Integrating nature into acceptance and commitment therapy for anxiety and comorbid medical diagnosis: Two case studies

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Abstract
The effectiveness of integrating nature-based interventions into acceptance and commitment therapy (ACT) for individuals with anxiety and comorbid medical diagnosis was examined. Participants experienced a 5-minute nature-based exercise before every session and were asked to spend at least 15 minutes in nature every day between sessions. These nature-based interventions were integrated with an adapted eight-week protocol for ACT. Relying on a quasi-experimental single subject design involving two participants from the Pacific Northwest, this study found clinically significant changes in anxiety, mindfulness, and experiential avoidance for participant one but clinically non-significant change in these areas for participant two. Although change in general health was found to not be clinically significant at post-treatment for both participants, it was at 3-month follow-up for participant one. Common journal themes for the two participants included an increased sense of calmness and increased present moment awareness with insight. Limitations included absence of a control group, an untested protocol, restricted generalizability, and the use of self-report measures. This was the first study to use a combination of nature-based intervention and ACT to treat this population. The potential effectiveness of using nature-based interventions was supported. Future research is needed to test whether a true difference exists between treatment using ACT with a nature-based component and ACT alone through randomly-controlled study. Also, future research should compare the effects of this treatment with PTSD versus GAD, as well as its impact on individuals with and without a comorbid medical diagnosis. Other research could explore ways to maximize the effectiveness of nature-based interventions and help individuals overcome barriers to spending time in nature. Further research could investigate more extensive long-term effects.

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INTEGRATING NATURE INTO ACCEPTANCE AND COMMITMENT THERAPY FOR
ANXIETY AND COMORBID MEDICAL DIAGNOSIS: TWO CASE STUDIES

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BY
KEITH M. INGULLI

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OF
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Abstract

The effectiveness of integrating nature-based interventions into acceptance and commitment therapy (ACT) for individuals with anxiety and comorbid medical diagnosis was examined. Participants experienced a 5-minute nature-based exercise before every session and were asked to spend at least 15 minutes in nature every day between sessions. These nature-based interventions were integrated with an adapted eight-week protocol for ACT. Relying on a quasi-experimental single subject design involving two participants from the Pacific Northwest, this study found clinically significant changes in anxiety, mindfulness, and experiential avoidance for participant one but clinically non-significant change in these areas for participant two. Although change in general health was found to not be clinically significant at post-treatment for both participants, it was at 3-month follow-up for participant one. Common journal themes for the two participants included an increased sense of calmness and increased present moment awareness with insight. Limitations included absence of a control group, an untested protocol, restricted generalizability, and the use of self-report measures. This was the first study to use a combination of nature-based intervention and ACT to treat this population. The potential effectiveness of using nature-based interventions was supported. Future research is needed to test whether a true difference exists between treatment using ACT with a nature-based component and ACT alone through randomly-controlled study. Also, future research should compare the effects of this treatment with PTSD versus GAD, as well as its impact on individuals with and without a comorbid medical diagnosis. Other research could explore ways to maximize the effectiveness of nature-based interventions and help individuals overcome barriers to spending time in nature. Further research could investigate more extensive long-term effects.
Keywords: generalized anxiety disorder (GAD), posttraumatic stress disorder (PTSD), comorbid medical diagnosis, acceptance and commitment therapy (ACT), nature-based intervention, nature-based stress reduction, attention restoration theory, restorative environment, single case quasi-experimental design
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Introduction

Generalized Anxiety Disorder (GAD) is classified in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV-TR; American Psychological Association [APA], 2000) as an experience of “excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance)” (p. 476). Individuals find it difficult to control worry, experience distress or impairment in salient areas of functioning, and experience at least three of the following six symptoms: restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, and sleep disturbance (APA, 2000). The lifetime prevalence rate of GAD in the community is approximately 5% (APA, 2000). Significant differences in both age and race exist between the presentation and treatment of GAD (Brenes, Knuudson, McCall, Williamson, Miller, & Stanley, 2008). For instance, older adults report fewer symptoms than younger adults with GAD (Brenes et al., 2008). African Americans are less likely to report receiving medications or seeing a mental health therapist than Caucasian individuals (Brenes et al., 2008).

Research has shown that having GAD is not only associated with mental health, but physical health as well (Belik, Sareen, & Stein, 2009; Bowen, Senthilselvan, & Barale, 2000; Demyttenaere, Bonnewyn, Bruffaerts, De Graaf, Haro, & Alonso, 2008; Harter, Conway, & Merikangas, 2003). In fact, individuals with GAD often experience a variety of comorbid medical conditions (Belik et al., 2009). For instance, 24-27% of individuals with Traumatic Brain Injury (TBI) have been found to be diagnosed with GAD (Soo, Tate, & Lane-Brow, 2011; Van Reekum, Bolago, Finlayson, Garner, Links, 1996). GAD has also been found to be associated with peptic ulcer disease (Goodwin & Stein, 2002), chronic pain (McWilliams, Goodwin, & Cox, 2004), irritable bowel syndrome (Drossman et al., 1988), restless legs
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syndrome (Kahn-Greene, Killgore, Kamimori, Balkin, & Killgore, 2007), multiple sclerosis (Chalfant, Bryant, & Fulcher, 2004), diabetes (Grigsby, Anderson, Freedland, Clouse, & Lustman, 2002) stroke (Leppavuori, Pohjasvaara, Vataja, Kaste, & Erkinjuntti., 2003) and unexplained dizziness (Yardley, Luxon, & Haacke, 1994).

The combination of an anxiety disorder and physical illness is worthy of attention because it has been associated with a broad variety of negative outcomes in the literature above and beyond when each condition is considered alone (Belik et al., 2009). These include non-suicide related death (Kawachi et al., 1994) disability (Belik et al., 2009; Sareen et al., 2006) and poor quality of life (Sareen et al., 2006). Thus, choosing the most effective treatment for GAD can not only enhance the mental health and physical health of an individual, but also affect multiple life outcomes.

The purpose of this study was to determine the effectiveness of integrating nature-based interventions into acceptance and commitment therapy for two participants with both anxiety and a comorbid medical diagnosis using a quasi-experimental single subject design.

**Treatment of Generalized Anxiety Disorder**

**Cognitive-behavioral interventions.** Although a variety of psychological treatments exist for GAD, some of the best supported are cognitive-behavioral therapies (CBT; Borkovec & Ruscio, 2001). From a CBT conceptualization, GAD is maintained by inaccurate predictions that catastrophic events will occur (Borkovec & Ruscio, 2001) and the inability to appropriately use relaxation coping (Borkovec & Costello, 1993). CBT involves helping clients to notice both internal and external anxiety cues so that they can learn to use new coping skills to help deal with both the psychological and somatic symptoms of the disorder (Borkovec & Ruscio, 2001).
CBT can include a variety of components in the treatment of GAD. These include: psychoeducation, self-monitoring, stimulus control, relaxation training, worry exposure, cognitive therapy, imagery rehearsal of coping skills, and problem-solving skills (Borkovec & Ruscio, 2001; Hoyer et al., 2011). Psychoeducation involves providing information about GAD and its treatment. Self-monitoring is a way to help clients to become aware and keeping track of thoughts, feelings, and bodily sensations that they experience during times when they experience anxiety. As clients continue to self-monitor outside of sessions, they can better notice their experience of anxiety in order to apply new coping methods (Borkovec & Ruscio, 2001). Stimulus control involves helping clients to limit the conditions under which worrying occurs (Hoyer et al., 2011). Because individuals with GAD often experience muscle tension, relaxation training such as progressive muscle relaxation and relaxing imagery is also used. After practicing relaxation techniques in session, clients are taught to use these techniques outside of session such as following stressful events or when they are experiencing anxiety (Borkovec & Ruscio, 2001). Worry exposure involves helping the client to habituate to the feared hypothetical or potential feared stimulus that causes worry thus changing the meaning (Hoyer et al., 2011). Cognitive therapy is used to help individuals with GAD notice negative and inaccurate thoughts, look at the evidence, think of more accurate alternative thoughts, and use these new thoughts when experiencing worry or anxiety. Rehearsing coping skills in session through imagery rehearsal is also used in CBT (Borkovec & Ruscio, 2001). Problem-solving skills are often used to aid clients with GAD through following a series of steps for solving current or actual problems (Hoyer et al., 2011).

