EVALUATING ACCEPTANCE AND COMMITMENT THERAPY FOR INSOMNIA: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

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Insomnia is a subjective perception of dissatisfaction with the amount and/or quality of sleep and is associated with a number of significant health concerns. Individuals with insomnia often report dysfunctional beliefs about sleep, heightened pre-sleep arousal, and sleep-incompatible behaviors. While traditional behavioral interventions have well addressed the dysfunctional beliefs about sleep and sleep-incompatible behaviors, Acceptance and Commitment Therapy (ACT) may add unique and useful treatment components to existing interventions. A pilot ACT study by Baik and O’Brien (2013) using an ACT protocol revealed promising outcomes for persons with insomnia; the present study examined the efficacy of ACT for insomnia by modifying the previous study using a randomized controlled group. The overall results of the study indicate that the participants viewed the treatment as acceptable and beneficial. They experienced reduced symptoms of insomnia and pre-sleep arousal. Additionally, participants showed improvements in acceptance, use of thought control strategies, and present-focused thinking to variable degrees. The direct indicators of change in sleep activities through the sleep diaries suggest that the participants experienced some improvements in the sleep parameters; however, these changes may not be strongly accounted for by the treatment effect, but are most likely explained by self-monitoring. Despite several limitations observed in the current study, it is meaningful as the first randomized controlled group outcome study that provides empirical data on the benefits of ACT for insomnia. As a relatively new intervention approach for insomnia, ACT is promising and it will likely continue to benefit from future refinement.
This dissertation is dedicated to individuals with insomnia
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INTRODUCTION

Insomnia is a subjective perception of dissatisfaction with the amount and/or quality of sleep. The diagnosis of insomnia, according to both the Diagnostic Statistical Manual of Mental Disorders-4th edition (DSM-IV; American Psychiatric Association, 2000) and the International Classification of Sleep Disorder-2nd edition (ICSD-2; American Academy of Sleep Medicine, 2005), is made on the basis of a subjective complaint of insomnia (whether this is corroborated by objective evidence in the sleep laboratory or not) and the presence of daytime distress or performance impairment. The subjective complaints of insomnia include difficulties in initiating and/or maintaining sleep and non-restorative sleep. The accompanied daytime distress or performance impairment encompass a range of decreased daytime functioning such as fatigue, daytime sleepiness, mood disturbance, motivation reduction, attention difficulties, and memory impairment (American Psychiatric Association, 2000; Kessler et al., 2012; World Health Organization, 1992).

Insomnia is found to be one of the most common sleep complaints in the industrialized world (Ancoli-Israel & Roth, 1999). A recent epidemiological study conducted with 10,094 managed health care plan subscribers in the U.S. indicated that the prevalence of insomnia ranged from 3.9% to 22.1% depending on the diagnostic criteria used (Roth et al., 2011). Other researchers reported that approximately one third of adults in Western countries have experienced sleep difficulties with sleep initiation, maintenance, or non-restorative sleep (Jacobi, & Sareen, 2008; LeBlanc et al., 2009; Morphy et al., 2007; Ohayon & Reynolds III, 2009; Stein, Belik, Jacobi, & Sareen, 2008).

The medical burden and human costs of insomnia are substantial (Kessler et al., 2012; Shahly et al., 2012). Insomnia has been identified as a significant predictor of cardiovascular
and non-cardiovascular disease mortality (Ayas et al., 2003; Dew et al., 2003; Kripke, Garfinkel, Wingard, Klauber, & Marler, 2002; Mallon, Broman, & Helta, 2002; Newman et al., 2000). It has also been associated with significantly reduced productivity, weakened immunity, increased healthcare costs, and increased accident rates (Daley et al., 2009; Metlaine, Leger, & Chaudat, 2005; Simon & VonKorff, 1997).

Although nearly everyone experiences a few nights of troubled sleep (e.g., transient sleep disorders) in their lifespan and can recover to their normal sleep patterns, some individuals may not recover from the transient changes in their sleep and undergo a prolonged period of insomnia accompanied by significant decrements in their functioning. It has been hypothesized that pre-sleep cognitive activity, which oftentimes is characterized by unpleasant and anxiety-provoking thoughts, plays an important role in the etiology and maintenance of insomnia (Borkovec, 1979; Coursey et al., 1975; Lichstein & Rosenthal, 1980; Youkilis & Bootzin, 1981).

In the following literature review, the role of pre-sleep cognition and arousal in insomnia will be examined. Next, a theoretical model of insomnia pertaining to pre-sleep cognition and sleep-incompatible arousal will be discussed. Following this, a review of current psychological interventions for insomnia will be presented. Included in this review will be a discussion of treatment components used in the interventions as well as unaddressed research questions. Then, a review on acceptance and mindfulness interventions will be discussed. Finally, the objectives and hypotheses for the present investigation will be presented.
CHAPTER I. INSOMNIA: ONSET AND MAINTENANCE

Pre-sleep Cognition and Arousal in Insomnia

Individuals with insomnia frequently report intrusive thoughts and worries as one of the primary factors that interfere with the ability to fall asleep (Borkovec, 1982; Espie, 1991; Morin, 1993). It also has been studied that individuals with insomnia tend to have elevated arousal levels at the pre-sleep stage, which interferes with sleep onset.

Individuals with primary insomnia reportedly worry about difficulty sleeping and have a higher number of catastrophic beliefs about the consequences of not sleeping, (Harvey and Greenall, 2003; Carney et al., 2010). Additionally, a number of studies found high positive correlations between measures of such pre-sleep cognitive activity and sleep onset latency (Harvey, 2000; Nicassio, Mendlowitz, Fussell, & Petras, 1985; Van Egeren, Haynes, Franzen, & Hamilton, 1983). For example, Harvey (2000) investigated the role of pre-sleep cognition in insomnia. In her study, a sample of people with insomnia and a “good sleeper” comparison group completed measures of sleep disturbance, anxiety, depression, worry, reasons for worry, and reactions to uncertain situations. The participants also participated in a semi-structured interview that assessed: overall sleep quality, cognitive interference (i.e., frequency of intrusive thoughts that kept them awake), sleep latency, the focus of their attention while attempting to sleep, content of pre-sleep cognitive activity, duration of time spent focused on each area of content, level of preoccupation with the thought, difficulty getting to sleep because of the thoughts, and whether the thoughts focused on the past, present, or future. Results indicated that approximately 80% of the participants with insomnia reported that they experienced a “racing mind” at bedtime and were more preoccupied with pre-sleep cognition. They also attributed their delayed sleep onset latency to pre-sleep cognition relative to the “good sleepers.” It was also
reported that the contents of pre-sleep cognitions among the insomniac group were more focused on worry about not getting to sleep, general worries, solving problems, and noises in the house whereas the “good sleepers” more often reported thinking about “nothing in particular.”

Other researchers have also identified cognitive activity as an important element of insomnia. For example, Wicklow and Espie (2000) analyzed the content of pre-sleep thoughts among individuals who had difficulty with sleep onset. They reported that there was a positive correlation between cognitive activity and sleep onset latency measured with actigraphy. Additionally, thoughts about sleep and anticipated consequences of getting poor sleep were two of the strongest predictors of sleep latency.

Another study, using the similar methodology (actigraphy and sleep diary), found that pre-sleep thoughts were significantly correlated with measures of sleep disturbance (Harvey and Espie, 2004). Furthermore, Tang, Schmidt, and Harvey (2007) found that when pre-sleep worry was provoked by the presence of a clock, longer sleep onset latency (measured through actigraphy) was reported from both normal sleepers and persons with insomnia. Finally, Suh, Ong, Steidmann, Nowakowski, Dowdle, Willett, Siebern, and Manber (2012) investigated cognitive predictors of insomnia among persons with insomnia. They found that relative to individuals who scored higher on a measure of sleep self-efficacy, those who scored lower had longer sleep onset latency, poorer sleep quality, higher insomnia severity, and more anxiety about anxiety itself and sleep.

In terms of arousal, it is well established that sympathetic activation may be an important component of insomnia. Several researchers reported that individuals with insomnia showed an overall pattern of higher level of body temperature at both day and night (Adam, Tomeny, & Oswald, 1986), whole-body oxygen consumption during the day and sleep (Bonnet & Arand,
1992, 1995), phasic vasoconstriction during sleep (Monroe, 1967), frontalis and mentalis electromyogram activity before sleep onset (Freedman & Sattler, 1982).

de Zambotti, Covasson, de Mintona, Sarlo, and Stegagno (2011) investigated psychophysiological characteristics of sleep onset (transition from wakefulness to sleep) by comparing individuals with primary insomnia to normal sleepers. Cardiovascular activity was measured using impedance cardiography, and sleep was measured with polysomnography as well as subjective reports of insomnia and mood for two consecutive nights. It was shown that people with insomnia had higher levels of sympathetic activity during sleep onset relative to the normal sleepers. Specifically, insomniacs had significantly higher heart rate and lower pre-ejection period values (PEP; inversely related to sympathetic β-adrenergic activity) at baseline. Also, individuals with insomnia did not show significant changes in PEP values during sleep onset, while normal sleepers showed an increase in PEP. Although other variables of impedance cardiography did not yield significant differences between persons with insomnia and normal sleepers, this study suggests that participants with insomnia experienced higher pre-sleep arousal. In a subsequent study, de Zambotti and colleagues (2013) reported that persons with primary insomnia experienced higher sympathetic activation throughout the whole sleep cycle. de Zambotti and his colleagues concluded that higher sympathetic activation was one of the significant features of primary insomnia.

Pre-sleep cognitions have been reported to be associated with pre-sleep arousal. Lichstein and Rosenthal (1980) investigated pre-sleep arousal using a self-reported questionnaire to assess both cognitive (e.g., active mind at bedtime, thinking, worrying, analyzing) and somatic (i.e., general bodily arousal that delays sleep onset such as one’s body as restless, shifting, sweaty) arousal. They reported that individuals endorsed cognitive arousal items three times more
frequently than they endorsed somatic arousal items as interfering with their attempt to fall asleep. Nicassio et al. (1985) found that both cognitive and somatic arousal, measured through self-reported questionnaires, were significantly correlated with each other and general indices of sleeping difficulty, and sleep-onset latency. Bélanger et al. (2005) also examined pre-sleep cognitive activity among three groups: persons with and without comorbid generalized anxiety disorder and good sleepers. The results showed that both insomniac groups reported greater pre-sleep cognitive arousal than the group of good sleepers.

Furthermore, Drake, Richardson, Roehrs, Scofield, and Roth (2004) hypothesized that there is a trait vulnerability to sleep disturbance and hyperarousal. They conducted a study among adult community populations \( n = 104 \). While spending a night at a sleep laboratory, participants completed various measures regarding sleep parameters including an insomnia stress response test (sleep disturbance in response to stressful situations) and were assessed on polysomnography, heart rate, and Multiple Sleep Latency Test. The results showed that those who scored high on the insomnia stress response test (i.e., higher likelihood of disturbed sleep due to stressful situations) had lower sleep efficiency and increased sleep latency on the polysomnographical assessment. Those who reported higher likelihood of sleep disturbance in response to stress also showed significantly greater sleep latency although the heart rate was not significantly different compared to those who reported less likelihood of sleep disturbance. Furthermore, individuals who reported the more likelihood of disturbed sleep were shown to have approximately 8 times more likelihood of having a history of insomnia, even after controlling for current insomnia.

In addition, Fernandez-Mendoza et al. (2010) reported similar findings in a study to test cognitive-emotional arousal using subjective measures of sleep parameters and the same stress-
response test developed by Drake et al. (2004). The participants completed measures of insomnia in response to stressful situations, mood, sleepiness, arousability (defined as predisposing individual characteristics in physiological arousal), rumination, personality factors, and stress coping. The results showed that individuals’ scores on the insomnia in response to stress were significantly associated with their pre-sleep cognitive and somatic arousal. Also, those who scored high on the insomnia in response to stress showed similar levels of cognitive-emotional hyperarousal relative to individuals with chronic insomnia. Taken as a whole, these findings suggest that pre-sleep cognitions, which are characterized by intrusive and negative thoughts that are often expressed in forms of stress, are associated with a various aspects of sleep disturbance (e.g., delayed sleep onset latency, poor quality). Persons with insomnia appear to experience elevated cognitive-emotional arousal and somatic arousal as measured through various subjective and physiological indices support.

**Thought Suppression and Insomnia**

When individuals experience negatively toned cognitions and emotions, they oftentimes attempt to suppress those unwanted thoughts (Harvey, 2000; 2001; Kuisk, Bertelson, & Walsh, 1989). In the earlier literature of behavioral treatment in 1960s and early 1970s, thought suppression (“thought stopping” treatment/technique) was studied for its use for psychological problems that were often characterized with obsessive ruminations. Wolpe (1958) suggest reciprocal inhibition techniques to treat various neurotic behaviors by relearning procedures through which a non-anxiety-producing response is continually repeated until it extinguishes the undesirable response, in the presence of a stimulus. Despite several favorable findings on the treatment outcomes of thought stopping (e.g., Kumar and Wilkinson, 1971; Stern, 1970; Stern, Lipsedge, & Marks, 1973; Wolpe, 1958, 1970; Yamagami, 1971), its utility and benefits are
refuted in the literature. For example, Wegner and colleagues (1987) demonstrated that intentional and purposeful attempts to suppress thoughts can have paradoxical effects using samples of undergraduate students. Specifically, Wegner et al. (1987) hypothesized that efforts to reduce the occurrence of cognitions could paradoxically increase their frequency and intensity. In their first experiment, subjects were randomly assigned to one of two experimental conditions: initial suppression versus initial expression. For the initial suppression condition, individuals were instructed to first suppress a thought and then to express it. Alternatively, for the initial expression condition, individuals were instructed to first express a thought and then to suppress it. Procedurally, each participant was first instructed to describe what they were thinking and to report their thoughts during a practice period. Then, participants in the initial suppression group were instructed to verbalize their thoughts as they did during the practice condition with a restriction that they should not think about a white bear. Any occurrence of white bear in their thoughts was to be indicted by ringing a bell. Following the suppression condition, these participants were instructed to think of a white bear while expressing their freely occurring thoughts. Again, the occurrence of a white bear thought was signaled by ringing the bell. The participants in the initial expression group were given the exact same instructions in reverse order. The occurrences of bell rings as well as audible mentioning of “white bear” were used as dependent measures.

The results of this study showed that the frequency of white bear reports (via bell ringing, verbal reports, or both) was higher during the expression period for both groups. However, change in frequency of white bear reports for the initial suppression group was 8 times higher during the second expression condition relative to the initial suppression period. Alternatively, the frequency of white bear reports during the expression condition was approximately 2 times
higher than the suppression condition for the participants in the initial expression condition. Wegner and colleagues (1987) argued that these results demonstrated that initial thought suppression had a “paradoxical effect,” creating a temporary preoccupation with the white bear which was then expressed during the subsequent expression condition.

In a subsequent experiment by Wegner et al. (1987), individuals were randomly assigned to three conditions: initial expression, initial suppression, and initial suppression with distraction. The third condition included instructions to distract oneself from a thought of a white bear by instead thinking of a red Volkswagen. The procedures were identical to the first experiment, but measures of thought duration and red Volkswagen reports were also recorded. The results showed that the overall frequency and duration of the white bear thought were higher during the expression period relative to the suppression condition period for both groups. This was consistent with findings from the first experiment. Also, the frequency for the white bear thoughts during suppression was not significantly lower for the distraction group. This indicated that individuals continued to think of a white bear despite being encouraged to instead think of a distracter. In terms of duration, the initial suppression group showed approximately 20 times longer duration of the white bear thought during the expression period relative to the suppression period. This contrasts with the other two groups who showed a 7 times longer duration.

Based on these findings, Wegner and colleagues (1987) concluded that although thought suppression can be achieved for a brief period of time, suppressing thoughts is inherently difficult to do and has a “rebound effect” by which the thoughts may eventually return with increased intensity, frequency, and duration.

Harvey (2000) reported relevant findings among individuals with insomnia. In this study, individuals who were diagnosed with insomnia, relative to good sleepers, reported feeling less in
control of their thinking and tended to purposefully attempt to control their thoughts during pre-
sleep periods using meta-cognitive control strategies (e.g., worry, suppression, reappraisal). Also,
Harvey (2001) administered a questionnaire about the use of thought control strategies among
persons with and without insomnia. Persons with insomnia, relative to those without insomnia,
reported more frequent use of cognitive suppression and cognitive reappraisal efforts. This
finding was replicated by Bélanger et al., 2005 and Schmidt et al., 2009.

In a subsequent study, Harvey (2003) attempted to investigate how thought suppression
influenced pre-sleep cognitive activities among persons with insomnia. She compared
individuals who met the diagnostic criteria of DSM-IV for insomnia with individuals who did
not report sleep disturbances. Both groups chose one issue, problem, or thought that they
considered to be most likely to occur as they went to bed. The two groups were then given one
of two sets of instructions. Specifically, one group was instructed to suppress their thoughts
about the selected issue prior to going to sleep (i.e., “… suppress it as quickly and firmly as you
can. You can think about whatever else you like but it is absolutely essential that you try and
suppress this material from coming into your mind.”, p.596). The other group was instructed to
“let their mind go free” without exerting any effort to control it (i.e., “Let you[r] mind go free,
don’t try and control your thoughts, just relax and let them come and go as you please.”, p.
596).

This study yielded several interesting findings. First, individuals with insomnia reported
feeling less in control of their thinking and more uncomfortable about their self-selected thought,
relative to those without insomnia. Also, individuals with insomnia were more likely to
purposely control and suppress their thinking while estimating their sleep-onset latency to be
longer, compared to individuals without insomnia. Regardless of the insomnia diagnosis, there
was an overall pattern that individuals in the suppression group estimated their sleep onset latency to be longer than those in the non-suppression group. However, the “rebound effect” (Wegner et al., 1987) was not shown in the results. Instead, participants in the suppression group reported a reduced frequency of the target thought. From these findings, Harvey (2003) concluded that although active attempts to suppress a thought resulted in a reduction in the frequency of the thought, such attempts may have an adverse impact by delaying sleep-onset latency and decreasing sleep quality. Schmidt and Gendolla (2008) found a similar result on thought suppression. When individuals were instructed to suppress their thoughts at bedtime, they initially reported a lower frequency of the suppressed thought. However, once they began to fall asleep (i.e., experiencing sleepiness and drowsiness), the suppressed thoughts increased in frequency. The authors argued that this rebound occurred because individuals’ ability to control and monitor their cognition lessened as they experienced drowsiness.

Related to thought suppression, when individuals with insomnia were instructed to try to stay awake as much as possible while lying in bed as a means to eliminate voluntary sleep effort, they reported reduced anxiety related to sleep and improved sleep onset latency (Broomfield & Espie, 2003). The authors claimed that this improvement in sleep onset latency could be attributed to lowered anxiety about sleep and sleep performance. Broomfield and Espie argued that lowered sleep anxiety, which was achieved from reduced sleep effort, reduced activation of metacognitive sleep beliefs (e.g., “thinking about sleep means that I am a poor sleeper.”) and sleep-related intrusions (Wells, 2001). Thus, although the exact mechanism that underlies thought suppression and pre-sleep cognitions needs to be investigated more in future research, it is plausible to posit that the act of suppression has an aversive influence on sleep, perhaps maintaining heightened pre-sleep cognitive arousal and physiological activation.
In summary, individuals with insomnia tend to have higher levels of pre-sleep cognitive activity and physiological activation. They have also been shown to exert efforts to control the cognitive activity using thought suppression. The use of these control strategies subsequently results in increased arousal, which then can further interfere with sleep. It can thus be argued that insomnia is partially maintained by a cyclic process of pre-sleep cognition, thought suppression, and arousal.

**Lundh’s Cognitive and Behavioral Model of Pre-sleep Cognition, Arousal, and Insomnia**

Lundh (2000) presented an integrated model of insomnia that focuses on cognitive and behavioral factors that interfere with sleep. This approach is based on the view of insomnia as a disorder of sleep-incompatible arousal. According to Lundh (2000), the cognitive factors responsible for the sleep-incompatible arousal and insomnia can be classified as sleep-interfering processes and sleep-interpreting processes. Sleep-interfering processes subsume cognitive variables that elevate arousal and interfere with sleep. Examples of such cognitive variables include: stressful life events, traumatic memories, worries, and concerns about various life circumstances.

Sleep-interpreting processes refer to cognitive activities that influence how individuals with insomnia perceive, interpret, evaluate, and think about their sleep and the consequences of poor sleep. For example, it has been reported that persons with insomnia tend to perceive that they need longer sleep durations than they need or currently have (Chambers & Keller, 1993) and hold stronger beliefs about the detrimental consequences of insomnia on physical and mental health, mood disturbances, and decreased energy level (Morin et al., 1993). Lundh (2000) argues that sleep-interfering processes can be exacerbated by sleep-interpreting processes. For example, when one attempts to sleep while experiencing intrusive thoughts, he or she may
naturally experience arousal. This arousal can become exacerbated if the individual begins engaging in extensive sleep-interpreting processes (e.g., “I must get 8 hours of sleep. If I do not get enough sleep, I will not be able to function well.”) See Figure 1 for the graphical illustration of the interaction between sleep-interfering and sleep-interpreting processes (adapted from Lundh & Broman, 2000).

