQI are denoted in Figure 7.3. At pre-test, Participant A4 obtained the measure's maximum score of 21, suggesting severe subjective symptoms of sleep impairment. At post-test, Participant A4's PSQI score dropped to 18 (a decrease of 3 points, or

14.29% decrease), suggesting some improvement in sleep quality. However, by follow-up, Participant A4 obtained a score of 20—again nearly maxing the possible impairment index. Although slight, Participant A4 did appear to obtain some decrease in perceived sleep impairment from pre-test to follow-up (a 1-point decrease, or -4.67%).

Scores on the PCL-M for Participant A4 are presented in Figure 7.4. With respect to PTSD symptom severity, Participant A4 obtained a score of 55 at pre-test, and his score was above the recommended cutoff for determining possible presence of PTSD. By post-test, Participant A4's score rose to 57 (a 2-point, or 3.64% increase). At follow-up, this individual obtained a score of 62—a 5-point or 8.77% increase from post-test. Overall, Participant A4's self-report of PTSD symptom severity increased by 7 points, or 12.73%, from pre-test to follow-up.

Participant A4's scores reflect increases in his perceived nightmare severity, posttraumatic cognition, and PTSD symptom severity from pre-test to follow-up. Somewhat divergently, Participant A4 obtained a slight decrease in overall sleep impairment during the same period of time. This individual appeared to obtain some relief from nightmares during active treatment. He also indicated improvement in overall sleep quality during his active treatment phase, despite reporting increased posttraumatic cognition and a slight increase in PTSD symptom severity. However, during the period of time between post-test and follow-up, Participant A4 appeared to experience increases in sleep impairment, PTSD symptoms, and nightmare severity, relative to his self-reported functioning at post-test. This pattern is peculiar in the sense that he indicated a decrease in posttraumatic cognition by follow-up, but seemingly paradoxical increase in overall PTSD symptoms. Although there is no clearly defined rationale for this trend, Participant A4 appeared to have a marked increase in nightmare severity once the

treatment phase ended. The relative presence or absence of PTSD symptoms (including nightmares) can fluctuate in response to environmental factors, as well as internally or psychologically-oriented factors. It is possible that increased presence of nightmares could elevate PCL-M scores, or conversely, increases in other PTSD symptoms could intensify nightmare severity. A causal mechanism for this change is unclear, however.

A5. Participant A5 was another of the four individuals that completed all the active IRT treatment and follow-up sessions. Information about subjective long-term improvement or deterioration is available for Participant A5, and lends valuable insight into his symptom trajectory. Somewhat divergently from other participants in this study, Participant A5 indicated lesser preliminary symptom severity on the four measures than other participants. Participant A5's scores on the DDNSI, PTCI, PSQI, and PCL-M are included in Figures 8.1-8.4, respectively.

Figure 8.1 illustrates Participant A5's scores on the DDNSI during his active IRT treatment phase and at the follow-up session. At the initial session of active IRT treatment, Participant A5 obtained a score of 11 on the DDNSI, and is below the cutoff score of 20 suggested by Krakow to determine possible presence of severe nightmares. During the second session of active IRT treatment, Participant A5 obtained a score of 13 on the DDNSI (an 18.18% increase), followed by a score of 12 during the third session (a 7.69% reduction from Session 2). At follow-up, Participant A5 obtained a score of 11, indicating no change in subjective nightmare severity from Session 1 to follow-up. Overall, this individual indicated some sub-threshold problems with nightmares during the first session of active IRT treatment, and no change in this symptom at follow-up.

Figure 8.2 denotes participant A5's PTCI scores at pre-test, post-test, and follow-up. At pre-test, Participant A5 obtained a score of 90 on the PTCI, suggesting Participant A5 started the study with less indicators of posttraumatic cognitions than other participants. At post-test, Participant A5 obtained a PTCI score of 59—a 31-point or 34.44% reduction from pre-test. However, at the time of follow-up testing, this participant obtained a score of 83 (an increase of 24 points, or 40.68% increase from post-test). Overall, Participant A5's scores on the PTCI decreased from pre-test to follow-up (-7 points, or -7.78%).

As for general sleep quality, Participant A5's scores on the PSQI are included in figure 8.3. At pre-test, Participant A5 obtained a score of 7, suggesting poor self-reported sleep quality. Participant A5's score on the PSQI increased to 8 at post-test (a 14.29% increase), then dropped to a score of 3 at follow-up (a 5-point decrease, or 62.58% reduction from post-test). Overall, Participant A5 indicated better sleep quality by the follow-up session, reflected in a 57.16% (4-point) reduction from pre-test to follow-up. Again, Participant A5 entered the study reporting lesser degrees of impairment on this measure than other participants, but did appear to obtain improvements in his general sleep quality during the time he was involved in the study.

Participant A5's scores on the PCL-M are shown in Figure 8.4. As was the case for posttraumatic cognition, this individual's endorsement of items on this measure did not at any time during the study yield scores above the commonly accepted cutoff for determining possible presence of PTSD with this measure. From pre-test to post-test, Participant A5's scores on the PCL-M dropped from 36 to 29 (-7 points, or a 19.44% reduction). By follow-up, this individual obtained a score of 24 on the PCL-M—a 5-point or 17.24% reduction from post-test. Overall, Participant A5 indicated fewer symptoms of PTSD on the PCL-M from pre-test to follow-up (a 12-point or 33.33% reduction). Again, it is important to note that this participant's score at pre-

test was below the recommended cutoff score in assessing possible presence of PTSD with the measure. However, obtaining scores below the generally accepted cutoff score should not be misinterpreted as definitive evidence that this individual does not meet diagnostic criteria for PTSD.

Participant A5's overall endorsement of problems is unique, relative to other participants in the study. For example, he indicated presence of some problems with nightmares during the initial session, but did not endorse items in a manner suggestive of "severe" difficulty with nightmares. His participation in this study, however, was set in motion by subjectively perceived problems with nightmares and/or the recommendation of a treating professional in the PTSD Clinical Team. Despite having scores below the recommended cutoff for "severe" nightmares, his very involvement in the study is due to problematic nightmares. Additionally, his scores on the PCL-M are below the recommended cutoff score for determining possible presence of PTSD. However, all participants in this study were recruited from the existing patient pool in the PTSD Clinical Team. These patients were previously evaluated by Clinic Staff for presence of PTSD, and were determined to meet diagnostic criteria prior to acceptance in the PTSD Clinic. In other words, mental health professionals determined that Participant A5's symptoms met diagnostic criteria for PTSD or Anxiety Disorder Not Otherwise Specified (with PTSD features), although it is possible that Participant A5 may not currently report symptoms of sufficient severity to warrant a continued diagnosis or there may be underreporting of objectively present symptoms. The purpose of this study is to evaluate the response of veterans diagnosed with PTSD to IRT treatment, rather than evaluate the relative presence or absence of PTSD. This logic calls into question the accuracy of item endorsement, although no definitive evidence to that effect can be determined. Overall, Participant A5 indicated reductions in posttraumatic cognition, sleep

disturbance, and PTSD symptom severity from pre-test to follow-up. He indicated problems with nightmares that intensified briefly, then returned to baseline functioning by follow-up. It seems that Participant A5 perceived some benefit and improvement in functioning during the time he was involved in the study.

B1. Participant B1 was one of two individuals in the delayed treatment group, or one of the four overall participants, who completed the study from pre-test to follow-up. He was absent for the second session of active IRT treatment due to illness, but was able to complete all other testing intervals. Despite missing a session, the availability of pre-test data, data from the second pre-test immediately preceding active IRT treatment, post-test, and follow-up information provides useful information about his symptom trajectory during the study. During the time between pre-testing intervals, the participants in the B group (delayed treatment) served as a waitlist. They continued their typical treatment plans, such as therapy services through the VA, but were not involved in any treatments that specifically focused on nightmares. Participant B1's scores on the DDNSI, PTCI, PSQI, and PCL-M are presented in Figures 9.1-9.4, respectively.

This participant's scores on the DDNSI are included in Figure 9.1. Of note, Participant B1 was absent for the second session of active IRT treatment due to illness, and no data is available for that interval. During the first session of active IRT treatment, Participant B1 obtained a DDNSI total score of 24, suggesting presence of severe nightmare disorder. His score decreased to 14 during the third session of active IRT treatment, and was 17 (21.43% increase) at the follow-up session. Overall, Participant B1 indicated a considerable improvement in nightmare severity during the course of the study. His DDNSI scores decreased 29.17% from the initial session of pre-testing to follow-up. Additionally, Participant B1's scores no longer met the

cutoff for determining possible presence of severe nightmare disorder by post-test, and remained below the threshold at follow-up.

Figure 9.2 includes Participant B1's scores on the PTCI at pre-test (study onset), the second pre-test administered to Group B (delayed treatment) participants immediately preceding their active IRT treatment course, post-test, and follow-up. At pre-test, Participant B1 obtained a score of 104 on the PTCI. Participant B1 also completed the second administration of pre-testing (labeled "PTCI PRE 2 in Figure 9.2), immediately preceding active IRT treatment, and obtained a score of 108. Although there was a slight increase (3.85%) in PTCI scores from baseline to the second pre-test, there was no marked change in self-reported posttraumatic cognition. At post-test, Participant B1 obtained a score of 151 on the PTCI, suggesting a relative increase in posttraumatic cognition (+37.48%). By follow-up, Participant B1's score on the PTCI decreased to 143 (a 8-point or 5.30% decrease). Overall, Participant B1 indicated a 37.50% increase in posttraumatic cognition from baseline to follow-up.

Participant B1's scores on the PSQI are included in Figure 9.3. At baseline ("PSQI PRE" in Figure 9.3), Participant B1 obtained a score of 14 on the PSQI, indicating poor overall sleep quality. By the second pre-testing session, Participant B1's score decreased slightly to 13 (-7.14%). However, this change is not suggestive of a striking difference in sleep functioning between the pre-testing sessions. At post-test, Participant B1 again obtained a score of 13. His score on the PSQI was again 13 at follow-up, suggesting no change from post-test. Although Participant B1's sleep functioning did appear to improve slightly during the course of the study, the only change in scores took place prior to his engagement in the IRT treatment, suggesting external variables better account for the change.

Figure 9.4 denotes Participant B1's scores on the PCL-M. During the initial pre-testing session, he obtained a score of 66 on the PCL-M, and his score was above the recommended cutoff for determining possible presence of PTSD. At the pre-testing immediately before active IRT treatment, Participant B1 obtained a score of 64 on the PCL-M. Despite a slight decrease (-3.03%), there was no marked change in his scores during the waitlist period. Participant B1's score on the PCL-M rose to 69 (a 7.81% increase) at post-test, suggesting some intensification of symptoms during that time. By follow-up, Participant B1's PCL-M score fell to 63 (-8.70% from post-test). Overall, this individual appeared to obtain some slight improvement in self-reported PTSD symptoms during the course of the study. From baseline, Participant B1's score decreased by 3 points at the follow-up session (-4.55%). However, this individual also appeared to experience a slight decrease in PTSD symptoms during the period of time that he was not receiving any active IRT treatment (but may have been engaged in other mental health treatment), suggesting no significant change in perceived PTSD symptoms from pre-test to follow-up.

Participant B1's symptom trajectory was somewhat unexpected. Although he reported intensifying posttraumatic cognition, his self-report of nightmare severity decreased considerably, and his PTSD symptom severity and sleep impairments decreased somewhat, as well. This pattern is unusual in the sense that despite improvement or relative stability in symptoms, cognition appeared to paradoxically progress in the opposite direction. It is possible that the act of self-monitoring and being attuned to cognitive processes improved objective appraisals of trauma-related cognition with time, or there was a legitimate intensification of PTSD-congruent beliefs. The change mechanism here is unclear, but this pattern is nonetheless unusual.

B2. Participant B2 is the second individual from the delayed treatment group, or last of four overall participants, to complete the study in its entirety. This participant attended all sessions, providing helpful information about fluctuations in symptom presentation during the course of this study. Participant B2's scores on the DDNSI, PTCI, PSQI, and PCL-M are presented in Figures 10.1-10.4.

Participant B2's scores on the DDNSI are included in Figure 10.1. This individual entered active IRT treatment with a score of 17, suggesting presence of problems with nightmares, but below the cutoff of 20 suggested by Krakow for determining presence of severe nightmare disorder. During the second session of active IRT treatment, Participant B2's score decreased by 1 point (-5.88%) to a score of 16 on the DDNSI. At Session 3 of active IRT treatment, this individual again indicated a decrease in nightmare severity, and obtained a score of 13 (a 18.75% decrease from Session 2). However, by follow-up, Participant B2 indicated a return to his baseline score of 17, or a 30.77% increase from Session 2. In general, this individual's endorsement of DDNSI items suggested some improvements in nightmare severity during his active IRT treatment phase, but by follow-up, this improvement did not appear to be retained.

This individual entered the study with a PTCI score of 158 (Figure 10.2). There was minimal (-1 point, or 0.63% reduction) change in his PTCI score from the initial pre-test to the pre-test immediately preceding his involvement in active IRT treatment. This relative stability suggests no significant change in posttraumatic cognition during the waitlist period. By post-test, Participant B2's score on the PTCI dropped to 138 (a 20-point or 12.66% reduction from his initial pre-test score). At follow-up, Participant B2 obtained a PTCI score of 93—a 32.61% decrease from post-test, or a 65-point (41.14%) reduction from his initial pre-test. It appears that

this participant experienced a marked decrease in subjective indicators of posttraumatic cognition.

Participant B2's scores on the PSQI are included in Figure 10.3. During the initial pre-testing session, he obtained a score of 16, suggesting presence of subjectively poor sleep quality. However, by the pre-testing immediately preceding active IRT treatment, his score dropped to a 10 (a 36.50% decrease). Although still above the cutoff for scores reflecting poor sleep quality, this is a considerable reduction from baseline. Again, participants in the delayed treatment group did not receive any nightmare-focused intervention during the time between baseline pre-test and the pre-testing immediately preceding active IRT treatment. At post-test, Participant B2 obtained a score of 10 on the PSQI, indicating no perceived change in overall sleep quality. By follow-up, his score increased to 11 (a 10% increase from post-test). Overall, it appears that this participant's sleep quality improved somewhat from the baseline assessment to follow-up (a 5-point, or 31.25% decrease). However, it is important to note that the most marked reduction in his sleep disturbance occurred prior to the active IRT treatment, suggesting that external factors account for the majority of change for this individual.

Figure 10.4 displays Participant B2's scores on the PCL-M. Participant B2 obtained a score of 66 on the PCL-M at baseline pre-test, and his score was above the cutoff typically used for determining possible presence of PTSD symptoms. This individual's PCL-M score decreased to 49 (-25.76%) at pre-testing immediately preceding active IRT treatment. Again, this decrease in score took place when the participant was not engaged in active nightmare-focused treatment. At post-test, his score on the PCL-M was again 49, suggesting no perceived change in PTSD symptoms from the second pre-testing session. However, at follow-up, Participant B2 obtained a score of 38 on the PCL-M—this decrease was 22.44% lower than post-test, and was 42.42%

lower than his initial pre-testing PCL-M score. In general, this individual appeared to obtain considerable reduction in PTSD symptom severity during the time of this study. However, it is important to note that the change preceding active IRT treatment was larger than that following active IRT treatment, suggesting external variables better account for the initial change.

Overall, Participant B2 obtained mixed positive results during the course of this study. He indicated considerable improvement in posttraumatic cognition (41.14% reduction from pre-test to follow-up), overall sleep quality (31. 25% reduction from pre-test to follow-up), and PTSD symptom severity (42.42% reduction from pre-test to follow-up). However, it appears that these improvements are not secondary to reduction in nightmare severity, as Participant B2 indicated only temporary reduction in nightmare severity, followed by a return to his baseline functioning. This pattern suggests that although there seem to be factors contributing to improvement in Participant B2's functioning during the course of the study, it is unlikely to be a result of improvement in nightmares, and is better accounted for by external factors. As mentioned earlier, there is typically a correlation between sleep quality and PTSD symptoms. It is possible that improvement related to other PSTD symptoms—for example, hypervigilance—could contribute to improvement in general sleep quality, or vice versa. Reductions in problematic symptoms could contribute to reconciliation of some PTSD-congruent cognition. This hypothesis is not definitively supported by any means, but could explain how this participant could apparently obtain treatment gains in other areas, but retaining difficulty with nightmares.

B3. Participant B3 was present for the initial pre-testing session, the three sessions of active IRT treatment, and post-testing, but was absent for the second administration of pre-testing immediately preceding active IRT treatment for Group B, as well as the follow-up

session. The study facilitator was unable to reach Participant B3 to gather information about his reason(s) for not attending the follow-up session. The available information for Participant B3's scores on the DDNSI, PTCI, PSQI, and PCL-M are presented in Figures 11.1-11.4.

This individual's scores on the DDNSI during active IRT treatment are presented in Figure 11.1, but no follow-up information is available. During the first session of active IRT treatment, Participant B3 obtained a score of 27 on the DDNSI, suggesting presence of severe nightmares and reflecting the highest pre-test DDNSI score for participants involved in the study. At Session 2 of active IRT treatment, this individual indicated a slight decrease in nightmare severity, and obtained a score of 26 (3.70% decrease). There was no change in DDNSI scores for Participant B3 from Session 2 to Session 3. In general, this individual indicated only slight decrease in nightmare severity during the course of active IRT treatment. However, without follow-up data available, long-term trajectory of nightmare severity is unknown.

Figure 11.2 includes Participant B3's PTCI scores at the initial pre-testing session, and at post-test. This participant was absent for the second session of pre-testing administered to Group B immediately preceding active IRT treatment, and was also absent for the follow-up session. At pre-test, Participant B3 obtained a score of 201 on the PTCI—the highest score relative to other participants involved in the study. At post-test, Participant B3 obtained a score of 216 on the PTCI, reflecting a 7.46% increase from pre-test. The long-term trajectory of this participant's self-reported posttraumatic cognition is not known due to lack of follow-up data. It appears that during the course of the study, this individual perceived a heightened degree of posttraumatic cognition.

Participant B3's scores on the PSQI are presented in Figure 11.3. This participant obtained a score of 17 at pre-test, suggesting presence of poor general sleep quality. By follow-

up, Participant B3's score decreased by one point for this measure, reflecting a 5.88% decrease from pre-test. Although a slight improvement in sleep quality was indicated by Participant B3, no marked improvement was observed.

With regard to PTSD symptoms, Participant B3's scores on the PCL-M are included in Figure 11.4. At pre-test, this individual obtained a score of 81 on the PCL-M—well above the cutoff for determining possible presence of PTSD, and the highest score obtained by study participants. At post-test, Participant B3 obtained a score of 74 on the PCL-M, reflecting a 8.64% decrease from baseline. Here, Participant B3's 7-point reduction in PTSD symptom severity suggests that he perceived some relief from symptoms, but continued to experience severe PTSD symptoms.

Participant B3 entered the study reporting problems with posttraumatic cognition and PTSD symptoms that were more intense than the other study participants. He also indicated problems with poor sleep quality, as well as presence of severe nightmares. Overall, his report of problematic symptoms decreased somewhat from pre-test to post-test for nightmares (-3.70%), general sleep quality (-5.88%), and PTSD symptoms (-8.64). However, he indicated intensification of posttraumatic cognition during the same timeframe (+7.46%). Participant B3 is unique in the sense that he reported the most intense problems with posttraumatic cognition, PTSD symptoms, and nightmares at pre-test, relative to other participants in the study. Given the extent to which he reported problematic PTSD symptoms—4 points below the maximum value for the measure at pre-test—it is prudent to consider that the extent of problems with PTSD symptoms other than nightmares could have limited potential benefit in this domain. For this individual specifically, the degree of perceived problems with PTSD symptoms far exceeded his concerns related to nightmares, although he did enter the study reporting severe nightmares. It is

quite possible that impairments related to other PTSD symptoms would potentially limit this individual's ability to engage in this treatment modality. Despite ongoing difficulty with PTSD symptoms, poor sleep quality, and nightmares, this individual did obtain some relief from symptoms during the course of the study. It is possible that external or personal factors changed during that time, allowing for some reduction in symptoms, despite intensifying posttraumatic cognition.