**Effectiveness of CBT.** Research has shown the CBT interventions are effective in mitigating symptoms for GAD. In fact, two meta-analyses have already been conducted that
demonstrated its positive effects for this population. For instance, in a meta-analysis of 13 experimental studies for GAD, Borkovec and Ruscio (2001) concluded that CBT was found to produce more immediate and long-term results for both depression and anxiety for individuals with GAD than either no-treatment or nonspecific control groups and greater effects to either cognitive or behavior therapy alone. It is important to note that all 13 studies defined CBT differently, delivered the therapy through disparate methods, and measured progress with different measures. This may have introduced unwanted heterogeneity to the results. Although these weaknesses exist, the differing methods may also represent a strength; CBT yielded larger effect sizes than other types of therapy in all studies regardless of the method. The results are thus believed to be valid.

In a more recent meta-analysis, Covin, Ouimet, Seeds, and Dozois (2008) reviewed 10 studies that used CBT to treat GAD. Search criteria included the use of both cognitive and behavior therapy, published in a peer-reviewed journal, and the use of scores from the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) to measure outcome. Findings showed that using CBT for GAD can be greatly effective for reducing pathological worry with an average of a large effect size. Effects were maintained at both a 6- and 12-month follow-up. The authors used a Fail Safe N to demonstrate that 18 studies with a null effect would be needed to lower the results of this meta-analysis to insignificance. Although younger adults showed the greatest gains, older adults still made significant gains between pre- and post-treatment and follow-up. Using only one measure (e.g., PSWQ) is a strength of this meta-analysis as results were measured consistently across studies. However, the strict inclusion criterion likely eliminated many studies which may have led to different findings and may thus not be representative of GAD studies in aggregate.
Other research has demonstrated the effectiveness of CBT for “real-world” environments, although with smaller effect. Kehle (2008) sought to find whether CBT is effective for GAD in a frontline service setting. Twenty-nine participants with problematic worry were treated with manualized CBT for eight sessions. Change in anxiety was measured using the PSWQ. Results of those who completed treatment were compared to those who did not. Results showed significant change in worry from pre- to post-treatment for those who completed treatment while those who did not complete treatment showed no significant change. Medium to large effects sizes were found for those who completed treatment. Because these effect sizes are smaller than those found in randomly-controlled studies, the author concluded that although effective, CBT does not produce the “full effects” when used in a frontline setting (p. 197). Because the treatment was manualized, this study could be easily replicated, and thus represents a strength. However, it is important to note that participants in this study did not need to meet criterion for GAD, only debilitating worry. Also, there were only a small number of participants in this study ($n = 29$). Thus, generalizing the result of the study to the GAD population as a whole is likely unfounded.

Research has also demonstrated the utility of CBT in a primary care environment. For instance, Stanley et al. (2009) conducted a randomized clinical control trial of 134 older adults in a primary care environment. Participants were designated to either a CBT group or an enhanced usual care (EUC) group for three months. The EUC group consisted solely of bi-weekly supportive phone calls. Measures of anxiety or worry included the PSWQ, Generalized Anxiety Disorder Severity Scale (GADSS; Shear, Belnap, Mazumdar, Houck, & Rollman, 2006), Structured Interview Guide for the Hamilton Anxiety Scale (SIGH-A; Shear et al., 2001), and the Beck Anxiety Inventory (BAI; Beck, Brown, Epstein, & Steer, 1988). Results showed that
individuals in the CBT group compared with the EUC group significantly improved worry severity in a primary care environment for older adults. It is important to note that participants in the EUC group engaged in substantially less sessions ($M = 4.3$) as compared to the CBT group ($M = 7.4$). This represents a weakness to the study as this difference may have compromised the results. Also, as noted in the article, the sample of older adults was not representative of older adults in primary care regarding sex, education, or age (Stanley et al., 2009). Although these weaknesses exists, analysis at 6, 9, 12, and 15 months allowed the investigators to conclude that the treatment effects were maintained for the long-term, and thus represents a significant strength of this study.

Some research has shown that CBT is significantly more effective for GAD when compared to specific cognitive or behavioral components while others has not. For instance, Butler, Fennell, Robson, and Gelder (1991) sought to compare CBT to Behavioral Therapy (BT), a subset of CBT, and a wait list control group. Fifty-seven participants were randomly allocated to each group. Results showed that a more consistent positive change in symptoms of anxiety, depression, and cognition was found in CBT over both BT and the wait list control group. Also, attrition occurred with the BT group and not with the CBT group. Unlike a majority of other studies researching the treatment of GAD, this study used 6 measures to assess cognition in order to determine the salience of this variable in anxiety management thus representing a strength of this study. A weakness of the study is that only 8 of 57 patients in this study were men. Thus, these findings can only validly be generalized to females. Also, only half of the measures of anxiety demonstrated a significant difference between CBT and BT. The finding that CBT is superior to BT for GAD may be unfounded.
In a study of 55 individuals by Borkovec and Costello (1993), CBT was compared to a behavioral intervention alone called applied relaxation (AR) as well as nondirective therapy (ND) in the treatment of GAD. Using multiple measures of both anxiety and depression, scores of clients who received either AR or CBT were found to be significantly (statistically and clinically) different from those receiving ND. At 12 months, CBT had a higher degree of significant change than either group. However, this finding may be misleading as many participants received further treatment between the post-treatment assessment and the follow-up. While this weakness exists, a strength of this study is that it not only included various measures to measure statistically significant change, but clinical significant change as well, thus highlighting the return to normal functioning.

Dugas et al. (2010) also conducted a study to compare CBT to applied relaxation when treating GAD. Sixty five adults were randomly delegated to either a CBT group, applied relaxation (AR), or a wait-list. Self-report measures were used to rate GAD symptoms at pre-test, post-test, 6, 12, and 24-months following sessions. CBT was found to have similar effectiveness in comparison to AR. Both were found to be superior to the waitlist group. CBT was found to be superior when measured over time as it was the only treatment that led to continuous improvement. While this finding is notable, it is important to emphasize that one therapist with unknown competency conducted treatment with 61 of the 65 participants. It is difficult to draw clarity as to whether aspects of the therapist or treatment led to the various differences.

Borkovec, Newman, Pincus, and Lytle (2002) sought to compare cognitive therapy, applied relaxation and self-control desensitization, and a combination of these methods (CBT) when treating GAD. Sixty-nine individuals were assigned to either group. While no significant
differences were found between types of treatment, all methods reported significant with-in 
group improvement on all measures and these gains were maintained at 2-year follow-up. 
Interpersonal difficulties were found to be negatively associated with post-treatment 
 improvement. The authors hypothesized that adding interpersonal treatment to CBT may 
increase therapeutic effectiveness. The study’s extensive long-term assessment (2 years) which 
found continued significant change is a strength of this study and provides strong evidence for 
the long-term effects of these interventions. As the study used four anxiety-related measures and 
they all indicated significant change, the findings are well-supported.

**Comparing CBT components.** Some research has compared specific components of CBT 
to other components of the therapy in order to decipher which aspect of the therapy is more 
integral. Hoyer et al. (2009) compared Worry Exposure (WE) to Applied Relaxation (AR), two 
components of CBT. Seventy-three individuals were randomly assigned to either a WE or an 
AR group. Hamilton Anxiety Scale (HAM-A; Hamilton, 1959), State-Trait Anxiety Scale-
German Version (STAI; Laux, Glanzmann, Schaffner, Spielberger, 1981), and self-report scales 
of anxiety, worrying, depression were used at pre-treatment, 6 months, and 1-year follow-up. 
Although no significant differences were found between the two treatments, results showed that 
effects were high for both treatments and stable for both 6 months and 1 year. Both AR and WE 
as a stand-alone treatment can be effective routes to treating GAD. While strengths of this study 
include using three well-validated measures of anxiety and systematically tracking treatment 
adherence, the study did not include demographic information related to race or culture thus 
limiting its clarity with generalizability.