Lundh (2005) also suggests that healthy pre-sleep processes involve a cognitive deactivation that leads to a decrease in controlled and strategic information processing as well as the corresponding physiological deactivation. This cognitive deactivation can involve (a) less verbal regulation and control, as compared with daytime functioning, and (b) more acceptance of spontaneously occurring physiological and mental processes.

In summary, insomnia can be understood in the following manner. Sleep-interfering processes (e.g., worries, intrusive or unwanted thoughts; pre-sleep cognition) induce increased arousal leading to delayed sleep onset. When sleep-interpreting processes (e.g., “I must get to sleep or something bad will happen”) interact with sleep-interfering processes, higher elevation of arousal can result. This elevated arousal then may trigger one’s effort to control the pre-sleep cognitions (e.g., thought suppression) as an attempt to remedy the interference. However, such effort can lead to increased frequency and intensity of the cognitions and arousal.

Lundh’s model of insomnia is consistent with the literature findings on pre-sleep cognition, arousal, and thought suppression among insomnia. In turn, interventions that aim to reduce cognitive activity and physiological arousal can be expected to yield promising outcomes. Cognitive and behavioral therapy for insomnia (CBT-I) has been used as one of the main treatment approaches for insomnia. A review and discussion of CBT-I is provided in the following section.
CHAPTER II. COGNITIVE AND BEHAVIORAL THERAPY FOR INSOMNIA (CBT-I)

Cognitive and behavioral therapies have been extensively used for insomnia (e.g., Edinger, Hoelscher, Marsh, Lipper, & Ionescue-Pioggia, 1992; Hoelscher & Edinger, 1988; Morin, 1993, Perlis, 2005). These interventions are based on the position that insomnia is perpetuated by maladaptive cognitions and behaviors (Smith & Neubauer, 2003) and target both sleep-interfering and -interpreting processes. CBT-I emphasizes methods designed to reduce cognitive arousal that is heightened by maladaptive cognitive activities as well as modify sleep incompatible behaviors that interfere with successful sleep preparation (Perlis, 2005).

Some of the commonly used cognitive approaches of CBT-I include cognitive restructuring, correcting dysfunctional beliefs and attitudes about sleep, behavioral experiments to test and challenge unrealistic expectations, and Socratic questioning to facilitate one’s learning and self-efficacy (Edinger et al., 1992; Harvey, 2002, 2005; Harvey et al., 2007; Morin, 1993; Perlis, 2005). These techniques target dysfunctional attitudes and beliefs about sleep such as worries about presumed catastrophic consequences of a poor night’s sleep, and problematic expectations about sleep.

Widely used behavioral approaches include stimulus control therapy, sleep restriction, sleep hygiene and relaxation-based interventions. Stimulus control therapy, rooted in classical conditioning, aims to reassociate the bed and bedroom stimuli with de-arousal and sleep compatible states (Bootzin, 1977). Stimulus control instructions can include going to bed only when sleepy, establishing a standard wake-up schedule, and using the bed/bedroom for only sleep, avoiding sleep incompatible behaviors (e.g., worrying) and other activities (e.g., watching TV, eating). Sleep restriction therapy aims to reduce insomnia by curtailing time in bed to the actual amount of nightly sleep time (Spielman et al., 1987). Once patients’ time in bed matches
sleeping time they are then instructed to extend their time in bed in 15-minutes increments each week (Spielman et al., 1987). Sleep hygiene methods focus on educating individuals about behaviors and conditions that are conducive to healthy sleep. Interventions typically teach about the effects of substances (e.g., alcohol, tobacco), exercise, diet, and environmental factors (e.g., lighting, noise, temperature). Although sleep hygiene methods are seldom used as primary intervention, they are often combined with other methods. Finally, relaxation-based therapy aims to reduce or eliminate sleep-disruptive physiological (e.g., somatic tension) or cognitive (e.g., intrusive thoughts)/affective (e.g., anxiety) arousal. Some of the common techniques here include progressive muscle relaxation, imagery training, and meditation.

Although the methods and components of CBT-I for sleep problems vary, the effect sizes have generally been favorable. Several clinical trials showed that CBT-I yielded greater improvements than relaxation or no treatment control groups on subjective insomnia symptoms and objective sleep measures (e.g., polysomnography or actigraphy) among people with primary insomnia (e.g., Edinger et al., 2001a, 2001b; Espie et al., 2001; Guilleminault et al., 2002). For example, Edinger and colleagues (2001a, 2001b) conducted a randomized controlled outcome trial among 75 individuals with persistent sleep-maintenance insomnia using three different modalities: CBT-I (sleep education, stimulus control, and time-in-bed restrictions), progressive muscle relaxation training, and placebo (quasi-desensitization). They found that individuals who received CBT-I had an average of 54% reduction in wake time after sleep onset time relative to individuals who received progressive muscle relaxation training (16%) or placebo (12%). Also, the CBT-I group showed an average sleep time of more than 6 hours, a sleep efficiency (calculated from the number of minutes of sleep divided by the number of minutes in bed) of 85.1%, and reduced subjectively reported symptoms while the other groups
had less than 5 hours of sleep, a 78.8% of sleep efficiency, and inconsistent symptom reduction. These improvements were sustained through 6-months of follow-up.

A meta-analysis (Irwin, Cole, & Nicassio, 2006) showed that the efficacy of behavioral interventions for insomnia based on three modalities (CBT-I, relaxation method, behavioral treatment only) all yielded moderately similar effects among older adults in sleep quality, sleep efficiency, and decreases in sleep onset latency and frequency of waking after sleep onset. Specifically, although the changes in sleep latency and quality were found to be similar across the modalities, the improvements in the frequency of wakening after sleep onset were greater in CBT-I and behavioral-only interventions relative to relaxation training alone. In addition, CBT-I, compared to relaxation training, yielded substantially higher effects in sleep efficiency improvements.

Finally, a review on the evidence of psychological and behavioral treatment of insomnia (Morin et al., 2006) suggests that CBT-I is efficacious and effective in treating persistent insomnia even with cormorbid medical or psychiatric conditions such as chronic pain (Currie, Wilson, Pontefract, & deLaplante, 2000), breast cancer (Quesnel et al., 2003), HIV (Dreher, 2003), depressive symptoms (Morawetz, 2003), posttraumatic stress disorder (Krakow et al., 2001), and alcohol dependency (Greeff & Conradie, 1998).

Despite the promising outcomes of CBT-I, some shortcomings and limitations have been noted. Harvey and Tang (2003) argued that the effect sizes for CBT-I are moderate and lower than the effect sizes reported for CBT for other psychological disorders. For example, a meta-analysis on CBT-I outcomes (Morin et al., 1994) reported that CBT-I treatments yielded effect sizes (z-scores; defined as the amount of change associated with a treatment, in standard deviation units) of 0.88 for sleep onset latency, 0.65 for wake time after sleep onset, 0.53 for
number of awakenings, 0.42 for total sleep time, and 0.94. Another meta-analysis (Murtagh & Greenwood, 1995) yielded similar effect sizes. However, these effect sizes are substantially lower than effect sizes reported for a range of other psychological disorders such as panic disorder (Clark et al., 1999), depression (Dobson, 1989), generalized anxiety disorder (Borkovec & Ruscio, 2001), and posttraumatic stress disorder (Van Etten & Taylor, 1998; Gillespie, Duffy, Hackmann, & Clark, 2000).

Given that (a) pre-sleep cognition is associated with insomnia and arousal, (b) thought suppression strategies increase levels of pre-sleep cognitive activity and arousal, and (c) CBT-I principally uses thought control strategies for the management of pre-sleep cognitive activity, it is plausible to argue that reduced effect sizes associated with CBT-I may in part be due to the use of thought control strategies. Thus, non-control focused interventions such as acceptance and mindfulness may be able to address pre-sleep cognitions and related arousal more effectively.
CHAPTER III. ACCEPTANCE AND MINDFULNESS-BASED INTERVENTIONS FOR INSOMNIA

Acceptance and Commitment Therapy (ACT) for Insomnia

ACT is based on a set of philosophical (e.g., functional contextualism) and theoretical (e.g., relational frame theory, radical behaviorism) principles that support key therapy processes. For a detailed presentation of the philosophical and theoretical foundations of ACT and therapy processes, see Appendix O. In the following section, ACT outcomes relevant to insomnia are presented.

Dalrymple, Fiorentino, Politi, and Posner (2010) provided a case example to suggest how ACT can be used for insomnia, particularly with patients who were not responsive to traditional CBT-I. In this study, a patient (who previously had been unsuccessfully treated with CBT-I) received four weekly and five bi-weekly insomnia intervention sessions. Three sessions were based on CBT-I (sleep restriction, sleep hygiene, stimulus control) and six sessions were based on ACT (willingness, defusion and mindfulness, values and committed action, relapse prevention). Prior to the intervention, this patient reported a number of sleep complaints including poor sleep quality, “sleep neurosis” (overly concerned with the “right” amount of sleep), early morning awakenings with difficulty falling back to sleep, and diminished quality of life. During the initial treatment sessions using CBT-I, the patient showed increased sleep efficiency and overall better sleep. However, he continued to report poor quality of sleep and difficulty adhering to the sleep restriction and stimulus control techniques. Additionally, the patient reported continued concerns about getting the “right amount” of sleep, catastrophic thinking (e.g., “my day will be ruined” after a poor night of sleep), and a fear of “letting go” (e.g., “I know sleep is about letting go, but I’m afraid to let go”).
When the ACT treatment components were introduced, the following observations were made: the patient was better able to (1) identify his experiential avoidance (e.g., avoiding reading in the evening due to fear of insomnia), (2) non-judgmentally observe the physical sensations of fatigue and the accompanying thoughts without engaging in efforts to decrease it (e.g., compensating the following night by sleeping longer or resting the next day), (3) clarify values (e.g., being a patient, nurturing, guiding, and understanding father and husband) and goals (e.g., planning an activity with his family on the weekend regardless of the level of fatigue he was experiencing) that would move him in the direction of the values, (4) identify possible barriers to pursuing the values (e.g., feeling tired after a poor night of sleep, to which he is likely to respond with avoidance) and how mindfulness skills can facilitate his non-judgmental observation on the perceived barriers while engaging in the goal-pursuit. It was reported that the patient was indeed more able to experience discomfort and engage in committed actions (e.g., choosing to spend time with his family and feel tired at the same time). In summary, the patient gained insight that the presence of insomnia/fatigue and related thoughts themselves was not the problem, but that his efforts to avoid these experiences paradoxically worsened the insomnia and fatigue and eventually led to reduced quality of life.

This study by Dalrymple, Fiorentino, Politi, and Posner (2010) illustrated how ACT components assisted the patient with managing insomnia when he was not responsive to CBT-I. The ACT approach was reported to be helpful in shifting the patient’s focus from symptom-reduction to acceptance of the negative experiences around insomnia as well as an increased willingness to make behavioral changes required for improved sleep. The authors concluded that patients with insomnia that is characterized by heightened arousal and rumination appear to be promising candidates for ACT. Despite the improvements reported by the patient, the study has
several limitations. First, because the ACT approaches were combined with CBT-I, the effectiveness of ACT cannot be clearly differentiated from the effects of CBT-I. Also, the results were derived from sleep diaries and subjective reporting of the patient. Additional measures that assess ACT components and sleep parameters are needed to obtain more information of the process and outcome of the study. Lastly, since this study was a case example, the findings are not always applicable to more generalized insomnia populations.

Another study conducted by McCraken, Williams, and Tang (2011) found significant positive correlations between psychological flexibility, particularly acceptance of pain and values-based action, and measures of sleep quality among individuals with chronic pain. Specifically, McCraken et al. (2011) examined the potential utility of ACT for treating insomnia by measuring sleep and psychological flexibility among 159 adult patients receiving ACT for pain management. The results showed that although general acceptance was less consistently related to sleep, acceptance of pain and values-based action were significantly correlated with insomnia severity, problems with sleep, rest, sleep efficiency, and daily fatigue. Although the study by McCraken et al. (2011) may not be applicable to general populations because the results were based on chronic pain patients, the results suggest that ACT may be an effective intervention for insomnia because acceptance, which is one of ACT’s main therapeutic components, was associated with various sleep related parameters.

A preliminary study conducted by Baik and O’Brien (2013) evaluated an ACT protocol for insomnia (Fletcher, 2008; unpublished). Six individuals with persistent insomnia participated in the ACT intervention. The participants received six weekly individual sessions of ACT, which was based on an untested ACT protocol developed by Fletcher (2008). The ACT protocol which originally contained eight weekly sessions was trimmed down to six sessions (the values
and committed action components were omitted). Thus, the treatment components utilized in the preliminary study included acceptance, cognitive defusion, being present, and self as context. Additionally, various ACT exercises and metaphors were provided to the participants while they were instructed to monitor their sleep activities. The overall results from the study (Baik & O’Brien, 2013) indicated that a majority of the individuals who completed the treatment reported improvements on daily sleep logs and four different pre- and post-treatment questionnaire measures. Specifically, several symptoms of insomnia improved over the course of treatment compared to the baseline periods as more than half of the participants on average reported longer total sleep time, decreased sleep onset latency, greater sleep satisfaction, improved mood, and decreased daytime sleepiness. Also, variable portions of the study sample experienced a decrease in overall sleep difficulties and use of thought control strategies while showing an increase in psychological flexibility and present-focused thinking on variable clinical significance levels. Although the degree of the improvement was not consistently significant from a statistical perspective, the promising effects of the treatment merit further investigation. Baik and O’Brien (2013) claimed that the intervention did appear to promote changes in key factors associated with sleep difficulties along with the changes in the levels of mindfulness, acceptance, and diffusion throughout the treatment.

In summary, ACT interventions for insomnia attempt to target both sleep-interfering and -interpreting processes by addressing cognitive arousal and sleep-incompatible behaviors. The goals of an ACT intervention for insomnia involve assisting individuals with: (1) acquiring an acceptance stance (rather than “fighting” with their insomnia), (2) reducing cognitive fusion (e.g., recognizing their sleep incompatible thoughts as thoughts) (3) learning to be present (i.e., increasing one’s awareness of the present moment through mindfulness), (4) perceiving self as
context (e.g., increasing one’s awareness of their own flow of sleep-related experiences without unneeded evaluations of them), (5) clarifying values (i.e., clarifying their values that will improve the quality of life, while refocusing attention away from sleep), and (6) establishing committed action (i.e., developing plans and goals of one’s action that is conducive to their pursuit of values regardless of their insomnia).

**Mindfulness-based Interventions**

Mindfulness-based stress reduction (MBSR) has also been used to aid persons with insomnia. The bulk of evidence suggests that mindfulness meditation alone was not highly effective for insomnia (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003; Britton, Shapiro, Penn, & Bootzin, 2003; Heidenreich, Tuin, Pflug, Michal, & Michalak, 2006). However, when it was incorporated into multicomponent interventions, more promising outcomes were observed. Bootzin and Stevens (2005) conducted a pilot study using a multi-component intervention (stimulus control, use of bright light, sleep hygiene education, cognitive therapy, and MBSR) that included mindfulness meditation and several other sleep and stress management methods for adolescents with insomnia and a history of substance abuse. Participants who completed the intervention showed significant improvements in sleep efficiency, sleep onset latency, number of awakenings, and quality and soundness of sleep on self-reported measures. Additionally, participants reported significant improvements in sleepiness and worry, and rated the treatment to be helpful in improving sleep and relaxation as well as increasing daytime energy.

In another multi-component group intervention study using mindfulness meditation with CBT-I components (sleep restriction, stimulus control, sleep education, and sleep hygiene; Ong et al., 2008), statistically and clinically significant reductions in pre-sleep arousal, sleep effort,
and dysfunctional sleep-related cognitions were found. The effect sizes of this intervention were reported to be large across several variables.

Heidenreich et al. (2006) found significantly decreased problematic cognitive activity and sleep onset latency as well as increased total sleep time among individuals with insomnia who received mindfulness-based cognitive therapy. Also, Lundh and Hindmarsh (2002) conducted a study using a cognitive activity similar to mindfulness training, the Cognitive-Emotional Self-Observation Task, in an effort to unveil insomniac’s cognitive processing. During the task, individuals were instructed to observe their thoughts, feelings, and body sensations without attempting to change them at all while lying awake in bed for 5 minutes. They were then asked to name their thoughts and rate the level of difficulty in remembering the thoughts, the degree of controllability of the thoughts, and emotional states. Lundh and Hindmarsh (2002) found that this meta-cognitive observation task was associated with decreases in sleep latencies, longer sleep time, and an increase in sleep efficiency.

This emerging literature suggests that mindfulness can exert beneficial effects on insomnia treatment when it is combined with other treatment methods.

**Summary and Description of Present Study**

Insomnia is a subjective perception of dissatisfaction with the amount and/or quality of sleep. Pre-sleep cognitive activity plays an important role in insomnia and arousal experienced before sleep-onset. Individuals with insomnia show a greater tendency to engage in control strategies such as thought suppression. However, such control strategies tend to increase pre-sleep cognitive activity and arousal. Although CBT-I has been shown to be effective in treating insomnia, the effect sizes of CBT-I outcome studies were shown to be moderate. Perhaps these
moderate effect sizes of the CBT-I outcomes are due to the cognitive methods that involve various types of control strategies. It is suggested that other therapy approaches such as mindfulness and ACT can address pre-sleep cognition and arousal more effectively because these approaches do not utilize control strategies. It can also be expected that ACT approaches add a unique therapeutic component with a focus on enhancing quality of life which CBT-I does not address. Although there is limited research investigating the effectiveness of ACT for insomnia, there is preliminary evidence that it may be beneficial.

The present study aimed to investigate the effectiveness of ACT for insomnia using a randomized control group outcome study design. It was hypothesized that individuals who receive the ACT treatment would experience improved sleep and sleep-related activities compared to a control group. Also, it was hypothesized that individuals would show greater psychological flexibility and less use of thought control strategies after receiving ACT intervention.
CHAPTER IV. METHOD

Study Design

In accordance with the stage model of behavior therapy evaluations (Rounsaville, Carroll, & Onken, 2001), the present study replicated a previous pilot study (Baik & O’Brien, 2013) using a randomized controlled trial. This study fit Stage I criteria and followed several recommended research activities including: (a) use of a treatment manual with a control group, (b) justification and specification of participant inclusion/exclusion criteria, (c) random assignment, (d) establishment of treatment fidelity, and (e) identification of outcome measures as well as an exploratory process to facilitate the understanding of the treatment efficacy.

The intervention was conducted in a group format with approximately 3-4 participants per group. Changes in participants’ sleep quality as well as related activities and levels of acceptance and mindfulness were measured at pre- and post-treatment for the ACT group and an equivalent time period for the control group. The ACT groups were given a protocol that emphasized acceptance, mindfulness, and values, while the control groups only monitored their sleep activities. The control groups received the ACT treatment after completing the appropriate length of baseline monitoring in accordance with the institutional human subject research guidelines.

Participants

Participants were recruited from advertisements placed in a local newspaper, campus newspaper, online campus newsletter, psychology experiments online recruitment system, and flyers posted in a small northwest rural community in Ohio from January 2014 to March 2015.

Participation criteria were derived from the DSM-IV-TR (APA, 2000) diagnostic criteria for primary insomnia and combined with basic ethical and research considerations. Criteria for
participation also required that the participants be over 18 years of age and able to give voluntary consent. Additionally, the participants were required to be experiencing difficulty with initiating or maintaining sleep or non-restorative sleep for at least one month and that this sleep disturbance (or associated daytime fatigue): (a) caused clinically significant distress or impairment in social, occupational, or other important areas of functioning; (b) did not occur exclusively during the course of Narcolepsy, Breathing-Related Sleep Disorder, Circadian Rhythm Sleep Disorder, or a Parasomnia; (c) did not occur exclusively during the course of another mental disorder (e.g., Major Depressive Disorder, Generalized Anxiety Disorder, a Delirium); and (d) was not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition. Finally, individuals who were currently taking medications that affect sleep (according to their health care providers and directed prescription information) were excluded from the study.

Each individual was screened for eligibility prior to study participation by the researcher using a clinical interview (the interview script is provided in Appendix A) and the Insomnia Symptom Questionnaire (Okun et al., 2009; see Appendix B). Participants were compensated with one of the following options based on their preference: (a) receiving extra-credit for undergraduate psychology course(s) or (b) participating in a drawing for eight gift cards worth $50 upon their completion of the study.