Discussion

Taken together, the findings of this study are not sufficient to definitively offer a position of relative support or non-support for the original hypotheses. There were a total of five hypotheses proposed, but only limited information is available, due largely to the constraints of such a small sample of participants and incomplete data. Each of the five original hypotheses—related to nightmare severity, sleep disturbance, posttraumatic control appraisals, subjective symptoms of PTSD, and long-term retention—will be described in the follow sections, along with considerations for possible contributing factors in the observed trends.

H1: The first hypothesis, "IRT intervention for posttraumatic nightmares will significantly reduce veteran participants' nightmare distress and frequency," is perhaps the most central line of inquiry for this particular intervention. Unfortunately, only limited outcome information is available for the participants involved in the study (Figures 1.1, 2.1, and 3.1). Of the seven participants who attended more than one active IRT treatment sessions, five indicated at least some improvement in nightmare distress and severity by the third session (Participants A3, A4, B1, B2, and B3; Figures 6.1, 7.1, 9.1, 10.1, and 11.1). Two participants indicated increases in nightmare distress and severity during the course of active IRT treatment (Participants A1 and A5; Figures 5.1 and 8.1). However, with respect to course, by the time of

follow-up, two participants indicated a return to baseline (Participants A5 and B2; Figures 8.1 and 10.1), one participant displayed an increase in nightmare distress and severity (Participant A4; Figure 7.1), and one participant indicated a marked reduction in nightmares (Participant B1; Figure 9.1).

Although unexpected, given previous research in IRT (Krakow & Zadra, 2006; Nappi, et. al., 2009) generally supporting its efficacy, there are a number of reasonable explanations as to how such a pattern could manifest. First, it is important to understand that this treatment relies on practice—without sufficient engagement and rehearsal outside the therapy session, any improvement in nightmare distress is unlikely. Given the overall pattern of perceived decreases in nightmare distress and frequency at post-test, this reasoning seems to be quite plausible. During active IRT treatment, participants are instructed to practice the imagery rehearsal and rescripting techniques at home, on a daily basis. Participants' engagement in the treatment would be reasonably enhanced by accountability of attending the weekly appointments and reporting relative successes and difficulties, and in that sense active treatment serves as a source of external motivation. However, during the period of time between post-test and follow-up, participants were no longer receiving the structured IRT intervention on a weekly basis, and although they are instructed to continue practicing the techniques, there is limited external accountability for enacting that practice. It is feasible that participants who discontinued the practice also discontinued what benefits may have been reaped from the intervention, whereas the participant(s) who continued to engage in rehearsing the rescripted nightmares retained benefit or continued to obtain improvements.

Second, post-test data may not fully capture long-term changes in nightmare distress, due to the short amount of time that the participants would have actively engaged in the intervention

"target" of rehearsing rescripted nightmare content. Typically, the active IRT sessions do not initiate rehearsal of a person's rescripted nightmare content until the next-to-last or last session. Post-testing took place during the final session of active IRT treatment for both groups. Thus, participants had been rehearsing the rescripted nightmare content for a short period of time—perhaps too short a timeframe for any observable effects to take place. It would be reasonably anticipated that any marked change might not be observed until some time had passed following post-testing, after a participant had the opportunity to enact the intervention across time.

Other issues may better explain the unanticipated pattern of nightmare severity, and merit consideration, as well. For example, a potential weakness of this study is the reliance on self-report measures, including the DDNSI. This measure is very helpful in determining *perceived* markers of nightmare severity, assuming the individual completing the measure is a reliable reporter. Also, a secondary function of IRT intervention is the development of awareness, and the seemingly paradoxical focus on nightmare frequency, severity, etc. affords participants opportunity to become increasingly aware of the presence of nightmares in a detailed format. It is quite possible that with continued involvement in IRT treatment, participants developed enhanced reflectivity about the presence of nightmares, and effects that nightmares have on their overall functioning. In other words, participants may have developed a more accurate appraisal of nightmare qualities when they were asked to indicate them weekly, as opposed to relying on a post hoc analysis of the qualities from distant memory. Alternatively, it may well be the case that these participants did actively engage in the intervention and in general, still did not obtain a reduction in nightmare severity.

H2. The second hypothesis, "posttraumatic control appraisals will be modified by completing IRT," refers to scores on the PTCI and relates to the concept of control appraisals

(Figures 1.2, 2.2, and 3.2). Here, increasing scores are reflective of higher endorsement of trauma-related cognition and beliefs. These trauma-related cognitions are used to illustrate the previously discussed concept of control appraisals, where decreasing scores would reflect movement toward appraisals of relative self-efficacy. Although this hypothesis was not framed directionally, in this sample there still remains no means of offering evidence of definitive support or non-support for any causal change function attributable to control appraisals. However, general trends observed in the available data will be outlined, along with discussion of issues that would likely influence changes in control appraisals.

Overall, four participants endorsed more indicators of posttraumatic cognitions from pre-test to post-test (Participants A3, A4, B1, and B3; Figures 6.2, 7.2, 9.2, and 11.2), whereas three participants endorsed fewer (Participants A1, A5, and B2; Figures 4.2, 8.2, and 10.2). At follow-up, two participants obtained lower scores on the PTCI than at pre-test (Participants A5 and B2; Figures 8.2 and 10.2), and two obtained higher scores on the PTCI compared to their pre-test scores (Participants A4 and B1; Figures 7.2 and 9.2). For the participants with follow-up data available, those who obtained a decrease in their PTCI score at post-test appeared to maintain a decrease at follow-up, compared to pre-test, and those who obtained an increase at post-test also indicated an overall increase at follow-up. In general, those participants who also indicated lower scores on the PCL-M (Figure 1.4) during the study also tended to indicate a decrease in posttraumatic cognitions on the PTCI, but participants who obtained increases on the PTCI also tended to report increased PTSD symptom distress on the PCL-M. However, there does not appear to be strong evidence that IRT intervention initiated a dramatic shift in posttraumatic cognition, nor evidence supporting the hypothesis that changes in control appraisals could

account for the improvements in other PTSD symptoms following IRT that have been reported by other researchers in the IRT literature.

The inclusion of PTCI scores was an effort to gain insight into the role of cognition (control appraisals) in IRT intervention. Unfortunately, the small sample size and missing follow-up data limits interpretive potential. Although no definitive information can be reported, there appeared to be some relationship between posttraumatic cognition and PTSD symptoms for the individuals involved in this study. Specifically, the three participants who obtained lower PTCI scores at post-test also obtained lower scores on the PCL-M, and three of the four participants who obtained higher scores on the PTCI at post-test also indicated higher scores on the PCL-M. Somewhat surprisingly, there was a generally inverse pattern for PTCI scores and DDNSI scores—at the time of post-test, two of three participants who obtained a lower score on the PTCI indicated an increase in DDNSI scores, whereas the four participants who obtained a higher score on the PTCI at post-test indicated a decrease in DDNSI scores (Figures 1.1 and 1.2). Anecdotally, there appeared to be a tendency for increasing posttraumatic cognition to correspond with reduced nightmare severity, and vice versa, for these study participants.

Here, the PTCI is somewhat unique, relative to the other three measures, in the sense that it asks respondents to indicate their level of agreement with a series of statements reflecting thoughts and beliefs, whereas the other measures ask for endorsement of symptoms (either in terms of distress caused by symptoms or frequency). In this study, the PTCI is the most abstract measure and perhaps the most subjective, as its content reflects cognition and beliefs commonly indicated by people who have PTSD, rather than asking relatively concrete questions about the absence or presence of problematic symptoms. That notion serves as both a strength and

weakness of the measure for this study, as the measure assesses concepts that are subtle indicators of PTSD, but also relies on a degree of abstraction.

The idea of priming to cognitive processes is also appropriate to consider. Participants would likely be attuned to the common symptoms of PTSD, as individuals receiving treatment for PTSD are routinely provided psychoeducation about symptoms they may find problematic. However, there is some divergence in the area of beliefs or cognitions associated with PTSD, such as those presented in the PTCI. Individuals receiving Evidence-Based Psychotherapies (EBPs) for PTSD, such as Prolonged Exposure Therapy or Cognitive Processing Therapy, or psychotherapy that is cognitively-oriented would routinely be introduced to the role of cognition and/or beliefs in PTSD, whereas individuals with PTSD receiving other treatment modalities are less likely to be aware of the beliefs common to people with PTSD. In this study, five of eight participants had completed an EBP for PTSD previously, and three had no indication of receiving a cognitive or cognitive-behavioral intervention. Of note, the three participants who indicated a decrease in PTCI scores at post-test had previously completed an EBP for PTSD, whereas three of the four participants who obtained an increase in PTCI scores at post-test had not completed an EBP for PTSD. The pattern observed for this group of individuals seems to suggest a relationship between previous engagement in treatment that involves a cognitive component and changes in posttraumatic cognition following IRT intervention, although definitive evidence to that effect is not available. Nonetheless, for this group of individuals, those who received previous trauma-focused treatment tended to obtain reductions in posttraumatic cognition following IRT intervention, compared to those who had not completed a cognitively-oriented intervention.

H3. The third hypothesis, "sleep disturbance symptoms will improve in response to IRT intervention," relies upon information obtained from participants' PSQI scores (Figures 1.3, 2.3, and 3.3). Again, there is not sufficient evidence to either support or disconfirm the causal mechanism imbedded in this hypothesis, given a lack of available data. Overall, four of the seven participants who completed post-testing indicated a reduction in symptoms of sleep disturbance from their baseline functioning (Participants A4, B1, B2, and B3; Figures 7.3, 9.3, 10.3, and 11.3), whereas two participants indicated an increase in symptoms of sleep disturbance (Participants A1 and A5; Figures 4.3 and 8.3), and another indicated no change (Participant A3; Figure 6.3). Additionally, movement in either direction at post-test on the PSQI also seemed to correspond with changes in nightmare severity (DDNSI)—both participants who indicated an increase on the PSQI also obtained increases on the DDNSI, and four of the five participants who indicated a decrease on the DDNSI also obtained a decrease on the PSQI at post-test (Figures 1.1. and 1.3). At follow-up, all four individuals indicated a decrease in symptoms of sleep disturbance from their baseline functioning, including one individual who had shown an increase at the time of post-testing (Participants A4, A5, B1, and B2; Figures 7.3, 8.3, 9.3, and 10.3).

Despite being unable to offer a definitive position of support or non-support for this hypothesis, follow-up data suggests that there was a general trend of improved sleep quality during the time participants were involved in the study. This observation is consistent with previous research in IRT indicating a trend of improved sleep quality following IRT intervention (Krakow & Zadra, 2006; Nappi, et. al., 2009; Krakow et al., 2001; Krakow, et al., 1995). However, it is also important to note that external factors likely contributed to much of the improvement observed in this study, at least for some participants. For example, Participant B2

obtained a considerable decrease in PSQI score from the initial pre-testing to follow-up (Figure 1.3). Upon closer examination, however, the majority of improvement in sleep quality obtained by Participant B2 took place between the pre-testing sessions—prior to his course of active IRT treatment (Figures 2.3 and 10.3). This observation points to some external factor accounting for the change more so than his improvement in sleep quality resulting from IRT treatment.

One possible explanation may lie in the study design. As outlined earlier, the study was originally designed to isolate effects of the imagery rescripting and rehearsal portion of IRT treatment from the gains that might be obtained from instruction in sleep hygiene. Study participants did receive both of these components, but received the sleep hygiene portion before entering the study. Some of the considerable improvement (a 6-point reduction on a measure with a range of 0—21) obtained by Participant B2 between pre-testing sessions may be the result of enacting changes in sleep habits, as presented in the sleep hygiene portion of the treatment (before entering the study). Participant B2 had approximately six weeks to enact these changes prior to the second pre-testing session immediately before he began active IRT treatment, and gains may have related to an improvement in sleep habits.

Alternatively, there may be other external factors that better account for the change. For example, Participant B2 also obtained a marked reduction in PCL-M score during the same timeframe (between pre-testing sessions). It is quite plausible that improvement(s) in PTSD symptoms allowed for improved sleep quality, or improved sleep quality reduced the severity of some PTSD symptoms. There is no directional presumption here, as it is possible that resolution of some external source of stress—such as financial difficulty or a strained relationship—could reasonably result in a reduction in PTSD symptom severity. It is also very possible that a combination of external factors and benefit from involvement in the IRT treatment both

contributed to this participant's improvement, as well as the improvements indicated by other participants. Overall, there did appear to be a tendency for participants who returned for follow-up to report improvement in sleep quality during the course of this study, even when they obtained increases on other measures.

H4. The fourth hypothesis, "subjective symptoms of PTSD will be improved by completing IRT," refers to participants' scores on the PCL-M (Figures 1.4, 2.4, and 3.4). Other research in IRT has noted a tendency for individuals that complete IRT to obtain reductions in other PTSD symptoms (Krakow et al., 2001) and inclusion of this hypothesis was an attempt to establish the relative contribution of the imagery rescripting and rehearsal portion of IRT to this phenomenon. However, the aforementioned small sample size and missing data does not afford opportunity to offer a definitive position. Overall, four participants obtained a decrease in PCL-M scores from pre-test to post-test (Participants A1, A5, B2, and B3; Figures 4.4, 8.4, 10.4, and 11.4) and three participants obtained an increase in PCL-M scores during the same timeframe (Participants A3, A4, and B1; Figures 7.4 and 9.4). From pre-test to follow-up, one participant indicated an increase in PTSD symptoms (Participant A4; Figure 7.4) and three obtained a reduction in PCL-M scores, including one participant that had indicated an increase at post-test (Participants A5, B1, and B2; Figures 8.4, 9.4, and 10.4).

The PCL-M is the only measure included in this study with a previously established standard of determining response to treatment. A change of 5 points on the PCL-M is considered reliable (Monson, et. al, 2008) and a change of more than 10 points is considered clinically significant (Weathers, et. al., 1993). In this study, one participant obtained a reliable (6-point) increase from pre-test to post-test, two obtained a reliable (7-point) decrease from pre-test to post-test, and one obtained a clinically significant (17-point) decrease from pre-test to post-test

(Figure 1.4). However, the participant that obtained a clinically significant decrease during this timeframe—Participant B2— indicated that the change took place between pre-testing sessions, rather than during the time he was involved in active IRT treatment (Figures 2.4, 3.4, and 10.4). From post-test to follow-up, one participant obtained a reliable (5-point) increase, two obtained a reliable (5-point and 6-point) decrease, and one obtained a clinically significant (11-point) decrease (Figure 1.4.). Here, Participant B2 again obtained the clinically significant decrease (Figures 2.4, 3.4, and 10.4), suggesting there were benefits obtained from either changes in external factors, improvement due to IRT intervention, or some combination of both. For the four individuals with follow-up data available, one obtained a reliable (7-point) overall increase in PCL-M scores, and two obtained clinically significant (12-point and 28-point) decreases in their PCL-M scores from pre-test to follow-up (Figures 1.4 and 2.4).

Overall, there appeared to be a general tendency for participants to obtain a decrease in PCL-M scores during their time in this study. As was the case for posttraumatic cognition or control appraisals, participants who previously completed an EBP for PTSD tended to obtain more favorable results at post-test than the participants who had not completed an EBP previously. The four participants who indicated a reduction in PTSD symptom severity had all previously completed an EBP, whereas the three participants who obtained an increase in PCL-M scores had not previously completed an EBP for PTSD. Of the four participants who returned for follow-up, three indicated an overall decreased PCL-M score from pre-test, and two of those individuals had completed an EBP, and one had not. The individual that obtained an overall increase in PCL-M score from pre-test to follow-up had not completed an EBP.

There are a number of possible contributing factors that could account for a tendency to respond better to IRT after completing a trauma-focused intervention. As outlined previously,

EBPs tend to provide information about common beliefs following trauma, as well as the role cognition has in PTSD symptom maintenance. Participants who had completed an EBP may have been better prepared to engage in this intervention, and may have more fully comprehended the influence of cognition upon one's wellbeing. IRT relies heavily upon using cognitive processes to one's advantage—namely, using creativity, narration, and extensive mental imagery to provide an image that is less distressing than the nightmare(s), then repeatedly exposing the individual to that new dream content while they are awake. Individuals already equipped with an understanding of the role thoughts play in behavior and emotional states would likely be more prepared to engage in an intervention that relies upon such abstract concepts.

Additionally, individuals who have completed an EBP likely have a fairly well-developed "tool kit" for coping with PTSD-specific symptoms in a healthy manner. For example, rather than avoiding anxiety-provoking (but objectively safe) material—such as nightmares—people who have completed an EBP are likely to be aware of the merits of facing the material head-on and working to resolve it. Thus, individuals with previous experience enacting EBPs might be more willing to "approach" nightmare content than those without a background in trauma treatments. A final consideration relates to familiarity with a structured intervention. EBPs are generally very structured interventions, and clients engaging in EBPs for PTSD are advised that their relative success is contingent upon consistent and persistent enactment of the content *outside of session*. Thus, individuals who have completed an EBP are at least accustomed to the necessity of doing therapy "homework" to obtain improvement, and consequently might be willing to engage in the necessary IRT practice at home more so than an individual that has not completed structured interventions. Conversely, individuals that have engaged in no treatment or treatments that are passive in out-of-session work may have more difficulty with completing the

outside practice necessary for IRT to be helpful. These considerations are by no means definitive answers to the apparent relationship between previous engagement in EBPs and outcome on the PCL-M, but appear to be reasonable projections.

H5. The fifth and final hypothesis, "gains obtained from IRT treatment will be retained long-term," refers to follow-up data (Figures 1.1-1.4, 2.1-2.4, and 3.1-3.4). Previous IRT has reported a generally favorable long-term trajectory for retention of treatment gains from IRT (Forbes, et al., 2003; Lu, et al., 2009; Krakow, et al., 1993). However, the availability of follow-up data in this study is limited to that of four participants (Participants A4, A5, B1, and B2)—far too few to draw definitive conclusions about the longevity of benefit. The available long-term outcomes on each of the measures were presented broadly within the preceding sections, but will be revisited to more fully address symptom trajectories over the long-term for the four participants who returned to complete follow-up.

From pre-test to post-test, Participant A4 indicated improvement in nightmare severity (DDNSI) and sleep quality (PSQI). However, at the follow-up session, Participant A4 obtained a score on the DDNSI that was well above his baseline score on that measure, suggesting he did not perceive ongoing improvement in nightmare severity over the long-term (Figure 7.1). Similarly, Participant A4's score on the PSQI also increased from post-test to follow-up (to one point below his baseline score on the measure), again suggesting that the gains he obtained during the active treatment phase were not retained long-term for sleep quality (Figure 7.3). Overall, this participant did not appear to retain the gains he had obtained during the course of IRT intervention.

Participant A5 indicated improvement in posttraumatic cognition (PTCI) and PTSD symptom severity (PCL-M) from pre-test to post-test. By the follow-up session, his score on the

PTCI increased to slightly below baseline, suggesting that he generally did not appear to retain gains in the posttraumatic cognition domain (Figure 8.2). With regard to his PCL-M score at follow-up, Participant A5's score improved substantially, implying he did retain gains in reduced PTSD symptom severity and actually obtained further improvement from post-test to follow-up (Figure 8.4). In general, this individual appeared to obtain mixed results—although he did not appear to retain gains in improved posttraumatic cognition, he did indicate ongoing improvement in PTSD symptom severity.

From pre-test to post-test, Participant B1 indicated improvement in nightmare severity (DDNSI) and sleep quality (PSQI). At the follow-up session, his score on the DDNSI increased from post-test, but his follow-up score remained lower than his baseline score (Figure 9.1). Although he did indicate intensification of nightmares from post-test to follow-up, it appeared that he did retain some benefit when compared to his baseline functioning. Participant B1's score on the PSQI remained the same from post-test to follow-up, suggesting he retained the improvement. Overall, Participant B1's improvements in nightmare severity did not appear to be retained from post-test to follow-up (but he did indicate overall improvement relative to his baseline) and his improvement in sleep quality was retained.