Provencher, Dugas, and Ladouceur (2004) compared the CBT components of problem-
solving training versus cognitive exposure in the treatment of GAD. Eighteen French-speaking
Caucasian individuals with a diagnosis of GAD received 12 sessions of either problem-solving training or cognitive exposure treatment depending on their individual worries. Measures included the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; Di Nardo, Brown, & Barlow, 1994), the Structured Interview on Worry, Beliefs About Worry, and Catastrophizing (SIWBC; Laberge, Dugas, & Ladouceur, 2000), the PSWQ, the Worry and Anxiety Questionnaire (WAQ; Dugas, Freeston, Provencher, Lachance, Ladouceur, & Gossling, 2001), the BAI, Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979), and the Self-Monitoring Notebook (SMN; Dugas & Ladouceux, 2000). On all measures, statistically significant results were found for both treatments. In particular, clinically significant reductions in time spent worrying and level of depressive symptoms were found. Treatment gains were maintained at 6 months. The authors concluded that both problem-solving training and exposure pieces of CBT were found to be active components in the treatment of GAD. A weakness of this current study was the small number of participants ($n = 18$). However, the researchers did include a method for ensuring treatment integrity and administered multiple anxiety scales to validate findings. Although a small sample, the study appeared internally valid.

*Integration of CBT and other elements.* Although the studies presented below have substantial weaknesses, they do provide evidence that integrating components of other treatments into CBT increases its effectiveness. In a study by Newman, Castonguay, Borkovec, Fisher, and Nordberg (2008), the feasibility of integrating CBT with interpersonal emotional processing therapy was investigated. This integration includes elements of CBT as well as current relationships, origins of current interpersonal problems, the therapeutic relationship, and avoidance of emotion. Results showed that integrative therapy significantly lowered symptoms of GAD with improvements lasting 1 year post-treatment. The effect size was higher than the
average effect size cited in the literature for CBT alone with GAD. The authors found that an integration of CBT and interpersonal emotional processing therapy could be conducted in a competent, non-problematic, non-confusing, and thus complementary fashion. Although this study had few participants (\(n = 21\)), many strengths were present. Participants were randomized to the therapist and both statistically and clinically significant change supported the results. These results are likely valid.

In another preliminary study conducted by Fava et al. (2005), the effectiveness of Well-being Therapy (WBT), which is CBT with a component that focuses on enhancing well-being and restoring normal functioning, was tested. In the study, CBT was compared to CBT plus WBT. WBT was found to create significant more change over CBT in regard to symptom reduction and well-being enhancement. These improvements were maintained at a 1-year follow-up. The authors concluded that adding a WBT component to CBT has clinical benefits and is practical. Although this finding is salient, the small sample size (\(n = 16\)) and the fact that treatment was provided by only one experienced psychotherapist represent significant weaknesses of this study. The result may have been different given a larger sample size and range of practitioners. The results should be interpreted cautiously.

Finally, adding pre-treatment Motivational Interviewing (MI) to CBT, an approach designed to decrease ambivalence about change and increase motivation, has been studied by Westra, Arkowitz, and Dozois (2009). This recent randomized preliminary study compared MI followed by CBT with the efficacy of CBT alone. Results showed that adding the MI component led to significantly enhanced reductions in worry. While this finding is salient, it is important to note that no differences were found between the two groups on measures of anxiety, beliefs about worry, depression, disability, and clinician-rated severity. It is unclear whether
adding a MI component at pre-treatment to CBT is an effective way to improve the treatment of GAD as a whole. While this study was randomly-controlled, included a diverse range of participants, and included a generous long-term follow-up, some weaknesses existed. The group with MI experienced four extra sessions as compared to the CBT group alone, likely influencing the results of the study. Because many participants were refused participation in the study due to long travel requirements, generalizability is limited.

**Limitations.** Although CBT has been found to be effective in randomly controlled trials, some research has shown that only 50% of individuals who complete treatment achieve high-end functioning after receiving CBT (Hunot, Churchill, Silva de Lima, & Teixeira, 2007). Research by Kehle (2008) supports this notion that CBT may not be as effective in front-line settings as compared to randomly controlled studies. According to Antony (2011), “despite the fact that evidence-based interventions exist for all of the anxiety disorders, many individuals obtain only partial relief from these treatments, and some do not benefit at all” (p. 5). These limitations have led to an emphasis on other methods for treatment.

**Mindfulness-based interventions.** Mindfulness-based interventions have also been found to be effective in treating individuals with GAD. According to Kabat-Zinn (2003), mindfulness involves “paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 145). Mindfulness was originally derived from Buddhist spiritual practice, and developed as a path leading to the end of personal suffering (Thera, 1962). However, in modern day psychology, it has been embraced as a way to increase awareness and respond proficiently to mental processes that contribute to distress and pathological behavior (Bishop et al., 2004).
According to Roemer and Orsillo (2002), GAD is “characterized by a chronic focus on potential events in the future, and GAD worry seems to serve an experientially avoidant function” (p. 61). It is believed that worry associated with anxiety functions to lessen internal distress, especially surrounding uncertainty (Roemer & Orsillo, 2002). Worry is also understood to be primarily verbal-linguistic (Borkovec & Inz, 1990) allowing individuals to rehearse possibilities without experiencing the full impact of the hypothetical catastrophes (Roemer & Orsillo, 2002). As a result, individuals experiencing anxiety at this level are consistently focusing on and thus worrying about the perceived threat in future rather than focusing on the present moment. Roemer & Orsillo (2002) assert that “this causes threatening meanings to be maintained, and worry itself becomes an unwanted internal experience that prompts attempts at avoidance” (p. 63). In addition, this results in a disruption in the information feedback that an individual can obtain from their environment (Hayes, Strosahl, & Wilson, 1999). The verbal-linguistic nature of worry and its role in experiential avoidance suggests a need to emphasize experience rather than solely cognitive methods in the treatment of GAD (Hayes et al., 1999). Mindfulness-based approaches, with their focus on present-moment and mindful awareness, may help to treat individuals with this future-focused worry. Mindfulness teaches individuals to accept the present moment rather than engaging in avoidance patterns. According to Borkovec (1994), treatment that involves mindfulness may than reduce negative spirals of distress that result from the disorder. Borkovec (2002) states that, “It may be that simply living in the present moment and engaging in far less future-oriented thought of all types (except under strict stimulus control conditions and at times when planning and problem solving would be adaptive) would be sufficient for creating a happy, adaptive, and anxiety-free way of being” (p. 78).
Individuals with GAD often experience behavioral restrictions such as slow decision-making speed (Metzer, Miller, Cohen, Sofka, & Borkovec, 1990), poor problem solving and procrastination (Borkovec et al., 1999; Stober, 1998), and not pursuing desired activities (Roemer & Orsillo, 2002). According to Borkovec et al. (1999), the focus on desired or valued action, present in mindfulness and acceptance-based behavioral therapies, will likely lower insufficiencies in problem solving and decision-making and increase positive control over one’s behavior.

**Mindfulness-based stress reduction.** Mindfulness-based stress reduction (MBSR) is an 8-week 2 and 1/2 hour long program that serves a wide number of patients with both psychological and physiological issues. It was created and first used by Jon Kabat-Zinn at the University of Massachusetts Medical Center in 1979. According to Kabat-Zinn et al. (1992), MBSR is a “highly structured training program in mindfulness meditation” (p. 938).