A total of 112 individuals made initial contact with the researchers via email and 2 individuals contacted the researchers via phone. Among those who contacted the researchers, 69 individuals completed the initial phone-screening and 48 attended the individual in-person clinical interview for pre-treatment assessment. Of these 48 participants who completed the pre-treatment assessment, 27 were assigned to the ACT group and 21 were assigned to the control
group. As detailed in Figure 2, 23 participants withdrew from the study at various stages of their participation. Thus a total of 25 participants (11 in the control group and 14 in the treatment group) completed the study.

The mean age for the entire sample \((n = 25)\) was 26.04 \((SD = 12.18)\). Twenty-one (84%) of the participants reported Caucasian/White racial ancestry, three (12%) reported African American racial ancestry, and one (4%) reported biracial racial ancestry. Sixteen (64%) of the participants identified themselves as female and nine identified themselves as male (36%). There were no significant between group differences on demographic variables (see Table 1).

**Measures**

**Interview for Participation Eligibility**

Interested individuals who contacted the researcher for study participation via phone were assessed for their participation eligibility. The phone interview inquired about age; the presence, duration, and symptoms associated with the sleep disturbance; use of medications; current diagnoses of psychological disorders; and the presence of chronic medical conditions that may affect sleep (see Appendix A for the telephone interview script). Also, their insomnia was assessed using an additional screening questionnaire described below.

**The Insomnia Symptom Questionnaire (ISQ).** The ISQ, originally developed by Okun et al., (2009), is a 13-item self-report instrument designed to rapidly assess insomnia (see Appendix B). ISQ items ask respondents to rate the presence, frequency, and duration of sleep symptoms and significant daytime consequences of insomnia using dichotomous and ordinal scales. The ISQ scoring algorithm allows researchers and clinicians to quickly assess if an individual meets the case definition of insomnia and to increase diagnostic confidence in assigning a diagnosis of insomnia disorder. Although the test-retest reliability of the ISQ has not
been reported, the measure has a high degree of internal consistency (Cronbach’s $\alpha = .89$) and high specificity (>90%) with varied sensitivity (Okun et al., 2009). The Cronbach’s alphas for the current study were .92 at pre-treatment and .91 at post-treatment. The test-retest reliability (Pearson’s $r$) was .41 ($p = .056$). This measure was used to determine participants’ eligibility in conjunction with the other method of participation criteria; only participants who met the diagnostic criteria were included in the study according to the ISQ. See Table 1 for the summary of insomnia-related characteristics of the sample, which includes criteria of sleep symptom, duration, and daytime impairment.

**Treatment Fidelity Measure and Treatment Satisfaction Scale**

A measure that assesses general knowledge of ACT was included to increase treatment fidelity among ACT therapists for the current study. Also, a brief scale to assess participants’ overall experiences of the treatment was included.

**ACT Knowledge Questionnaire (ACTKQ).** The ACTKQ was developed by Luoma and Plumb (2013) to assess conceptual knowledge of ACT for use in studies and evaluation of the training of therapists who are learning ACT (see Appendix C). This measure has 16 multiple-choice items that contain basic principles and theoretical knowledge of ACT. In a study that evaluated the effectiveness of a brief introductory ACT training for clinicians in a NHS setting, it was reported that the participating clinicians showed an increase in ACT knowledge (Richards, Oliver, Morris, Aherne, Iervolino, & Wingrove, 2011). However, the reliability and validity of the measure was not reported. The ACTKQ was completed by study therapists prior to and after their clinical training.

**Treatment Satisfaction Scale (TSS).** The TSS was developed by the principal investigator in order to assess the satisfaction and impact of ACT for insomnia (see Appendix D).
Based on the several primary focuses suggested by Seligman (1995), 7 questions were created asking participants to rate overall treatment satisfaction, helpfulness of treatment components, and outcomes using Likert-scales. The TSS was administered and collected after treatment was completed. The Cronbach’s alpha for the current study was .54.

**Treatment manual adherence.** All sessions were conducted by three clinicians in doctoral level clinical psychology training under the supervision of a licensed clinical psychologist. Each clinician was paired with another clinician who observed the session in the room and marked whether key treatment components were provided during the session using a protocol checklist (see Appendix E); the check list contains 33 items of critical treatment and procedural elements of the overall treatment provision, which can be answered as either Yes or No, at each stage of the procedure.

**Treatment Outcome Measures: Questionnaires and Sleep Diary**

Five questionnaires and one sleep diary were included to capture the changes in individuals’ sleep activities and ACT-related constructs.

**The Insomnia Severity Index (ISI).** The ISI (Morin, 1993) is a self-report instrument measuring perceptions of insomnia. It has been used as both brief screening instrument and a treatment outcome measure. The ISI has seven items that assess the severity of sleep-onset and sleep maintenance difficulty, satisfaction with sleep, impairments in daily functioning, and degree of distress and concern caused by insomnia (see Appendix F). A higher value indicates more severe symptoms of insomnia. Morin (1993) provided descriptive/interpretative terms for clusters of scores as follows: 0-7, not clinically significant insomnia; 8-14, subthreshold insomnia; 15-21, clinical insomnia/moderate severity; 22-28, clinical insomnia/severe. The ISI has sound psychometric properties with acceptable to high degrees of internal consistency.
(Cronbach’s alphas ranged from .74 to .91) and validity (see Bastien, Vallières, & Morin, 2000; Morin et al., 2011). The Cronbach’s alphas for the current study were .84 at pre-treatment and .86 at post-treatment. The test-retest reliability (Pearson’s $r$) was .36 ($p = .1$).

**Pre-Sleep Arousal Scale (PSAS).** The PSAS (Nicassio, Mendlowitz, Fussel, & Petras, 1985; Appendix G) is a 16-item self-report measure of pre-sleep arousal (see Appendix E). The items were based on clinical observations and interviews with sleep-disturbed patients. Two types of items are contained in the PSAS. Cognitive items assess thoughts and worries associated with sleep difficulties (e.g., worry about falling asleep, being mentally alert). Somatic items assess physiological aspects of sleep difficulties (e.g., heart racing, rapid breathing). Each item is rated on a five-point Likert scale that ranges from 1 (“Not at all”) to 5 (“Extremely”). The PSAS was reported to have adequate internal consistency for the cognitive and somatic scales ($\alpha = .88$ and .79 among college students, .67-.84 among normal sleepers, .76-.81 among insomniacs; Nicassio et al., 1985). Also, the PSAS has been found to be useful when associated with anxiety, depression, and several sleep parameters (e.g., sleep onset latency) (Nicassio et al., 1985). The Cronbach’s alphas for the current study were .85 at pre-treatment and .9 at post-treatment. The test-retest reliability (Pearson’s $r$) was .25 ($p = .27$).

**The Acceptance and Action Questionnaire-II (AAQ-II).** The AAQ-II was designed to assess willingness to experience naturally occurring thoughts and feelings without engaging in avoidance strategies (Bond et al., 2011; see Appendix H). The measure consists of 7 self-rated questions (e.g., “I am afraid of my feelings.”) that are responded to on a 7-point Likert-type scale that ranges from 1 (Never true) to 7 (Always true). A lower score indicates greater willingness. Bond and colleagues found that the AAQ-II has good internal consistency ($\alpha = .84$) and test-retest reliability (3 month and 12 month test-retest reliability were reported to be $\alpha = .81$ and .79,
respectively; Bond et al., 2011). The Cronbach’s alphas for the current study were .93 at pre-treatment and .9 at post-treatment. The test-retest reliability (Pearson’s $r$) was .65 ($p = .001$).

**The Thought-Control Questionnaire Insomnia-Revised (TCQI-R).** The TCQI-R (Ree et al., 2005) is a revised version of the Thought Control Questionnaire-Insomnia (TCQ-I; Harvey, 2001) that was originally adapted from the Thought Control Questionnaire (TCQ; Wells and Davies, 1994). The TCQI-R measures use of thought-controlling strategies in pre-sleep situations in six domains: aggressive suppression, cognitive distraction/suppression, behavioral distraction/suppression, social avoidance, worry, and reappraisal (see Appendix I). Individuals are instructed to rate how often they engage in each technique using a four point rating scale (1 = *almost never*; 2 = *sometimes*; 3 = *often*; 4 = *almost always*). The subscale scores are calculated by summing across items within a domain and a total TCQ is generated by summing all items. An $r=.83$ test-retest reliability coefficient for the total TSQ score was reported by Ree et al. (2005). The Cronbach’s alphas for the current study were .77 at pre-treatment and .82 at post-treatment; the test-retest reliability (Pearson’s $r$) was .65 ($p = .001$).

**The Experiences Questionnaire (EQ).** The EQ is a 20-item self-report inventory that assesses an individual’s *decentering* or *disidentification* with content of negative thinking (see Appendix J; Fresco et al., 2007). Decentering refers to a perspective or attitude that is present-focused and involves detaching oneself from one’s thoughts and emotions by taking the view that one’s thoughts and emotions do not necessarily reflect nor shape the objective reality correctly (e.g., “I feel depressed now”, instead of “I am depressed.”). The EQ also measures rumination (e.g., “I think over and over again about what others have said to me.”) and perspective (e.g., “I can observe unpleasant feelings without being drawn into them.”). Items are rated on a 5-point scale (1 = *never*; 2 = *rarely*; 3 = *sometimes*; 4 = *often*; 5 = *all the time*). A
total EQ score is obtained by summing across all items. For the current study, only 11 items (item # 3, 6, 9, 10, 12, 14, 15, 16, 17, 18, and 20) that pertain to decentering were included; possible decentering total scores range from 11 to 55. The EQ is a reliable and valid measure of decentering with satisfactory internal consistency ($\alpha = .83$) and significant convergent correlations with related constructs (Fresco et al., 2007). The Cronbach’s alphas for the current study were .67 at pre-treatment and .83 at post-treatment; the test-retest reliability (Pearson’s $r$) was .64 ($p = .001$).

**The Pittsburgh Sleep Diary (PghSD).** The PghSD (Monk et al., 1994) was developed to assess and quantify subjectively reported sleep and waking behaviors in both research and practice settings. The PghSD contains two components, a “bedtime” component and a “waketime” component. The “bedtime” component pertains to the events of the day preceding sleep such as meal times, use of stimulants (e.g., coffee, alcohol, tobacco), exercise, and naps. The “waketime” component relates to events during the sleep period itself including bedtime, lights out time, sleep latency, final waking time, method of final awakening, frequency of nightly awakening, wake after sleep onset time, reason for nightly awakenings, sleep quality, and mood and alertness on final wakening (see Appendix K).

The current study mainly focused on the “waketime” components which permitted the calculation of: Time in Bed (TIB; the total time spent in bed), Sleep Onset Latency (SOL; estimated minutes to fall asleep), Total Wake Time (TWT; a total number of minutes awake per night), Total Sleep Time (TST; calculated minutes of sleep by the formula, $TST = TIB - (SOL + TWT)$), Wake After Sleep Onset (WASO; a total number of times of waking after falling asleep per night), Sleep Efficiency (SE; the ratio between TST and TIB, calculated by the formula, $SE = TST/TIB$), Sleep Quality (SQ; participants’ subjective rating of the night’s sleep), Mood (mood
on final awakening), and Alertness (alertness on final awakening).

The PghSD was shown to have acceptable sensitivity in detecting sleep differences associated with weekends, age, gender, personality, and circadian rhythms. It has also been reported to be concordant with actigraphic estimates of sleep timing and quality (Monk et al., 1994). Although the original scale used a 10cm visual analogue scale for various items, the present study used a numerical scale that ranged from 1 (very bad) to 10 (very good) for ratings of sleep quality, mood on final wakening, and alertness on final wakening. An additional question was added to the daily diary in order to assess daily mindfulness exercises.

**Insomnia Intervention**

Fletcher (2008; unpublished) developed an insomnia treatment manual using Acceptance and Commitment Therapy (ACT) principles and tools that were adapted from Hayes et al. (1999). The original protocol was designed to provide eight weekly sessions with daily mindfulness meditation exercises along with a number of commonly used ACT intervention components. The intervention was delivered within 2 weekly group therapy sessions by grouping 4 sessions into two sessions without altering or omitting the original protocol. The order of the session contents remained the same.

The ACT protocol for insomnia tackles sleep-related physiological and cognitive de-arousal with its focus on mindfulness and acceptance, while addressing sleep-related stimulus control and daytime facilitation of night-time sleep with its focus on commitment and behavior change. The initial step of the ACT protocol is to increase the level of acceptance toward insomnia and fundamental unworkability of behavioral and cognitive strategies that are based on controlling and maladaptive perceptions of sleep (i.e., “Creative Hopelessness”, “Control is the problem and acceptance is the solution”). In order to facilitate the therapeutic process, several
ACT metaphors as well as mindfulness exercises are used, targeting both cognitive and physiological elements of insomnia. Then, the ACT protocol advances to components of *Values* and *Committed Action*, directing one’s attention to clarifying values and pursuing behavior changes that are more congruent with those values.

The current study modified the original protocol based on the findings from Baik and O’Brien (2013). The entire manual is provided in Appendix L. Also, see Table 2 for a summary of treatment elements.

**Procedure**

Upon the initial contact made by an individual, researchers provided them with general information about the study and participation criteria along with a request for a brief initial telephone screening consultation. Once interested individuals granted permission for the researcher to contact them for the telephone screening, the telephone interview for eligibility was conducted by a trained research assistant. Eligible participants were then scheduled for an individual assessment in which they signed the informed consent form and completed the pre-treatment measures including ISQ, ISI, STQ, PSAS, AAQ-II, TCQI-R, and EQ (see Appendix M for the interview and assessment procedure). Upon completion of the measures and assessment, participants were randomly assigned to either the treatment group or control group using a computerized random number generator.

Following assignment, participants were instructed to complete the sleep log on a daily basis for one week. This constituted the pre-treatment baseline period. Then, the treatment group attended a total of 2 weekly sessions of group therapy while the control group continued to monitor sleep. Treatment group participants continued to complete the sleep diary for one week after the second session. Additionally, one week after the second session, participants completed
the post-treatment measures, reviewed their progress with the researcher, and were scheduled for a post-treatment assessment. A flow chart to illustrate study design is provided in Figure 2. For ethical purposes, all participants who were originally assigned to the control group received the treatment at a later time point.

All groups were led by psychology graduate students with training and supervision from a licensed psychologist who has expertise in ACT. Two training sessions were provided to trainee therapists prior to the treatment onset and supervision was held to monitor treatment fidelity after each treatment session.
CHAPTER V. RESULTS

Data Analyses Overview

Based on the recommended guidelines for a Stage I study (Rounsaville et al., 2001), the data analysis plan consisted of two parts. First, the feasibility and acceptability of the study was assessed by evaluating treatment-related variables such as sleep diaries for treatment compliance and the TSS for treatment satisfaction as well as the ACTKQ for therapist training. Second, an evaluation of the effects of the ACT treatment on sleep, acceptance, use of control strategies, and decentering was conducted.

Feasibility and Acceptability of the Study

Treatment Compliance

Overall, participants complied with instructions related to completing the daily sleep diaries and attending the treatment sessions as scheduled. All participants who completed the study submitted diaries at a 100% completion rate, meaning that there was no single day omitted in each period. In addition, participants monitored their use of daily medication, sleep activity, and daily functioning in accordance with the study participation instructions.

There was, however, a concern around scheduling the treatment time because each participant had different needs, obligations, and commitments. This issue hindered the overall aspect of timing participants’ treatment sessions as planned (i.e., having exactly seven days between sessions and recording exactly seven days of diary data), thus the exact time period between sessions varied. For the control group, the pre-post interval ranged from 17 days to 25 days ($M = 20, SD = 3.16$). For the treatment group, the pre-post interval ranged from 21 days to 42 days ($M = 27.29, SD = 6.72$).
Treatment Manual Adherence and ACT Knowledge Questionnaire (ACTKQ)

Each session had above 95% of treatment manual adherence rate across three clinicians. All of the therapists showed satisfactory understanding of the ACT treatment as the therapists scored 100% on the ACTKQ after the training.

Treatment Satisfaction Scale (TSS)

A total of twenty-one valid surveys were collected and analyzed (not all participants provided their responses to this survey because it was an optional task for participation). Table 3 provides a summary of participant ratings of helpfulness, satisfaction, easiness of contents, and easiness of daily mindfulness exercise. An examination of Table 2 indicates that 85.7% of the participants reported that the treatment was helpful in managing their sleep problems, 90.5% reported that they were satisfied with the treatment, 95.2% reported that the treatment contents were easy to understand, and 90.5% reported that it was easy for them to practice the daily mindfulness exercise.

Table 3 provides a summary of participant reports of the helpfulness of different aspects of the intervention. The participants reported that the following elements were most helpful: “Leaves on a Stream meditation” (n = 15), “Breathing exercise with counting” (n = 15), “Passengers on the Bus metaphor” (n = 11), “Tug-of-War with a Monster metaphor” (n = 10), and “Chessboard metaphor” (n = 6). The following elements were reported to be not helpful: “Clean vs. Dirty Discomfort” (n = 7) and “Bum at the Door metaphor” (n = 5).
Outcomes

Questionnaire Measures

A total of 22 participants (8 in control and 14 in treatment) were included in the analyses of the questionnaire measures because three participants from the control group were excluded from the questionnaire data due to clerical errors made by the researchers.¹

The Insomnia Severity Index (ISI). A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was used to compare the differences in the mean ISI scores between the conditions at time 1 and time 2. The time 1 and time 2 means for the control group were 18.38 (SD = 5.40) and 15.88 (SD = 6.80), respectively (see Figure 3). The time 1 and time 2 means for the treatment group were 19.00 (SD = 5.31) and 12.85 (SD = 4.91), respectively.

There was a non-significant main effect of condition on the ISI scores, $F(1, 20) = .35$, $p = .56$, $\eta^2_p = .02$. There was a significant main effect of time on the ISI scores, $F(1, 20) = 10.25$, $p = .004$, $\eta^2_p = .34$. However, there was a non-significant condition x time interaction, $F(1, 20) = 1.82$, $p = .19$, $\eta^2_p = .08$. The main effect for time indicated that the overall mean ISI score at time 2 ($M = 14.37$, $SD = 1.25$) was significantly lower than the overall mean at time 1 ($M = 18.69$, $SD = 1.18$). This indicates that participants were reporting fewer insomnia symptoms at time 2 relative to time 1.

Pre-Sleep Arousal Scale (PSAS). A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was used to compare the differences in the mean PSAS scores between the conditions at time 1 and time 2. The time 1 and time 2 means for the control group were

1 Three participants in the control group completed the post-treatment measures after receiving the treatment, which was provided to them for ethical reasons, instead of at the end of their baseline monitoring period. Thus, the questionnaire data from these participants were excluded from the analyses of questionnaire measures.
48.38 (SD = 8.60) and 46.25 (SD = 11.65), respectively. The time 1 and time 2 means for the
treatment group were 51.07 (SD = 11.32) and 39.5 (SD = 12.23), respectively (see Figure 4).
There was a non-significant main effect of condition on the PSAS scores, $F(1, 20) = .26, p = .62, \eta^2_p = .01$. There was a significant main effect of time on PSAS scores, $F(1,20) = 5.32, p = .03, \eta^2_p = .21$. However, there was a non-significant condition x time interaction, $F(1,20) = 2.53, p = .13, \eta^2_p = .11$. The main effect for time indicated that the overall mean PSAS score at time 2 ($M = 42.88, SD = 2.67$) was significantly lower than the overall mean at time 1 ($M = 49.72, SD = 2.32$). This indicates that participants were reporting less pre-sleep arousal at time 2 relative to
time 1.

**The Acceptance and Action Questionnaire-II (AAQ-II).** A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was used to compare the
differences in the mean AAQ-II scores between the conditions at time 1 and time 2. The means
of time 1 and time 2 for the control group were 25.63 (SD = 13.18) and 19.88 (SD = 7.94),
respectively. The means of time 1 and time 2 for the treatment group were 24.79 (SD = 9.36)
and 20.64 (SD = 9.91), respectively (see Figure 5). There was no significant main effect of
condition on AAQ-II scores, $F(1, 20) = .00, p = .99, \eta^2_p = .00$. There was a significant main
effect of time on AAQ-II scores, $F(1, 20) = 6.94, p = .02, \eta^2_p = .26$. However, there was a non-
significant condition x time interaction, $F(1, 20) = .18, p = .67, \eta^2_p = .01$. The main effect for
time indicated that the overall mean AAQ-II score at time 2 ($M = 20.26, SD = 2.05$) was
significantly lower than the overall mean AAQ-II score at time 1 ($M = 25.21, SD = 2.40$). This
indicates that participants were reporting less experiential avoidance (less psychological
inflexibility; more willingness) at time 2 relative to time 1.
The Thought-Control Questionnaire Insomnia-Revised (TCQI-R). A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was used to compare the differences in the mean TCQI-R scores between the conditions at time 1 and time 2. The means of time 1 and time 2 for the control group were 81.75 ($SD = 14.28$) and 76.00 ($SD = 14.87$), respectively. The means of time 1 and time 2 for the treatment group were 80.64 ($SD = 9.23$) and 72.57 ($SD = 14.87$), respectively (see Figure 6). There was a non-significant main effect of condition on the TCQI-R scores, $F(1, 20) = .24, p = .63, \eta^2_p = .01$. There was a significant main effect of time on the TCQI-R scores, $F(1, 20) = 10.557, p = .004, \eta^2_p = .35$. However, there was a non-significant condition x time interaction, $F(1, 20) = .3, p = .6, \eta^2_p = .02$. The main effect for time indicated that the overall mean TCQI-R score at time 2 ($M = 74.29, SD = 2.58$) was significantly lower than the overall mean TCQI-R score at time 1 ($M = 81.20, SD = 2.50$). This indicates that participants were reporting fewer thought control strategies during insomnia contexts at time 2 relative to time 1.