At the post-test session, Participant B2 indicated an improvement in all four of the domains assessed—nightmare severity (DDNSI), posttraumatic cognition (PTCI), sleep quality (PSQI), and PSTD symptom severity (PCL-M). From post-test to follow-up, Participant B2's score on the DDNSI increased to his baseline score, suggesting he did not retain gains in nightmare severity. Conversely, his score on the PTCI decreased considerably from post-test to follow-up, implying he did retain improvement in posttraumatic cognition and actually continued to improve after the intervention was completed. Participant B2's score on the PSQI increased

from post-test to follow-up, but remained below his baseline score on that measure, overall. With regard to PTSD symptom severity, Participant B2's score decreased substantially from post-test to follow-up—at the study's end, his score on the PCL-M was below the threshold score used to determine possible presence of PTSD. Overall, Participant B2 obtained mixed long-term results. Although he did not appear to retain gains in nightmare reduction, his improvements in posttraumatic cognition, sleep quality, and PTSD symptom severity did appear to be retained when compared to his baseline functioning.

Although it was not an area of inquiry directly embedded in this hypothesis, there was also some evidence of improvement in symptoms from post-test to follow-up, even when participants had indicated an intensification of symptoms at the post-testing session. For example, Participant A5's scores on the DDNSI and PSQI increased from the pre-test to post-test session. However, at follow-up, Participant A5's scores on these measures decreased from post-test—his score on the DDNSI returned to baseline, and his score on the PSQI dropped to below threshold in determining presence of poor sleep quality. Similarly, Participant B1's score on the PCL-M increased from pre-test to post-test, but dropped below his baseline score at the follow-up session. For some individuals, there may be a gains obtained long-term that are not readily apparent immediately following the treatment's conclusion.

Another area not embedded in this hypothesis, but nonetheless meriting attention, is the overall pattern of change from post-test to follow-up. Overall, one participant indicated a reduction in nightmare severity on the DDNSI from post-test to follow-up (Participant A5; Figures 1.1 and 8.1) and three participants indicated an increase in nightmare severity during the same timeframe (Participants A4, B1, and B2; Figures 1.1, 7.1, 9.1, and 10.1). As for posttraumatic cognition, three participants obtained a reduction in PTCI scores from post-test to

follow-up (Participants A4, B1, and B2; Figures 1.2, 7.2, 9.1, and 10.1) and one participant obtained an increase on the PTCI from post-test to follow-up (Participant A5; Figures 1.2 and 8.1). With regard to sleep quality, one participant indicated improvement on the PSQI from post-test to follow-up (Participant A5; Figures 1.3 and 8.3), two participants indicated increases in problematic sleep quality from post-test to follow-up (Participants A4 and B2; Figures 1.3, 7.3, and 10.3), and one participant indicated no change from post-test (Participant B1; Figures 1.3 and 9.3). Finally, in terms of PTSD symptom severity, three participants' scores on the PCL-M decreased from post-test to follow-up (Participants A5, B1, and B2; Figures 1.4, 8.3, 9.3, and 10.3) and one participant obtained an increased score on the PCL-M from post-test to follow-up (Participant A4; Figures 1.4 and 7.4). For these four individuals, gains obtained by post-test tended to be retained at follow-up for posttraumatic cognitions and general sleep quality, but tended to decline for nightmare severity and PTSD symptom severity during the same timeframe.

Although mentioned previously, it is important to be aware of the difference in time between post-test and follow-up for the two groups. Figures 3.1-3.4 include graphic depictions of participants' scores on the four measures across the study's 12-week duration, and illustrate the study's timeframe for administration of each testing interval. Group A (the immediate treatment group) completed their course of IRT and the post-testing during Week 3 of the study, but did not complete follow-up until Week 12 (rather than at the one-month follow-up interval, which would have been during Week 7 for this group). In other words, there was a 9-week lag between post-testing and follow-up testing for Group A participants. On the other hand, Group B (delayed treatment) participants began active IRT treatment during Week 6, completed post-testing during Week 8, and returned for follow-up testing during Week 12 of the study. Thus, Group B participants completed follow-up at the one-month interval, as planned, whereas Group A

participants completed their follow-up testing nine weeks after post testing. It is not known if this variation from the design had any effect on outcomes, but should be noted as potential limitation.

Regarding long-term outcomes following IRT intervention, it is important to understand the necessity of ongoing practice and enactment of IRT techniques for benefit to be obtained or retained. During the period of time between post-testing and follow-up, there was no external "check" on participants' engagement in ongoing practice, and it is not known if participants reliably enacted the techniques, or if they discontinued. Thus, it is prudent to again reiterate that the outcomes obtained in this study are by no means definitive evidence that IRT intervention "works" or "doesn't work." Rather, these outcomes should be considered within this study's full context—namely, these results reflect self-report data from very few participants, there was methodological divergence from the way IRT is typically implemented, the follow-up period varied between the two groups, and there was no verifying information about participants' relative engagement in the intervention.

Limitations

Participant Variables. There are a multitude of participant variables that influence response to treatment, and there is no definitive "one-size-fits-all" approach to addressing psychological symptoms. For example, people differ widely in their ability to use abstraction, and some people are naturally more concrete than others. This intervention relies heavily upon abstraction, such as forming mental representations of images, creating narratives of content, and being able to engage their focus on imagined scenery and related sensations. It may be the case that some of the participants in the study happen to tend toward relatively concrete cognitive processes, and this intervention may consequently be a poor fit for them.

Engagement. Participant engagement in the IRT treatment was also not assessed by formal means during this study. As outlined earlier, IRT intervention requires considerable practice or engagement in "homework" outside of session. Without sufficient engagement in the treatment, it is unlikely to be beneficial—attending weekly sessions is not generally adequate exposure to the intervention, but mental health consumers are at times inconsistent in applying out-of-session practice. This assertion should not be interpreted as placing undue blame upon clients or a presumption of poor motivation—many factors can influence a client's level of engagement, including presence of anhedonia, distress, rapport with providers, availability of transportation, comprehension of material, or subjective agreement with the rationale for enacting an intervention. Regardless of the source, when attendance is considered a reflection of engagement in treatment, given the overall pattern of drop-outs and missing data, there seemed to be some evidence of limited engagement.

Fluctuations of PTSD Symptoms. Additionally, psychological symptoms tend to be influenced by external variables not assessed in this study. With regard to PTSD symptoms in particular, there are many external factors that influence the waxing and waning of symptoms commonly reported by people with PTSD, such as approaching anniversaries of trauma experiences, encountering environmental "triggers" of trauma-related associations, stress, interpersonal difficulties, depression, or even resolution of stressors that had previously served to intensify symptoms. It is possible that during the course of this study, participants encountered a downturn on the rollercoaster of life, leading to intensification of symptoms; alternatively, some individuals may have been able to resolve a source of personal distress, and thus observed an improvement in their functioning. There was some evidence that external variables accounted for symptom change in either direction for at least some participants in this study (such as the

improvements previously noted for Participant B2, obtained *before* he was engaged in active IRT treatment), limiting the degree to which conclusions about IRT intervention's relative efficacy can be drawn.

Nature of the Trauma(s) and Duration of Symptoms. The nature of trauma experienced by participants in this study, and duration of time that they have persistently experienced PTSD symptoms—particularly, nightmares—could also influence response to treatment. Study participants had experienced trauma during their military service, usually related to combat. Combat trauma tends to be somewhat divergent from other forms of trauma (for example, surviving a natural disaster or a mugging) in the sense that there are often *multiple* traumas encountered in combat situations. Thus, it is fairly common for individuals with PTSD from combat trauma to have different nightmares, related to different events. IRT intervention initially focuses on a single nightmare—typically the one that the individual experiences most frequently (and not always the one that is most distressing). After completing IRT and enacting the practice across time, usually until the nightmare has reduced in frequency and severity, clients are encouraged to apply the IRT techniques to other nightmares, if applicable. In other words, it could be the case that the participants encountered multiple nightmares that each required intervention. This process may be a relevant issue limiting results at post-test or even follow-up periods, and it is possible that extending the follow-up period or including multiple long-term follow-up sessions would yield different results.

With regard to duration of symptoms, most of the participants in this study had experienced the primary traumatic event over ten years prior—a very long time for nightmare content to be "embedded" in the deep recesses of memory and inadvertently rehearsed across time. The study duration was only a total of 12 weeks, and was a comparatively very short period

of time to allow for modification of the imagery to take place. Anecdotally, the study facilitator indicated that participants who were younger (e.g., had experienced trauma more recently) tended to respond more positively to the intervention. It may be the case that study participants would obtain treatment gains after a longer period of time. These two issues serve as illuminating prospects for future research in the treatment of combat trauma-related nightmares.

Intervening Treatment Variables. Another participant variable that serves as a limitation is embedded in the study's design. Namely, participants in this study continued receiving their typical mental health treatment during the course of the study, aside from nightmare-focused intervention. Thus, some participants were actively engaged in individual or group therapy services, and most participants were taking at least one psychotropic medication during their involvement in the study. Also, five of the eight participants had previously completed an EBP for PTSD. As outlined earlier, participants who had previous experience with an EBP tended to fare better with IRT intervention than those who had not in this study. The decision for participants to maintain their typical mental health treatment during the study was to ensure that they were receiving the highest standard of care as determined by their primary mental health treatment providers, and to protect them from any potential adverse effects of changes to their treatment plan (such as discontinuing medication). Study participants were not compensated for their time or involvement in this study, and their motivation for participating was driven by hope for personal symptom reduction, a desire to potentially help other veterans, or some combination thereof. In other words, since participation in IRT treatment was voluntary, there may have been difference in participants' motivations for enrolling in the study. Taken together, the risk of potential harm to the participants was weighted as immensely more important than the presence of intervening treatment variables.

Validity

Generalizability. In this study, the ever-present question of generalizability is very prominent. This study was designed to assess the effectiveness of IRT in reducing or resolving posttraumatic nightmares, and secondarily sleep disturbance, PTSD symptoms, and posttraumatic cognition for a veteran population. The very small *N* involved in the study is perhaps the most obvious limitation to generalizability. The participants in this study were all male veterans, and most were Caucasian. The small number and generally homogenous composition of study participants certainly limits its generalizability. However, a considerable range of ages and war eras was represented in this group. It may be the case that some of the observed trends for this group of individuals related to the diversity of participants' ages and respective war eras, and it is possible that these variations had a significant influence in outcome variability. In many ways, the results of this study reflect outcomes for seven men of varying ages with posttraumatic nightmares from combat trauma, and not the efficacy of IRT intervention in general. Overall, the available literature in IRT tends to support its efficacy and long-term benefit for nightmare reduction or resolution. However, for the individuals involved in this study, the outcomes were somewhat mixed.

Study Design vs. Scripted IRT. It is also noteworthy that the "standard" application of IRT intervention involves sleep hygiene instruction, in addition to the rescripting and rehearsal portion, whereas this study was designed to examine only the latter. This intentional separation of components was intended to isolate the effects of the hallmark components of rescripting nightmares and rehearsal of the new content from gains that may have been obtained as a result of basic sleep hygiene. Although all participants received both of these components by the end of the study, it is possible that implementing the sleep hygiene and rescripting/rehearsal aspects in

close proximity is necessary for optimal results. However, it does not appear to be the case that generally worse outcomes were obtained for Group B participants, relative to those participants in the immediate treatment group. Specifically, individuals in the delayed treatment group (Group B) received their course of IRT intervention at least one month post sleep hygiene instruction. This design variable may also explain some of the improvements that were observed between the two pre-testing sessions (at study onset and immediately preceding active IRT treatment) for Group B participants—although they were not involved in the active IRT treatment, they had received instruction in helpful sleep habits that may have resolved some related issues.

Additionally, unlike many large, externally funded studies, the context of this study did not allow for the luxury of extensive participant screening. Specifically, prospective participants needed only to be veterans receiving treatment from the VA PTSD Treatment Clinic, indicate problems with nightmares, and be free of over psychotic processes to be included. It may be the case that including participants with comorbid conditions (such as health problems, depression, and personality pathology) may explain why the outcomes of this study were generally more mixed than previous IRT researchers' findings, at least to some extent.

Provider Variables. The IRT intervention was also facilitated and implemented by a sole clinician and researcher. The facilitator is a skilled and accomplished clinician, and has earned a board-certification in Clinical Psychology. However, therapy outcomes also tend to correlate with the degree to which a client "clicks" with their provider, and personality or interpersonal preference variables can influence that rapport, just as skill or perceived competence can influence the relationship. It is possible that there was a therapeutic mismatch or "excellent fit" between provider and participants—just as there is no "one size fits all" approach

to treatment, there is also no comparable approach to therapist-client matching. In other words, it is possible that outcomes would have varied if other clinicians were providing the treatment. In some ways, this study is an indication of how participants responded to IRT intervention with this study facilitator, and not necessarily a reflection of response to IRT intervention in the broad sense.

Design Integrity. An additional consideration relates to design integrity. The study was originally designed to have a follow-up session three months after each group's respective post-testing session. However, time constraints resulting from unanticipated delays outside the control of the researcher and study facilitator led to a change from three-month follow-up to a one-month follow-up period early in the study. Following that amendment, the actual follow-up period did not take place at one-month post intervention for the immediate treatment group (Group A), but instead took place at the same time as Group B's one-month interval—nine weeks post intervention for Group A. In sum, Group A's follow-up session is actually nine weeks after receiving active IRT intervention, whereas Group B's follow-up session was one month post intervention. It is not known if this departure had any effect on the follow-up data, but should be taken into consideration, particularly with regard to Group A's follow-up data.

Limitations of Measures. Finally, the measures selected for this study also pose a potential weakness in the sense that they are all self-report inventories, and thus rely on the accuracy and reliability of participants' report. It is always a possibility that an individual completing self-report inventories either over-reports or under-reports symptom severity, or misunderstands the inquiry presented in the measure. This process is not necessarily an act of intentionality, and can be influenced by a client's lack of awareness of an objectively present problem, limited willingness to acknowledge a suspected problem, or desire to "please" a

treatment provider. Alternatively, reporting symptoms beyond what are objectively present can reflect a "cry for help," desire to obtain secondary gain, or simply reflect a hurried or random set of responses by disinterested individuals. More specifically, there is a potential influence of service-connected disability status upon self-report. At times, individuals may continue reporting symptoms that are lessened or no longer present, rather than risk loss of income and other benefits. In other words, some individuals may perceive improvements, but not accurately report them for this reason alone.

Many other possible motivations—both implicit and implicit—influence the manner in which an individual chooses to endorse items. The use of self-report measures inherently carries these risks, yet there is perhaps information to be learned solely in the sense of gaining a better understanding of how a client *wants* to be understood, objectively so or not. Overall, for the purposes of this study, the use of self-report measures was weighed to be the most efficient (on both the researchers' and participants' parts) and informative means of gaining an understanding of fluctuations in participants' symptoms over time.

Considerations for Clinicians

Although the results of this research did not allow for any definitive conclusions to be drawn about the effectiveness of IRT or possible mechanisms of action, there were some areas that seem to be relevant considerations in a clinical sense. For this small group of individuals, there was generally not an apparent resolution to nightmares following IRT intervention—in other words, for a possible myriad of reasons, this intervention did not appear to be resoundingly curative for these individuals during the course of the study. However, this observation should not be interpreted as evidence that IRT intervention "doesn't work," particularly considering most participants did obtain some improvement in at least one of the areas studied. Due to design

limitations, it is impossible to draw any definitive conclusions or causal connections between IRT intervention and the observed outcomes. Clinicians should instead exercise some consideration in determining appropriateness of IRT for their clients. It may be worthwhile for clinicians to reflect on individual clients' needs prior to beginning IRT treatment, and perhaps consider modifying the treatment to "fit" that person's needs. Here, a handful of areas that may be useful for clinicians utilizing IRT techniques to consider will be discussed.

In determining appropriateness of IRT intervention for an individual, it may be useful to first establish the person's relative comfort with using imagery-based techniques. Perhaps attempting to engage a client in a guided imagery exercise and assessing the client's response would offer some insight into how that individual would respond to an IRT-based intervention for nightmares. As discussed previously, IRT intervention relies heavily upon an individual's ability to develop purposeful "mastery" over imagery—a fairly abstract process—and it may be difficult for some individuals to utilize these techniques. For individuals with difficulty utilizing imagery effectively, this intervention may not be a good therapeutic fit, or they may require additional assistance in developing an imagery strategy that suits their needs.

Additionally, for this group of individuals, there appeared to be some relationship between previously completing an EBP for PTSD and the individuals' relative success with IRT intervention. Clinicians may find it useful to "screen" potential IRT clients to determine if they have historically demonstrated commitment and engagement in treatment, given benefits from IRT seem to be at least partially attributable to client engagement. It may be helpful for clinicians to encourage clients seeking treatment for posttraumatic nightmares to first complete an EBP, or for clinicians to consider providing additional rationale for treatment to clients without prior history in structured interventions. Anecdotally, some clients completing IRT

intervention appeared to deeply struggle with the difference between rescripting nightmare content and rescripting actual traumatic events, particularly when loss of life was involved. They tended to express a belief that changing the nightmare content was "denying what really happened" or "dishonoring" a person who lost their life in the traumatic event, and those individuals often appeared hesitant to engage with the treatment. In such cases, it may be helpful to encourage completion of an EBP to help the individual begin working through traumatic memory and associated feelings of guilt or responsibility prior to beginning IRT treatment. Alternatively, providing psychoeducation about nightmares and their shifting content (particularly when the client has acknowledged some distortion of the trauma and is not reporting replication nightmares) in greater detail than is typically warranted in IRT intervention may also be helpful in resolving similar ambivalence.

Also related to the "screening" process for IRT-based interventions, it may be helpful to assess the type of nightmares that the client typically experiences, and consider tailoring the duration of IRT treatment to fit that individual's unique needs. Individuals with difficulty related to a single nightmare with relatively consistent content may have better response to the typical brief IRT intervention than individuals with problems related to multiple nightmares. For people with multiple nightmares, a longer duration of treatment or continuation of "check-in" sessions beyond the typical course of IRT intervention may be beneficial. An additional consideration for screening appropriateness of IRT relates to client variables. Specifically, IRT might be more helpful for individuals who have intact cognitive functioning and mental acuity, and may not be a good fit for individuals who have cognitive impairments.

With further regard to duration of treatment, many participants in this study generally did not appear to have obtained dramatic improvement in symptoms at the post-test or even follow-

up period. However, some possible contributing factors may be addressed by clinicians offering additional means of external motivation (e.g., additional follow-up sessions or "check ins") to clients completing IRT intervention, particularly when there is indication that they continue to have difficulty with nightmares at the end of their involvement in the typical course of IRT intervention. It may be the case that continuation of sessions to assist with encouraging ongoing practice, problem-solving difficulties with implementation of IRT techniques, and offering supportive feedback about barriers to improvements may yield better long-term results for clients presenting with posttraumatic nightmares.

A final consideration relates to implementing a structured approach to assessing clients' engagement in the treatment, particularly if the clinician is planning to extend the IRT-based treatment or use "check-in" sessions to continue addressing nightmares. Typically, during the course of IRT treatment, a clinician does provide clients with means of documenting their daily practice, nightmare qualities, etc. via worksheets or at least informally "check in" on clients' relative success or difficulty with enacting the techniques. Some clients may respond to benefits obtained during treatment by mistakenly believing that they no longer need to practice the techniques, and may consequently experience a return of problematic nightmares. Here, reinforcing the necessity of ongoing practice at home through metaphor (e.g., going to the gym once per week to lose weight vs. going to the gym every day) may also be helpful. Perhaps extending the approach to a longer-term or ongoing assessment process, beyond the typical course of IRT would offer additional structure to help with continued practice.

Although these suggestions are by no means definitively supported by the results of this study, they do appear to be worthwhile areas for clinicians to consider. It is possible that making similar modifications to the treatment would improve client outcomes. Additional research in the

use of IRT with modified protocols is needed before formally or definitively suggesting such modifications, but the aforementioned considerations may be worthwhile for clinicians seeking a more flexible or tailored means of helping clients resolve problematic nightmares.

Concluding Remarks.

Overall, participants appeared to obtain at least some benefit in one or more areas during the time they were involved in the study. For those who returned to the follow-up session, there was a general trend of symptoms continuing in the same direction (for better or worse) as their post-testing tendency. However, there is not overwhelming evidence that this intervention initiated a marked change for the participants in the study.