Research on mindfulness-based stress reduction (MBSR) programs has shown some positive findings with GAD. For instance, Kabat-Zinn et al. (1992) engaged in a study to determine the effectiveness of group MBSR on individuals with GAD or panic disorder. Individuals who met criteria for either GAD or panic disorder with or without agoraphobia, were given the following measures via phone weekly and at monthly intervals for the 3 months following treatment: the BAI, the BDI, and ratings on severity and frequency of panic attacks. Also, the following group of assessments was completed at the recruitment, beginning of the program, end of the program, and at the 3-month follow-up: the HAM-A, the Hamilton Rating Scale for Depression (HAM-D; Williams, 1988), and the Mobility Inventory for Agoraphobia (Chambless, Caputo, Jasin, Gracely, & Williams, 1985). Individuals were asked to complete an expectancy 5-point scale at recruitment and a compliance questionnaire at the end of treatment.
Twenty out of 22 participants were found to have significantly reduced symptoms. These changes were maintained at the 3-month follow-up. The authors concluded that mindfulness meditation training can not only lessen symptoms of anxiety and panic, but help maintain these improvements. While this study had substantial weaknesses such as a small sample size ($n = 22$), relatively short follow-up period, and no control group, it did have various strengths. For instance, a meticulous diagnosis assessment was used to determine study appropriateness. Also, both self-report and trained clinician ratings were used to limit subjective bias.

Lee et al. (2007) found further support for MBSR in a study in which they looked at a meditation-based stress management program for patients with either GAD or panic disorder. Forty-six patients, with either GAD or panic disorder with or without agoraphobia, were randomly assigned to either the meditation program or an education program. Changes at 0, 2, 4, and 8 weeks were measured with the BAI, BDI, State-Trait Anxiety Inventory (STAI; Speilberger, Gorsuch, & Lushene, 1970), Symptom Checklist-90—Revised (SCL-90-R; Derogatis, 1992), HAM-D, and HAM-A. Results showed significant reductions in anxiety symptoms in those undergoing the meditation-based stress management group in comparison to the education group. While this study had many strengths including using various measures of anxiety, many weaknesses existed. For instance, no long-term follow-up was used and the results may have been influenced by the medication that all participants were taking. In addition, the control group was an education group, a didactic experience with unknown influence.

In another study, Vollestad, Sivertsen, and Nielsen (2011) studied the effects of MBSR on multiple anxiety disorders. Seventy-six participants were randomly delegated to either an MBSR group or a control group. Measures related to anxiety that were given included the BAI, PSWQ, and the STAI. Results showed that the MBSR group significantly improved on all outcome
measures related to anxiety. Medium to large effect sizes were found on all measures of anxiety and remained unchanged at six months. Through mediation analysis, the authors found that mindfulness fully mediated changes in symptoms of acute anxiety while only partially mediated any changes in trait anxiety and worry. Weaknesses of this study included the use of only self-report measures, thus increasing the possibility of social desirability, as well as unknown treatment adherence. While these weaknesses were present, the study did include multiple measures to increase the validity of findings and a random group assignment.

**Mindfulness-based cognitive therapy.** Mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002), was originally developed to use mindfulness strategies to improve recovery from depression and prevent relapse. According to Segal et al. (2002), the main goal of the MBCT program is to aid individuals in making “a radical shift in their thoughts, feelings, and bodily sensations” and thus decentering from the normal patterns of thinking (p. 65). MBCT uses the MBSR context, yet includes elements of cognitive therapy. Although originally intended for preventing depression relapse, research has supported the use of MBCT for GAD.

In a study by Craigie, Rees, Marsh, and Nathan (2008), twenty-three adults with GAD engaged in a MBCT program consisting of 9 weekly 2-hour groups sessions, a post-treatment assessment session, and a 6-week and 3-month follow-up. Outcome measures used included the PSWQ, the Depression Anxiety Stress Scales-short form (DASS21; Lovibond & Lovibond, 1996), the BDI, and the BAI. The Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q; Endicott, Nee, Harrison, & Blumenthal, 1993) and the Reactions to Relaxation and Arousal Questionnaire (RRAQ; Heide & Borkovec, 1983) were also used. Significant improvements in pathological worry, stress, and quality of life at post-treatment were found.
These findings were maintained at follow-up. Although significant, substantial weaknesses of this study exist including the very small rate of clinical improvement in worry scores and that no control group was utilized. A further weakness is the large percentage of participants with diagnoses in addition to GAD (78%). However, given the findings, and the fact that attrition was low, the authors concluded that MBCT was a credible and acceptable intervention deserving of further study.

In another study aimed at deciphering the effectiveness of MBCT, Evans, Ferrando, Findler, Stowell, Smart, and Haglin (2008) conducted a study of 11 individuals with GAD who completed a MBCT group. Measures used included the BDI, the BAI, the PSWQ, the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971), and the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). These measures of anxiety, worry, and depressive symptoms were completed at baseline and at the end of treatment. Results showed that participants experienced significant improvement in anxiety and depressive symptoms. Although significant reductions were found, no significant change in mindfulness occurred. Thus, this study demonstrated that there may be a need to integrate mindfulness methods with other methodologies in order to increase attention to enhance the effectiveness of mindfulness training. While weaknesses of this study existed such as a small sample size (n = 12) and non-randomized design, strengths were present. The group was led by a clinical psychologist who was well-trained in MBSR and with many years of experience. Treatment adherence was likely high.

Research has also been conducted by Kim et al. (2009) to determine the effectiveness of MBCT in conjunction to medication on GAD and panic disorder. Participants were 46 individuals assigned to either an anxiety disorder education program or a MBCT program for 8
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weeks. Measures included the HAM-D, the BDI, the SCL-90-R, and the BAI. The MBCT group had significant improvement over the education group on all anxiety and depression scale scores. The authors concluded that MBCT is effective in relieving anxiety and depression symptoms in individuals with either panic disorder or GAD. While this study was not randomized, the length of the MBCT program was substantially longer than the education group, and included limited long-term results, the study did have its strengths; it was conducted by well-trained psychologists and a control group was present.

**Effectiveness across mindfulness-based interventions.** Research has shown that mindfulness-based therapies in general can have beneficial effects on lowering anxiety symptoms. In a meta-analytic review of mindfulness-based therapy on anxiety and depression, Hofmann, Sawyer, Witt, & Oh (2010) analyzed effect sizes using 39 studies. Meta-regression analysis was used to examine the effect sizes as a function of the characteristics of the study (e.g., study year, quality of study, type of therapy, number of sessions). Results related to anxiety of uncontrolled studies revealed a moderate effect size (Hedges $g = 0.63$) for individuals with subclinical anxiety and a robust effect size (Hedges $g = 0.97$) for those with anxiety disorders. Results from active treatment controlled studies revealed a significant robust effect size (Hedges $g = 0.81$) for subclinical anxiety. Effects were sustained at follow-up for a median period of 12 weeks. The authors concluded that mindfulness-based therapy is a promising intervention for treating anxiety in clinical populations. While a weakness of this meta-analysis includes not truly knowing the quality of studies used to determine treatment integrity and analysis, strengths included using data from multiple databases and reference lists from relevant studies. Data from a broad range of sources was included in order to increase the sample’s generalizability.
Acceptance is a universal aspect of treatment across mindfulness-based interventions. Campbell-Sills, Barlow, Brown, and Hofmann (2006) investigated the differential effects of suppression versus acceptance of emotional responses in individuals with anxiety and mood disorders. Individuals were randomly assigned to either a group where they were taught to suppress emotions or a group where they were taught to accept them. Both groups watched an emotional film and were then asked to use the emotion regulation strategy they had learned (i.e., suppression or acceptance). The acceptance group displayed less negative affect following the film. The suppression group showed an increase in heart rate whereas the acceptance group showed diminished heart rate. The authors concluded that this study supports the idea that suppression is not helpful at diminishing negative feelings whereas acceptance is effective. A variety of strengths were present within this study; some examples included the use of both psychological and psychophysiological measures to track change and post-treatment questionnaires to verify proper participant understanding. However, notable weaknesses were present. Because the participants were predominantly Caucasian, the results cannot be generalized to other cultural groups. Because a control group was not present in this study, any distinct advantages of acceptance were not clear.