The Experiences Questionnaire (EQ). A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was used to compare the differences in the mean EQ scores between the conditions at time 1 and time 2. The time 1 and time 2 means for the control group were 32.5 ($SD = 2.39$) and 37.88 ($SD = 4.26$), respectively. The time 1 and time 2 means for treatment group were 35.07 ($SD = 7.95$) and 36.14 ($SD = 8.70$), respectively (see Figure 7). There was a non-significant main effect of condition on EQ scores, $F(1, 20) = .02, p = .89, \eta^2_p = .01$. There was a significant main effect of time on EQ scores, $F(1, 20) = 9.39, p = .01, \eta^2_p = .32$. Additionally, there was a significant condition x time interaction, $F(1, 20) = 4.18, p = .05, \eta^2_p = .17$. The main effect for time indicated that the overall mean EQ score at time 2 ($M = 37.01$, $SD = 2.58$) was significantly lower than the overall mean EQ score at time 1 ($M = 38.20$, $SD = 4.26$).
was significantly higher than the overall mean EQ score at time 1 \( M = 33.79, SD = 1.45 \). This indicates that participants were reporting higher levels of decentering and less rumination at time 2 relative to time 1.

Follow-up analyses of the significant interaction indicated that the EQ mean for the treatment group at time 1 \( M = 35.07, SD = 7.95 \) was not significantly different from the EQ mean \( M = 32.5, SD = 2.39 \) for the control group at time 1 \( F(1, 20) = .78, p = .39 \). Also, the mean EQ score for the treatment group a time 2 \( M = 36.14, SD = 8.70 \) was not significantly different from mean EQ score for the control group \( M = 37.88, SD = 4.26 \) at time 2 \( F(1, 20) = .28, p = .61 \). An analysis of time differences for the control group alone indicated that there was a significant increase from time 1 and time 2 \( p = .004 \). For the treatment group alone, there was a non-significant increase in EQ means from time 1 to time 2 \( p = .41 \). Taken together, these results indicate that both groups showed increase in the EQ scores from time 1 and 2 and that the control group had a greater difference between time 1 and time 2.

**Sleep Diary Measure**

**The Pittsburgh Sleep Diary (PghSD).** Eight 2 (condition; control/treatment) x 3 (time; week 1/ week 2/ week 3) ANOVAs were conducted using weekly means of time spent in bed, sleep duration, sleep onset latency, awakenings after sleep-onset, sleep efficiency, sleep quality, mood on final wakening, and alertness on final wakening.

**Time in bed (TIB).** The TIB in minutes was calculated by the amount of time that elapsed between “lights out” and “finally woke.” This time period includes the minutes to fall asleep, minutes individuals were awake throughout the night, and total sleep time. The weekly means (week 1, 2, and 3) for the control group were 471.45 \( SD = 91.16 \), 490.16 \( SD = 96.05 \), and 444.75 \( SD = 70.18 \), respectively. The weekly means for the treatment group were 458.92
(SD = 104.05), 463.54 (SD = 75.65), and 468.01 (SD = 72.3), respectively. See Figure 8 for a graphical representation of the means. There was a non-significant main effect of condition on TIB, $F(1, 23) = .03, p = .87, \eta^2 = .001$. There was a non-significant main effect of time on TIB, $F(2, 22) = 2.92, p = .08, \eta^2 = .21$. There was a non-significant condition x time interaction, $F(2, 46) = 2.1, p = .13, \eta^2 = .08$.

**Sleep onset latency (SOL).** The SOL in minutes was derived from participant reports of the time in minutes it took to fall asleep each night. The weekly means (week 1, 2, and 3) for the control group were 65.1 (SD = 33.82), 52.92 (SD = 44.1), and 42.42 (SD = 19.65), respectively. The weekly means for the treatment group were 59.36 (SD = 36.38), 45.14 (SD = 32.02), and 46.45 (SD = 36.58), respectively (see Figure 9). There was a non-significant main effect of condition on SOL, $F(1, 23) = .07, p = .80, \eta^2 = .003$. There was a significant main effect of time on SOL, $F(2, 46) = 5.21, p = .01, \eta^2 = .19$. There was a non-significant condition x time interaction, $F(2, 46) = .61, p = .55, \eta^2 = .03$.

Follow-up analyses of the significant time effect indicated that there was a significant linear trend ($F(1, 23) = 11.49, p = .003$). Bonferroni-corrected post hoc tests showed that the overall mean of week 1 ($M = 62.22, SD = 7.11$) was significantly higher than the overall means for weeks 2 ($M = 49.03, SD = 7.61; p = .04$) and 3 ($M = 44.44, SD = 6.12; p = .003$). Further, the overall mean of week 2 was not significantly different from the overall mean of week 3 ($p = .43$).

**Total wake time (TWT).** The weekly TWT means (week 1, 2, and 3) for the control group were 27.29 (SD = 45.31), 19.48 (SD = 42.72), and 16.26 (SD = 26.59), respectively. The weekly TWT means for the treatment group were 20.79 (SD = 24.18), 22.93 (SD = 26.29), and 18.23 (SD = 24.66), respectively (see Figure 10). There was a non-significant main effect of
condition on TWT, $F(1, 23) = .001, p = .98, \eta^2_p = 0$. There was a non-significant main effect of time on TWT, $F(2, 46) = 1.09, p = .34, \eta^2_p = .05$. There was a non-significant condition x time interaction, $F(2, 46) = .68, p = .51, \eta^2_p = .03$.

**Total sleep time (TST).** The TST in minutes was calculated by subtracting sleep onset latency in minutes and total wake time in minutes from TIB. The weekly means (week 1, 2, and 3) for the control group were 379.07 ($SD = 104.17$), 417.77 ($SD = 119.95$), and 386.07 ($SD = 72.21$), respectively. The weekly means for the treatment group were 378.77 ($SD = 90.2$), 395.59 ($SD = 68.02$), and 403.32 ($SD = 71.85$), respectively (see Figure 11). There was a non-significant main effect of condition on TST, $F(1, 23) = .003, p = .96, \eta^2_p = .00$. There was a non-significant main effect of time on TST, $F(2, 46) = 2.49, p = .09, \eta^2_p = .1$. There was a non-significant condition x time interaction, $F(2, 46) = 1.25, p = .30, \eta^2_p = .05$.

**Wake after sleep onset (WASO).** The WASO is the number of times an individual woke in a night as reported on the “waketime” section of the sleep diary. The weekly means (week 1, 2, and 3) for the control group were 1.62 ($SD = 1.23$), 1.71 ($SD = 1.56$), and 1.03 ($SD = 1.29$), respectively (see Figure 12). The weekly means for the treatment group were 1.80 ($SD = 1.17$), 1.34 ($SD = 1.11$), and 1.31 ($SD = 1.21$), respectively. There was a non-significant main effect of condition on WASO, $F(1, 23) = .004, p = .95, \eta^2_p = .004$. There was a significant main effect of time on WASO, $F(2, 46) = 7.83, p = .001, \eta^2_p = .254$. There was a significant condition x time interaction, $F(2, 46) = 3.2, p = .05, \eta^2_p = .122$.

Follow-up analyses of Bonferroni-corrected post hoc tests indicated that the WASO mean for the treatment group at time 1 ($M = 1.80, SD = 1.17$) was not significantly different from
control group \((M = 1.62, SD = 1.23)\) at time 1 \((F(1, 23) = .13, p = .72)\). Also, the mean WASO score for the treatment group at time 2 \((M = 1.34, SD = 1.11)\) was not significantly different from control group \((M = 1.71, SD = 1.56)\) at time 2 \((F(1, 23) = .47, p = .50)\). Furthermore, the WASO mean for the treatment group at time 3 \((M = 1.31, SD = 1.21)\) was not significantly different from the mean WASO score for the control group \((M = 1.03, SD = 1.29)\) at time 3 \((F(1,23) = .32, p = .58)\). An analysis of time differences for the control group alone indicated that the time differences happened later in the study, the weekly WASO mean for time 1 was not significantly different from time 2, \(p = 1.0\); however, the weekly WASO mean for time 2 was significantly higher than the WASO mean for time 3, \(p = .01\), similarly WASO mean for time 1 is significantly higher than time 3, \(p = .03\). For the treatment group alone, the decrease in the weekly WASO means was significant from time 1 to time 3, \(p = .04\); however, there was no significant difference between time 1 and 2, \(p = .61\); or time 2 and 3, \(p = 1.0\). Taken together, both treatment and control groups showed significant decrease in WASO between time 1 and time 3; however, the treatment group showed a steady decrease in WASO throughout while the control group showed a slight increase from time 1 to time 2.

**Sleep efficiency (SE).** The SE in percentage was calculated based on the ratio of TST to TIB. The weekly means (week 1, 2, and 3) for the control group were 79.95 \((SD = 14.19)\), 84.54 \((SD = 16.94)\), and 86.43 \((SD = 9.34)\), respectively (see Figure 13). The weekly means for the treatment group were 81.78 \((SD = 9.65)\), 85.30 \((SD = 7.31)\), and 86.23 \((SD = 9.31)\), respectively. There was a non-significant main effect of condition on SE, \(F(1, 23) = .04, p = .85, \eta^2_p = .002\). There was a significant main effect of time on SE, \(F(2,46) = 6.06, p = .01, \eta^2_p = .21\). There was a non-significant condition x time interaction, \(F(2, 46) = .20, p = .82, \eta^2_p = .01\).
Follow-up analyses of the significant time effect indicated that there was a significant linear trend \((F(1, 23) = 12.61, p = .002)\). Bonferroni-corrected post hoc tests showed that the overall mean of week 1 \((M = 80.86, SD = 2.39)\) was significantly lower than the overall means for weeks 2 \((M = 84.92, SD = 2.51; p = .02)\) and 3 \((M = 86.33, SD = 1.88; p = .002)\). There was no significant difference found between the overall means of weeks 2 and 3 \((p = .42)\).

**Sleep quality (SQ).** The weekly means (week 1, 2, and 3) for the control group were 4.68 \((SD = 1.46)\), 5.41 \((SD = 1.98)\), and 5.6 \((SD = 1.88)\), respectively. The weekly means for the treatment group were 5.11 \((SD = 1.71)\), 5.33 \((SD = 1.53)\), and 5.78 \((SD = 1.7)\), respectively (see Figure 14). There was a non-significant main effect of condition on SQ, \(F(1, 23) = .08, p = .78\), \(\eta^2_p = .004\). There was a significant main effect of time on SQ, \(F(2,46) = 4.84, p = .01, \eta^2_p = .17\). There was a non-significant condition x time interaction, \(F(2, 46) = .51, p = .60, \eta^2_p = .02\).

Follow-up analyses of the significant time effect indicated that there was a significant linear trend \((F(1, 23) = 6.57, p = .02)\). Bonferroni-corrected post hoc tests showed that the overall means of week 1 \((M = 4.89, SD = .32)\) was significantly lower than the overall means for weeks 2 \((M = 5.37, SD = .35; p = .02)\) and 3 \((M = 5.69, SD = .36; p = .02)\). There was no significant difference found between the overall means of weeks 2 and 3 \((p = .22)\).

**Mood on final wakening (MOOD).** The weekly means (week 1, 2, and 3) for the control group were 4.92 \((SD = 1.64)\), 5.37 \((SD = 1.7)\), and 5.54 \((SD = 1.96)\), respectively. The weekly means for the treatment group were 5.52 \((SD = 1.42)\), 5.62 \((SD = 1.54)\), and 5.58 \((SD = 1.87)\), respectively (see Figure 15). There was a non-significant main effect of condition on MOOD, \(F(1, 23) = .24, p = .63, \eta^2_p = .01\). There was no significant main effect of time on MOOD.
nor condition x time interaction \((F(2, 46) = .9, p = .41, \eta^2_p = .04)\) nor condition x time interaction \((F(2, 46) = .56, p = .57, \eta^2_p = .02)\).

**Alertness on final wakening (ALERT).** The weekly means (week 1, 2, and 3) for the control group were 4.52 \((SD = 1.96)\), 4.93 \((SD = 1.91)\), and 5.36 \((SD = 1.81)\), respectively. The weekly means for the treatment group were 5.47 \((SD = 1.71)\), 5.23 \((SD = 1.28)\), and 5.5 \((SD = 1.64)\), respectively (see Figure 16). There was a non-significant main effect of condition on ALERT, \(F(1, 23) = .58, p = .46, \eta^2_p = .02\). There was no significant main effect of time on ALERT \((F(2,46) = 1.37, p = .26, \eta^2_p = .06)\) nor Time x Condition interaction \((F(2, 46) = 1.19, p = .31, \eta^2_p = .05)\).

**Exploratory Analyses**

Additional analyses were conducted in order to account for possible variances in therapists; the principal investigator was a more advanced therapist in clinical training. It was thought to be possible that the participants who received the treatment from the more advanced therapist might have had different outcomes. A total of 16 (8 control and 8 treatment) participants were included in these analyses.

For questionnaire measures, the ISI, AAQ-II, TCQI-I, and EQ were essentially the same. However, different results were observed for the PSAS. For sleep dairy (PghSD) variables, TWT, TST, SE, SQ, MOOD, ALERT, SOL, and WASO results were essentially the same. However, different results were observed for TIB. These different results are reported below.

**PSAS**

A 2 (condition; control/treatment) x 2 (time; pre- and post-treatment) ANOVA was conducted. The time 1 and time 2 means for the control group were 48.38 \((SD = 8.60)\) and 46.25
(SD = 11.65), respectively (see Figure 17). The time 1 and time 2 means for the treatment group were 52.50 (SD = 12.48) and 36.00 (SD = 8.60), respectively. There was a non-significant main effect of condition on PSAS scores, $F(1, 14) = .53, p = .48, \eta^2_p = .04$. There was a significant main effect of time on PSAS scores, $F(1, 14) = 9.05, p = .01, \eta^2_p = .39$. There was also a significant condition x time interaction, $F(1, 14) = 5.39, p = .04, \eta^2_p = .28$.

Follow-up analyses indicated that the PSAS mean for the treatment group at time 1 ($M = 52.50, SD = 12.48$) was not significantly different from the PSAS mean ($M = 48.38, SD = 8.60$) for the control group at time 1 ($F(1,14) = .59, p = .45$). However, the mean PSAS score for the treatment group a time 2 ($M = 36.00, SD = 8.60$) was marginally significantly different from mean PSAS score for the control group ($M = 46.25, SD = 11.65$) at time 2 ($F(1,14) = 4.01, p = .07$). An analysis of time differences for the control group alone indicated that there was not a significant difference between time 1 and time 2 ($F(1,14) = .24, p = .64$). For the treatment group there was a significant decrease in PSAS means from time 1 to time 2 ($F(1,14) = 14.20, p = .002$). Taken together, these results indicate that the treatment group reported lower pre-sleep arousal symptoms at time 2 relative to the control group. Also, the difference between time 1 and time 2 was significantly greater for the treatment group relative to the control group.

**PghSD**

**TIB.** The weekly means (week 1, 2, and 3) of the control group were 503.51 (SD = 77.78), 504.21 (SD = 83.27), and 462.65 (SD = 49.67), respectively. The weekly means of treatment group were 430.36 (SD = 113.54), 453.38 (SD = 87.60), and 454.47 (SD = 93.81), respectively. See Figure 18 for a graphical representation of the means. There was a non-significant main effect of Condition on TIB, $F(1, 14) = 1.17, p = .30, \eta^2_p = .08$. There was a non-
significant main effect of Time on TIB, $F(2, 28) = 1.30, p = .29, \eta^2_p = .09$. There was a

significant Time x Condition interaction, $F(2, 28) = 3.44, p = .05, \eta^2_p = .20$.  

Follow-up analyses of Bonferroni-corrected post hoc tests indicated that the TIB mean for the treatment group at time 1 ($M = 430.36, SD = 113.54$) was not significantly different from the TIB mean ($M = 503.51, SD = 77.78$) for the control group at week 1 ($F(1, 14) = 2.26, p = .16$). Also, the mean TIB score for the treatment group at week 2 ($M = 453.38, SD = 87.60$) was not significantly different from the mean TIB score for the control group ($M = 504.21, SD = 83.27$) at week 2 ($F(1, 14) = 1.42, p = .25$). Furthermore, the TIB mean for the treatment group at week 3 ($M = 454.47, SD = 93.81$) was not significantly different from the mean TIB score for the control group ($M = 462.65, SD = 49.67$) at week 3 ($F(1, 14) = .05, p = .83$). An analysis of time differences for the control group alone indicated that the time differences were mixed in that the weekly TIB mean for week 1 was not significantly different from the TIB mean for week 2 ($p = 1.0$) and 3 ($p = .18$); however, the weekly TIB mean for week 2 was significantly higher than the TIB mean for week 3 ($p = .05$). For the treatment group, the increases in the weekly TIB means were not significant (week 1 and 2, $p = .64$; week 2 and 3, $p = 1.0$; week 1 and 3, $p = .75$). This pattern of interaction was not readily interpretable.
CHAPTER VI. DISCUSSION

The present study investigated the effectiveness of ACT for insomnia using a randomized controlled group outcome study design. The primary hypothesis was that individuals who received the ACT treatment would experience improved sleep and sleep-related activities relative to the control group. It was also hypothesized that individuals in the treatment group would show greater psychological flexibility and less use of thought control strategies after receiving ACT intervention.

The feasibility and acceptability of the study were demonstrated through randomization of participants, inclusion of a control group, and the high treatment compliance rates among the participants who completed the study. Additionally, the ACT intervention was administered in accordance with the treatment manual based on treatment integrity checks.

One notable finding from this study is that the treatment satisfaction survey results indicate that most participants who received the intervention reported that their experience was positive and helpful. It also provided information on the perceived helpfulness of treatment elements. Specifically, participants reported that treatment elements aimed at mindfulness/meditation (breathing exercises), acceptance (“passengers on the bus” metaphor), and relinquishing control efforts (“tug of war with a monster” metaphor) were particularly helpful.

In the ACT literature, data on how study participants experienced the various elements of ACT treatments are rarely reported. Baik and O’Brien (2013) provided qualitative analyses on the treatment elements based on participants’ subjective reporting, which was consistent with the results from the current study. Also, one study (Hertenstein et al., 2014) reported that they included a single question that assessed the degree of perceived helpfulness of the treatment
using a Likert-scale (1-5: not helpful to extremely helpful); 5 subjects rated the intervention as ‘5’ and 5 subjects rated it as ‘4.’ The present intervention was rated similarly, suggesting that the participants perceived the intervention to be helpful.

Evaluation of questionnaire outcome data yielded four main findings. First, there was no evidence of a consistent treatment effect. Second, there were a number of main effects for time on the questionnaire measures. These main effects for time indicated that participants reported improvements in their symptoms of insomnia, level of pre-sleep arousal, level of experiential avoidance, use of thought control strategies, and degree of decentering at time 2 relative to time 1. Third, when only the advanced therapist’s sample was analyzed, the treatment group, relative to the control group, reported significantly more improvement in pre-sleep arousal across time. This finding indicated the presence of a statistically significant treatment effect. Finally, an examination of group means (as illustrated in the various treatment outcome figures) indicated that the pattern of results for several variables (insomnia symptoms, pre-sleep arousal, and use of thought-control strategies) were consistent with predictions (i.e., there are indications that the treatment group improved more than the control group from time 1 to time 2). It is plausible that a more powerful study would have yielded statistically significant treatment effect findings on these variables.

Examinations of the sleep diary data are generally congruent with questionnaire data. Specifically, there were no significant treatment effects observed and there were a number of main effects for time that showed improvements in sleep onset latency, nighttime awakenings, sleep efficiency, and sleep quality from the beginning to end of the study.

The main effects for time observed on some variables in the current study are in line with other intervention studies such as CBT-I. In three meta-analyses by Morin et al. (1994, 2004)
and by Murtagh and Greenwood (1995), individuals who received one or more CBT component(s) reported the following average changes from pre-treatment to post-treatment: (a) SOL reduced from 64 minutes to 37 minutes, (b) TWT reduced from 70 to 38 minutes, (c) TST increased from 339 to 370.8 minutes, and (d) WASO reduced from 1.63 to .44 times per night. In the current study, participants in the treatment group reported a reduction in their SOL on average from 59 to 46 minutes. They also experienced an increase in their TST on average from 378 to 403 minutes and a decrease in their WASO on average from 1.80 to 1.31 times per night. However, the TWT data from the current study differ from the meta-analyses. Specifically, the means from pre-treatment to post-treatment were 21 and 18 respectively, a smaller change for the current study. These data also indicate that the current study participants were reporting substantially less TWT (i.e., 21 and 18 for the current study versus 70 and 38 for the meta-analyses). Thus, a floor effect may have limited capacity for greater improvement.