This research is somewhat novel in its design and intention, and serves as a model of sorts for future research. First, there had been no controlled trials to date that evaluated the imagery rescripting and rehearsal in isolation from the cognitive-behavioral sleep hygiene component of IRT intervention. There was evidence that at least some of the participants obtained considerable benefit during the time following sleep hygiene instruction, but preceding IRT—perhaps even more so than during their engagement in the imagery component.

Second, there is not a clearly identified mechanism of action in IRT. A primary goal of this study was to evaluate the role of posttraumatic cognition, or control appraisals, in IRT intervention to better understand the tendency for those who complete IRT to obtain reductions in other PTSD symptoms. Here, there was very limited evidence that posttraumatic cognition modified nightmares or other PTSD symptoms—the results for this group of individuals actually pointed to an inverse relationship between posttraumatic cognition and nightmare severity. However, there appeared to be a generally positive correlation between posttraumatic cognition

and PTSD symptom severity. While it was unexpected that nightmare severity would apparently not vary in the same direction, this research affords new areas for future inquiry.

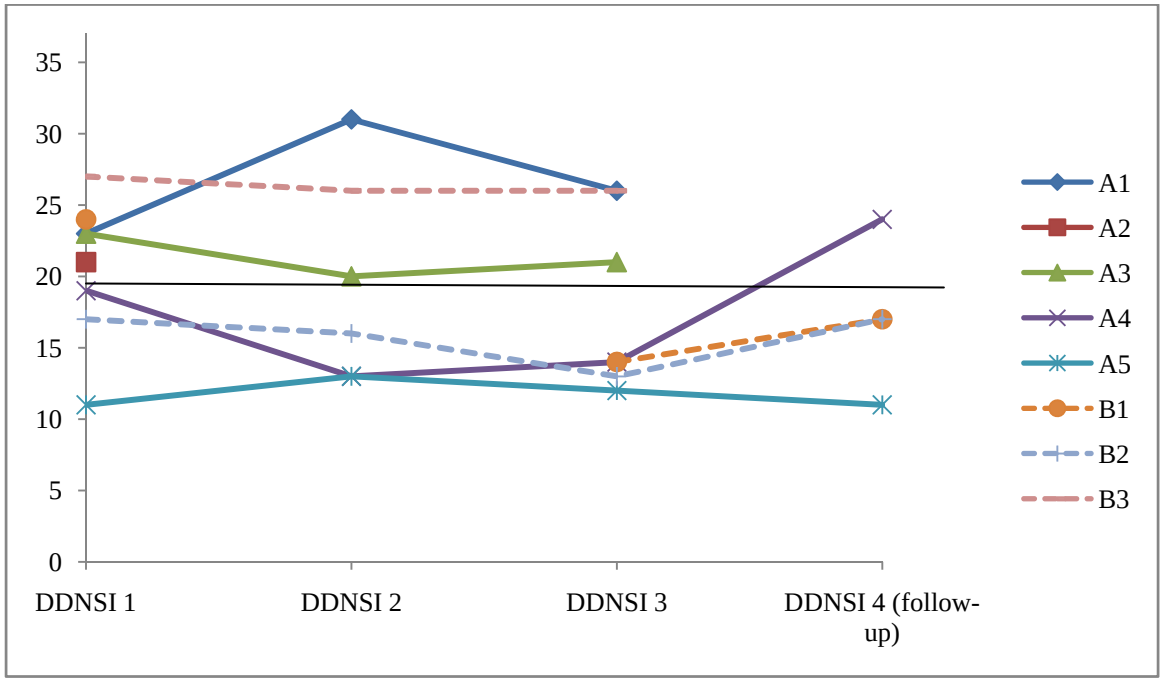
Third, there seemed to be a general tendency for participants to obtain reductions in nightmares while actively engaged in treatment, but the gains seemed to decline by the follow-up period. It may be helpful to encourage IRT clinicians to include follow-up "booster" sessions in an effort to encourage ongoing engagement in the intervention, and hopefully improve long-term outcomes. This observation may serve as a useful variable in future IRT research, with regard to including additional sources of external motivation.

Fourth, there was a general tendency for individuals that had completed an EBP for PTSD previously to have better outcomes than the individuals with no history of engaging in a structured intervention. It is not known if there is a cumulative effect involved for intervention, a function of familiarity with structured intervention, or if the pattern just happened to be present for the individuals involved in this study. Sequencing IRT after EBP intervention seemed to elicit better outcomes for the participants in this study. This pattern is certainly noteworthy, and merits further consideration in future research.

In the broadest sense, this research could perhaps be best characterized as a pilot study. Although there were very few participants and a number of factors limiting the interpretation or generalizability of findings, the outcomes elicited a number of questions for future research. Additional areas of interest could be addressed with modifications to the design of this study. For example, extending the follow-up period(s) to longer intervals may reveal helpful information about how IRT techniques could influence nightmare distress for individuals with multiple nightmares (such as those often reported by combat veterans with PTSD) across an extended period of time. Replicating the study design with a larger group of participants would also

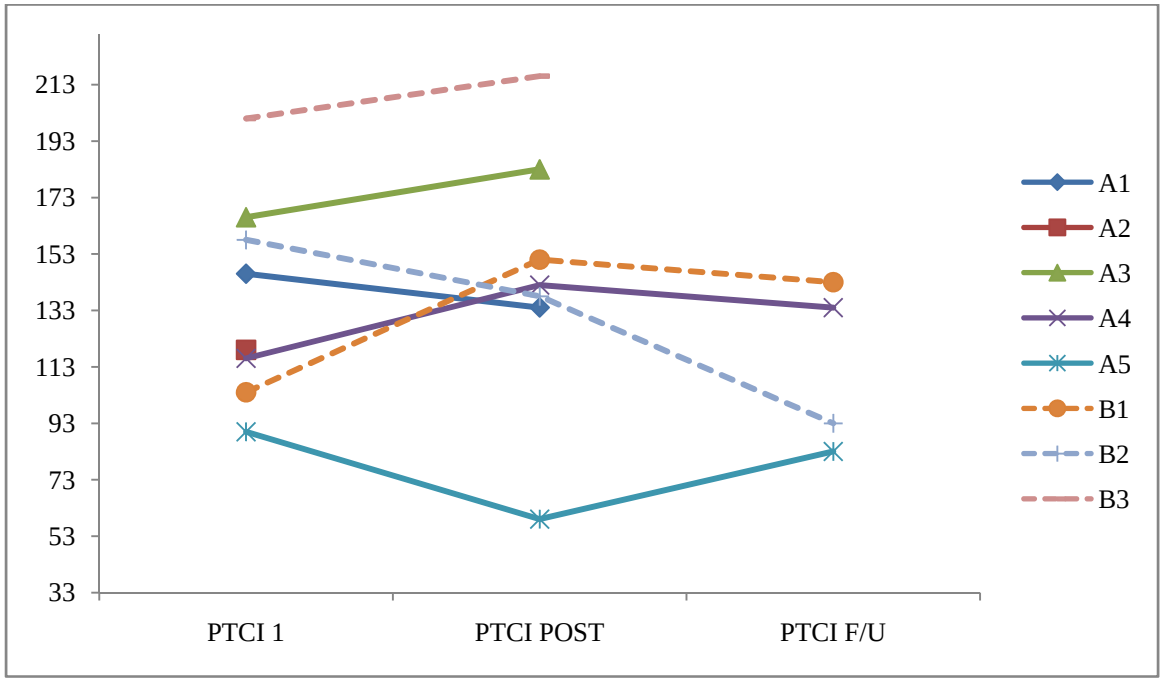
provide more definitive evidence of IRT's relative efficacy than can be provided here. Future research in this area may benefit from including embedded validity measures (regarding symptom severity), means of assessing engagement in treatment, integrating objective assessment techniques (such as sleep studies), attempting to limit some external variables that likely influence course (regarding other mental health services), and further investigation of the roles that history of multiple traumas (combat trauma) and multiple posttraumatic nightmares, duration of symptoms, and age may play in symptom trajectory following IRT intervention.

Figure 1.1. Individual DDNSI scores.



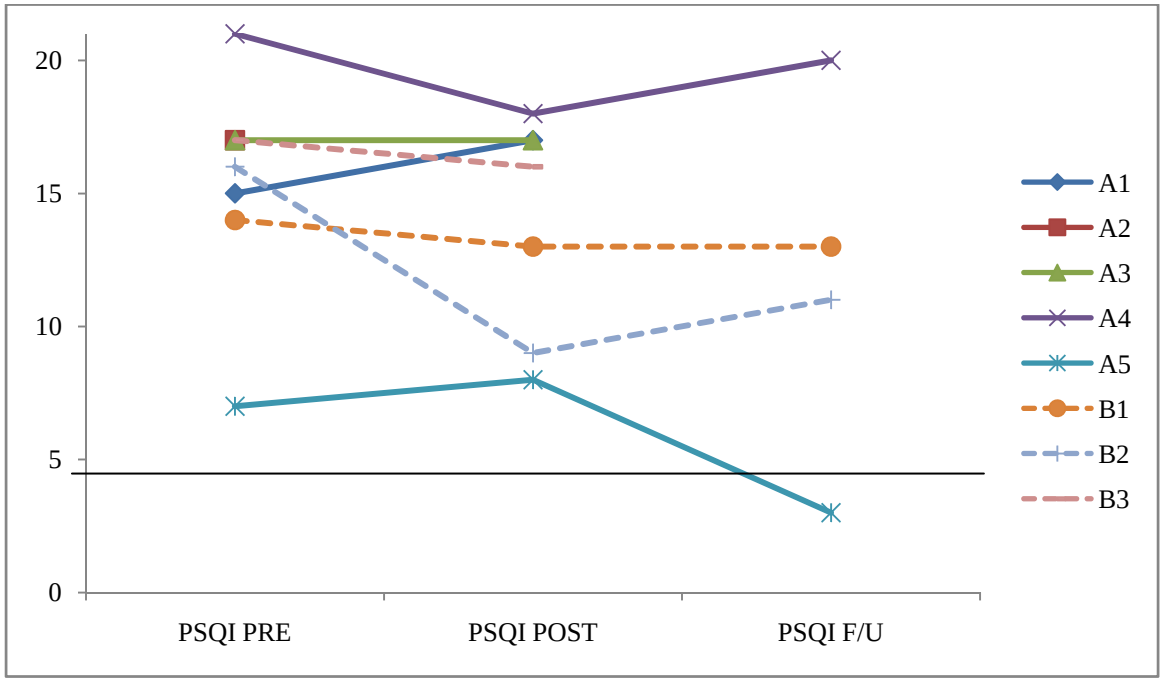
DDNSI (Disturbing Dream and Nightmare Severity Index) Range 0-37, scores >20 suggest severe self-reported nightmares. Group A participants' data are reflected in solid lines, whereas Group B participants' data are denoted with dashes.

Figure 1.2. Individual PTCI scores.



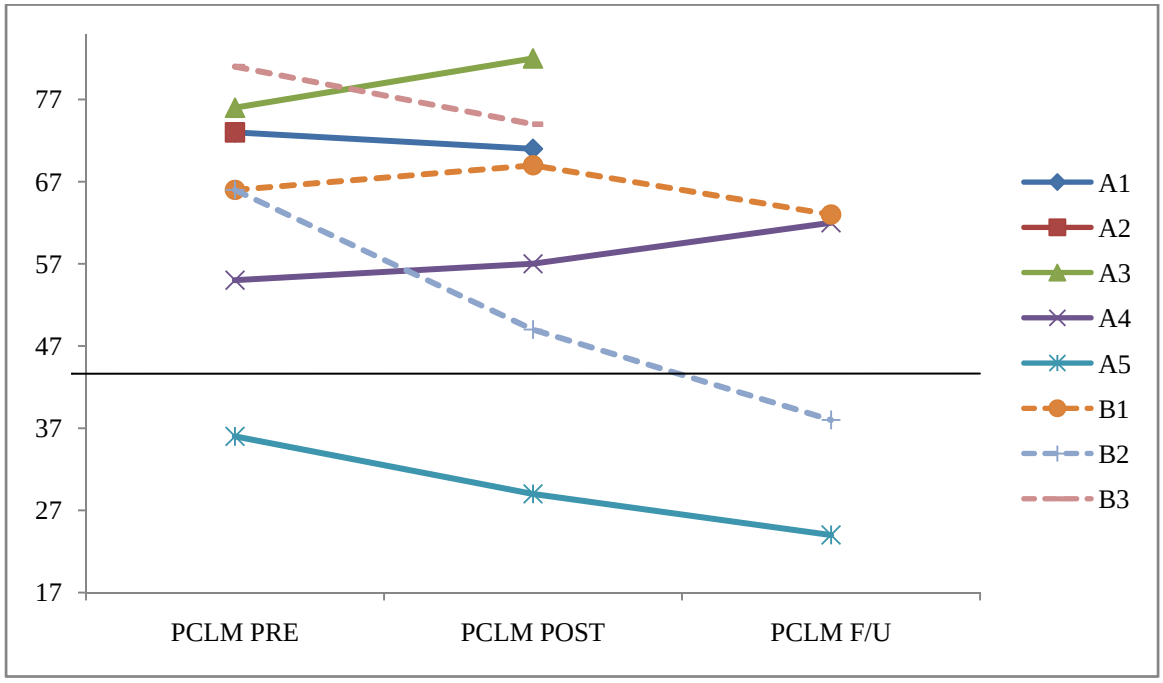
PTCI (Posttraumatic Cognitions): Full Score, Range 33-231 (higher scores reflect increased presence of Posttraumatic cognition). Group A participants' data are reflected in solid lines, whereas Group B participants' data are denoted with dashes.

Figure 1.3. Individual PSQI scores.



PSQI (Pittsburgh Sleep Quality Index): Range 0-21 (>5 = poor self-reported sleep quality). Group A participants' data are reflected in solid lines, whereas Group B participants' data are denoted with dashes.

Figure 1.4. Individual PCL-M scores.



PCL-M (PTSD symptom severity): Range 17-85 (>40-45 suggest possible presence of PTSD). Group A participants' data are reflected in solid lines, whereas Group B participants' data are denoted with dashes.

Figure 2.1. Individual DDNSI scores during participants' active IRT treatment session and at follow-up.

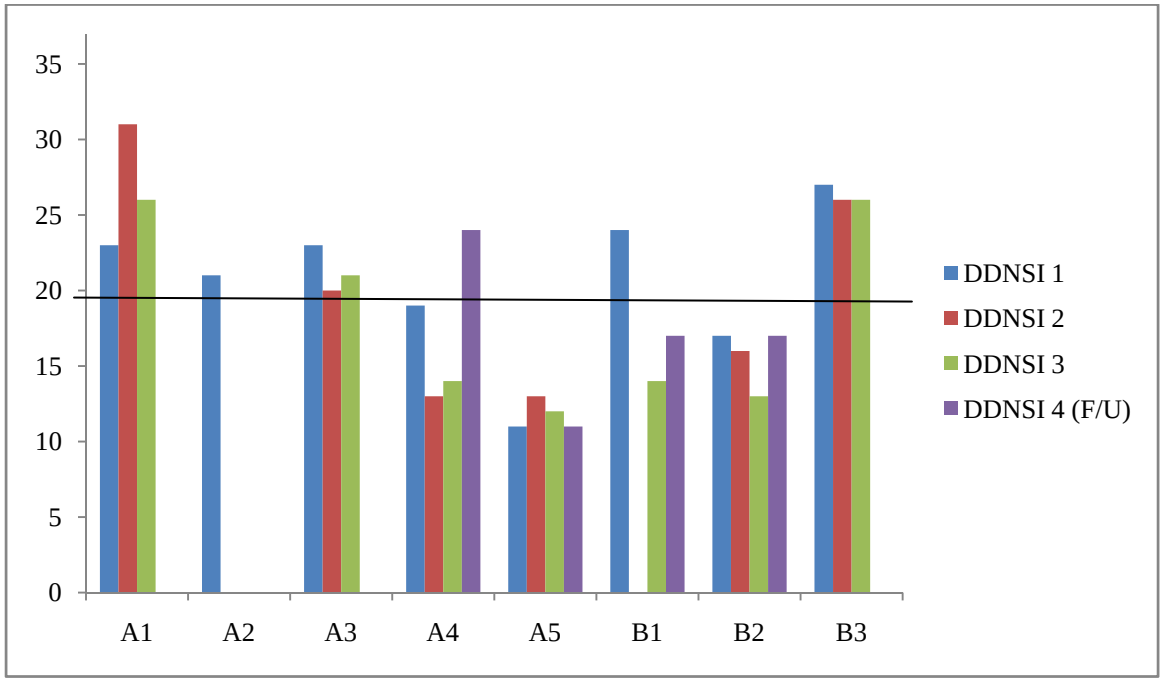


Figure 2.2 .Individual PTCI scores at pre-test, post-test, and follow-up. Group B participants' scores on the PTCI are included at the second pre-test administration, immediately preceding their active IRT treatment.

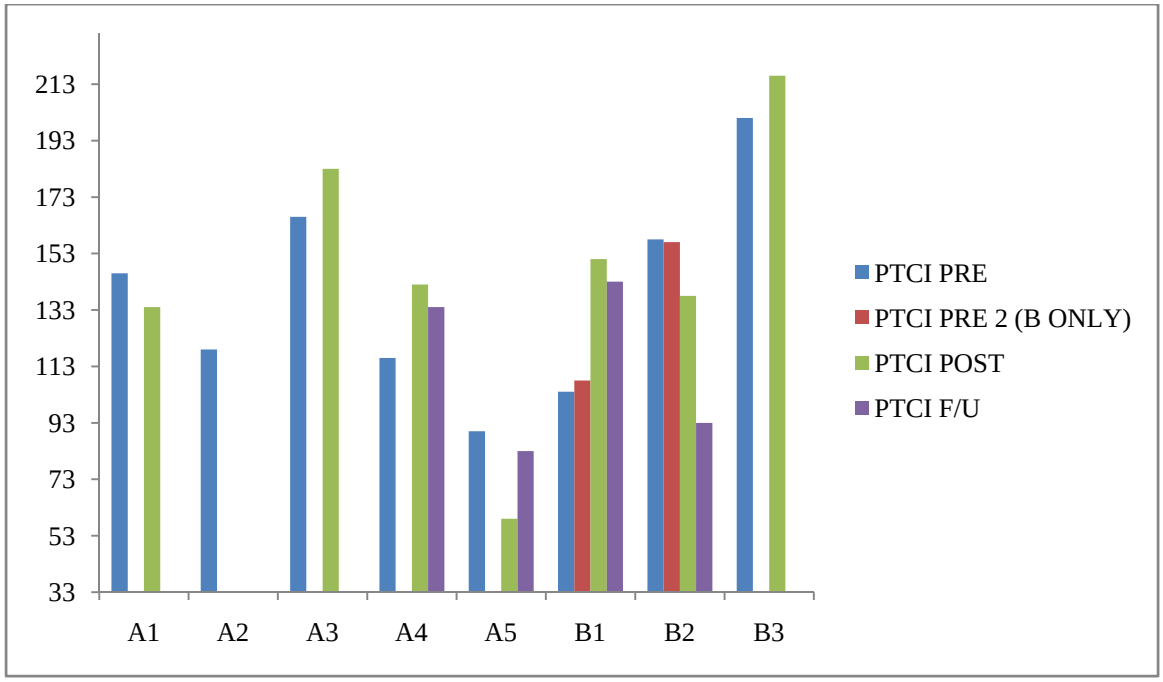


Figure 2.3. Individual PSQI scores at pre-test, post-test, and follow-up. Group B participants' scores on the PSQI are included at the second pre-test administration, immediately preceding their active IRT treatment.