**Acceptance-based behavioral therapy.** Acceptance-based behavior therapy is an integration of the theoretical and practical foundations of a variety of mindfulness-based treatments. Research has shown support for this treatment with individuals with GAD. For instance, Roemer, Orsillo, and Salters-Pedneault (2008) studied the effectiveness of acceptance-based behavioral therapy in which individuals were taught to increase acceptance of internal experiences and engage in valued behaviors. Participants were assigned to immediate or delayed treatment in a random fashion. Results showed that acceptance-based behavior therapy led to
statistically significant reductions in GAD symptoms rated by both clinician and participants. Effect size was slightly less than medium. Results were maintained at 3 and 9-month follow-up assessments. During this assessment, 78% of treated participants no longer met criteria for GAD and 77% were found to acquire greater functioning. These proportions of participants whose symptoms of GAD had remitted remained constant or increased over a 9-month period. As predicted, reductions in experiential avoidance and increases in mindfulness were found in the treatment group. It is important to note that this study had a variety of weaknesses. For instance, the study had a relatively short follow-up period thus making it difficult to assume long-term change. Three participants began taking medication during the study which may have influenced their scores. Strengths of this study included using both self-report and clinician-rated measures to limit bias. This study used the highly praised randomized design to assign participants to either treatment or control group.

Acceptance and commitment therapy. Acceptance and commitment therapy (ACT), developed by Hayes, Storsahl, & Wilson (1999), was created to help individuals create a rich and meaningful existence while accepting the pain that accompanies living. Unlike CBT, where the goal of treatment is to decrease the frequency and severity of unwanted internal experiences (e.g., thoughts, feelings, etc.), ACT focuses on helping individuals to reduce the struggle with wanting to control or eliminate those experiences while engaging in valued activities (Wetherell et al., 2011). Based on a contextual theory of cognitive and language known as relational frame theory (RFT; Barnes-Holmes, Hayes, Barnes-Holmes, & Roche, 2001), ACT includes six core therapeutic processes: contacting the present moment, defusion from thoughts, acceptance of emotions, self-as-context, clarifying values, and committed action (Harris, 2009). Contacting the present moment refers to being mentally present, and thus engaging with whatever is happening
in the present moment. Defusion of thoughts denotes detaching oneself from thoughts, images, and memories rather than getting tangled up in them. Acceptance of emotions represents opening up and making room for difficult feelings, urges, emotions, and sensations. Self-as-context means recognizing the observing self, the aspect of oneself that is aware of what one is thinking, feeling, and doing in the moment. Clarifying values signifies deciding what one wants their life to be about, to stand for, and thus how one wants to behave on an ongoing basis. Committed action refers to doing what one needs to do in order to live by one’s values even if uncomfortable feelings or thoughts arise. ACT uses a variety of metaphors to help “highlight the psychological processes occurring within the client’s struggle” across situations (Hildebrandt, 2007, p. 58). Metaphors are also used to help the client view their struggle with their pain as the problem rather than seeing the feeling itself as the problem (Hildebrandt, Fletcher, & Hayes, 2007).

While research has supported the use of ACT for decreasing experiential avoidance for both GAD and anxiety in general, mixed results have been found for the treatment’s impact on decreasing anxiety. In a study by Codd, Twohig, Crosby, and Enno (2011) three individuals with anxiety disorders including GAD were treated with 9-13 sessions of ACT. At the end of treatment, all individuals showed clinically significant decreases on multiple measures related to their particular anxiety disorder (e.g., PSWQ, ADIS-IV). Results were maintained at a follow-up time period of greater than 8 months. Large decreases in avoidance behavior were especially noticed through time series assessments of the client’s progress. However, change in anxiety severity was not noted. The authors suggested that this reflects the nature in which individuals were able to change their response to anxiety. Further, they convey that the results indicate the importance of focusing treatment on behavior rather than on decreasing anxiety. While a
strength of this study was that multiple standardized measures were used to track change, several limitations existed. This study included a small sample size \((n = 3)\) and a lack of participant diversity (e.g., all were Caucasian); the generalizability of the findings is reduced. No control group was used and treatment integrity was not assessed.

Research has found that ACT is as effective as CBT but that individuals experience change through a different path. Forman, Herber, Moitra, Yeomans, and Geller (2007) randomly assigned 101 individuals with both anxiety and depression to either cognitive therapy or ACT. Using the BAI to measure anxiety, significant changes were found for both types of treatment. However, the way in which change occurred was found to be different. Changes in observing and describing experience were more potently correlated with outcomes for individual in the CBT group while changes in awareness, acceptance, and experiential avoidance were more strongly associated with individuals in the ACT group. Equivalent improvement in depression, functioning difficulty, and well-being were also found. These findings support the notion that CBT and ACT are both effective for GAD yet help individuals achieve change through disparate paths. It is important to note that while a variety of strengths were present in this study (e.g., a large sample size was used \([N = 101]\), diverse sample), many limitations were as well. For instance, the treatment was conducted by students with limited experience with both CBT and ACT. The degree of treatment adherence is unclear. No follow-up was conducted, limiting knowledge of long-term effects.

Research by Arche, Eifert, Davies, Vilardaga, Rose, & Craske (2012) also found similar effectiveness for CBT as compared to ACT for anxiety disorders with minor outcome differences. Participants included 128 individuals with an anxiety disorder were randomized to either an ACT or CBT treatment. Progress was assessed at pre-treatment, post-treatment, and 6-
and 12-month follow-up using a variety of measures including Clinical Severity Ratings (CSRs), Anxiety Sensitivity Index (ASI; Peterson & Reiss, 1993), PSWQ, Fear Questionnaire (FQ; Marks & Mathews, 1979), Quality of Life Index (QOLI; Frisch, 1994), and the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004). According to the results, similar improvement was made on all outcome measures, regardless of whether the treatment was CBT or ACT. At the 6-month follow-up, ACT showed steeper improvements on the CSR. Also, ACT showed higher AAQ scores than CBT while CBT showed higher scores on the QOLI at the 12-month follow-up. While minor differences exist, the authors indicate that this study demonstrates that ACT and CBT lead to similar overall improvement. Strengths of this study include treatment integrity verification through audiotape, randomization to groups, and a relatively large sample size (n = 128). Weaknesses include high attrition and the nature of having a mixed anxiety sample which restricts the conclusions the results can indicate about specific anxiety disorders.

ACT has also been found to be effective with older populations. For instance, Wetherell et al. (2011) conducted a feasibility study in which seven older adults were treated with ACT for 12 sessions while nine others were treated with CBT. Anxiety symptoms were measured using the HAM-A. Following treatment, a significant change in level of anxiety was found in both the ACT and CBT groups. Although significant, the authors noted that results were smaller than in effects observed in younger adult samples. Results show that using ACT is feasible with this age group but deserves empirical evaluation. Several weaknesses were apparent in this study including a low sample size (n = 16), the low number of participants in the CBT treatment group, and that only one measure was used to determine change in anxiety. Both generalizability and internal validity may have been compromised.
A need for increased effectiveness. Although some effectiveness has been found in the research for using mindfulness-based interventions with GAD, some research has shown that these interventions elicit no significant increases in mindfulness itself (e.g., see Evans et al., 2008) and no reduction in severity of anxiety (Codd et al., 2011). Because of the demanding attentional requirements of mindfulness meditation, individuals with GAD particularly experience challenges maintaining focus as their “contents of mental consciousness are for most of the time oriented away from present moment to moment awareness” (Evans et al., 2008, p. 717). In fact, according to Kaplan (1995), “directed attention is necessary for stepping back from the situation one is facing, for pausing to get a larger picture of what is going on” (p. 171). It is imperative to find ways to enhance this mode of psychotherapy to increase its effectiveness.