Nonetheless, the current study’s results generally align with other literature on the treatment of insomnia. Moreover, in the prior study by Baik and O’Brien (2013) consisting of six participants with insomnia, more than half of the participants reported improvements in the following sleep parameters after receiving six weekly ACT interventions: increased TST, decreased SOL, increased sleep satisfaction, improved mood, and decreased daytime sleepiness. Also, variable portions of their sample experienced a decrease in overall sleep difficulties and use of thought control strategies while showing an increase in psychological flexibility and present-focused thinking on variable clinical significance levels.

In the current study, participants in the control group also showed changes in same direction as the treatment group, though the magnitude of change for the treatment group was marginally greater than those reported by the control group. The lack of significant differences
between the groups and the general patterns of time effects in the current study suggests that these changes can be attributed to the effect of self-monitoring. The effects of behavioral self-monitoring have been well documented in the research literature. Based on self-regulation theory (Bandura, 1998; Kanfer, 1991), self-monitoring plays a critical role in self-evaluation and self-reinforcement for progress made towards one’s goals. Self-monitoring involves paying deliberate attention to one’s own target behavior and recording some details of that behavior (e.g., the circumstances that precipitate or surround the behavior). Self-monitoring increases one’s awareness of her or his behavior and the occurrence of potential variables that may affect such behaviors in real-world settings (Haynes, O’Brien, & Kaholokula, 2011).

Numerous studies reported that self-monitoring can change the form and frequency of a behavior and that the monitored behaviors tend to change in a therapeutically desired direction (Haynes et al., 2011). In fact, some studies used this reactive effect of self-monitoring as an intervention strategy itself (e.g., Burke et al., 2011; Burke, Wang, & Sevick, 2010; Harris et al., 2005; Humphreys et al., 2009). In the weight loss literature, a number of studies consistently reported that weight self-monitoring was associated with weight loss (e.g., Butryn et al., 2007; Welsh et al., 2009). Moreover, Haynes et al. (2011) suggest that when individuals are given well-defined instructions and training, they tend to adhere to the monitoring, which in turn increases the likelihood of behavioral change.

**Implications of the ACT intervention for Insomnia**

The ACT model identifies *experiential avoidance* as an overarching term for etiological and maintaining ill-psychological health factors, which can be understood as the tendency to alter one’s intrusive private events in form, frequency, or sensitivity as means to cope with adverse events. Ironically, engaging in avoidance behaviors can lead to an increased
likelihood of performing actions that are inconsistent, and perhaps hinder one’s long-term and higher-ordered values and goals (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Thus, avoiding one’s intrusive private events rather than accepting them can potentially lead to unfulfilled goal- and value-achievements, which may result in psychological suffering.

While ACT is not conceptualized as a disorder-specific intervention that focuses on symptom reduction as a primary goal, ACT may assist with managing insomnia. Individuals with insomnia may demonstrate controlling strategies to cope with difficult private events such as thoughts, feelings, or even physiological sensations; unaware of the negative impact of such strategies. Difficulties falling asleep represent a classic example of a problem that is worsened by an increased effort to control it (Espie et al., 2006). Thus, the primary focus of the current intervention was to facilitate one’s acceptance of naturally occurring private events and to enhance one’s sense of personal values and committed actions toward such value-driven goals. The participants were thus encouraged to disengage from focusing on their inabilities to fall asleep (or maintain one’s sleep) or on the negative consequences of sleep difficulties. By disengaging from avoidance activities that elevate pre-sleep arousal and allowing themselves to experience the natural fluctuations in their physiological and cognitive activities, individuals can develop a psychophysiological state that is more conducive to sleep. Also, guiding individuals to their values and facilitating their commitment to value-based action planning can benefit individuals so that they shift their focus from the value of sleep, which often is distorted or exaggerated, to other valued aspects of their lives.

The efficacy of ACT has been demonstrated for a number of adverse health conditions (Powers, zum Vörde Sive Vörding, & Emmelkamp, 2009); however, studies of its use to treat insomnia are yet in their infancy. The current study provided empirical data suggesting that
there may be benefits associated with ACT for insomnia. However, a small sample size and reactivity of self-monitoring resulted in an inability to generate statistically significant treatment effects.

**Limitations and Future Directions**

There are several limitations of the study. First of all, the sample size was small and the treatment effect sizes were small to moderate. A larger number of participants would be necessary to increase the power and decrease the Type II error rate. The small sample size was largely a result of participant attrition. Nearly a third of the participants \((n = 21)\) who completed the initial phone-screening with trained research assistants dropped out of the study and did not attend the in-person pre-treatment assessment. Another set of drop-outs occurred for the control group from time 1 to time 2. The control group participants who dropped out \((n = 10)\) may have lost interest or experienced significant improvement in sleep difficulties as a function of self-monitoring. After the first session, there was very good participant retention in the treatment group with only two persons dropping out. After the second treatment session, five treatment group participants did not attend the follow-up appointment to collect data and/or return the final week of self-monitoring data. This attrition could be due to participants’ lack of commitment or motivation after receiving all the treatments or scheduling conflicts.

Second, the treatment length was perhaps insufficient to elicit strong results. The original treatment protocol developed by Fletcher (2010) was designed as an 8-week treatment. However, the current study modified the length to 3 weeks combining several weeks of treatment into two 2-hour sessions. Future studies that administer the treatment on a weekly basis may better address the benefits of the treatment. Furthermore, a longer treatment period may improve participant retention and capture the treatment effect more clearly because other extraneous
variables (e.g., idiosyncratic factors, time, stability of one’s sleep patterns, and level of rapport with clinician) can be better controlled.

Lastly, in ACT intervention literature, it is often reported that individuals do not show great symptom reductions, but report increased life-satisfaction and quality of life (e.g., Darlymple et al., 2010; Hertenstein et al., 2014, McCraken et al., 2011). The current study did not investigate how the intervention influenced individuals’ perceived changes in their life-satisfaction or quality of life, which might have provided additional meaningful information. Future studies may include a measure of quality of life as part of treatment outcome measures based on ACT’s fundamental focus on increasing psychological flexibility and valued life, and goal-directed behaviors rather than elimination of aversive physical or psychological experiences. Future research will advance our understanding of the mechanisms underlying ACT and maximize its effectiveness for individuals with insomnia; the effects of ACT on outcome measures beyond sleep, such as daytime functioning (e.g., daytime fatigue, work performance, social functioning) and quality of life can be further investigated.

Conclusions

Insomnia is a prevalent and significant health concern that is perpetuated by dysfunctional beliefs about sleep, heightened arousal, and sleep-incompatible behaviors. While CBT addresses challenging the dysfunctional beliefs about sleep and modifying sleep-incompatible behaviors, ACT focuses on addressing mechanisms that perpetuate individuals’ pre-sleep arousal by mitigating the experiential avoidance efforts which heighten one’s pre-sleep arousal.

The current study was based on the pre-sleep cognition and arousal model, and implemented a behavioral intervention that focuses on assisting individuals with insomnia to
better manage their pre-sleep arousal by increasing one’s acceptance. While progress toward
establishing the effectiveness of the ACT intervention for insomnia has been encouraging, a clear
estimate of the effectiveness of the intervention cannot be ascertained by this study due to its
limitations. Despite the drawbacks, the current study does provide preliminary data on the
acceptability and perceived helpfulness of ACT for insomnia. As a relatively new intervention
approach for insomnia, ACT is promising and it will likely continue to benefit from future
refinement.
REFERENCES


supported techniques of cognitive behavior therapy (pp. 576-583). Hoboken, NJ: John Wiley & Sons.


APPENDIX A

PHONE INTERVIEW SCRIPT FOR SCREENING

We appreciate your interest in our study. Before we ask you to come in for an individual appointment, we would like to ask you some questions. We are asking you these questions because we are looking for individuals with sleep problems in specific conditions. We are not going to ask you any information that can identify your personal identity. Please do not give us your personal information such as your name, address, occupation, or so. If you do not feel comfortable answering the questions I am about to ask you, please do not hesitate to let me know and you may choose not to answer any items. Also, I will not ask you to turn in any document or proof for your answer. Please try to answer to the questions to the best of your knowledge in an honest manner.

List of the questions:

- What is your age?
- Do you have experience sleep problems?
  - If yes, what is your sleep problem like?
    - If it pertains to sleep onset, continue to the next question.
    - If it pertains to sleep apnea or breathing related, terminate the interview and inform that this study is to investigate individuals’ sleep problems, mainly with sleep onset.
  - If no, terminate the interview and inform that this study is to investigate individuals’ sleep problems, mainly with sleep onset.
- How long have you been experiencing the sleep problem?
  - If for at least a month, continue to the next question.
  - If less than a month, terminate the interview and inform that we are interested in individuals who have been experiencing sleep problems for at least a month.
- Do you take any medications that you believe to interfere with your sleep?
  - If no, continue to the next question.
  - If yes, terminate the interview and inform that we are interested in individuals without current medication that affects sleep.
- Are you currently diagnosed with a major psychiatric disorder such as Major Depressive Disorder, Anxiety Disorder, or any other condition you believe to affect your sleep?
  - If no, continue to the next question.
  - If yes, terminate the interview and inform that we are interested in individuals who are currently not diagnosed with such conditions.
- Do you have any chronic medical conditions that you believe to affect your sleep?
  - If no, schedule an initial individual appointment.
If yes, terminate the interview and inform that we are interested in individuals who currently do not have any chronic medical conditions that affect their sleep.
APPENDIX B

THE INSOMNIA SYMPTOM QUESTIONNAIRE (ISQ)

Name____________________ ID#___________ Date___________ Age______

**Instructions:** If you have experienced any sleep symptoms during the past month please circle the appropriate number to let us know how your sleep is affecting your daily life.

<table>
<thead>
<tr>
<th>During the past month did you have...</th>
<th>Never</th>
<th>Do not know</th>
<th>Rarely less than once per week</th>
<th>Sometimes 1-2 times per week</th>
<th>Frequently 3-4 times per week</th>
<th>Always 5-7 times per week</th>
<th>How long has the symptom lasted? (# of weeks, months or years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Difficulty Falling asleep?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>□ wks □ mos □ yrs</td>
</tr>
<tr>
<td>2. Difficulty staying asleep?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>□ wks □ mos □ yrs</td>
</tr>
<tr>
<td>3. Frequent awakenings from sleep?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>□ wks □ mos □ yrs</td>
</tr>
<tr>
<td>4. Feeling that your sleep is not sound?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>□ wks □ mos □ yrs</td>
</tr>
<tr>
<td>5. Feeling that your sleep is unrefreshing?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>□ wks □ mos □ yrs</td>
</tr>
</tbody>
</table>

**Instructions:** If you have experienced any sleep symptoms during the past month please circle the appropriate number to let us know how your sleep is affecting your daily life.

<table>
<thead>
<tr>
<th>During the past month...</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. How much do your sleep problems bother you?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Have your sleep difficulties affected your work?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Have your sleep difficulties affected your social life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. Have your sleep difficulties affected other important parts of your life?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. Have your sleep difficulties made you feel irritable?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. Have your sleep problems caused you to have trouble concentrating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. Have your sleep difficulties made you feel fatigued?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. How sleepy do you feel during the day?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
## APPENDIX C

### ACT KNOWLEDGE QUESTIONNAIRE (ACTKQ)

<table>
<thead>
<tr>
<th>Linking Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>This section helps you to generate a unique personal code that can be used to link your pre and post ACT training responses. It will not be used to link your responses to you in any way.</td>
</tr>
<tr>
<td>What is the first letter or number of the name of street you live on? ______</td>
</tr>
<tr>
<td>What is the second letter of the city of your birth? ______</td>
</tr>
</tbody>
</table>

**Directions:** This questionnaire consists of 16 items regarding Acceptance and Commitment Therapy. Please read each question carefully and circle the letter of the best response.

1. Suppose a client states, “I’ve learned that the thoughts I have are not me. I want to talk to others who have a trauma history so that they can know that they are not defined by their trauma history.” In this example, what concept has the client most likely internalized?
   a. willingness
   b. self-as-context
   c. defusion
   d. values as goals

2. Which of the following is not an ACT-consistent statement about committed action?
   a. Engage in valued life activities even when psychological barriers arise.
   b. The process is more important than the outcome of our actions.
   c. Failure is not a possible outcome of truly committed action.
   d. Behaving confidently is not the same as feeling confident.

3. When discussing willingness a client responds, “I’ll talk to my wife about how much pain I am in as long as I don’t get overwhelmed.” The client is having difficulty grasping
   a. the all or nothing nature of willingness
   b. the difference between willing and wanting
   c. the need to be open to experience at all times
   d. the link between willingness and values

4. If a therapist uses the phrase “As it is, not as it says it is,” she is referring to
   a. the process of defusion
   b. the concept of conceptualized self
c. the process of contact with the present moment  
d. the concept of self-as-context

5. From an ACT perspective, what is problematic with this therapist statement?: “When your girlfriend told you she was leaving it made you feel sad.”  
a. Linking emotions to external events could result in more avoidance.  
b. The therapist is reinforcing the content of the story.  
c. The therapist identified reasons as causes for emotions.  
d. The therapist is referring to emotions as real phenomena.

6. A client tells a story about her life that includes drinking alcohol every day, three failed marriages, moving every 12 months, overeating, and repetitious self-injury. What process is most likely to functionally connect these issues?  
a. escape maintained behavior  
b. experiential avoidance  
c. relational frames of comparison and time  
d. excessive cognitive fusion

7. Discriminating a difference between evaluation and description is one component of  
a. defusion.  
b. self-as-context.  
c. willingness.  
d. values.

8. Which of the following best illustrates a client’s confusion with goals as values?  
a. A man wants to be a good employee.  
b. An adolescent wants to be more educated.  
c. A woman wants to be emotionally available for several people in her life.  
d. A woman wants to be married.

9. According to the ACT book, when a therapist says the phrase “If you are not willing to have it, you’ve got it” he is illustrating the concept of  
a. defusion.  
b. control as the problem.  
c. acceptance.  
d. values.

10. Which of the following is not an ACT-consistent explanation of “psychopathology”?  
a. emotional avoidance.  
b. ineffective thinking and behavior patterns.  
c. cognitive fusion.  
d. lack of committed action.
11. Ongoing self awareness is the same as
   a. self-as-content.
   b. the conceptualized self.
   c. the evaluated self.
   d. self-as-process.

12. Which of the following is not a statement about contact with the present moment?
   a. Thoughts and feelings often present themselves as about the past or future, but they are experienced now.
   b. Cultivating awareness of thoughts and emotions as they occur allows us to notice when they get in the way of valued action.
   c. You are not your thoughts, memories, or roles.
   d. Life is not something to be lived when you have solved your problems, life is going on now.

13. Values are
   a. non verbal qualities of action
   b. verbally construed global desired life consequences
   c. a decision, not a choice
   d. the sum of the goals achieved while on a life path

14. Willingness, as defined by the ACT book, refers to
   a. a person’s motivation to try something new or different in their life.
   b. a feeling or belief that is helpful for tolerating discomfort.
   c. noticing thoughts as verbal constructions.
   d. giving up the struggle with emotional discomfort and disturbing thoughts.

15. The purpose of creative hopelessness is:
   a. To create a coherent story about why the client’s life is painful.
   b. To help a client recognize that his or her life, as it is being lived now, is hopeless.
   c. To show that the strategies that the client has used to manage internal experiences are unworkable.
   d. To illustrate to the client that they need to find new ways to fix their problems.

16. The belief “anxiety is bad” is an example of
   a. a dysfunctional thought.
   b. unwillingness.
   c. cognitive fusion.
   d. deliteralization.
APPENDIX D

TREATMENT SATISFACTION SCALE (TSS)

This questionnaire is developed for us to understand your overall experience with the treatment. Your answers will be completely anonymous and not linked with any of your answers on other questionnaires that you completed prior to this present survey. Please be sure to answer to every items on this survey. When you are done, please place this survey in the envelope provided to you.

1. How much did treatment help with the specific problem that led you to therapy?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>made things a lot better</td>
<td>made things somewhat better</td>
<td>made no difference</td>
<td>made things somewhat worse</td>
<td>made things a lot worse</td>
<td>Not sure</td>
</tr>
</tbody>
</table>

2. Overall, how satisfied were you with this therapist’s treatment of your problem?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely Satisfied</td>
<td>Very Satisfied</td>
<td>Fairly Well Satisfied</td>
<td>Somewhat Satisfied</td>
<td>Very Dissatisfied</td>
<td>Completely Dissatisfied</td>
</tr>
</tbody>
</table>

3. Overall, how easy were the treatment contents to understand?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Easy</td>
<td>Very Easy</td>
<td>Fairly Easy</td>
<td>Somewhat Easy</td>
<td>Very Difficult</td>
<td>Extremely Difficult</td>
</tr>
</tbody>
</table>

4. How easy was for you to practice the mindfulness exercise(s) daily?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Easy</td>
<td>Very Easy</td>
<td>Fairly Easy</td>
<td>Somewhat Easy</td>
<td>Very Difficult</td>
<td>Extremely Difficult</td>
</tr>
</tbody>
</table>

5. Which treatment contents did you find to be most helpful? (Please circle. May choose more than one)

- “Man in a hole” metaphor
- “Tug-of-War with a Monster” metaphor
- Breathing exercise with counting
- “Polygraph” metaphor
- “Passengers on the bus” metaphor
- Clean vs. Dirty discomfort
- “Two scales” metaphor
- “What are the numbers?” metaphor
- “Chessboard” metaphor
- “Milk, milk, milk” exercise
- “Leaves on a stream” meditation
- “Bum at the door” metaphor
- “Moving through a swamp” Tonglen meditation
- Other (Please describe):
6. Which treatment contents did you find to be most **unhelpful**? (Please circle. May choose more than one)

<table>
<thead>
<tr>
<th>Treatment Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Man in a hole” metaphor</td>
</tr>
<tr>
<td>“Tug-of-War with a Monster” metaphor</td>
</tr>
<tr>
<td>Breathing exercise with counting</td>
</tr>
<tr>
<td>“Polygraph” metaphor</td>
</tr>
<tr>
<td>“Passengers on the bus” metaphor</td>
</tr>
<tr>
<td>Clean vs. Dirty discomfort</td>
</tr>
<tr>
<td>“Two scales” metaphor</td>
</tr>
<tr>
<td>“What are the numbers?” metaphor</td>
</tr>
<tr>
<td>“Chessboard” metaphor</td>
</tr>
<tr>
<td>“Milk, milk, milk” exercise</td>
</tr>
<tr>
<td>“Leaves on a stream” meditation</td>
</tr>
<tr>
<td>“Bum at the door” metaphor</td>
</tr>
<tr>
<td>“Moving through a swamp” meditation</td>
</tr>
<tr>
<td>Tonglen meditation</td>
</tr>
<tr>
<td>Other (Please describe):</td>
</tr>
</tbody>
</table>

Please indicate how truly each statement describes you.

**Compared to the time before I participated in this treatment, I feel..................**

7. More comfortable with accepting thoughts and feelings that arise in bed.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
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<tr>
<td>Somewhat True</td>
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<tr>
<td>True</td>
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<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
<td></td>
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</tbody>
</table>

8. More able to let go of my effort to control thoughts, feelings, and bodily sensations.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Very True</td>
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<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
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</tbody>
</table>

9. More able to see my thoughts as thoughts without judging or evaluating them.

<table>
<thead>
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<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
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<tr>
<td>Somewhat True</td>
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<tr>
<td>True</td>
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<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
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</tbody>
</table>

10. More able to clarify my goals and values.

<table>
<thead>
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<th>5</th>
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<tbody>
<tr>
<td>Very True</td>
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<tr>
<td>Somewhat True</td>
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<tr>
<td>True</td>
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<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
<td></td>
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</tbody>
</table>

11. More able to pursue my life in direction of my values.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Somewhat True</td>
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<tr>
<td>True</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
<td></td>
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</tr>
</tbody>
</table>

12. More confident that sleep difficulty is not getting in the way of my pursuit of valued living.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Very True</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat True</td>
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<tr>
<td>True</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat Untrue</td>
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<tr>
<td>Untrue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please provide us with any feedback or comments about your experiences with the treatment.

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
APPENDIX E

TREATMENT MANUAL ADHERENCE CHECKLIST

Please rate whether each item has been properly covered according to the treatment manual.