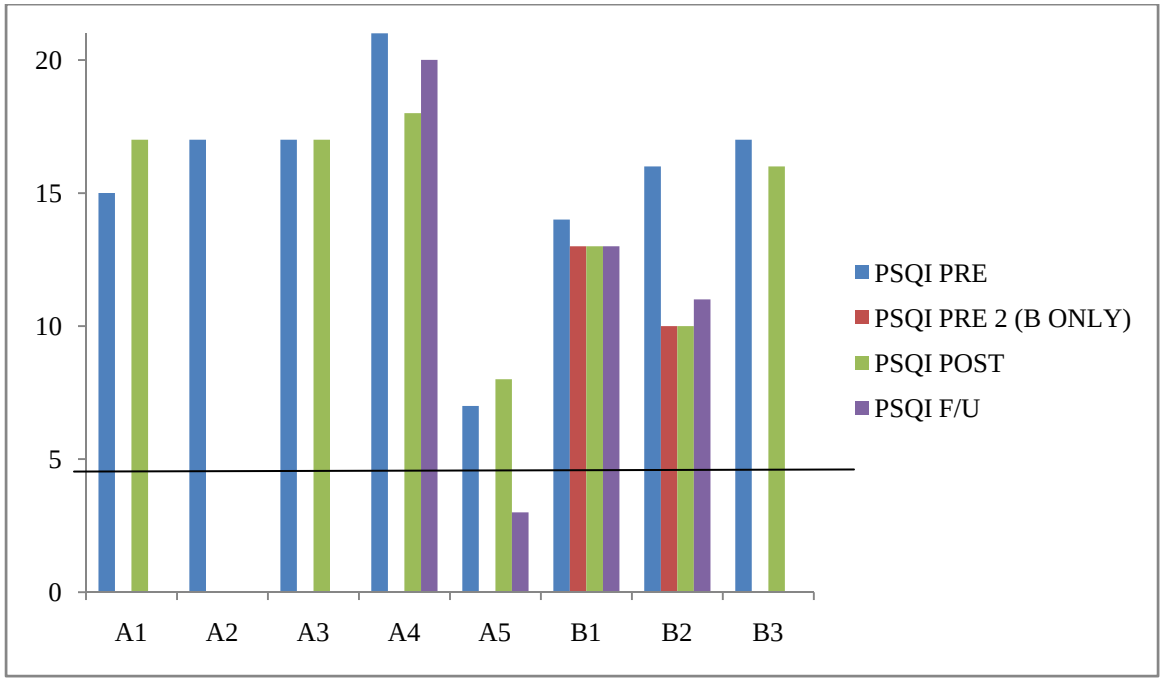


Figure 2.4. Individual PCL-M scores at pre-test, post-test, and follow-up. Group B participants' scores on the PCL-M are included at the second pre-test administration, immediately preceding their active IRT treatment.

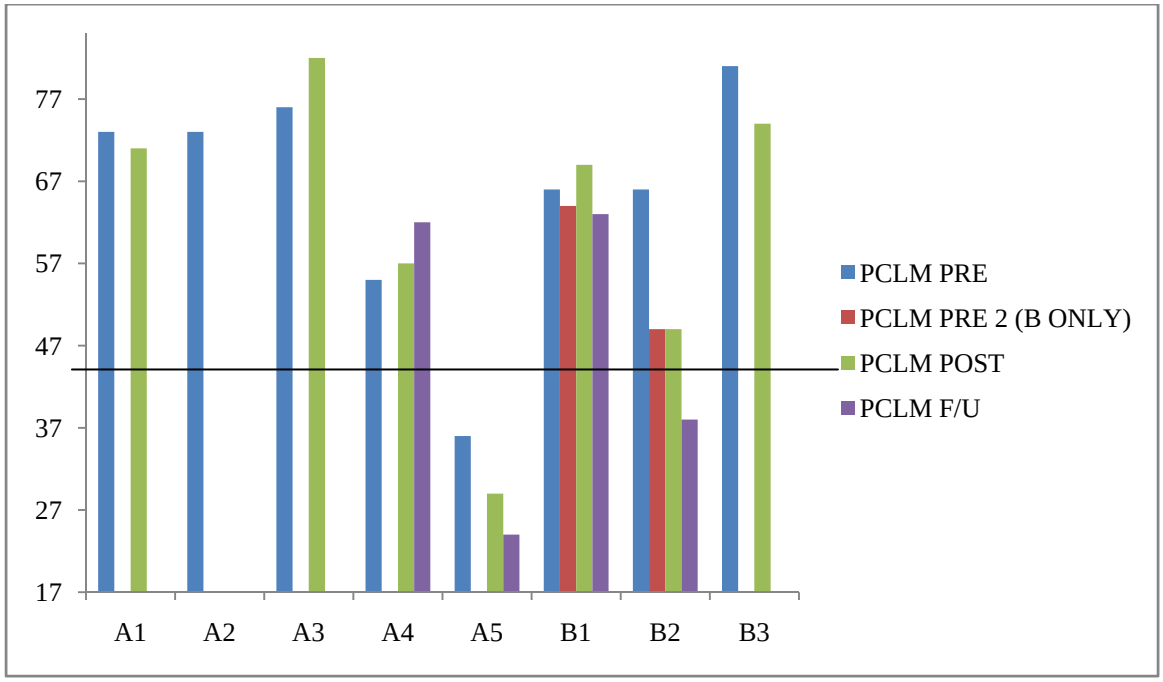


Figure 3.1. DDNSI scores across study duration (all available data)

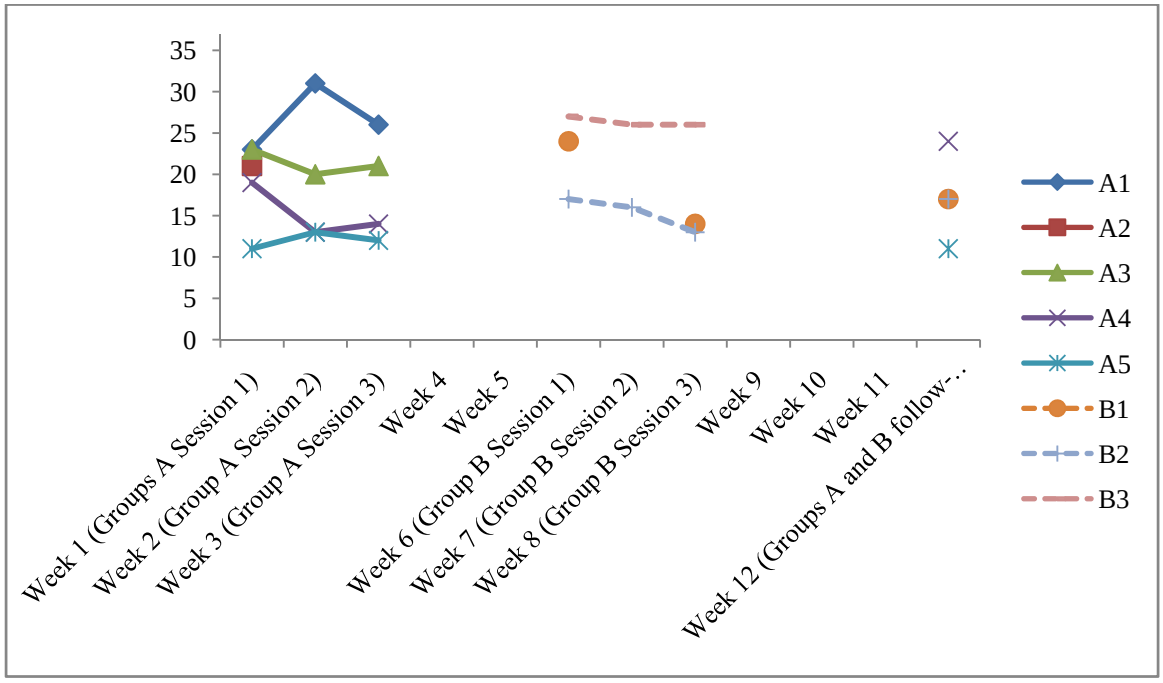


Figure 3.2. PTCI scores across study duration (all available data)

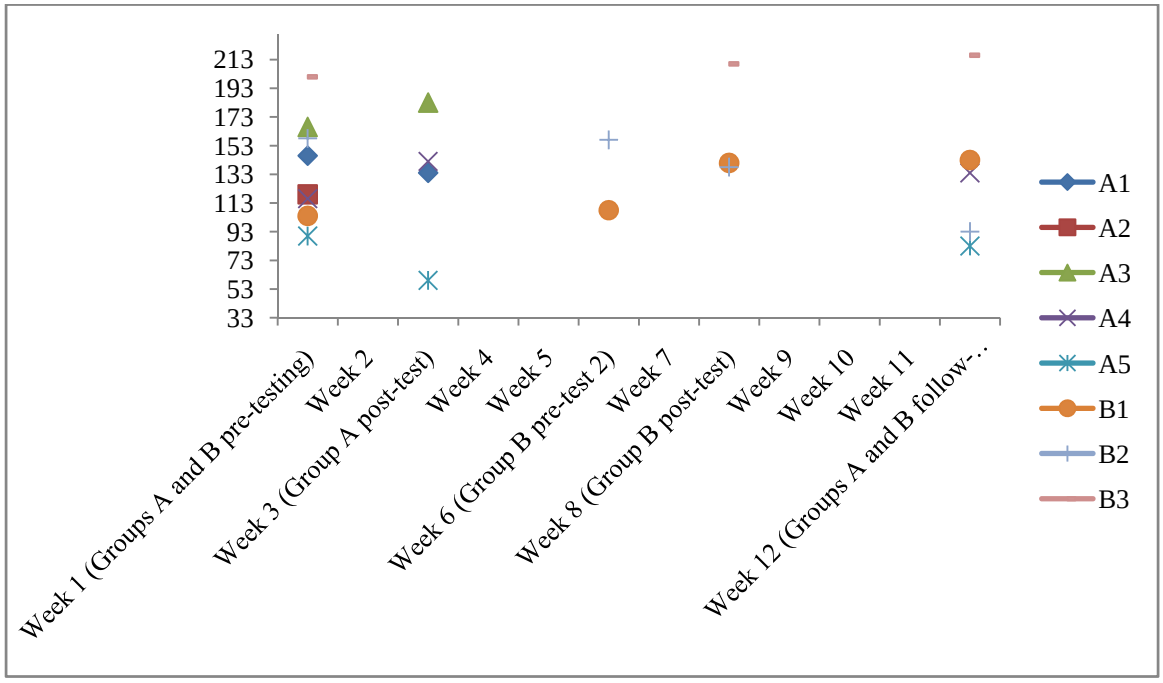


Figure 3.3. PSQI scores across study duration (all available data)

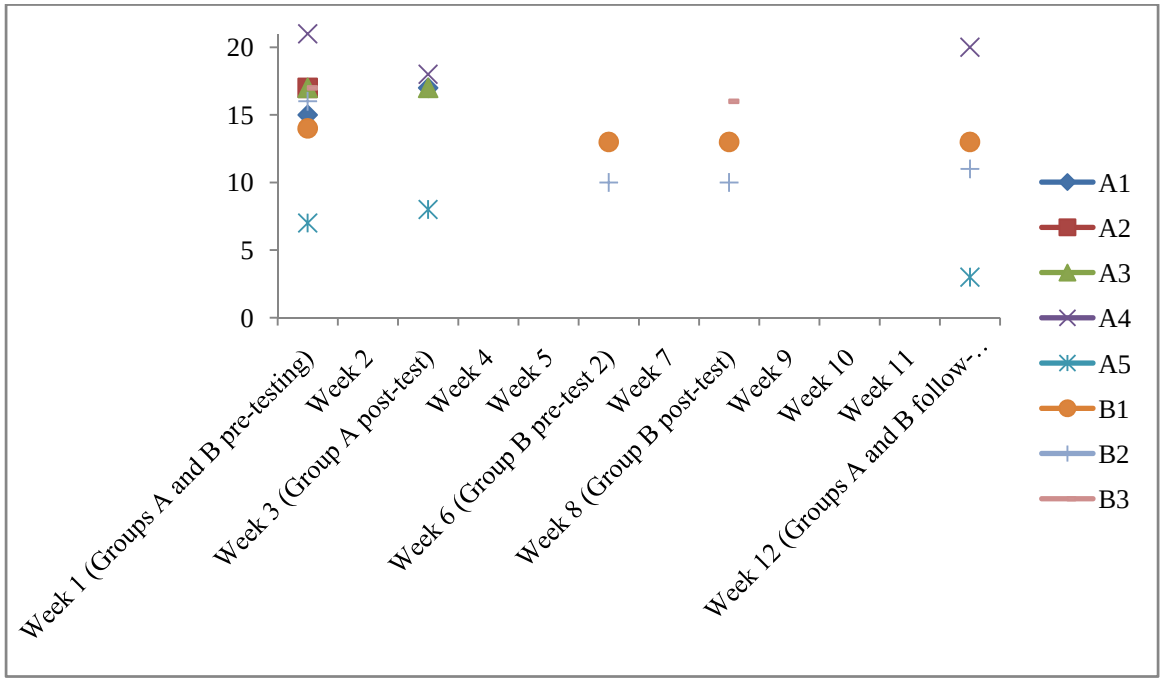


Figure 3.4. PCL-M scores across study duration (all available data)

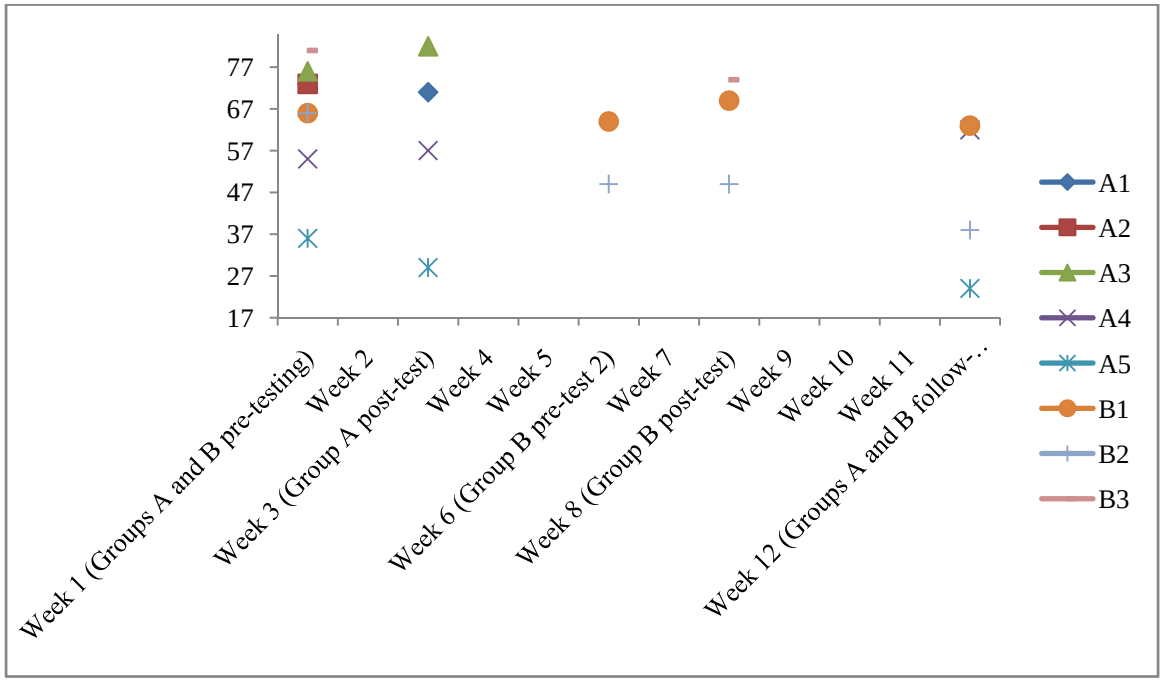
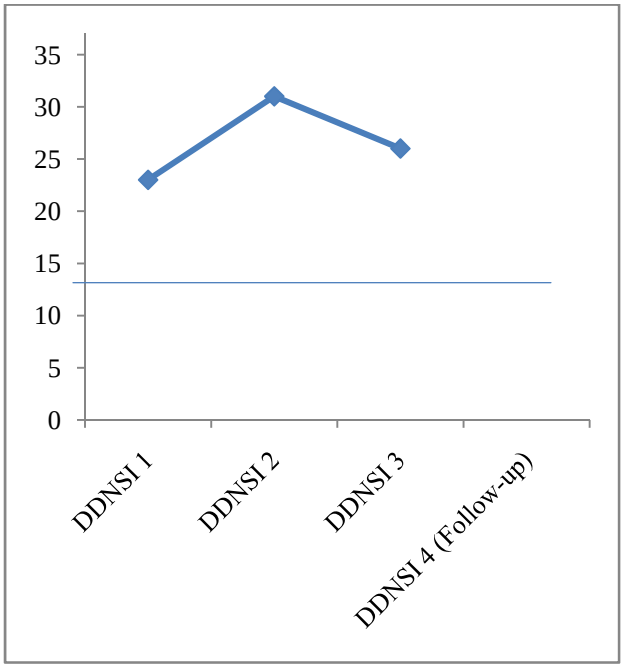
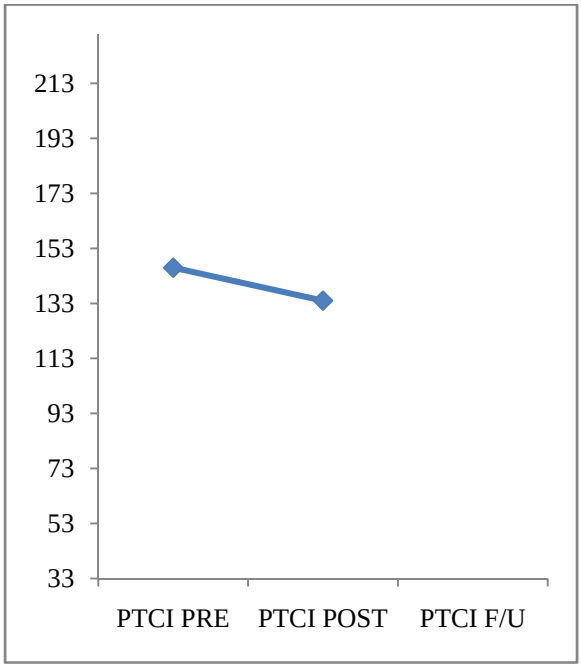


Figure 4.1. Participant A1 DDNSI scores



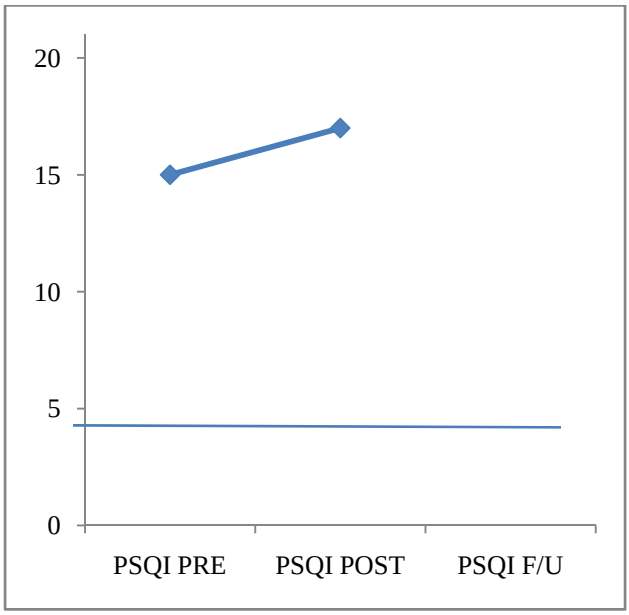
Participant A1 DDNSI scores during treatment.
Participant A1 was absent for the follow-up session.

Figure 4.2. Participant A1 PTCI scores



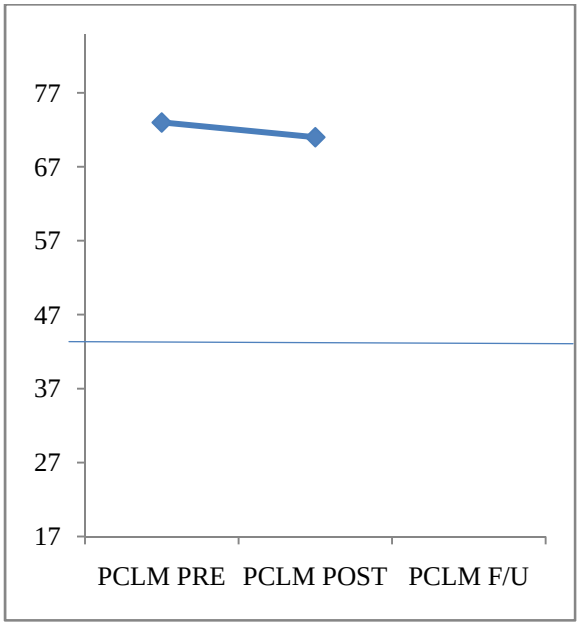
Participant A1, PTCI scores at pre- and post-test.
Participant A1 was absent for the follow-up session.