Nature-based interventions. Mental health clinicians and researchers have effectively used a variety of nature-based interventions over the past few decades to help individuals to overcome various mental health challenges. Some common interventions include conducting therapy in an outdoor environment (Berger & McLeod, 2006), nature-based homework assignments (Kaplan, 1995; Swanson, 1995), incorporating nature-based rituals into the therapeutic practice (Berger & McLeod, 2006), connecting clients with animals (Kahn, 1999), helping clients engage in environmental restoration work (Shapiro, 1995), and encouraging extended wilderness experiences (Kaplan & Talbot, 1983; Kellert & Derr, 1998). Other nature-based interventions have included strategic questioning to explore connections with the natural world (Conn, 1995), viewing nature photos (Berto, 2005), viewing nature murals (Felsten, 2009), increasing the number of plants in one’s environment (Raanaas, Evensen, Rich, Sjostrom, & Patil, 2011), and viewing simulated natural environments (Ulrich, Lunden, & Eltinge, 1993).
The word “nature” comes from the Latin word *natura* meaning “birth, constitution, character, course of things” (Louv, 2008, p. 8). “Nature” or the “natural world” has been defined in a variety of ways. In its broadest meaning, nature includes the “material world and all of its objects and phenomena; by this definition a machine is a part of nature” (Louv, 2008, p. 8). The other meaning is what we call “the outdoors” (Louv, 2008, p. 8). It is this second definition for which we are mostly concerned in this study. Some have referred to nature as the “physical world relatively untouched by human interference” (Davis, 2006). Although humans often see themselves as separate from nature, theorists contest that humans are actually a part of nature and that a duality does not exist (Davis, 2006).

An environment which encompasses nature is often described as a “natural environment”. A range of settings have been described in the literature as natural environments. According to Clayton and Myers (2009), a natural environment could include wild nature (e.g., forests, wilderness areas) or “nearby nature” areas such as domestic nature (e.g., plants, pets) and managed nature (e.g., zoos, parks). Some research has referred to the natural environment as any “green space” (e.g., wilderness, parks, gardens, and playgrounds; Faber Taylor & Kuo, 2006). Environments not considered a natural environment might include urban areas without green space and indoor environments without plants.

Historically, nature’s cultural role has varied. For the Jewish people during the reign of the Roman Empire, nature’s wilderness served as a “sanctuary from oppressors” (Kaplan & Talbot, 1983, p. 164). Christians have historically defined the natural world as an environment presenting “earthly temptations, physical dangers, and spiritual confusion” (Kaplan & Talbot, 1983, p. 164). In contrast, Asian traditions have viewed the natural world as instructive, and “essential to the correct understanding of one’s role in society” (Kaplan & Talbot, 1983, p. 164).
The cultural context, and the individual’s values, identity, life experiences, and preconceptions all embedded within this context, has determined the meaning of nature within each society. Various cultural aspects of modern day society such as living in densely populated urban areas, having busy lives, working in buildings, and driving in climate-controlled cars have been theorized to act as barriers to spending time in nature (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2008).

In this study, “nature,” “natural,” and “natural world” were generally defined as the “physical world relatively untouched by human interference” (Davis, 2006). The concept of “relatively untouched” is included in this definition in order to include both domestic and managed aspects of the natural world (e.g., gardens, parks, trees, house plants) that have experienced human interference but are still a part of nature.

**Nature as a restorative environment.** Restorative natural environments are those settings that are capable of restoring attention, reducing stress, and subsequently lowering anxiety. Kaplan (1995) believes that a restorative environment is made up of four components. Restorative environments are places that have an essence of being away. This is a “conceptual rather than physical transformation” in which the individual is able to either view an old environment in a new fashion or actually going to a restorative location (Kaplan, 1995, p. 173). Restorative places also have a necessary degree of fascination, the ability to hold attention (Kaplan, 1995). Unlike some environments (e.g., sporting events, classrooms) that require a high degree of directed attention referred to as “hard fascination,” natural environments are thought to elicit “soft fascination,” thus holding our attention with little effort (Kaplan, 1995, p. 172). This allows one’s directed attention to rest and become subsequently restored (Kaplan, 1995). Restorative environments need to also have extent, and be “rich enough and coherent
enough so that it constitutes a whole other world” (Kaplan, 1995, p. 173). Compatibility must exist between the environment and one’s intentions. In other words, “one’s purposes fit with the environmental demands” and “the environment must provide the information needed to meet one’s purposes” (Kaplan, 1995, p.173). Research related to a restorative natural environment’s effect on attention and anxiety is described below.

_Nature and attention._ According to attention restoration theory (ART), restorative environments are capable of restoring one’s directed attention (Kaplan, 1995). In support, nature-based psychotherapeutic interventions have been found in the literature to yield enhanced attentional capabilities (e.g., Berto, 2005; Cimprich, 1993; Felsten, 2009; Hartig, Evans, Jamner, Davis, & Garling, 2003; Raanaas et al., 2011).

Berto (2005) conducted three experiments to test nature’s attention restoration. In each experiment, the undergraduate participants were first mentally fatigued by engaging in a sustained attention task. Then each experiment varied in regard to whether participants viewed photographs of a restorative environment, non-restorative environments, or geometrical patterns. Unlike the other studies, experiment allowed the participants to control the amount of time spent viewing photos. All participants then performed the sustained attention task again. Only participants who viewed photos of the restorative environment improved their performance on the final test. Restorative value of photos was not diminished when participants were given the control of time spent viewing photos, even though they chose a shorter period of time to view photos. Results support nature’s capacity to restore and maintain attentional capability. A major limitation of these studies included only using undergraduate participants with uncertain demographic features. Generalizability of these results is in question; however, the
randomization of groups and the use of a measure of restoration that is well-grounded in theory are strengths of this study.

Cimprich (1993) conducted a study to test whether participating in activities known to restore directed attention after breast cancer surgery increase attentional capacity. Thirty-two female volunteers undergoing breast cancer treatment were selected to participate at three days post-surgery. Four objective measures including the Digit Span subtest of the Wechsler Adult Intelligence Scale, (WAIS; Wechsler, 1955), Symbol Digit Modalities Test (SDMT; Smith, 1955) the Necker Cube Pattern Control Test (NCPC; Cimprich, 1990), and an adaption from the Finding A’s Test (Eckstrom, French, Harman, & Dermen, 1976) called the Letter Cancellation Task (LC), were combined to form a total attention score and used to measure directed attention. The Visual Analogue Mood Scale (VAMS; Luria, 1975) was used to decipher whether attentional performance was influenced by decreased arousal in conjunction with depression. Measurements were taken at four times (3, 18, 60, and 90 days) throughout a three month period. Participants were asked to engage in restorative activities for 20-30 minutes at least three times per week. Proposed restorative activities included nature activities, activities involving exploring and finding out new information about things of interest, and activities done for pure enjoyment. After the initial measurement, participants were randomly selected to receive the intervention or not receive the intervention. The intervention group experienced a significant mean improvement in total attention score at each of the four time points, whereas the nonintervention group showed inconsistent performance over time and did not show improvement. No correlation was found between scores on the VAMS and attention scores over time. The restorative intervention almost exclusively chosen by participants involved the natural environment. According to the author, activities in nature can restore directed attention and thus
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promote effective functioning after breast cancer treatment. This study included many strengths; use of a standardized protocol, randomized group assignment, and multiple measures to verify change. However, weaknesses were present. Only participants from the mid-west participated in the study, limiting generalizability. The integrity of the protocol used in this study is unknown.