<table>
<thead>
<tr>
<th>Pre-Treatment Assessment Baseline</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and overview of treatment</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Informed Consent Form</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Limit of Confidentiality</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Pre-Treatment Measures</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Discussion of Sleep Problems</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Baseline Periods</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Sleep Diary</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Scheduling the next Appointment</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 1</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Baseline Sleep Diary</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Orientation to treatment</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Commitment to the treatment</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Building Alliance</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Creative Hopelessness</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Tug-of-War with a Monster metaphor</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Polygraph metaphor</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Falling in love metaphor</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Passengers on the bus metaphor</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Willingness and Acceptance Practice</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Mindfulness Exercises</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 2</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Sleep Diary &amp; Meditation Practice</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>“Control is the Problem”</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>“Self-as-context” and Cognitive Defusion</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Labeling thoughts (Leaves on a stream)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Milk, Milk, Milk Exercise</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Observer Exercise</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>What’s the number? Exercise</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Chessboard Metaphor Exercise</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>“Bum at the door”/ Discussion of Value</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>“Moving Through a Swamp”</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Tonglen meditation practice</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Termination</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect Sleep Diary</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Post-Treatment Package</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Drawing</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
APPENDIX F

INSOMNIA SEVERITY INDEX (ISI)

Name: ____________________  Date: ________________________

1. Please rate the current (i.e., last 2 weeks) **SEVERITY** of your insomnia problem(s).

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty falling asleep:</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Difficulty staying asleep:</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Problem waking up too early:</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. How **SATISFIED**/dissatisfied are you with your current sleep pattern?

<table>
<thead>
<tr>
<th></th>
<th>Very Satisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

3. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc.)?

<table>
<thead>
<tr>
<th></th>
<th>Not at all Interfering</th>
<th>A Little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very Much Interfering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

4. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

<table>
<thead>
<tr>
<th></th>
<th>Not at all Noticeable</th>
<th>A Little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very Much Noticeable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. How **WORRIED**/distressed are you about your current sleep problem?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A Little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Guidelines for Scoring/Interpretation**

Add scores for all seven items ($1a+1b_1c+2+3+4+5$) = _______

Total score ranges from 0-28

- 0-7 = No clinically significant insomnia
- 8-14 = Subthreshold insomnia
- 15-21 = Clinical insomnia (moderate severity)
- 22-28 = Clinical insomnia (severe)
APPENDIX G

PRE-SLEEP AROUSAL SCALE (PSAS)

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>A lot</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Heart racing, pounding or beating irregularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>A jittery, nervous feeling in your body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Shortness of breath or labored breathing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>A tight, tense feeling in your muscles</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Cold feeling in your hands, feet or your body in general</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Have stomach upset (knot or nervous feeling in stomach, heartburn, nausea, gas, etc.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Perspiration in palms of your hands or other parts of your body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Dry feeling in mouth or throat</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Worry about falling asleep</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Review or ponder events of the day</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Depressing or anxious thoughts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Worry about problems other than sleep</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Being mentally alert, active</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Can't shut off your thoughts</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Thoughts keep running through your head</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Being distracted by sounds, noise in the environment (e.g. ticking of clock, house noises, traffic)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
APPENDIX H

THE ACCEPTANCE AND ACTION QUESTIONNAIRE-II (AAQ-II)

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>never true</td>
<td>very seldom true</td>
<td>seldom true</td>
<td>sometimes true</td>
<td>frequently true</td>
<td>almost always true</td>
<td>always true</td>
</tr>
</tbody>
</table>

1. My painful experiences and memories make it difficult for me to live a life that I would value. 1 2 3 4 5 6 7
2. I’m afraid of my feelings. 1 2 3 4 5 6 7
3. I worry about not being able to control my worries and feelings. 1 2 3 4 5 6 7
4. My painful memories prevent me from having a fulfilling life. 1 2 3 4 5 6 7
5. Emotions cause problems in my life. 1 2 3 4 5 6 7
6. It seems like most people are handling their lives better than I am. 1 2 3 4 5 6 7
7. Worries get in the way of my success. 1 2 3 4 5 6 7
THOUGHT CONTROL QUESTIONNAIRE INSOMNIA-REVISED (TCQI-R)

Many people find that as they are trying to get to sleep at night thoughts relating to the day they have just had or thoughts about tomorrow come to mind. Other times thoughts relating to ongoing problems or stressors at work or at home come to mind. Sometimes these thoughts make it hard to fall asleep.

How often does thinking too much keep you awake?

0  1  2  3  4  5  6  7  8  9  10
Never           Every night

Below are a number of things that people do to control these thoughts. Please read each statement carefully and indicate how often you use each technique to control the thoughts that run through your mind as you are trying to get to sleep at night by circling the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

<table>
<thead>
<tr>
<th></th>
<th>Almost</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. I tell myself not to think about them now.         1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I try to push the thoughts out of my head.         1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I call to mind positive images instead.             1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. If the thoughts relate to a problem I make a decision about it in order to solve the problem.  1 2 3 4</td>
<td></td>
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<tr>
<td>5. I try to block them out by reading a book, watching TV or listening to the radio.  1 2 3 4</td>
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<tr>
<td>6. I ruminate about them.                              1 2 3 4</td>
<td></td>
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<tr>
<td>7. I decide to put them “on hold” until the morning.   1 2 3 4</td>
<td></td>
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<tr>
<td>8. I let my mind go blank.                              1 2 3 4</td>
<td></td>
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<tr>
<td>9. I tell myself not to be so stupid.                   1 2 3 4</td>
<td></td>
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<tr>
<td>10. I focus on the thought.                             1 2 3 4</td>
<td></td>
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<tr>
<td>11. I replace the thought with a more trivial bad thought.  1 2 3 4</td>
<td></td>
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<td></td>
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<tr>
<td>12. I punish myself for thinking the thought.           1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I dwell on other worries.                           1 2 3 4</td>
<td></td>
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<tr>
<td>14. I keep the thought to myself.                       1 2 3 4</td>
<td></td>
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<tr>
<td>15. I think about something else instead.               1 2 3 4</td>
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<tr>
<td>16. I challenge the thoughts validity</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>17. I get angry at myself for having the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
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<tr>
<td>18. I avoid discussing the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>19. I shout at myself for having the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>20. I analyse the thought rationally</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>21. I think pleasant thoughts instead</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>22. I worry about more minor things instead</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>23. I do something that I enjoy</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>24. I try to reinterpret the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>25. I occupy myself with work instead</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>26. I try a different way of thinking about it</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>27. I think about past worries instead</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>28. I focus on different negative thoughts</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>29. I question the reasons for having the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>30. I tell myself that something bad will happen if I think the thought</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>31. I keep myself busy</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>32. I prefer to think things through than distract from them</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>33. I seek reassurance from others (e.g. my bed partner or a friend on the following day)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>34. I say “stop” to myself</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>35. I do something physical to block them (e.g. turn over, get out of bed)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX J

EXPERIENCES QUESTIONNAIRE (EQ)

**Instructions:** We are interested in your recent experiences. Below is a list of things that people sometimes experience. Next to each item are five choices: “never”, “rarely”, “sometimes”, “often”, and “all the time”. Please darken one of these to indicate how much you currently have experiences similar to those described.

Please do not spend too long on each item—it is your first response that we are interested in. Please be sure to answer every item.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
<td>All the time</td>
</tr>
<tr>
<td>1</td>
<td>I think about what will happen in the future.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>I remind myself that thoughts aren’t facts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>I am better able to accept myself as I am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>I notice all sorts of little things and details in the world around me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>I am kinder to myself when things go wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>I can slow my thinking at times of stress.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>I wonder what kind of person I really am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>I am not so easily carried away by my thoughts and feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>I notice that I don’t take difficulties so personally.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>I can separate myself from my thoughts and feelings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>I analyze why things turn out the way they do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>I can take time to respond to difficulties.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>I think over and over again about what others have said to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>14.</td>
<td>I can treat myself kindly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>I can observe unpleasant feelings without being drawn into them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I have the sense that I am fully aware of what is going on around me and inside me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>I can actually see that I am not my thoughts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>I am consciously aware of a sense of my body as a whole.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19.</td>
<td>I think about the ways in which I am different from other people.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.</td>
<td>I view things from a wider perspective.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX K

THE PITTSBURGH SLEEP DIARY (PghSD)

Please keep this booklet by your bed, and fill it out last thing at night and first thing in the morning. There are 14 sheets in the booklet, one sheet for each night of sleep. Please feel out the left half of the sheet last thing at night, the right half first thing the following morning. We realize that estimates of time to falling asleep and time awake during the night are not going to be exact, just do the best you can.

When answering questions about how well you slept, your alertness and mood on awakening, please consider the line to represent your own personal range. Place a mark somewhere along the line to represent your feelings at that time. We are using the line so that you are not required to give “yes” or “no” answers, but can give one of a whole range of possible answers. Please try to use the whole scale, rather than simply putting your marks at one end or the other.

Name: _______________________    ID#__________________
Starting Date: _________________   Ending Date:_________________
SLEEP DIARY  **BEDTIME**  KEEP BY BED  study ID# ________________

Please fill out this part of the diary last thing at night.

day ______________  date _______________  initials _______________

Today, when did you have:  breakfast _______________
   (If none, write “none”)  lunch _______________
   dinner _______________

How many of the following did you have in each time period?  
(If none, leave blank)
   before or with  after breakfast  after lunch  after dinner
   breakfast
   before/with lunch
   after dinner

<table>
<thead>
<tr>
<th>Caffeinated drinks</th>
<th>before</th>
<th>after breakfast</th>
<th>after lunch</th>
<th>after dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________</td>
<td>_______________</td>
<td>___________</td>
<td>___________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alcoholic drinks</th>
<th>before</th>
<th>after breakfast</th>
<th>after lunch</th>
<th>after dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________</td>
<td>_______________</td>
<td>___________</td>
<td>___________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cigarettes</th>
<th>before</th>
<th>after breakfast</th>
<th>after lunch</th>
<th>after dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_______________</td>
<td>_______________</td>
<td>___________</td>
<td>___________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cigars/pipes/plugs</th>
<th>before</th>
<th>after breakfast</th>
<th>after lunch</th>
<th>after dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>(of chewing tobacco)</td>
<td>_______________</td>
<td>_______________</td>
<td>___________</td>
<td>___________</td>
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</tbody>
</table>

Which drugs and medications did you take today?  
(prescribed & over the counter)

<table>
<thead>
<tr>
<th>name</th>
<th>time</th>
<th>Dose</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>_______________</td>
<td>_______________</td>
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<td>_______________</td>
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</tbody>
</table>

What exercise did you take today?  
(If none, check here _____________)

<table>
<thead>
<tr>
<th>start</th>
<th>end</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>start</td>
<td>end</td>
<td>type</td>
</tr>
</tbody>
</table>

How many daytime naps did you take today?  
(If none, write 0)

Give times for each:
| start                        | end              |
| start                        | end              |

Did you complete your daily mindfulness exercise?  Yes_______    No_______
SLEEP DIARY

WAKETIME

KEEP BY BED

study ID#

________________

Please fill out this part of the diary first thing in the morning:

day _______________ date _______________ initials _______________

went to bed last night at __________________

lights out at __________________

minutes until fell asleep __________________

finally woke at _________________

awaken by: (check one)
alarm ______
someone whom I asked to wake me ______
oise ______
just woke ______

after falling asleep, woke up this many times during the night (circle)
0 1 2 3 4 5 or more

total number minutes awake _________________

- woke to use bathroom (circle)
  0 1 2 3 4 5 or more

- awakened by noises/child/bed partner (circle)
  0 1 2 3 4 5 or more

- awakened due to discomfort or physical complaint (circle)
  0 1 2 3 4 5 or more

- Just woke (circle)
  0 1 2 3 4 5 or more

RATINGS (place a mark somewhere along the line)

SLEEP QUALITY:

very bad _______________ very good _______________

1 2 3 4 5 6 7 8 9 10

MOOD ON FINAL WAKENING:

very tense _______________ Very calm _______________

1 2 3 4 5 6 7 8 9 10

ALTERNESS ON FINAL WAKENING

very sleepy _______________ very alert _______________

1 2 3 4 5 6 7 8 9 10
APPENDIX L

ACCEPTANCE AND COMMITMENT THERAPY FOR INSOMNIA
TREATMENT MANUAL

Kyoung deok Baik

Bowling Green State University

Adapted from


This is a general protocol for two 3-to 4-hour group sessions of Acceptance and Commitment Therapy (ACT) for insomnia. Each section of the treatment will have core intervention strategies, with additional treatment strategies listed at the end of each section. Because this manual will not fit all clients’ needs, it may be tailored to each particular client. Tailoring of the treatment may involve shifting components in this treatment manual to different sessions than indicated, or adding material to support the components that are already suggested in this manual, as well as reducing or increasing the number of sessions. Only material that is consistent with the ACT model may be added to the intervention. This protocol is to be used in conjunction with the sources listed above. Where exercises are not fully written out here, they can be easily found in these other sources.

In addition to the general ACT protocol, participants were taught meditation exercises in session and instructed to practice these daily for a specific amount of time, usually between 10 and 20 minutes, although it may be extended up to 45 minutes by the end of the treatment. The meditation exercises began with simple concentration training. The meditation instructions changed each week, adding awareness and acceptance of body sensations, thoughts, and feelings, specifically targeting sleep-interfering private events. For example, it is often easy to predict the thoughts that show up around bedtime, such as “I’m not sleepy yet”, “I’m not going to get enough sleep again”, “I’m going to be zombie tomorrow”, and “I can’t stand this”, and this “tape recording” can be recognized and addressed with acceptance and defusion exercises. After the pre-treatment assessment, meditation instructions can be modified to fit each individual’s needs and therapists can encourage clients to utilize their personal features into their meditation if clients show difficulty following the instructions. That is, based on an idiographic assessment and the phase of treatment, the meditation exercise should target the relevant ACT processes and content related to the client’s situation or story. These meditation exercises are not fully documented here, due to the range of different instructions given. However, several examples are provided. The important point is to include a daily meditation practice that is guided by ACT principles.
Beginning a meditation practice can be extremely demanding and clients will often have many questions and difficulties. In order to competently address the clients’ experiences, it is imperative that the therapist also engage in a regular meditation practice. This claim is not yet supported by data. However, other approaches with a meditation component also stress the importance of this (MBSR, MBCT) and ACT trainers claim that you must be willing to do ACT with yourself as the therapist in order to be an effective helper for someone else using this approach. It follows that including a meditation component then requires that the therapist practice meditation.

Use of sleep medications is widespread among insomnia clients, and how to deal with this issue should be considered at the outset. Is it the client’s goal to stop using sleep medications? If so, come up with a plan for tapering off of them, such as reducing the dose by half after the first two weeks, then continue to reduce the dose each week until they are no longer using them. Systematic tapering was not used for this study and is recommended for future studies.

Pre-treatment Assessment.

1. Introduction
   Make sure the client understands what he or she has agreed to participate in. The participant will be attending two sessions of group therapy. The sessions will occur consecutively within two weeks, generally at the same time on the same day. The client is expected to attend all sessions and to contact the therapist if he or she cannot attend. Make sure that you have the clients phone number(s) so you can reschedule in case the client does not attend the session. At the end of the last session, the clients will be expected to attend a post-treatment assessment and follow-up assessments if necessary.
   Allow the participant to ask you questions concerning the study.

2. Discuss limits to confidentiality
   Explain that everything that occurs in session will remain confidential. The only exceptions to this are that individuals will watch the recorded therapy sessions for supervision purposes. In addition, confidentiality must be broken according to the ethical codes of the American Psychological Association. This includes: if the client reports plans of harming themselves or others, or reports harming a child or the elderly.

3. Measures
   Ask client to fill out pre-treatment packet. Give them a sleep diary to take home. Explain each item on the diary and explain that the time to sleep onset, time spent awake, and time spent asleep must add up to the time spent in bed. Also ask them to record their medication use each day.

4. Termination
   Schedule next appointment or commit to calling within one week.

Session 1.
Assessment and Creative Hopelessness
1. Review sleep diary
At the beginning of session, look over the client’s sleep diary. Make sure that it is filled out completely; if there is any missing data, ask the client to fill it in as best they can. Review medication use for the week and discuss tapering if appropriate. Discuss the client’s sleep for the past week and assess for degree of satisfaction.

2. **Orientation to treatment**

   **Address context of therapy in medical setting**
   Acknowledge that the client came to the current sleep program seeking therapeutic assistance in managing their insomnia. This is a behavioral approach to their sleep problem, because their insomnia is believed to have a psychological component and has ruled out any other medical conditions that could be causing it.

   **Sludge in glass metaphor**
   “As I said, we will get into fairly basic issues, including some that you might not have expected in therapy. My experience with this approach is that it can put you on a bit of a **roller coaster**. All kinds of different emotions might emerge: interest, boredom, anxiety, sadness, clarity, confusion, and so on. It is like cleaning out a **dirty glass with sludge** in the bottom: the only way to do it is to stir up the dirt. So some stuff might get stirred up, and for a while, things may look worse before they look better. It is not that it is overwhelming - it is just that you should be prepared to let show up whatever comes up.”

   **Commitment to a Course**
   The treatment of insomnia, for some, can be difficult and frightening. Also, in some cases, the outcomes of ACT are not seen until later in the treatment. Therefore, the client should be warned of this and agree to participate in the entire treatment and not to judge the treatment impulsively.
   “A fundamental treatment like this is best done by carving out some space within which to work. Especially if we end up stirring up old issues sometimes it might look like we are going backward when we are really going forward. It is like exercise: sometimes good things hurt a bit. I believe that clients should hold therapists accountable: I’m not asking for a blank check. If we are moving ahead, you will know it and we will both see it in your life. It is just that we can’t be sure of this on a week to week basis. So what I would like is a period of time - 2 sessions. Let’s push ahead for that amount of time no matter what - even if you really want to quit. One of the reasons that I find this important, is that if you do not really engage in these 2 sessions you will not really know whether this treatment is useful or not.”

3. **Assessment**
   Obtain a picture of what insomnia looks like for this client. Find out what they find the most distressing about this problem and what it specifically disrupts in their life.
   - Ask them to describe the problem. Do they have more trouble getting to sleep or waking up earlier than desired?
   - Any pattern to better or worse sleep?
   - Why are they participating in the treatment? How will getting control of the insomnia make his or her life better?
4. **Alliance Building**

Creating an alliance is an important part of therapy. In addition to providing and gathering the necessary information during these sessions, the therapist should also work to be warm, empathetic, and accepting. It is important that the client and therapist have a sense of mutual trust and respect before beginning work from an acceptance and commitment perspective.

**Creative hopelessness**

**Recall of inability to sleep through imagery.**

“Find a comfortable position and when you are ready, gently close your eyes. Now remember to the last time that you had difficulty sleeping. You are lying in bed awake. As much as possible, bring to mind what that experience was like. What thoughts are showing up? … Notice any emotions that arise. Silently label them … How do you feel in your body? Do you notice any areas of tension? If so, notice where you are holding tension in your body.”

Debrief: What came up? What did the client do in response? What “shovels” did the client pick up in order to control their internal experiences?

Discuss what the client noticed from their efforts and ways of “controlling” their sleep in the past.

**The Tug-of-War with a Monster Metaphor**

“This situation is like being in a tug-of-war with a monster. It is big, ugly, and very strong. In between you and the monster is a pit, and as far as you can tell, it is bottomless. If you lose this tug-of-war, you will fall into this pit and will be destroyed. So you pull and pull, but the harder you pull, it seems the harder the monster pulls, and it appears that you are edging closer and closer to the pit. The hardest thing to see is that your job here is not to win the tug-of-war. Your job is to drop the rope.”

Sometimes clients ask, “How do I do that?” after this metaphor. It is best not to answer firmly at this point. The therapist can say something like: “Well, I don’t know. But the first step is really to see that the tug-of-war can’t be won… and that it doesn’t need to be.”

**Control is the problem … acceptance is the solution**

1. **Control is the problem – letting go is the alternative**

   Walk through the following exercises to help the client become aware of their programming:

   **Polygraph metaphor**

   Use this metaphor to illustrate that control does not work for negative emotions, such as anxiety.

   **Falling in love**

   Trying to control positive emotions does not work either.

   “Is this what your mind is like when you go to bed/wake up early? When lying in bed awake at night, the mind can be like a tape running, with a highly predictable storyline. This is
due to programming, which means that trying to make it go away is futile and only increases fusion with these thoughts.” Draw on the client’s experience as much as possible without trying to convince them that this is so.

2. **Passengers on the bus metaphor**

"It's as if there is a bus and you're the driver. On this bus we've got a bunch of passengers. The passengers are thoughts, feelings, bodily states, memories, and other aspects of experience. Some of them are scary, and they're dressed up in black leather jackets and they've got switchblade knives. What happens is, you're driving along and the passengers start threatening you, telling you what you have to do, where you have to go. "You've got to turn left," "you've got to go right," etc. The threat that they have over you is that, if you don't do what they say, they're going to come up from the back of the bus.