Figure 4.3. Participant A1 PSQI scores



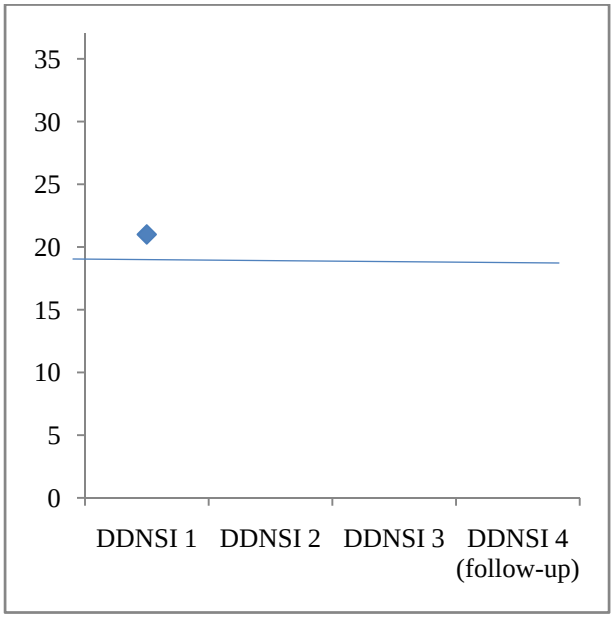
Participant A1, PSQI scores at pre- and post-test.
Participant A1 was absent for the follow-up session.

Figure 4.4. Participant A1 PCL-M scores



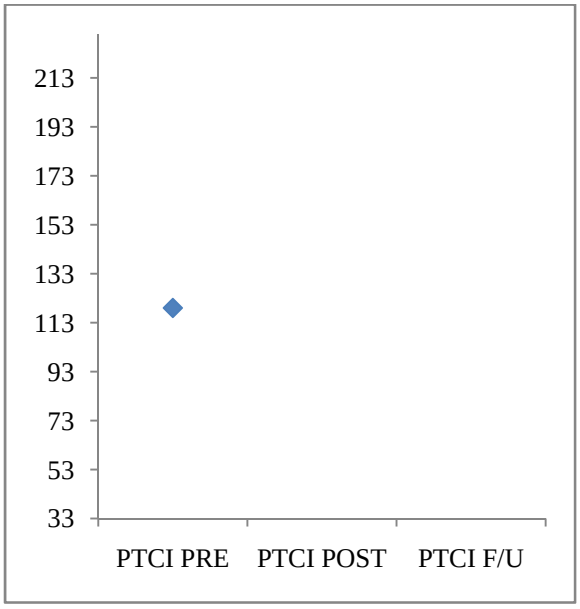
Participant A1, PCL-M scores at pre- and post-test.
Participant A1 was absent for the follow-up session.

Figure 5.1. Participant A2 DDNSI scores.



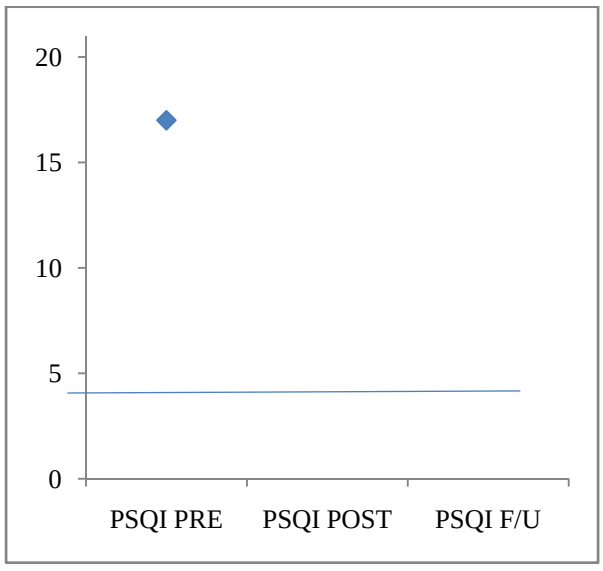
Participant A2 DDNSI score during treatment. Participant A2 dropped out of treatment after the first session, DDNSI scores during sessions two and three of treatment and follow-up information are unavailable.

Figure 5.2. Participant A2 PTCI scores.



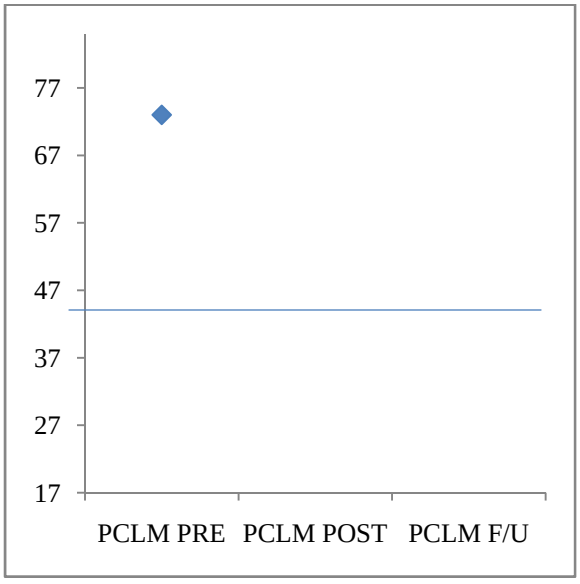
Participant A2 PTCI score at pre-test. Participant A2 dropped out of treatment after the first session, thus post-test and follow-up information is unavailable.

Figure 5.3. Participant A2 PSQI scores.



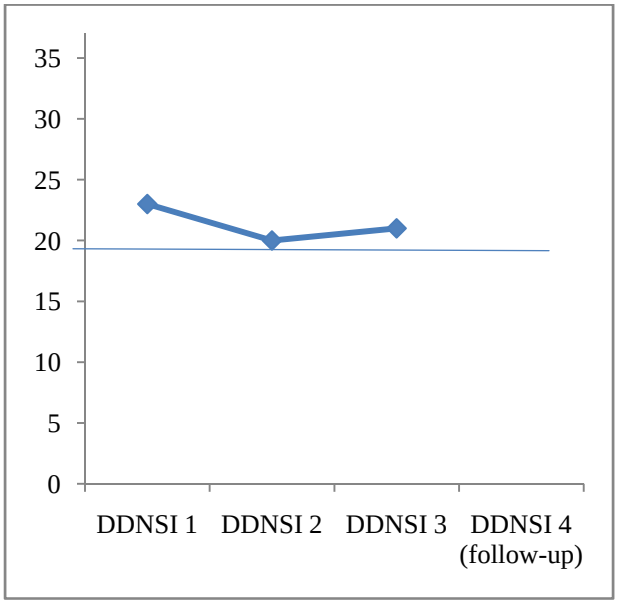
Participant A2 PSQI score at pre-test. Participant A2 dropped out of treatment after the first session, thus post-test and follow-up information is unavailable.

Figure 5.4. Participant A2 PCL-M scores.



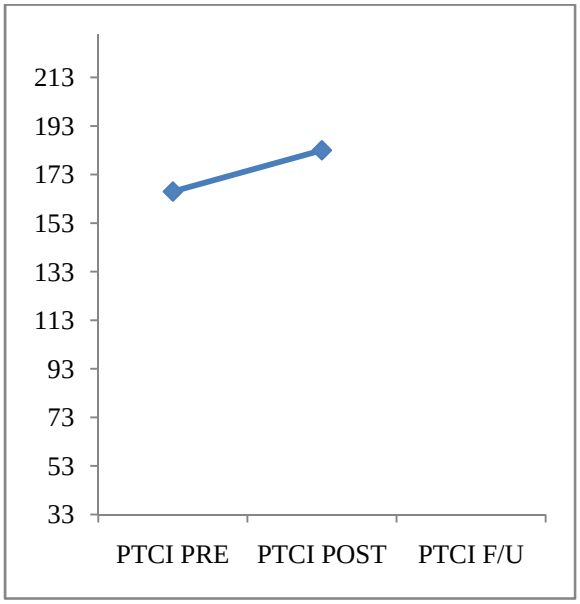
Participant A2 PCL-M score at pre-test. Participant A2 dropped out of treatment after the first session, thus post-test and follow-up information is unavailable.

Figure 6.1. Participant A3 DDNSI scores.



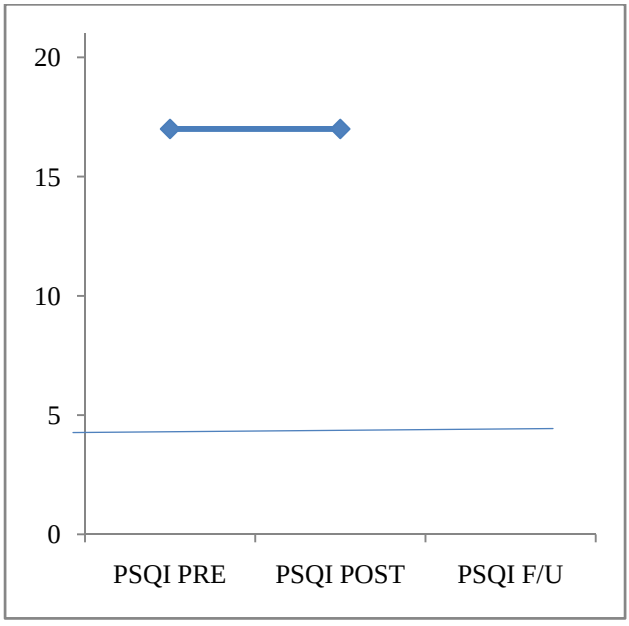
Participant A3 DDNSI scores during treatment. Participant A3 was absent for the follow-up session.

Figure 6.2. Participant A3 PTCI scores.



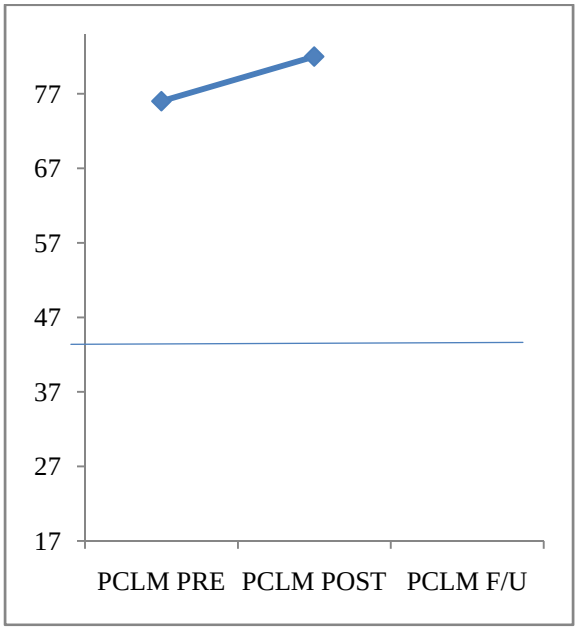
Participant A3 PTCI scores at pre- and post-test. Participant A3 was absent for the follow-up session.

Figure 6.3. Participant A3 PSQI Scores.



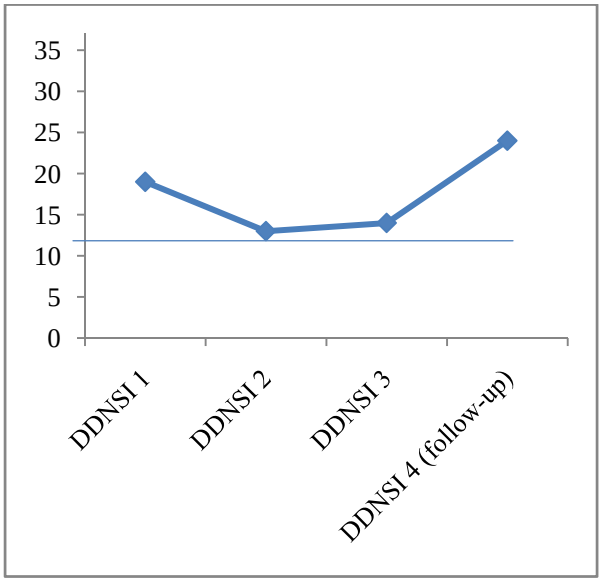
Participant A3 PSQI scores at pre- and post-test. Participant A3 was absent for the follow-up session.

Figure 6.4. Participant A3 PCL-M scores.



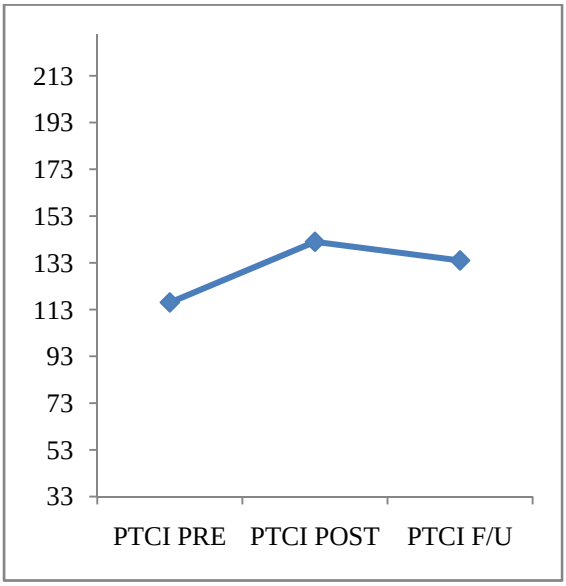
Participant A3 PCL-M scores at pre- and post-test. Participant A3 was absent for the follow-up session.

Figure 7.1. Participant A4 DDNSI scores.



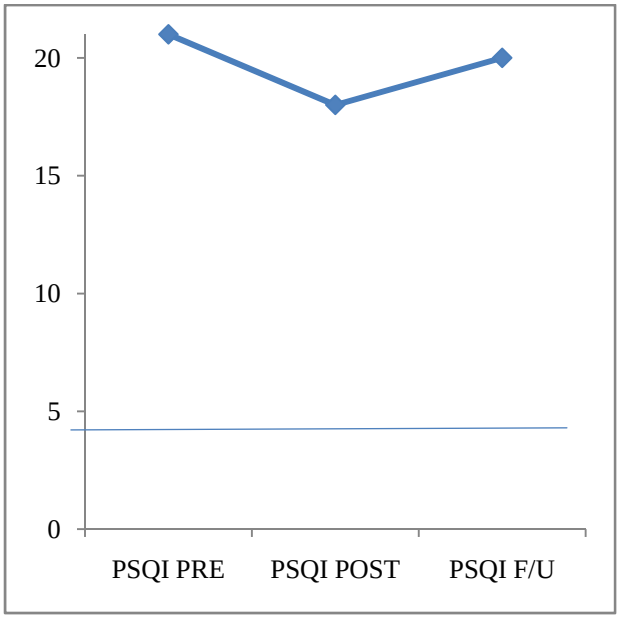
Participant A4 DDNSI scores during treatment.

Figure 7.2. Participant A4 PTCI scores.



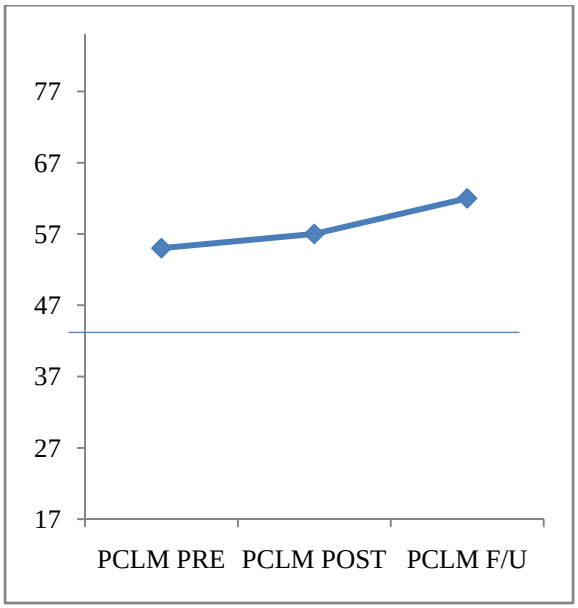
Participant A4 PTCI scores at pre-, post-, and follow-up.

Figure 7.3. Participant A4 PSQI scores.



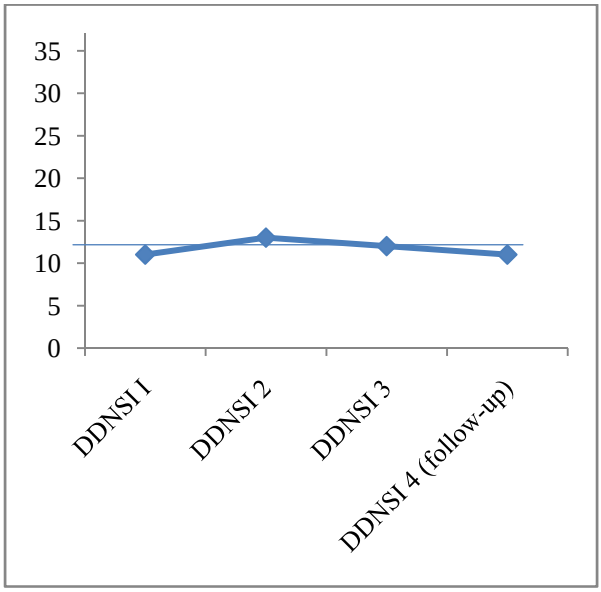
Participant A4 PSQI scores at pre-, post-, and follow-up.

Figure 7.4. Participant A4 PCL-M scores.



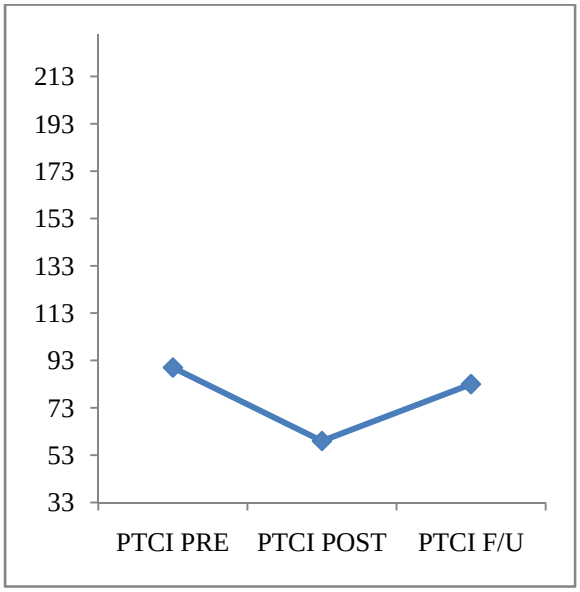
Participant A4 PCL-M scores at pre, post, and follow-up.

Figure 8.1. Participant A5 DDNSI scores.



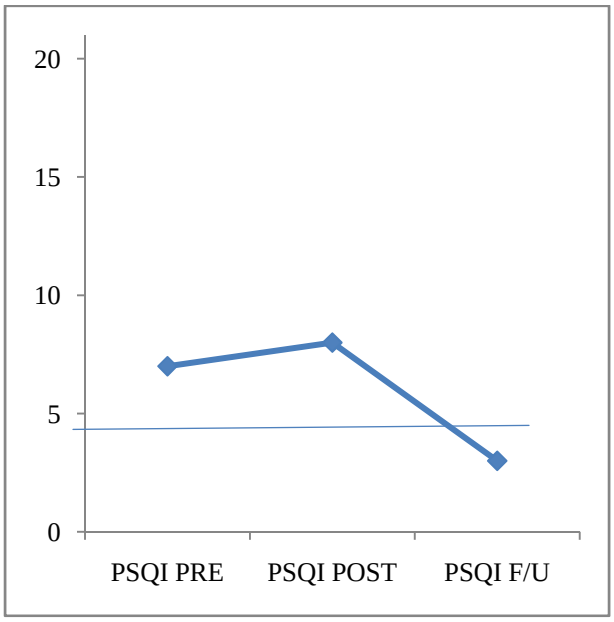
Participant A5 DDNSI scores during treatment and at follow-up.