Although the attention restoration capabilities of nature were shown to be effective with genuine nature, Felsten (2009) sought to study whether students would perceive wall-sized murals as high in restorativeness. Ninety-nine undergraduate psychology students at a small suburban campus and 137 undergraduate students at a large urban campus of the same university in the Midwestern region of the United States participated in the study. The participants were asked to imagine themselves mentally fatigued and in need of taking a break. They then viewed eight different photos representing four different types of scenes on campus often used for relaxing and socializing. These scenes included study rooms with no view of nature, a window view of nature, nature murals without water, and nature murals with water. Participants then viewed eight settings that were not expected to be restorative such as work areas and classrooms. They then rated the perceived restorativeness of all the photos through answering questions on a Likert scale. Settings with no nature fell between low to moderate in perceived restorative quality, marginally above moderate for environments of views of nature with built structures, in between moderate and high for nature murals that did not include water, and high for mural settings with water. The authors concluded that nature murals in indoor environments may provide students with attention fatigue restoration. Because settings of nature within buildings were also perceived as restorative, the authors proposed that window views of nature could also be included in campus settings to aid students with attentional fatigue. While this study included
a large sample size \((n = 236)\), it is limited in generalizability to college students from the Midwestern region of the United States. While this study provides support for the potential restorativeness of murals, it is unclear as to whether perceived restorativeness is correlated with actual restorativeness, representing a weakness of this study.

Raanaas et al. (2011) studied whether indoor plants in an office setting could lead to an increase in attentional capacity. Thirty-four students from the University of Norway were randomly assigned to either an office environment with plants or to an office without plants. Through the use of the reading span test, attention was assessed at three times: before entering the office, after undergoing a difficulty cognitive test, and after a 5-minute break. Attention capacity was measured on the reading span test as the number of correctly memorized words both in any order and in the same order that they were presented. Repeated measures analysis of variance (RM-ANOVA) was used to decipher the effects of the plants and measured time interval interactions. Participants with office plants increased their performance on the reading span test from time one to time two, where the no-plant group did not. No difference was found from time two to time three (5-minute break) for either group. There was no difference between either group when conducting the RM-ANOVA. The authors concluded that having plants in the office can positively affect directed attention and thus lead to enhanced cognitive ability in an office work environment. While this study did include random assignment to groups, it was limited by its small sample size \((n = 34)\) and monocultural sample. The validity of the results is questioned for alternate populations.

In another study by Hartig et al. (2003), psychophysiological stress recovery and directed attention restoration in natural and urban field settings were compared. The authors assessed emotion, ambulatory blood pressure, and attention among a sample of 112 young adults
randomly assigned to either the attention restoration or control condition. In hope of varying restoration, they had half of the participants begin the environmental treatment immediately after driving to the field site. The remaining participants completed a demanding attention task immediately before the treatment. After each situation, participants found that sitting in a room with tree views allowed for more rapid decrease in diastolic blood pressure than sitting in a viewless room. Walking in a nature reserve was found to lower blood pressure indicating greater stress reduction than did walking in the urban environment. Performance on a test of attention improved from the pretest to halfway through the walk in the nature reserve, while it went down in the urban environment. This difference in performance also remained present after the walk. Thus, authors concluded that natural environments are more effective in providing restoration from stress and attentional fatigue than urban environments. Strengths of this study included a relatively large sample ($n = 112$) and use of both physiological and attentional measures. Weaknesses included unknown demographic information and the use of only a small number of attention measures. Generalizability is limited and internal validity may have been compromised.

Hartig, Mang, and Evans (1991) conducted two studies in an effort to analyze the impact of various experiences thought to be restorative by using a multi-method measurement strategy. In the first study, participants were backpackers who spent time (mean of 5.04 days) in a natural environment, non-wilderness vacationers, or individuals not on vacation. All were given Overall Happiness Scale (OHS; Campbell, Converse, & Rodgers, 1976), Zuckerman Inventory of Personal Reactions (ZIPERS; Zuckerman, 1977) which measures emotional states, and a proof-reading task. A significant improvement in proofreading was found in the natural environment group while the other two groups declined in performance. Higher ratings of happiness
according to the OHS were also found between groups at post-test. No significant difference in emotional states according to the ZIPERS was found. To extend the exploratory finding of study 1 to further methodological rigor a second study was conducted. College students were randomly selected to either a nature walk, a walk in an urban setting, or a relaxation condition for 40 minutes. The ZIPERS, OHS, and same proofreading materials were given both pre and post conditions. Blood pressure and pulse were measured. A measure of perceived restorative quality based on Kaplan’s’ theoretical model was also given. Individuals in the nature environment group performed significantly better than the other conditions on the proofreading task. Higher ratings of happiness on the OHS, and lower ZIPERS anger/aggression scores were also found. The measure of perceived restorativeness scale showed that individuals in the natural environment group experienced a more restorative environment. No significant differences were found on both blood pressure and heart rate, although these readings were not taken until 50 minutes following the tasks. The authors concluded from the two studies that both short-term and long-term exposure to nature can cause restoration on attentional performance. An obvious weakness of this study was the delayed measurement of both blood pressure and heart rate, as these physiological entities are commonly known to differ dramatically based on time. The non-random group allocation of the first study and the college student sample of study 2 limit the generalizability and confidence in the treatment design.

Kuo (2001) investigated whether green surroundings can cause attention restoration in poor inner cities by randomly assigning 145 residents of public housing in an urban setting to either a building with or without nature. Nature was defined as green views and nearby green spaces. Attention and effectiveness in dealing with life challenges were measured. Individuals living in areas with trees and grass reported less procrastination when encountering major life
issues, evaluated these issues as being less severe, felt that these issues were more capable of being solved, and the issues were less continuous than the control group. Results on digit span backwards subtest of the WAIS-IV supported the attention restoration hypothesis: that green spaces lower mental exhaustion. While strengths of this study included random allocation to groups and a relatively large sample size ($n = 145$), weaknesses also were present. For instance, all participants were of lower socioeconomic status from Chicago, Illinois. This limits the generalizability of the results. Only one measure of attention was used in this study; the accuracy of the results is unclear.

Kuo and Faber Taylor (2004) looked at whether attention was enhanced after exposure to natural environments (green settings) versus non-natural environments. Parents from across the U.S. rated the effects of 49 afterschool and weekend activities. The impact of engaging in activity within green settings was compared to indoor and built settings. Green setting activities were found to reduce symptoms more than activities conducted in the other settings. Results were consistent across a variety of demographic factors (i.e., age, gender, income, community type, geographic region, and diagnosis). The authors concluded that ADHD symptoms can be reduced in children across a wide range of demographic characteristics when they spend time in natural environments. This study’s large sample size ($n = 528$) and national representation are clear strengths to this study. However, a distinct weakness was the study’s reliance on parental perceptions of symptoms, a method potentially wrought with bias.

In an attempt to draw greater support for their results, Faber Taylor and Kuo (2009) conducted a follow-up study with different methodology which looked at whether attention was enhanced after exposure to natural environment versus non-natural environments in participants with ADHD. Participants were 17 seven to twelve year-olds. They each participated in a 20-
minute walk in three environments (1 week apart): a city park and two urban settings. Concentration was measured via the digit span backwards subtest of the WAIS-IV. Results showed that children with ADHD were able to focus better after the walk in the park than the other two locations. Effect sizes were substantial. The authors concluded that 20 minutes of nature exposure can enhance attention in not just the general population but also in ADHD populations. While the controlled nature of this study is a clear strength, the small sample size ($n = 17$) and little information on demographics limit the generalizability.

Tennessen and Cimprich (1995) conducted a study to explore whether university dormitory residents with more natural views from their windows would score better than students with less natural views on tests of directed attention. Seventy-two students were divided into four groups, ranging from all natural views to all built views. Directed attention was measured using both the digit span forward and the digit span backward test of the WAIS-IV, the SDMT, the NCPC, and the Attentional Function Index (AFI; Cimprich, 1992). The POMS was used to assess depressed mood in case attentional performance was influenced by mood state. Individuals with natural views scored significantly higher on the SDMT than the groups with more built views. When view groups were collapsed to form two groups, the more natural view groups scored significantly higher on both the SDMT and the NCPC. No significant relationship was found between the POMS and a measure of attention. However, scores on the AFI were correlated with the depression-dejection subscale of the POMS showing that negative moods are associated with lower ratings of attention. The authors concluded that the results of the study support the connection between the nature, attentional fatigue, and attention restoration. It is necessary to consider several limitations present in this study. The sample size in the natural group was small ($n = 10$) and the participants were all from a Midwestern university, limiting the generalizability.
of the results. Attention was not measured at baseline before moving into the dorm room. It is difficult to determine what impact the natural view had on scores versus individual ability.