It's as if you've made deals with these passengers, and the deal is, "You sit in the back of the bus and scrunch down so that I can't see you very often, and I'll do what you say, pretty much." Now what if one day you get tired of that and say, "I don't like this! I'm going to throw those people off the bus!" You stop the bus, and you go back to deal with the mean-looking passengers. Except you notice that the very first thing you had to do was stop. Notice now, you're not driving anywhere, you're just dealing with these passengers. And plus, they're real strong. They don't intend to leave, and you wrestle with them, but it just doesn't turn out very successfully.

Eventually you go back to placating the passengers, to try to get them to sit way in the back again where you can't see them. The problem with that deal is that, in exchange, you do what they ask in exchange for getting them out of your life. Pretty soon, they don't even have to tell you, "Turn left"--you know as soon as you get near a left-turn that the passengers are going to crawl all over you. Eventually you may get good enough that you can almost pretend that they're not on the bus at all, you just tell yourself that left is the only direction you want to turn. However, when they eventually do show up, it's with the added power of the deals that you've made with them in the past.

Now the trick about the whole thing is this: The power that the passengers have over you is 100% based on this: "If you don't do what we say, we're coming up and we're making you look at us." That's it. It's true that when they come up they look like they could do a whole lot more. They've got knives, chains, etc. It looks like you could be destroyed. The deal you make is to do what they say so they won't come up and stand next to you and make you look at them. The driver (you) has control of the bus, but you trade off the control in these secret deals with the passengers. In other words, by trying to get control, you've actually given up control! Now notice that, even though your passengers claim they can destroy you if you don't turn left, it has never actually happened. These passengers can't make you do something against your will."

Discuss what passengers show up around sleeping. What are they saying? What is the client doing in response? What are some other options in stead of fighting with them or just doing what they say?

3. **Pain vs. suffering (what we do to get rid of pain)**

"We should try to distinguish "clean" and "dirty" discomfort. The discomfort that life just dishes up--that comes and goes as a result of just living your life--that is "clean" discomfort. Sometimes it will be high, or it will be low, because of your history, the environmental circumstances in which you find yourself, etc. The "clean" discomfort is what you can't get rid of
by trying to control it. "Dirty" discomfort, on the other hand, is emotional discomfort and disturbing thoughts actually created by your effort to control your feelings. As a result of running away, whole new sets of bad feelings have shown up. That may be a big part of why you are here. That extra discomfort--discomfort over discomfort--we can call "dirty discomfort" and once willingness is high, and control is low, it kind of falls out of the picture and you're left with only the "clean" kind. You don't know how much discomfort you'll have left in any given situation once only "clean" discomfort is there. Be very clear I'm not saying that discomfort will go down. What I am saying is that if you give up on the effort to manipulate your discomfort, then over time it will assume the level that is dictated by your actual history. No more. No less".

4. Willingness and acceptance

5. Meditation: mindfulness of breathing exercise with counting
   “Silently label each out-breath with a number, starting with one and building up to ten. After ten breathes, start over at one.” Clients are instructed to continue this practice at home, while seated in an upright position, for 10 – 20 minutes each day. Ask them to choose a place where they can sit regularly without being disturbed, and to let their partners or roommates know not to disturb them during this time. Ask them to set a timer and not to get up until the timer goes off. This is very important for learning to persist based on a commitment rather than stopping due to discomfort.

   The emphasis in this simple meditation is on simply noticing the struggle and developing present moment awareness. Tell the client to note any strategies they use to pick up the rope on their sleep diary to review for next session.

Process:
Plan the client’s meditation practice for the following week. Encourage clients to practice the mindfulness exercise daily and mark it on their sleep diary. Address any potential barriers to practicing daily and completing the full length of practice sessions. In particular, focus on terminating meditation sessions due to discomfort rather than the time elapsed. Discuss how the meditation is going and trouble-shoot any other issues. A common experience for beginning meditators is to wonder if they are “doing it right”. Respond to this by first normalizing that this response is very common, and then look at how this is another control strategy that prevents the individual from being present to what is happening in the moment. Explore with the client how they may worry about “doing it right” in many other areas of their life and that this simply a repetitive thought that they don’t need to buy. Be sure to spend time addressing client’s potential concerns or questions about their daily practice of mindfulness exercise.

Session 2.

Self as Context and Defusion

1. Review sleep diary and meditation

2. Introduce Self-as-context and Defusion
   Walk through the following exercises in order to facilitate defusion and self-as-context:
Chessboard Metaphor

Milk, milk, milk exercise

What are the numbers?

Observer exercise

3. Meditation

These exercises focus on building defusion and self-as-context. Pick one to guide the client through during the session and to assign as homework for the week.

Labeling thoughts

“Begin by bringing your awareness to the present moment. Let your mind rest lightly on the breath, noticing the whole length of the breath … Eventually, your mind will begin to wander. When you notice that you are lost in thought, simply label the process of thinking. Silently say to your “thinking, thinking, thinking”, touching the thought lightly with your mind, watching it until it naturally fades. Then bring your attention back to your breath. Notice that you are not your thoughts, though you may have believed you were for a moment. You are the one sitting in this chair, breathing in and out. Your breath reminds you of who you really are.”

Labeling may also be used to label specific thoughts, such as planning, worrying, or obsessing, and with emotions, body sensations, or anything else that occurs in the moment. Labeling the experience brings forth the observer.

Leaves on a stream

Walk through the Leaves on a stream exercise with the client and ask them to practice with you in session. Tell the client that they are the observer sitting on the riverbank and calmly watching their thoughts float by. They can practice this on their own as a meditation exercise.

Values and Committed Action

1. Introduce Values

Hopefully at this point in treatment the client is becoming less involved in struggles with sleep-related thoughts and is having some improvements in sleep quality and/or medication use. Some sleep researchers believe that daytime processes are just as important as those that occur at night. Consistent with this, engaging in valued actions may be important for improving quality of life and refocusing attention away from sleep and on positive aspects of their life.

At this point in treatment the therapist should assist the client assessing his or her values. Completing the values assessment inventory does this. Clarification of the client’s values assists in giving the client direction outside of the support of the therapist. This will aid in long-term outcome of the treatment because it helps direct the client in difficult situations. Additionally, increasing the time involved valued activities will help maintain values driven behavior over behavior regulated by avoiding or escaping the obsession.

The Values Assessment Inventory is used to clarify the client’s values.
2. Focus on committed actions

After values have been clarified, it is time to assist the client in shifting the focus to engaging in these behaviors. The client has been making commitments to increase his or her willingness throughout the treatment, and now the commitment should be more focused on engaging in these valued activities. The following exercises will assist the client in engaging in valued activities over slipping back into an avoidance strategy.

**Bum at the door**

"Imagine that you got a new house and you invited all the neighbors over to a party, a housewarming. Everyone's invited in the whole neighborhood--you even put up a sign at the supermarket. So all the neighbors show up, the party's going great, and here comes Joe-the-bum, who lives behind the supermarket in the trash dumpster. He's stinky and smelly and you think, God, why did he show up? But you did say on the sign, “Everyone's welcome.” Can you see that it's possible for you to welcome him, and really, fully, do that without liking that he's there? You can welcome him even though you don't think well of him. You don't have to like him. You don't have to like the way he smells, or his life style, or his clothing. You may be embarrassed about the way he's dipping into the punch or the finger sandwiches. Your opinion of him, your evaluation of him is absolutely distinct from you willingness to have him as a guest in your home. Now you can decide that even though you said everyone was welcome, in reality he's not welcome. But as soon as you do that, the party changes. Now you have to be at the front of the house, guarding the door so he can't come back in. Or if you say, OK, you're welcome, but you don't really mean it, you only mean that he's welcome as long as he stays in the kitchen and doesn't mingle with the other guests, then you're going to have to be constantly making him do that, and your whole party will be about that. Meanwhile, life's going on, the party's going on, and you're off guarding the bum. It's just not life-enhancing. It's not much like a party. It's a lot of work. What the metaphor is about, of course, is all the feelings and memories and thoughts that show up that you don't like; they're just more bums at the door. The issue is the posture you take with regards to your own stuff. Are they welcome? Can you choose to welcome them in, even though you don't like the fact they came? If not, what's the party going to be like?"

The fantasy is that withholding willingness will promote peace of mind. The reality is the opposite. In fact, most clients have noticed that when we try hard to stop one reaction from joining the party, other undesirable reactions follow along right behind: what one ACT therapist called "the bum's chums."

**Moving Through a Swamp**

At this point in therapy, it is useful to explain to the client that the need for willingness emerges in the context of commitment. Without a goal and a commitment to values and goals, there is no need for willingness. It is as if there is a swamp in front of you. Acceptance is what happens when you are willing to go into that swamp. But notice also that there is a purpose to it. It is not that we need to wallow in swamps. It is that when we are going somewhere, sometimes there is a swamp there, and we have the choice either to change directions or to open up. It is as if you could cast a string across the swamp to reach a particular point on the other side. Then, when you are up to your ass in goop, you can always refer back to the string and see if you are headed in the direction you set for yourself. Only you can cast that string, and without it acceptance loses its direction.
3. Meditation focused on Values and Committed Action
By the end of this session, you will have identified a few core values. Use these for the following meditations.

Metta meditation (ACT variation)
Guide the client to bring their attention to the breath for a few moments. Ask them to identify a core value (e.g. love, freedom) and imagine this exists as a ray of light. “Imagine that this light is entering your body from the top of your head. It is slowly filling you up with a glowing light, permeating every cell with [their value] … Now picture someone close to you that you feel positively toward. Imagine that this light is filling them … Now think of other people you know, acquaintances, and imagine that this light [their value] is filling them up … Think of someone you have difficulty with and imagine that this light [their value] is filling them up … Now imagine that every living person is filled up with this light and that you are giving this gift to all of them.”

Tonglen meditation (ACT variation)
“Close your eyes and take a moment to again bring to mind what you would consider a core value and find one word to describe it. As you hold this word in your mind, notice what sensations you are experiencing in your body. Notice if there is lightness, warmth, and a sense of openness. Think of an image that captures what you are experiencing – a shooting star or a calm day on the beach or an image of a loved one smiling for example.

Now bring to mind an issue that you’ve been struggling with. As you hold this issue in your mind, notice how you are feeling in your body. Are you feeling tense? Try to contact a sense of contraction around the issue. Think of an image that captures what you are experiencing – your boss frowning disapprovingly, a frightening monster, or a fire with angry flames for example.

Now take several long, slow deep breaths. On an in-breath, bring to mind your struggle, using the image you thought of or a word to represent it. Notice your body contracting and any physical sensations that arise. Breathe into this pain wherever it is located in the body. On the out-breath, recall your value using the word or image that you chose. Breathe into a sense of openness and relaxation. Continue touching in on your pain on the in-breath and breathing out, contacting your value.”

Debrief: Does the pain and the value start to overlap? Is it difficult to separate one from the other?

4. Termination
Inform the clients that the treatment is ended. Schedule an appointment (a week later) to complete the post-treatment measure packet.
APPENDIX M

PRE-TREATMENT ASSESSMENT PROCEDURES

Greeting and Setting up: Introduce the researcher and faculty advisor and show appreciation for their participation

- Parking Pass and Room Setting (Psychological Services Center)
- Briefly introduce the objectives of sleep study
- Address potential obstacles in therapy (e.g., communication, cultural differences)

**INTRO**

- Understand what s/he has agreed to participate
  - Will be attending between 6- weekly sessions of therapy to be agreed upon by both parties based on satisfaction with treatment progress
- Sessions: Every week at the same time on the same day
  - Expected to attend all sessions
  - Contact for cancelling or re-scheduling 24-hr prior to the scheduled appointment
- At the end of Treatment: may be expected to respond to assessments for Post-Treatment and Follow-up one or 3-month later.
- Questions?
- Informed Consent Form

**Limit of Confidentiality**

- Check Video/Audio recording for supervision purpose
- Encourage open-discussion
- CONFIDENTIAL (everything will be kept in a locked file cabinet)
  - Except, concerns of safety (self-/other harming plans or intentions)

**Complete Pre-Treatment measures**

- Leave the room for about 15 minutes and return to answer questions

**Discussion of Sleep Problems**

**Baseline Periods**

- Explain what it is and why it is needed
- Discuss what is expected during this period
- Discuss brief weekly check-up via phone during the baseline periods
- Get most reliable contact information
- Ok to leave message? Ok to email?

**Sleep Diary**

- Instruct how to complete item by item, especially mindfulness exercise.

**Termination**

- Schedule next appointment (tentative Treatment onset)
APPENDIX N

ACCEPTANCE AND COMMITMENT THERAPY (ACT)

Philosophical and theoretical foundations. ACT is based on functional contextualism which emphasizes a focus on the whole, complete behavioral event, sensitivity to the role of context in understanding the nature and function of a behavioral event, and a firm grasp on a pragmatic truth criterion (Hayes, 1993; Hayes, Strosahl, & Wilson, 1999). From this perspective, a psychological or behavioral conceptualization in ACT focuses on integrating and organizing a stream of ongoing interactions between the whole units and contexts that are historically and situationally defined (Hayes, 2004). Thus, ACT aims to alter the contextual components rather than the actual form or content of a behavior (Hayes, Strosahl, & Wilson, 1999).

The truth criterion of contextualism is based on workability and functionality. As opposed to a mechanistic world-view based in realism in ontology that perceives the world as being preorganized and waiting to be discovered, functional contextualism views the world based on functionality and workability (i.e., “what is true is what works”). In other words, ACT avoids the view that there are prescriptions of behaviors and cognitions by which individuals should abide, preempting and limiting flexibility in human actions. ACT rather pursues cognition and behavior that functions most adaptively given any contextual factors. ACT does not attempt to define what is objectively true or real since our perception of the world is based on interactions in and with the world, and these interactions are always inherently limited to our experiences (Hayes, 2004).

Thus, ACT takes a holistic and context-focused stance that allows freedom of openness and acceptance toward all psychological events, even if such events may be formally categorized
as “negative,” “maladaptive,” or even “psychotic.” Furthermore, contextualism views one’s
chosen values as an essential foundation for goals to guide one to achieving a meaningful life,
and this value component is heavily emphasized in courses of treatment.

In addition to the aforementioned philosophical roots of ACT, relational frame theory
(RFT) and rule governance play an important role in ACT. RFT is based on the notion that
human language and cognition enact humans to learn both arbitrary and nonarbitrary relations
from contextual cues and even apply those relations to wider arrays of new stimuli (Hayes,
Strosahl, & Wilson, 1999; Hayes, 2004). Hayes (2004) claims that both animals and humans
seem to have the ability to transfer relations learned from nonarbitrary cues to new events that
are formally related in the same way; nonarbitrary cues can be defined by formal properties (e.g.,
sizes, colors, or numbers of objects) of related events. However, the ability to abstract the
features of such relational responding and frame a new relation based on arbitrary cues under
contextual control (e.g., social norms, convention) seems to be uniquely found in humans.
Hayes (2004) illustrated this unique ability of relational learning using the following example:

For example, having learned that "x" is "smaller than" X," humans may later be able to
apply this stimulus relation to events under the control of arbitrary cues (such as the
words "smaller than"). A very young child will know, say, that a nickel is bigger than a
dime, but a slightly older child will learn that a nickel is "smaller than" a dime by
attribution, even though in a formal sense it is not. (p. 648)

Another example can be considered. Without direct training of forming the relation between a cat
and a word, “cat”, a child can derive the relation of the two from the acquired stimulus relations
between written word-oral name and written word-class of objects (Hayes, Strosahl, & Wilson,
Relational frame is thus understood as a term that entails the performance of such relational responding.

The newly established stimulus relations are resistant to alteration or extinction even with direct reversal training (Saunders, 1989). Once these relations are formed, individuals start engaging in a pattern of contextually controlled, yet arbitrarily applicable relational responding. That is, we accumulate and strengthen the contextual relations that are arbitrarily formed throughout our life experiences regardless of the truth or functionality (Hayes, 1991; Hayes & Hayes, 1989, 1992). RFT provides a foundation for psychological suffering as a result of the arrays of relational frames that were created among arbitrary contextual cues that are dysfunctional and resistant to change. In discussing RFT’s view on psychopathology and psychotherapy, the role of verbal activity needs to be addressed.

In RFT, the critical role of language is emphasized. Any types of human cognitive activities (thinking, reasoning, speaking with meaning, or listening with understanding) we engage in are grounded on deriving relations among events and are verbally operated. Human verbal activities and cognition are dependent on relational frames and they heavily guide human behaviors through behavioral formation based on contingencies (e.g., acquiring certain behaviors through verbal formulations of events and learning the relations between the events; Hayes, 2004). Earlier studies showed that humans are not as apt and precise as nonhumans at tracking changes in the environment when their behaviors are guided by verbal rules (e.g., Hayes, Brownstein, Haas, & Greenway, 1986; Mathews et al., 1977; Shimoff et al., 1981). When a behavior was learned by experience rather than a rule that is verbally formed, individuals showed higher sensitivity to changes in their environment (Hayes, Brownstein, Haas, & Greenway, 1986).
ACT applies this aspect of rule-governed behavior to clinically significant behaviors. Humans develop rigidity in their learned behaviors when those behaviors are rule-driven by verbal formulation despite negative consequences (Hayes, Strosahl, & Wilson, 1999). In ACT treatments, clinically relevant behaviors may be understood and analyzed in terms of how each behavior was established by verbal rules, which contain rich information about the underlying contextual factors and distorted criterion of truth. Understanding how these behaviors have been historically and situationally formed can facilitate the process of building a new contextual system that is more functional. In doing so, experiential openness and value-driven goals are highly encouraged, while the rigidity and dysfunctional relational frames that lead to insensitivity to the environmental contingencies are discouraged. Hayes, Strosahl, and Wilson (1999) argue that letting go of unneeded struggles, which are formed from a history of various types of rule-governed behaviors, is essential in treating psychological or behavioral problems.

Based on RFT, ACT emphasizes psychological flexibility as a core component in psychological sufferings. Hayes et al. (2006) suggest that despite the fact that the lack of relational abilities can be a source of psychological problems (e.g., mental retardation), a main source of psychopathology arises from psychological inflexibility. The notion of psychological inflexibility can be understood as the inability to change behaviors that are more consistent with long-term valued goals due to verbal rule-governance (i.e., the way that language and cognition interact with direct contingencies). Thus, an ACT/RFT model of psychopathology (Figure 2) is based on psychological inflexibility in the core of pathology. There are six primary components that lead to psychological inflexibility in their interrelated interactions: (1) cognitive fusion, (2) experiential avoidance, (3) dominance of the conceptualized past and feared future (weak self-
(1) cognitive fusion, (2) defusion, (3) acceptance, (4) lack of values clarity (dominance of pliance and avoidant tracking), (5) inaction, impulsivity, or avoidant persistence, and (6) attachment to the conceptualized self.

Figure 2. A model of the positive psychological processes ACT seeks to strengthen: extracted from Hayes et al., 2006.

Cognitive fusion refers to improper regulation of behavior by verbal processes (e.g., rules or derived relational networks), which are formed and reinforced by contextual factors (Hayes,
Strosahl, & Wilson, 1999). The functional contexts are heavily sustained by the social/verbal community in various forms, and a context of experiential control largely influences how the experience of successful living can be manipulated in terms of emotional and cognitive states. Through the process of cognitive fusion, human behaviors can be shaped and executed by inflexible verbal networks instead of direct environmental contingencies. Cognitive fusion results in acting in a way that is not in service of one’s values and goals. What is problematic here is not the form or content of cognition, but rather the contextual features that lead the cognitive content to guide human behavior in unhelpful ways (Hayes et al., 2006). For example, an individual with insomnia may suffer from a thought that she or he is unable to function very well or enjoy any activities because of the fear that the activities may influence their sleep.

Within the verbally regulated contextual relations, cognitive fusion interacts with experiential avoidance—the attempt to alter the form, frequency, or situational sensitivity of private events even when doing so causes behavioral harm (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). That is, the general focus on “feeling good/right” and avoiding “feeling bad/wrong” is assessed and evaluated through natural language processes under the influences of social/verbal rules that prevail the human culture and cognition. Humans develop patterns of behavior that are guided by those rules even if doing so may go against one’s valued ends (Hayes et al., 2006). Ironically, when attempting to avoid negative private events, the saliency and functional importance of such events in fact increase because the control efforts are verbally linked to conceptualized negative outcomes limiting the viable behavioral choices due to anticipation of feared private events (Hayes et al., 2006).

According to Hayes et al. (2006), when animals face an aversive event (e.g., pain) that they want to avoid, they do so by avoiding the situation in which they have learned the event
historically occurs. However, this option is not viable for humans to readily utilize when faced with the exact same event (pain) since relational frames allow the aversive event to occur in more extensive situations (if not nearly any situations) and the purely situational solutions are prevented by humans’ arbitrary contextual control. For example, after a loss of a significant other, thoughts and related emotions (sadness, frustration, etc.) can be activated by situational cues (e.g., activities or places they have done/ been to together), objects (e.g., pictures, gifts from the person), or any multitudes of other cues. Because it is nearly impossible to control the aversive event by avoiding situations, humans may begin to avoid the aversive thoughts and feelings themselves. What is problematic here is that this type of avoidance or suppression can ironically result in cuing the avoided event and the psychological presences of the actual event it is related to (Hayes et al., 2006). Continuing the example from cognitive fusion, one may start developing patterns of nighttime activities that strictly center around getting good sleep while avoiding any possible circumstances that may interfere with getting good sleep. This avoidance pattern can be applied to both cognition and behavior characterized by high levels of effort to control oneself and the environment in order for them to be conducive to sleep.