Figure 8.2. Participant A5 PTCI scores.



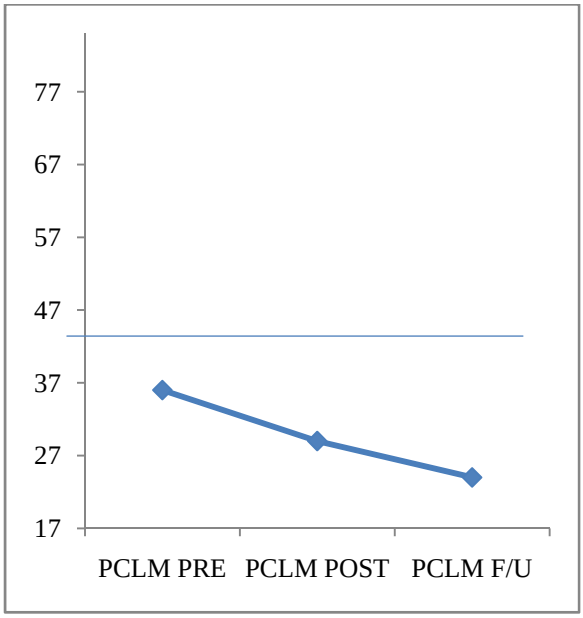
Participant A5 PTCI scores at pre, post, and follow-up.

Figure 8.3. Participant A5 PSQI scores.



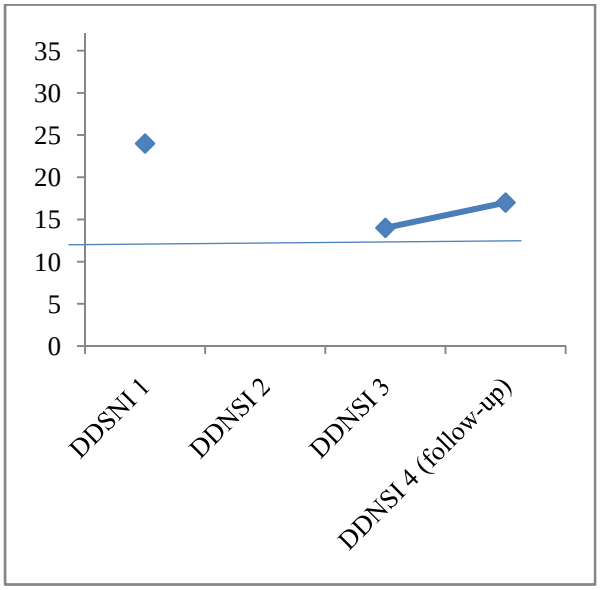
Participant A5 PSQI scores at pre, post, and follow-up.

Figure 8.4. Participant A5 PCL-M scores.



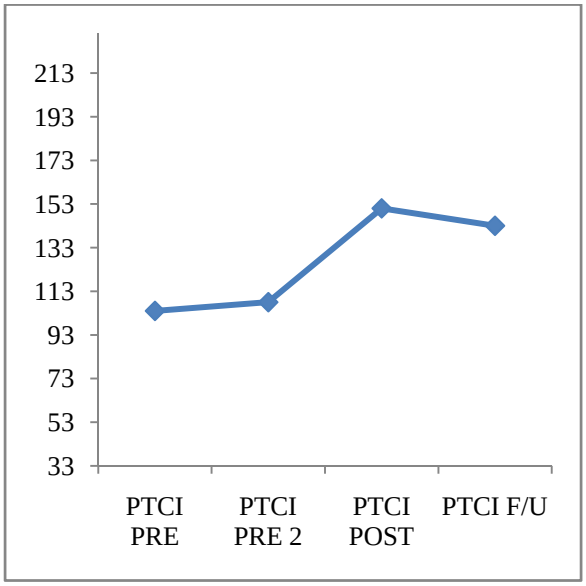
Participant A5 PCL-M scores at pre, post, and follow-up.

Figure. 9.1. Participant B1 DDNSI scores.



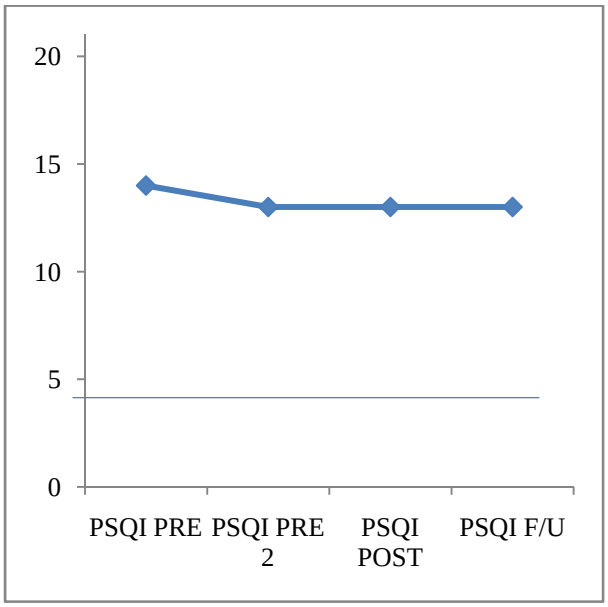
Participant B1 DDNSI scores during treatment. Participant B1 was absent for the second session of active IRT treatment (DDNSI 2).

Figure 9.2. Participant B1 PTCI scores.



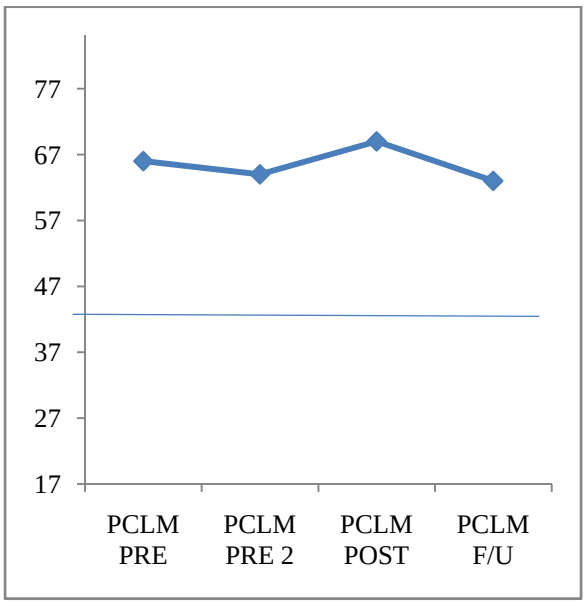
Participant B1 PTCI scores at study onset, pre-test, post-test, and follow-up.

Figure 9.3. Participant B1 PSQI scores.



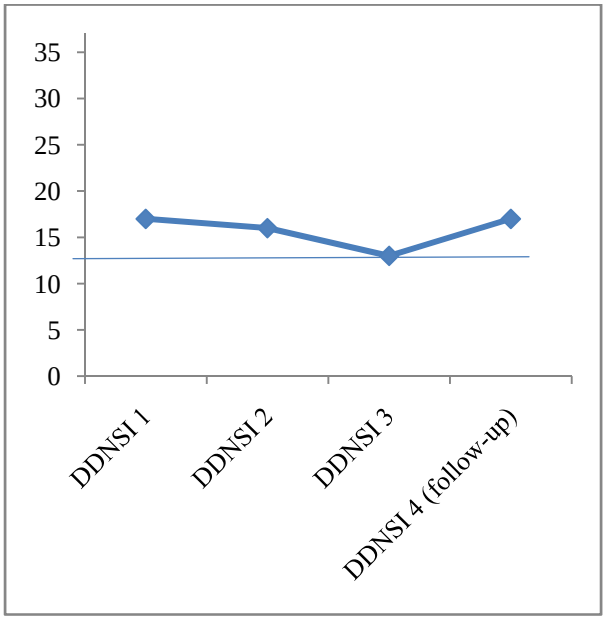
Participant B1 PSQI scores at study onset, pre-test, post-test, and follow-up.

Figure 9.4. Participant B1 PCL-M scores.



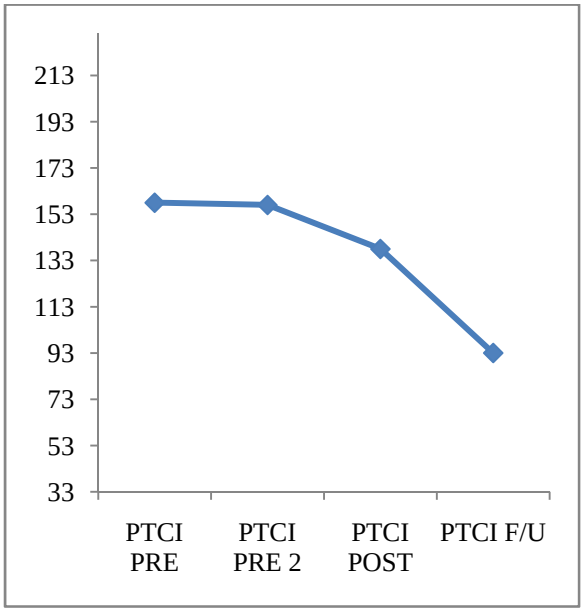
Participant B1 PCL-M scores at study onset, pre-test, post-test, and follow-up.

Figure 10.1. Participant B2 DDNSI scores.



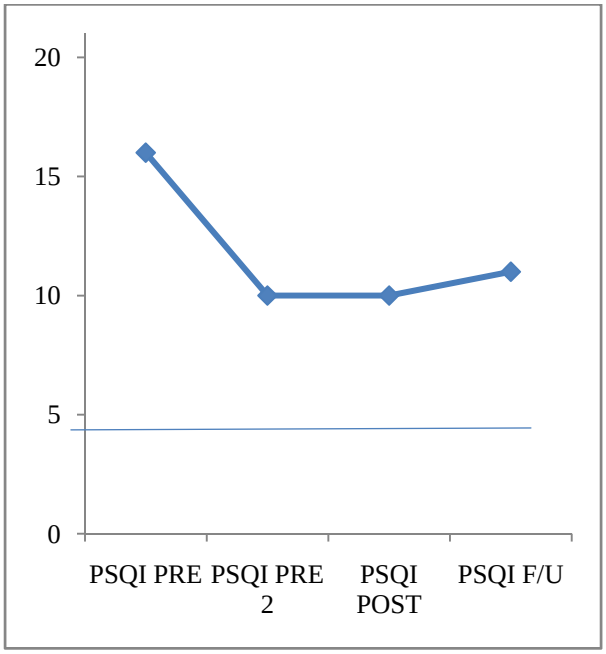
Participant B2 DDNSI scores during treatment and at follow-up.

Figure 10.2. Participant B2 PTCI scores.



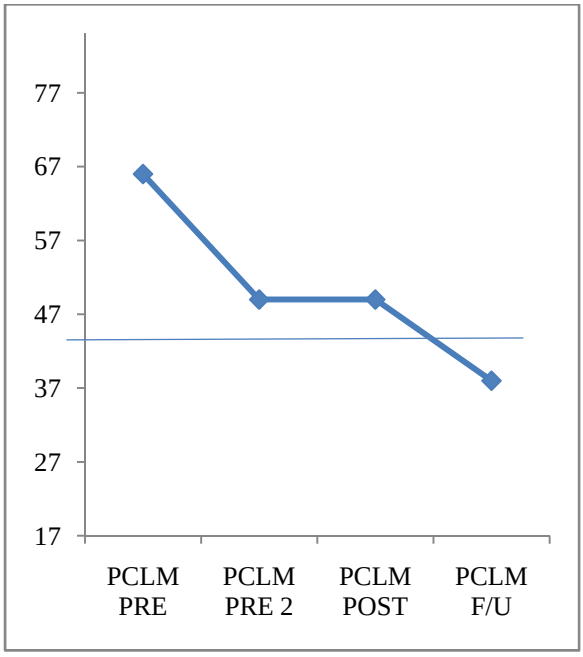
Participant B2 PTCI scores at study onset, pre-test, post-test, and follow-up.

Figure 10.3. Participant B2 PSQI scores.



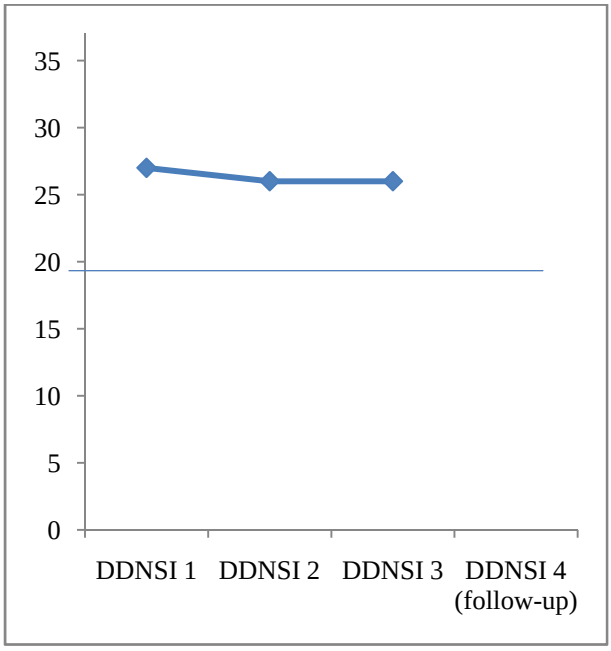
Participant B2 PSQI scores at study onset, pre-test, post-test, and follow-up.

Figure 10.4. Participant B2 PCL-M scores.



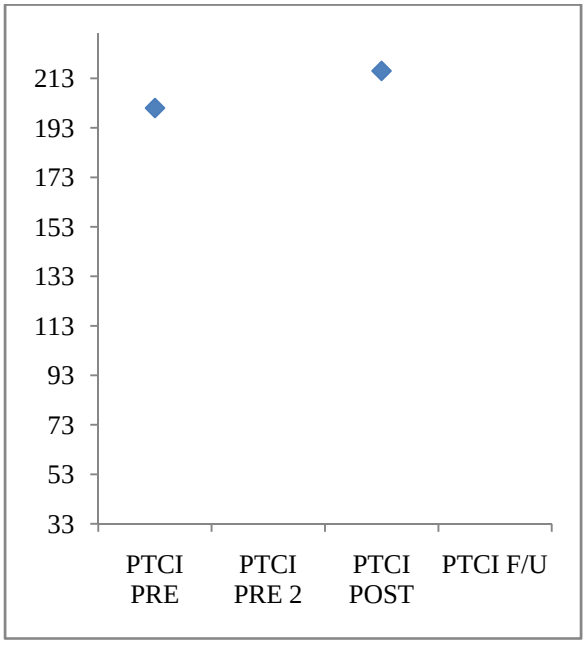
Participant B2 PCL-M scores at study onset, pre-test, post-test, and follow-up.

Figure 11.1. Participant B3 DDNSI scores.



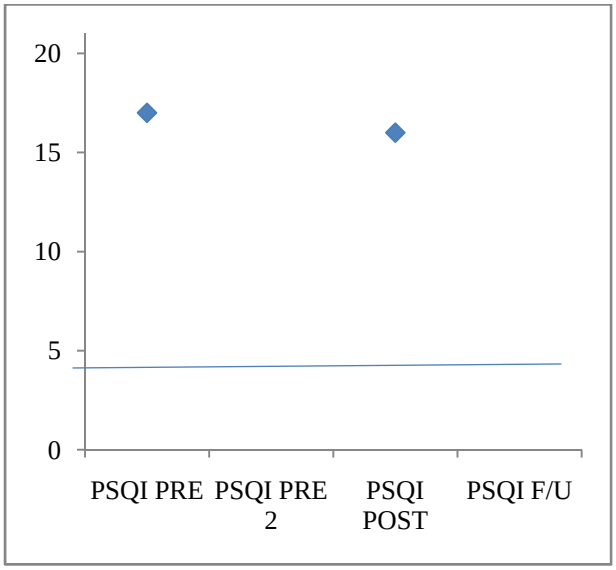
Participant B3 DDNSI scores during treatment. Participant B3 was absent for the follow-up session.

Figure 11.2. Participant B3 PTCI scores.



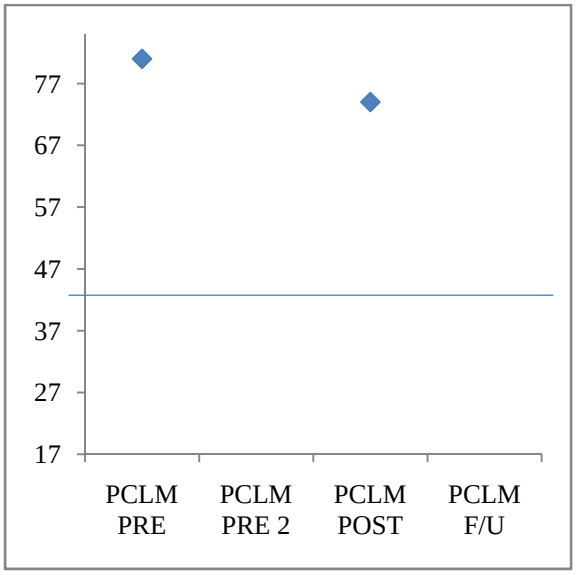
Participant B3 PTCI scores at study onset and post-test. Participant B3 was absent for the first session of treatment (pre-test 2) and follow-up session.

Figure 11.3. Participant B3 PSQI scores.



Participant B3 PSQI scores at study onset and post-test. Participant B3 was absent for the first session of treatment (pre-test 2) and follow-up session.

Figure 11.4. Participant B3 PCL-M scores.



Participant B3 PCL-M scores at study onset, post-test, and follow-up. Participant B3 was absent for the first session of treatment (pre-test 2) and follow-up session.

Office of Research Integrity
Institutional Review Board
401 11th St., Suite 1300
Huntington, WV 25701

FWA 00002704

IRB1 #00002205
IRB2 #00003206

March 4, 2013

Roslyn Feierstein, Ph.D.
Huntington VA Medical Center, MHC

RE: IRBNet ID# 306383-1
At: Marshall University Institutional Review Board #1 (Medical)

Dear Dr. Feierstein:

Protocol Title:	[306383-1] Imagery Rehearsal Therapy for Posttraumatic Nightmares: Sympton Severity and Control Appraisal Outcomes	
Expiration Date:	March 4, 2014	
Site Location:	VA	
Submission Type:	New Project	APPROVED
Review Type:	Expedited Review	

In accordance with 45CFR46.110(a)(4)(5)&(7), the above study was granted Expedited approval today by the Marshall University Institutional Review Board #1 (Medical) Chair for the period of 12 months. The approval will expire March 4, 2014. A continuing review request for this study must be submitted no later than 30 days prior to the expiration date. The Chair also acknowledged the submitted HIPAA authorization.

If you have any questions, please contact the Marshall University Institutional Review Board #1 (Medical) Coordinator Trula Stanley,MA,CIC at (304) 696-7320 or stanley@marshall.edu. Please include your study title and reference number in all correspondence with this office.

References

American Psychiatric Association. (2000). Posttraumatic stress disorder. *Diagnostic and statistical manual of mental disorders: DSM-IV-TR.* Washington, DC: Author. 467-468.

Baker, E. (1979). The relationship between locus of control and psychotherapy: A review of the literature. *Psychotherapy: Theory, Research & Practice, 16,* 351-362.

Benassi, V., Sweeney, P., & Dufour, C. (1988). Is there a relation between locus of control orientation and depression? *Journal of Abnormal Psychology, 97,* 357-367.

Buysse, D., Reynolds, C., Monk, T., Berman, S., & Kupfer, D. (1989). The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28,* 193-213.

Carlson, E. & Dalenberg, C. (2000). A conceptual framework for the impact of traumatic experiences. *Trauma, Violence, & Abuse, 1,* 4-28.

Dangleish, T. (2004). Cognitive approaches to posttraumatic stress disorder: The evolution of multirepresentational theorizing. *Psychological Bulletin, 130,* 228-260.

Davis, J. & Wright, D. (2006). Exposure, relaxation, and rescripting treatment for trauma-related nightmares. *Journal of Trauma & Dissociation, 7,* 5-18.

Davis, J., Byrd, P., Rhudy, J., Wright, D. (2007). Characteristics of chronic nightmares in a trauma-exposed treatment-seeking sample. *Dreaming, 17,* 187-188.