As contact with the present moment lessens, human behaviors are guided more by their cognition that is perhaps improperly and verbally regulated by cognitive fusion and experiential avoidance. Furthermore, immediate and short-term goals (e.g., feeling good, being right) can override long-term desired qualities of life (i.e., values) due to excessive needs to preserve the conceptualized self. The conceptualized history, future, or self becomes more salient in regulating one’s behavior than the fundamental workability or ultimate outcomes. As a result, psychological inflexibility increases, reinforcing the maladaptive patterns of cognition and behaviors (Hayes et al., 2006). Borrowing the aforementioned example, once the relational
frame is developed between grief, pain, and the contextual cues, one’s life may start revolving around avoiding such aversive psychological presences, limiting oneself into restricted domains that prevents him or her from pursuing valued goals. Throughout struggles and suffering, psychological inflexibility can lead to losing contact with what is valued in life beyond the immediate gratification or relief from psychological pain (Hayes et al., 2006). For example, although one values a family-oriented life, one may eventually avoid talking with family members or friends at night or withdraw from any activities they would have enjoyed otherwise because of the strong relational frame built upon sleep.

**Six core processes of ACT.** Based on RFT and the perspectives of psychopathology, ACT aims to address the six primary components that lead to psychological inflexibility and suffering. ACT’s core processes are interrelated, supporting each process, and can be conceptualized in two groupings: *mindfulness and acceptance* processes and *commitment and behavior change* processes. Mindfulness and acceptance processes include acceptance, cognitive defusion, contact with the present moment, and self as context (Fletcher & Hayes, 2005). Commitment and behavior change processes include self as context, values, and committed action. The primary goal of ACT is to increase psychological flexibility by fostering contact with the present moment and guide behaviors according to long-term quality of life outcomes (Hayes et al., 2006).

**Acceptance.** Acceptance involves actively embracing private events without engaging in attempts to alter their frequency, form, or content (Hayes et al., 2006). For example, patients are guided to accept and embrace private events (e.g., anxiety, pain, stress) fully as those events arise without defense, while they are encouraged to let go of any struggles related to those events. In insomnia treatment, patients can be taught to take an accepting stance toward their pre-sleep
cognitions without experiencing the need to control or change the thoughts or emotions that arise at bedtime.

**Cognitive defusion.** Techniques involved in cognitive defusion attempt to tackle the undesirable functions of cognition and other private events rather than the form, frequency, or situational sensitivity of the events (Hayes et al., 2006). In other words, cognitive defusion focuses on creating contexts in which deleterious functions of thoughts become diminished by changing the way individuals interacts or relate to thoughts. The core unique aspect of cognitive defusion is that patients are taught to recognize a thought as a thought (e.g., “I am having a thought that I am a failure.”), while treating the thought as an externally observable event rather than being fused with the content of the thought (“I am a failure.”). In the case of insomnia treatment, patients can learn ways to recognize their sleep-interpreting processes (i.e., non-functional interpretation of sleep disturbance) and perceive such thoughts (e.g., I am going to feel miserable tomorrow) as simply thoughts.

**Being present (contact with present moment).** Along with the preceding foundations of ACT, it is crucial that individuals engage in continuous and non-judgmental contact with psychological and environmental events. The underlying purpose of this approach is that patients learn how to experience the world more directly while increasing flexibility in their cognition so that they can engage in behavior that will promote their long-term desired life qualities. Thus, patients with insomnia are encouraged to recognize their concerns about catastrophic consequences of insomnia (e.g., I will fail miserably tomorrow at my work), which interferes with living in their present moment.

**Self as context.** Based on the assumed role of language in human’s relational conceptualization according to RFT, both ACT and RFT view the sense of self as being emerged
from vast sets of perspective-taking relations in an accumulated history of private events. Hayes et al (2006) suggest, “… since this sense of self is a context for verbal knowing, not the content of that knowing, its limits cannot be consciously known. Self as context is important in part because from this standpoint, one can be aware of one’s own flow of experiences without attachment to them or an investment in which particular experiences occur.” (pp. 9). It is suggested that defusion and acceptance can be fostered when one perceives and experiences the self as context (Hayes et al., 2006). The self as context construct can be taught through mindfulness training and other experiential processes of ACT. Thus, patients with insomnia are encouraged to recognize their sleep-interfering and –interpreting processes without assigning any terms that carry valence (e.g., I am having a thought about sleep and there is nothing wrong or good about it because it is just one of many thoughts I have.)

**Values.** In ACT, values are understood as chosen qualities of purposeful action that are instantiated moment by moment rather than gained as objects (Hayes et al., 2006). Promoting values and acting in accordance with pursued values is strongly encouraged in ACT treatment as it provides a fundamental purpose to engage in change, whether it is a concrete behavior, thought, or feeling. ACT aims to guide patients in choosing life directions in various domains that are meaningful to them while subverting the power of verbal processes over avoidance, social compliance, or fusion. What makes this component unique is that it provides a life direction that one pursues while other ACT components (i.e., acceptance, defusion, and so on) are clearing the path to it. Thus, ACT intervention distinctively carries a continuous quality as it is understood as an ongoing process rather than an end in itself. Patients with insomnia can learn that their effort to improve their sleep disturbance is not merely purposeful in terms of symptom
reduction, but that it is meaningful in terms of enhancing their overall life satisfaction (e.g., having a family-oriented life).

**Committed action.** Lastly, ACT encourages the development of patterns of effective action that promote values (Hayes, Strosahl, & Wilson, 1999). As analogous to traditional behavior therapy or any methods to promote behavioral changes, ACT utilizes sets of behavioral techniques such as exposure, skills acquisition, shaping, goal setting (Hayes et al., 2006). Distinct from values that are never achieved as an object, concrete goals that are in service of chosen values can be achieved. Goal attainment is done through therapy work and homework, while the exerted efforts to change behavior lead to contact with psychological barriers that are addressed through other ACT components (Hayes et al., 2006). Patients with insomnia are encouraged to work on building concrete goals of action that are in line with the values they clarified (e.g., participating in more family events) as well as addressing potential barriers that they anticipate to be in the way of goal attainment (e.g., getting a gym membership with their spouse or children in order to cope with fatigue).
APPENDIX O

HSRB APPROVAL

DATE: December 2, 2014
TO: Kyoun Baik, M.S.
FROM: Bowling Green State University Human Subjects Review Board
PROJECT TITLE: [533255-7] Evaluating Acceptance and Commitment Therapy for Insomnia: A randomized controlled trial
SUBMISSION TYPE: Continuing Review/Progress Report
ACTION: APPROVED
APPROVAL DATE: December 2, 2014
EXPIRATION DATE: December 1, 2015
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review category #7

Thank you for your submission of Continuing Review/Progress Report materials for this project. The Bowling Green State University Human Subjects Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

The final approved version of the consent document(s) is available as a published Board Document in the Review Details page. You must use the approved version of the consent document when obtaining consent from participants. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that you are responsible to conduct the study as approved by the HSRB. If you seek to make any changes in your project activities or procedures, those modifications must be approved by this committee prior to initiation. Please use the modification request form for this procedure.

You have been approved to enroll 60 participants. If you wish to enroll additional participants you must seek approval from the HSRB.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. All NON-COMPLIANCE issues or COMPLAINTS regarding this project must also be reported promptly to this office.

This approval expires on December 1, 2015. You will receive a continuing review notice before your project expires. If you wish to continue your work after the expiration date, your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date.

Good luck with your work. If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or hsrb@bgsu.edu. Please include your project title and reference number in all correspondence regarding this project.
This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board’s records.
Table 1

**Descriptive Statistics for Participant Demographic Variables and Insomnia Criteria***

<table>
<thead>
<tr>
<th></th>
<th>Control ( (n = 11) )</th>
<th>Treatment ( (n = 14) )</th>
<th>( t(23) ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>25.27</td>
<td>26.64</td>
<td>(.27, p &gt; .05)</td>
</tr>
<tr>
<td>SD</td>
<td>9.92</td>
<td>14.05</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>n = 6 (54.5%)</td>
<td>n = 10 (71.4%)</td>
<td>( \chi^2 (1, N = 25) = .76, p &gt; .05)</td>
</tr>
<tr>
<td>Male</td>
<td>n = 5 (45.5%)</td>
<td>n = 4 (28.6%)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>n = 8 (72.7%)</td>
<td>n = 13 (92.9%)</td>
<td>( \chi^2 (2, N = 25) = 2.20, p &gt; .05)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>n = 2 (18.2%)</td>
<td>n = 1 (7.1%)</td>
<td></td>
</tr>
<tr>
<td>Multiracial</td>
<td>n = 1 (9.1%)</td>
<td>n = 0</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>n = 6 (54.5%)</td>
<td>n = 9 (64.3%)</td>
<td>( \chi^2 (3, N = 25) = 1.46, p &gt; .05)</td>
</tr>
<tr>
<td>Graduate</td>
<td>n = 2 (18.2%)</td>
<td>n = 2 (14.3%)</td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>n = 2 (18.2%)</td>
<td>n = 3 (21.4%)</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>n = 1 (9.1%)</td>
<td>n = 0</td>
<td></td>
</tr>
<tr>
<td><strong>Geographic Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NW Ohio</td>
<td>n = 10 (90.9%)</td>
<td>n = 14 (100%)</td>
<td>( \chi^2 (1, N = 25) = 1.33, p &gt; .05)</td>
</tr>
<tr>
<td>Other</td>
<td>n = 1 (9.1%)</td>
<td>n = 0</td>
<td></td>
</tr>
<tr>
<td><strong>Sleep Symptom</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty falling asleep</td>
<td>M = 4.63</td>
<td>M = 4.71</td>
<td>( .41, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = .52</td>
<td>SD = .47</td>
<td></td>
</tr>
<tr>
<td>Difficulty staying asleep</td>
<td>M = 3.38</td>
<td>M = 3.57</td>
<td>( .29, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 1.51</td>
<td>SD = 1.55</td>
<td></td>
</tr>
<tr>
<td>Feeling that sleep is unrefreshing</td>
<td>M = 3.88</td>
<td>M = 4.0</td>
<td>( .23, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 1.46</td>
<td>SD = 1.11</td>
<td></td>
</tr>
<tr>
<td><strong>Duration (weeks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty falling asleep</td>
<td>M = 527.75</td>
<td>M = 260.86</td>
<td>( 1.44, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 714.34</td>
<td>SD = 366.33</td>
<td></td>
</tr>
<tr>
<td>Difficulty staying asleep</td>
<td>M = 616.83</td>
<td>M = 248.92</td>
<td>( 1.38, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 805.84</td>
<td>SD = 378.45</td>
<td></td>
</tr>
<tr>
<td>Feeling that sleep is unrefreshing</td>
<td>M = 590.83</td>
<td>M = 260.86</td>
<td>( 1.27, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 823.98</td>
<td>SD = 366.33</td>
<td></td>
</tr>
<tr>
<td>Daytime Impairment</td>
<td>M = 20.25</td>
<td>M = 22.07</td>
<td>( .64, p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>SD = 7.31</td>
<td>SD = 5.98</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Sleep symptom items are rated on a six-point scale that ranges as follows: 0 (“Never”), 1 (“Do not know”), 2 (“Rarely less than once per week”), 3 (“Sometimes; 1-2 times per week”), 4 (“Frequently; 3-4 times per week”), 5 (“Always; 5-7 times per week). Duration items are reported as number of weeks, months, or years; all the time units were converted into weeks for the analyses. Daytime Impairment items are rated on a five-point Likert scale that ranges from 0 (“Never”) to 4 (“Extremely”).

*: insomnia criteria data is derived from ISQ \( (n = 22) \) among only participants who completed.
### Table 2

#### Treatment Elements in Each Session

<table>
<thead>
<tr>
<th>Session</th>
<th>Themes/Goals</th>
<th>Intervention Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-treatment Assessment (Baseline)</td>
<td>Introduction, Baseline Assessment, Instruction</td>
<td>Introduce the intervention plan, discuss limits to confidentiality, assess baseline measures, provide instructions on sleep-diary</td>
</tr>
<tr>
<td>Session 1</td>
<td>Assessment and Creative Hopelessness</td>
<td>Review sleep diary, orientation to treatment, “Sludge in glass metaphor”, establish commitment to the treatment, build alliance, introduce <em>creative hopelessness</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Tug-of-War with a Monster” metaphor, “Polygraph” metaphor, “Falling in love” metaphor, assess outcome measures,</td>
</tr>
<tr>
<td></td>
<td>Control is the problem ...</td>
<td>“Passengers on the bus” metaphor, willingness and acceptance practice, mindfulness practice</td>
</tr>
<tr>
<td></td>
<td>acceptance is the solution</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Values and Committed Action</em></td>
<td>introduce values, focus on committed actions (“Bum at the door” and “Moving through a swamp”), meditation focused on values and committed action (ACT variations of Metta or Tonglen meditation practices)</td>
</tr>
<tr>
<td>Termination</td>
<td>Termination of the intervention &amp; Post-treatment assessment</td>
<td>Collect the sleep diary data, process the intervention, evaluate the intervention</td>
</tr>
</tbody>
</table>
Table 3

*Treatment Satisfaction: Helpfulness, Satisfaction, Easiness of Contents, Easiness of Daily Mindfulness Exercise*

<table>
<thead>
<tr>
<th>Question</th>
<th>Responses (N = 21)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>“How much did treatment help with the specific problem that led you to therapy?”a</td>
<td>“made things a lot better” (n = 3, 14.3%)</td>
<td>2.0</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>“made things somewhat better” (n = 15, 71.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“made no difference” (n = 3, 14.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Overall, how satisfied were you with this therapist’s treatment of your problem?”b</td>
<td>“Completely Satisfied” (n = 5, 23.8%)</td>
<td>2.33</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>“Very Satisfied” (n = 6, 28.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Fairly Well Satisfied” (n = 8, 38.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Somewhat Satisfied” (n = 2, 9.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Overall, how easy were the treatment contents to understand?”c</td>
<td>“Extremely Easy” (n = 9, 42.9%)</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>“Very Easy” (n = 4, 19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Fairly Easy” (n = 7, 33.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Somewhat Easy” (n = 1, 4.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“How easy was for you to practice the mindfulness exercise(s) daily?”d</td>
<td>“Extremely Easy” (n = 3, 14.3%)</td>
<td>2.95</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>“Very Easy” (n = 5, 23.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Fairly Easy” (n = 5, 23.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Somewhat Easy” (n = 6, 28.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Very Difficult” (n = 2, 9.5%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. responses that were not endorsed by anyone are not included in the table due to space limit.

See below for the response options.

a. the numeric code for responses: “1 = made things a lot better”, “2 = made things somewhat better”, “3 = made no difference”, “4 = somewhat worse”, “5 = a lot worse”, “6 = not sure”
b. the numeric code for responses: “1 = Completely Satisfied”, “2 = Very Satisfied”, “3 = Fairly Well Satisfied”, “4 = Somewhat Satisfied”, “5 = Very Dissatisfied”, “6 = Completely Dissatisfied”
c. the numeric code for responses: “1 = Extremely Easy”, “2 = Very Easy”, “3 = Fairly Easy”, “4 = Somewhat Easy”, “5 = Very Difficult”, “6 = Extremely Difficult”
d. the numeric code for responses: “1 = Extremely Easy”, “2 = Very Easy”, “3 = Fairly Easy”, “4 = Somewhat Easy”, “5 = Very Difficult”, “6 = Extremely Difficult”
### Table 4

*Treatment Satisfaction Survey: Most Helpful vs. Most Unhelpful Treatment Elements*

<table>
<thead>
<tr>
<th></th>
<th>Most Helpful</th>
<th>Most Unhelpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Man in a hole” metaphor</td>
<td>n = 0</td>
<td>n = 0</td>
</tr>
<tr>
<td>“Tug-of-War with a Monster” metaphor</td>
<td>n = 10</td>
<td>n = 1</td>
</tr>
<tr>
<td>Breathing exercise with counting</td>
<td>n = 15</td>
<td>n = 1</td>
</tr>
<tr>
<td>“Polygraph” metaphor</td>
<td>n = 1</td>
<td>n = 1</td>
</tr>
<tr>
<td>“Passengers on the bus” metaphor</td>
<td>n = 11</td>
<td>n = 2</td>
</tr>
<tr>
<td>Clean vs. Dirty discomfort</td>
<td>n = 2</td>
<td>n = 7</td>
</tr>
<tr>
<td>“Two scales” metaphor</td>
<td>n = 0</td>
<td>n = 2</td>
</tr>
<tr>
<td>“What are the numbers?” metaphor</td>
<td>n = 4</td>
<td>n = 0</td>
</tr>
<tr>
<td>“Chessboard” metaphor</td>
<td>n = 6</td>
<td>n = 2</td>
</tr>
<tr>
<td>“Milk, milk, milk” exercise</td>
<td>n = 1</td>
<td>n = 3</td>
</tr>
<tr>
<td>“Leaves on a stream” meditation</td>
<td>n = 15</td>
<td>n = 2</td>
</tr>
<tr>
<td>“Bum at the door” metaphor</td>
<td>n = 3</td>
<td>n = 5</td>
</tr>
<tr>
<td>“Moving through a swamp”</td>
<td>n = 2</td>
<td>n = 1</td>
</tr>
<tr>
<td>Tonglen meditation</td>
<td>n = 2</td>
<td>n = 0</td>
</tr>
</tbody>
</table>

*a: A total of 21 participants responded to the questions of “Which treatment contents did you find to be most helpful and unhelpful (separately)?”. They were able to choose more than one option, which yielded a total of 99 responses.*
Figure 1. An integrative model of the interaction between sleep-interfering and sleep-interpreting processes. Adapted from “Insomnia as an interaction between sleep-interfering and sleep-interpreting processes,” by L. G. Lundh and J. E. Broman, 2000, Journal of Psychosomatic Research, 49, p. 308.
Figure 2. Hierarchical flow chart of the study process and participants’ attrition.
Figure 3. Pre-treatment and post-treatment means of ISI scores by condition (entire sample). The descriptive/interpretative terms for clusters of scores as follows: 0-7, not clinically significant insomnia; 8-14, subthreshold insomnia; 15-21, clinical insomnia/moderate severity; 22-28, clinical insomnia/severe.
Figure 4. Pre-treatment and post-treatment means of PSAS scores by condition (entire sample). Each item is rated on a five-point Likert scale that ranges from 1 (“Not at all”) to 5 (“Extremely”); possible total scores range between 16 and 80.
Figure 5. Pre-treatment and post-treatment means of AAQ-II scores by condition (entire sample). Each item is rated on a seven-point Likert scale that ranges from 1 ("Never true") to 7 ("Always true"); possible total scores range from 7 to 49.
Figure 6. Pre-treatment and post-treatment means of TCQI-R scores by condition (entire sample). Each item is rated on a four-point Likert scale that ranges from 1 ("almost never") to 4 ("almost always"); possible total score for TCQI-R range from 35 to 140.
Figure 7. Pre-treatment and post-treatment means of EQ scores by condition (entire sample). Each item is rated on a five-point Likert scale that ranges from 1 (“never”) to 5 (“all the time”); possible total scores for decentering range between 11 and 55.
Figure 8. Weekly means of Time in Bed (TIB) in minutes by condition (entire sample).
Figure 9. Weekly means of Sleep Onset Latency (SOL) in minutes by condition (entire sample).
Figure 10. Weekly means of Total Wake Time (TWT) in minutes by condition (entire sample).
Figure 11. Weekly means of Total Sleep Time (TST) in minutes by condition (entire sample).
Figure 12. Weekly means of Wake After Sleep Onset (WASO) in frequency (a total number of times of waking after falling asleep per night) by condition (entire sample).
Figure 13. Weekly means of Sleep Efficiency (SE) in percentage by condition (entire sample).
Figure 14. Weekly means of Sleep Quality (SQ; participants’ subjective rating of the night’s sleep) on a scale that ranged from 1 (very bad) to 10 (very good) by condition (entire sample).
Figure 15. Weekly means of Mood on Final Awakening (MOOD) on a scale that ranged from 1 (very bad) to 10 (very good) by condition (entire sample).
Figure 16. Weekly means of Alertness on final awakening (ALERT) on a scale that ranged from 1 (very bad) to 10 (very good) by condition (entire sample).
Figure 17. Pre-treatment and post-treatment means of PSAS scores by condition (PI’s sample). Each item is rated on a five-point Likert scale that ranges from 1 (“Not at all”) to 5 (“Extremely”); possible total scores range between 16 and 80.
Figure 18. Weekly means of Time in Bed (TIB) in minutes by condition (the principal investigator (PI)’s sample).