Elsesser, K. & Satory, G. (2007). Memory performance and dysfunctional cognitions in recent trauma victims and patients with posttraumatic stress disorder. *Clinical Psychology & Psychotherapy, 14,* 464-474.

Epstein, S. (1991). The self-concept, the traumatic neurosis, and the structure of personality. *Perspectives in Personality: Self and Emotion, 3,* 63-98.

Foa, E., Ehlers, A., Clark, D., Tolin, D., & Orsillo, S. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological Assessment, 11*, 303-314.

Foon, A. (1985). Similarity between therapists' and clients' locus of control: Implications for therapeutic expectations and outcome. *Psychotherapy: Theory, Research, Practice, Training, 22*, 711-717.

Foon, A. (1987). Review: Locus of control as a predictor of outcome of psychotherapy. *British Journal **of** Medical Psychology, 60*, 99-107.

Forbes, D., Phelps, A., McHugh, A., Debenham, P., Hopwood, M., & Creamer, M. (2003). Imagery rehearsal in the treatment of posttraumatic nightmares in Australian veterans with chronic combat-related PTSD: 12-month follow-up data. *Journal of Traumatic Stress, 16*, 509-513.

Frazier, P., Steward, J., & Mortensen, H. (2004). Perceived control and adjustment to trauma: A comparison across events. *Journal of Social and Clinical Psychology, 23,* 303-324.

Gale, C., Batty, G., & Deary, I. (2008). Locus of control at age 10 years and health outcomes and behaviors at age 30 years: The 1970 British cohort study. *Psychosomatic Medicine, 70*, 397-403.

Germain, A. & Nielsen, T. (2003). Impact of imagery rehearsal therapy treatment on distressing dreams, psychological distress, and sleep parameters in nightmare patients. *Behavioral Sleep Medicine, 1*, 140-154.

Grunert, B., Smucker, M., Weis, J., & Rusch, M. (2003). When prolonged exposure fails: Adding an imagery-based cognitive restructuring component in the treatment of industrial accident victims suffering from PTSD. *Cognitive and Behavioral Practice, 10*, 333-346.

Hoehn-Saric, R., & McLeod, D. (1985). Locus of control in chronic anxiety disorders. *Acta Psychiatrica Scandinavica, 72,* 529-535.

Karlin, B., Ruzek, J., Chard, K., Eftekhari, A., Monson, C., Hembree, E., Resick, P., & Foa, E. (2010). Dissemination of evidence-based psychological treatments for posttraumatic stress disorder in the Veterans Health Administration. *Journal of Traumatic Stress, 23,* 663-667.

Krakow, B. (2002). Turning nightmares into dreams. The Berkley Publishing Group: New York.

Krakow, B., Hollifield, M., Johnston, L., Koss, M., Schrader, R., Warner, T., et al. (2001). Imagery rehearsal therapy for chronic nightmares in sexual assault survivors with posttraumatic stress disorder: A randomized controlled trial. *JAMA: Journal of the American Medical Association, 286,* 537-545.

Krakow, B., Kellner, R., Neidhardt, J., Pathak, D., et al. (1993). Imagery rehearsal treatment of chronic nightmares: With a thirty month follow-up. *Journal of Behavior Therapy and Experimental Psychiatry, 24,* 325-330.

Krakow, B., Kellner, R., Pathak, D., & Lambert, L. (1995). Imagery rehearsal treatment for chronic nightmares. *Behaviour Research and Therapy, 33,* 837-843.

Krakow, B. & Zadra, A. (2006). Clinical management of chronic nightmares: imagery rehearsal therapy. *Behavioral Sleep Medicine, 4,* 45-70.

Lu, M., Wagner, A., Van Male, L., Whitehead, A., & Boehnlein, J. (2009). Imagery rehearsal therapy for posttraumatic nightmares in U.S. veterans. *Journal of Traumatic Stress, 22,* 236-239.

Maher, M., Rego, S., & Asnis, G. (2006). Sleep disturbances in patients with posttraumatic stress disorder: Epidemiology, impact and approaches to management. *CNS Drugs, 20,* 567-590.

Monson, C., Gradus, J., Young-Xu, Y., Schnurr, P. P., Price, J., & Schumm, J. (2008). Change in posttraumatic stress disorder symptoms: Do clinicians and patients agree? *Psychological Assessment, 20*(2), 131-138.

Monson, C., Schnurr, P., Resick, P., Friedman, M., Young-Xu, Y., & Stevens, S. (2006). Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 74*, 898-907.

Moore, B. & Krakow, B. (2010). Imagery rehearsal therapy: An emerging treatment for posttraumatic nightmares in veterans. *Psychological Trauma: Theory, Research, Practice, and Policy, 2,* 232-238.

Nappi, C., Drummond, S., Thorp, S., & McQuaid, J. (2010). Effectiveness of imagery rehearsal therapy for the treatment of combat-related nightmares in veterans. *Behavior Therapy, 41*, 236-244.

Noon, G. (1996). The relationship between locus of control and posttraumatic stress disorder (PTSD) in battered women. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *56,* 7052.

O'Donnell, M., Elliott, P., Wolfgang, B., & Creamer, M. (2007). Posttraumatic appraisals in the development and persistence of posttraumatic stress symptoms. *Journal of Traumatic Stress, 20,* 173-182.

Okajima, I., Komada, Y., & Inoue, Y. (2011). A meta-analysis on the treatment effectiveness of cognitive behavioral therapy for primary insomnia. *Sleep and Biological Rhythms, 9,* 24-34.

Powers, M., Halpem, J., Ferenschak, M., Gillihan, S. & Foa, E. (2010). A meta-analytic review of prolonged exposure for posttraumatic stress disorder. *Clinical Psychology Review, 30,* 635-641.

Presson, P., & Benassi, V. (1996). Locus of control orientation and depressive symptomatology: A meta-analysis. *Journal of Social Behavior & Personality, 11,* 201-212.

Resick, P., Nishith, P., Weaver, T., Astin, M., & Feuer, C. (2002). A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape victims. *Journal of Consulting and Clinical Psychology, 70,* 867-879

Rothbaum, B. & Mellman, T. (2001). Dreams and exposure therapy in PTSD. *Journal of Traumatic Stress,* 14, 481-490.

Somers, J., Goldner, E., Waraich, P., & Hsu, L. (2006). Prevalence and incidence studies of anxiety disorders: A systematic review of the literature. *The Canadian Journal of Psychiatry, 51,* 100-113.

Spoormaker, V. & Montgomery, P. (2008). Disturbed sleep in posttraumatic stress disorder: Secondary symptom or core feature? *Sleep Medicine Reviews, 12,* 169-184.

Stein, D. & Nesse, R. (2011). Threat detection, precautionary responses, and anxiety disorders. *Neuroscience and Biobehavioral Reviews, 35,* 1075-1079.

Weathers, F., Litz, B., Herman, D., Huska, J., & Keane, T. (1993). The PTSD Checklist (PCL): Reliability, Validity, and Diagnostic Utility. Paper presented at the Annual

Convention of the International Society for Traumatic Stress Studies, San Antonio, TX.

Wittmann, L. (2007). PTSD: Posttraumatic sleep disorder? *Sleep and Hypnosis, 9,* 1-5.

Wittmann, L., Schredl, M., & Kramer, M. (2006). Dreaming in posttraumatic stress disorder: A critical review of phenomenology, psychophysiology, and treatment. *Psychotherapy and Psychosomatics, 76,* 25-39.

Curriculum Vitae

Ashley Kay Rose, M.A.
Department of Psychology, Marshall University
One John Marshall Drive
Huntington, WV 25755
Phone: (304) 488-6167
Email: rose41@marshall.edu

EDUCATION

Pursuing Doctor of Psychology	Marshall University, Huntington, WV Degree Anticipated: December 2013 Dissertation: *Imagery Rehearsal Therapy for Posttraumatic Nightmares: Symptom Severity and Control Appraisal Outcomes*
Master of Arts	Marshall University, Huntington, WV August 2009 Major: Psychology
Bachelor of Arts	Marshall University, Huntington, WV May 2006 Major: Psychology Minors: History and Sociology

EMPLOYMENT

July, 2012 to July, 2013 — **Veterans Administration Medical Center**
APA-accredited Predoctoral Internship in Clinical Psychology
Lexington, KY

Position: Psychology Intern
Supervisors: Edward Marshall, Ph.D., Steven Hansel, Psy.D., Karen Lenhoff, Ph.D., and Cynthia Dunn, Ph.D.

Major Rotations:

Acute Inpatient Psychology and Behavioral Health. Responsibilities included providing acute inpatient group and individual psychotherapy and assessment, outpatient individual therapy, outpatient behavioral medicine evaluations (transplant, bariatric, and pain candidacy), and outpatient assessment (dementia/memory, ADHD, and cognitive screening). Additional responsibilities included providing organizational consultation for the staff of the Lexington

VAMC Dialysis Unit, individual psychotherapy for acute dialysis patients, and instructing Employee Wellness programming. Supervised by Edward Marshall, Ph.D.

PTSD Clinical Team (PCT). Responsibilities included providing PTSD evaluations and outpatient individual and group therapy and assessments. Additional responsibilities included attending and contributing to weekly treatment team meetings, providing feedback to patients referred for evaluation to rule out presence of PTSD, and treatment planning. Supervised by Karen Lenhoff, Ph.D.

Minor Rotations:

Couples and Family Therapy. Responsibilities included providing consultation, psychoeducation, evaluation, and couples therapy to veterans and their families using primarily Integrative Behavioral Couples Therapy (IBCT) and Behavioral Family Therapy (BFT) approaches. Supervised by Steven Hansel, Psy.D.

Rural PTSD Clinical Team Outreach. Responsibilities included providing consultation, group therapy, and psychoeducation to veterans in a rural outpatient clinic located in London, KY. Supervised by Cynthia Dunn, Ph.D.

June, 2008 to December 2010 **Westbrook Health Services**
Parkersburg, WV

Position: Crisis Case Manager
Supervisor: Kimberly Dixon, L.I.C.S.W.

Responsibilities: Primary responsibilities include psychological crisis intervention, care coordination, initial evaluation and coordination of involuntary commitments, individual psychiatric evaluations in crisis settings, risk assessment, psychiatric consulting for Camden-Clark Memorial Hospital and St. Joseph Hospital, 24-hour Crisis Line operation, psychiatric crisis on-call, walk-in crisis counseling, and coordinating treatment referrals.

TEACHING EXPERIENCE

August, 2007 to May, 2012 **Marshall University Department of Psychology**
Huntington, WV

Position: Teaching Assistant
Supervisor: Steven Mewaldt, Ph.D.

Responsibilities: Instructor of Introductory Psychology (9 sections) with full course responsibility.

PRACTICA EXPERIENCE

June, 2011 to May, 2012 **Department of Veterans Affairs: Community-Based Outpatient Center**

Prestonsburg, KY

Position: Psychology Student
Supervisors: Megan Green, Psy.D.
Cheryl Scott-Richard, Psy.D.

Responsibilities: Provide individual therapy to veterans and members of their families; use cognitive-behavioral, evidence-based, interpersonal, and substance abuse/dependence interventions; work as part of an interdisciplinary team with psychiatrists, physicians, nutritionists, nurses, and social workers; participate in didactic trainings; conduct PTSD (PCT) and general mental health (GMH) diagnostic interviews and compose reports; complete diagnostic clarity assessments; and provide psychological consultation for veterans in the Prestonsburg, KY area.

August, 2010 to May, 2012 **Department of Veterans Affairs Medical Center**
Huntington, WV

Position: Psychology Student
Supervisors: Megan Green, Psy.D.
Roslyn Feierstein, Ph.D., A.B.P.P.
Cheryl Scott-Richard, Psy.D.
Agnes Hornich, Psy.D.

Responsibilities: Provide individual and group therapy to veterans and members of their families; use cognitive-behavioral, evidence-based, substance abuse/dependence, interpersonal, and biofeedback interventions; work as part of interdisciplinary treatment teams with psychiatrists, physicians, nutritionists, nurses, and social workers; participate and present cases in PTSD (PCT), substance abuse (SATP), and general mental health (GMH) clinical treatment team meetings; participate in biofeedback, Rorschach interpretive, evidence-based treatment, MMPI-2 assessment, and special topics trainings; conduct PCT and GMH diagnostic interviews and compose reports; complete neuropsychological, pre-operative (spinal cord stimulator, morphine pump, organ transplant, and amputation), chronic pain, response bias (malingering or feigning functional impairment), and diagnostic clarity assessments; provide consultation to polytrauma, pain management, and surgical departments.

October to December, 2009 **Cabell Huntington Hospital/Edwards Comprehensive Cancer Center**
Huntington, WV

Position: Psychological Trainee
Supervisor: Keith Beard, Psy.D.

Responsibilities: Developed a group psychotherapy manual for cancer survivors; provided group psychotherapy co-facilitation for survivors of breast and ovarian cancers; used cognitive-behavioral, interpersonal, and humanistic/existential group interventions; sought consultation

from medical professionals in the interdisciplinary Cancer Center; maintained treatment records and provided referrals as needed.

August, 2009 to August, 2010 **Marshall University Psychology Clinic**
Huntington, WV

Position: Psychological Trainee
Supervisor: Keith Beard, Psy.D.
Marianna Footo-Linz, Ph.D.

Responsibilities: Provided individual therapy to university students and community members; used cognitive-behavioral, existential, brief dynamic, and humanistic interventions; completed diagnostic intake interviews and compose reports; developed treatment plans; complete personality, ADHD/LD, and neuropsychological assessments; provided feedback on assessment results to referral sources; provided consultation to endocrinologists and psychiatrists; conducted psychoeducational presentations on campus; and provided behavioral and psychological consultation for area Head Start (state-funded pre-school) Programs.

January to August, 2009 **Marshall University Psychology Clinic**
Dunbar, WV

Position: Psychological Trainee
Supervisor: Thomas Linz, Ph.D.

Responsibilities: Provided individual therapy to community members; used cognitive-behavioral, brief dynamic, interpersonal, existential, and humanistic interventions; completed personality, ADHD/LD, and neuropsychological assessments; provided feedback on assessment results to clients; provided diagnostic intake interviews and compose reports; developed treatment plans; utilized community referrals when indicated.

RESEARCH EXPERIENCE

October, 2011 to Present — **Primary Investigator**. Dissertation: Imagery Rehearsal Therapy for Posttraumatic Nightmares: Symptom Severity and Control Appraisal Outcomes. Marshall University and the Huntington, WV Veterans Affairs Medical Center. Research Chair: Martin Amerikaner, Ph.D. VAMC Primary Investigator: Roslyn Feierstein, Ph.D., A.B.P.P.

January-December, 2010 — **Co-Investigator**. HIV Testing and Counseling, Marshall University. Data collection and program planning for a Department of Health and Human Resources-funded HIV education, testing, and counseling program. Principle Investigator: Keith Beard, Psy.D.

August-December, 2008 — **Research Assistant.** Data collection for an unpublished study of implicit religiosity factors and attitudes about health behaviors.

Marshall University. Principle Investigator: Paige Muellerleile, Ph.D.

PUBLICATIONS

Rose, A. (2010). Teach Me Empathy, Please. *Behavior Analysis Digest International, 22,* 3.

PROFESSIONAL TRAININGS

Advanced MMPI-2 Interpretation: VAMC Huntington. (Roger Greene, Ph.D.) 14-hour workshop on advanced interpretation of the MMPI-2. September, 2011.

Motivational Interviewing Training Workshop. (VAMC Huntington). 15-hour workshop on foundational skill development in Motivational Interviewing for clinicians. September, 2011.

Trauma-Focused Cognitive-Behavioral Therapy Training. (Medical University of South Carolina). 8-hour online training in intermediate skill development of cognitive-behavioral therapy for trauma survivors. August, 2011.

Cognitive Processing Therapy Training for Individual Therapy Workshop: VAMC Memphis. (Michelle Bowen, M.S.S.W., L.C.S.W., B.C.D.). 14-hour training for intermediate skill development of CPT for individual therapy. April, 2011.

Cognitive Processing Therapy Training for Group Therapy Workshop: VAMC Memphis. (Michelle Bowen, M.S.S.W., L.C.S.W., B.C.D.). 7-hour training for intermediate skill development of CPT for group therapy. April, 2011.

Rorschach Administration, Exner Scoring and Interpretation Seminar. (Janine Shaw, Ph.D., VAMC Huntington Chief of Mental Health). Approximately 22 hours of foundational training in Rorschach administration, the Exner scoring system, and Rorschach interpretation. January, 2011 to August, 2011.

Dialectical Behavioral Therapy Training. (Patrick Kerr, Ph.D. and Jessica Luzier, Ph.D. West Virginia University, School of Medicine, Department of Behavioral Medicine and Psychiatry). 8-hour foundational training in the use of DBT for individual and group therapy. January, 2011.

Biofeedback Technology Training (Roslyn Feierstein, Ph.D., A.B.P.P.) Approximately 12 hours of foundational training in the use of biofeedback technology and clinical applications. December, 2010 to February, 2011.

Trauma, PTSD and Grief Training (Eric Gentry, Ph.D.) 8-hour foundational training in clinical issues for trauma survivors, traumatic grief, and PTSD for clinicians. August, 2010.

HIV Testing and Counseling Training (WV Department of Health and Human Resources). 16-hour training in the use of "Ora-Sure" HIV testing equipment, diagnostic immunology

reporting, counseling HIV risk behavior, risk-reduction planning, and providing counseling on testing results. February, 2010.

WAIS-IV Training. (Gloria Maccow, Ph.D., Pearson Assessment) 7-hour training in the development and changes to WAIS-IV. October, 2008.

Nonviolent Crisis Intervention Training. (Kimberly Dixon, L.I.C.S.W.) 14-hour training in the use of nonviolent techniques for behavioral crisis intervention. June, 2008.

PROFESSIONAL AFFILIATIONS

- *Chair, Faculty Liaison,* Marshall University Psy.D. Program Student-Organized Advisory Panel (S.O.A.P.)
- *Student Member,* International Society for Traumatic Stress Studies
- *Student Member,* West Virginia Psychological Association
- *Former Campus Representative for Marshall University,* American Psychological Association of Graduate Students (APAGS)
- *Student Affiliate,* American Psychological Association

AWARDS AND SCHOLARSHIPS

- Marshall University Graduate College Award for Academic Excellence, $720 (Summer, 2009)
- Graduated *cum laude* from Marshall University
- Promise Scholarship recipient, $13,994 (Fall, 2002-Spring, 2006)
- Lubin Family Endowed Scholarship, $567 (Fall, 2003)
- Marshall University General Academic Scholarship, $182 (Fall, 2003)
- Marshall University General Academic Scholarship, $750 (Fall, 2002)

COMMUNITY OUTREACH

Assistant Coordinator/Volunteer, Prestera Race for Substance Abuse Recovery Huntington, WV. September, 2010 and September, 2011.

Program Coordinator, HIV Testing and Counseling, Marshall University. Provided approximately 85 hours of HIV psychoeducation, programming, testing and counseling in the Huntington, WV area to identify new cases of HIV infection and provide community education to reduce the transmission of HIV in targeted populations. Supervised by Keith Beard, Psy.D. January, 2010-December, 2010.

Member, Prestera Center for Community Behavioral Health Foundation Board of Trustees, Grant Committee. December, 2009-January, 2012

Outreach representative, Marshall University Psychology Clinic. August, 2009-September, 2010

Volunteer, Mid-Ohio Valley Health Department Threat Preparedness Volunteer/Critical Incident Stress Management. March, 2006-present.

Volunteer, Women's Wellness Day, Huntington, WV. May, 2009.

Volunteer, Epilepsy Day of Hope, Huntington, WV. April, 2009

Volunteer, CONTACT Pig Roast, Huntington, WV. October, 2005

Volunteer, Cammack Elementary kindergarten classrooms, Huntington, WV. January, 2004-May, 2004.

Provided approximately 200 hours of volunteer service to Huntington, WV-area community organizations throughout undergraduate studies, including Golden Girls Group Home, the Salvation Army, Goodwill, CONTACT rape crisis center, Marshall University, Autism Speaks, and the Humane Society. August, 2002-May, 2006.