Nature and anxiety. The simple act of spending time in nature (e.g., walking, gardening, hiking, etc.) has been found in the research to lead to restorative experiences such as the reduction in symptoms of stress (Nisbet, 2013; Ulrich et al., 1991). Doherty (1999, 2010, 2012) prefers to describe this occurrence using the blanket term nature-based stress reduction. A reduction in stress fostered through spending time in nature may result in lower levels of anxiety symptomology. Chalquist (2009) proposes that this is because a “disconnection from the natural world in which we evolved produces a variety of psychological symptoms that include anxiety, frustration, and depression” (p. 70). In fact, research by Ingulli & Lindbloom (2013) supports this belief through finding a significant correlation between having a connection to nature and psychological resilience.

A few studies support the role of nature as a restorative environment in the reduction of anxiety symptoms. Berget, Skarsaunet, Ekeberg, and Braastad (2007) studied 35 individuals with psychiatric symptoms as they interacted and worked with farm animals over a three-month period. During this time, the individuals spent a majority of their time in close contact with the animals. Through studying video records, they found that an increased intensity of work correlated significantly with decreased anxiety for individuals with affect disorders. A clear weakness of this study is the methodology of assessment, which involved studying video records. While salient information can be drawn through this method, it is dependent upon the perception of the researcher potentially limiting its validity.

Viewing pictures of nature has also been shown to lead to reductions in anxiety. Ulrich, Lunden, and Eltinge (1993) studied 160 patients recovering from heart surgery in order to
decipher whether views of simulated natural environments led to less anxiety. In the study, panels were placed at the foot of the bed of one of six possible pictures: two abstract designs, two nature pictures (a view of open water or view of an enclosed forest), and two control conditions (a white panel or no picture). Anxiety levels were reported to be significantly lower in patients with both open water and an enclosed forest than the other scenes presented. The authors concluded that viewing natural environments during the postoperative period of heart surgery can lower anxiety to a greater degree when compared to other pictures or control conditions. While a strength of this study is the relatively large sample size \(n = 160\), the self-report nature of the findings fall short of objectivity and may have been biased.

**Nature and mindfulness.** Zen Buddhism, a school of Buddhism prevalent in Vietnam, China, Japan, and Korea, “seeks to obtain a new way of perceiving the world, of intuitively and directly experiencing reality” (Berger, 1962, p. 122). A Zen Buddhism emphasis is “paying attention to the simple and often repetitive activities of daily life…” (Kaplan, 2001, p. 484). To create these kinds of experience of reality, Zen Buddhists often engage in mindfulness activities. Gardens in nature are often used as a venue to cultivate and practice mindfulness.

Kaplan (2001) has discussed the similarities between attention restoration theory (ART) and Eastern meditation, a concept closely related to mindfulness. He draws attention to monasteries that focus on meditation “tend to be situated in environments that are striking for their restorative qualities,” suggesting that such environments could facilitate meditation (p. 500). He goes on to point out that given an appropriate restorative environment, “even an unskilled individual could do something approximating meditation with comparably little mental effort” (p. 500). Like Kaplan, some speculate that natural environments and mindfulness
practice are complimentary. Although minimal in scope, a variety of nature-based mindfulness interventions have recently been recommended in the literature.

Some of the literature speaks to the benefits of engaging in nature-based activities in order to achieve a greater sense of mindfulness. Hiking in a natural environment has been recommended as a way to increase mindfulness (Lay, 2007). The author explains this phenomenon by stating that hiking facilitates mindfulness by “providing a novel situation that requires increased attention and concentration and by promoting present moment awareness and opportunity for reflection on the experience” (p. 34). Miller (2011) recommends six ways of connecting with nature and thus obtaining a mindful presence within the natural world. These include immersing oneself, crystallizing ephemeral moments, nurturing a child’s love for nature, following the flow of water, witnessing migration of nature’s creatures, and taking action to heal the environment. Other literature relates the importance of performing mindfulness activities within a natural environment. De Young (2009) recommends walking mindfully in a natural environment as way of increasing directed attention, vitality, and coping ability.

**Nature and mindfulness for anxiety.** Although a novel approach, one study found significant changes in anxiety as a result of a brief mindfulness exercise performed in nature. Radar (2009) evaluated the benefits of nature by asking fifty participants to spend two hours in a natural area. The individuals complete a condensed version of the DASS 21 prior to and after participating in a relaxation & sensory focus exercise. This exercise consisted of a 5-minute guided meditation in a park setting where the researcher read aloud to the participants whose eyes were closed. The meditation encouraged participants to pay attention to their breathing, to "breathe in nurturing and breathe out stress," to relax, and to become more aware of sensory stimulation such as body posturing, smells, sounds, and sensations on the skin (p. 77). Then
participants were encouraged to stay relaxed and focused on sensory stimuli while they also opened their eyes and added the sense of sight. After engaging in the exercise, the DASS 21 showed significant positive changes in anxiety in the predicted direction, \( p < .05 \), one tailed. According to the author, this is the first study that used an empirically validated measure to show that nature exposure can reduce anxiety. She concluded that anxiety relief can thus be obtained through nature exposure. One limitation of this study is its lack of control group. As a result, it is unclear if it was the 5-minute relaxation and sensory focus exercise that led to the changes in anxiety or another variable. The self-selection nature of this study may have attracted individuals who were already drawn towards nature thus increasing the chances of experiencing beneficial effects as a result of the treatment. While weaknesses were present, strengths included the use of a valid and reliable scale and detailing participant demographic features for aid in analysis.

Summary

In summary, a variety of approaches have been found to be effective for use with individuals with GAD. These include cognitive-behavioral therapy (e.g., Borkovec & Ruscio, 2001) and its various components, as well as mindfulness-based interventions (e.g., Hofmann et al., 2010). Although effective treatments exist, some believe that GAD remains the least successfully treated anxiety disorder (Brown et al., 1994). Mindfulness-based interventions, with their focus on present moment awareness, have been shown to be effective for individuals with GAD (e.g., Kabat-Zinn et al., 1992). However, research has shown that some individuals after participating in mindfulness interventions show no increase in mindfulness (Evans et al., 2008) and individuals with GAD are especially challenged by the heightened degree of attention necessary for mindfulness (Evans et al., 2008). In addition, some research has found that
individuals experience no reduction in severity of anxiety after treatment with a mindfulness-based intervention (Codd et al., 2011); thus, enhancing the effectiveness of mindfulness interventions is imperative. Research has shown that nature-based interventions not only increase attention (e.g., Berto, 2005) potentially enhancing mindfulness, but that they also facilitate nature-based stress reduction, lowering anxiety on their own (e.g., Berget, Ekeberg, & Braastad, 2008). Integrating a nature-based experience into the mindfulness-based interventions may increase its effectiveness. A study by Radar (2009) showed that using mindfulness interventions combined with nature exposure was effective in reducing anxiety for a group of 50 participants. Research has shown that the combination of an anxiety disorder and physical illness is associated with a broad variety of negative outcomes in the literature above and beyond when each condition is considered alone (e.g., Belik et al., 2009). Choosing the most effective treatment for GAD and a comorbid medical diagnosis could not only enhance the mental health and physical health of an individual, but also affect multiple life outcomes.

In this dissertation, individuals with anxiety and a comorbid medical diagnosis were treated with a mindfulness-based intervention that embraces nature-based stress reduction. More specifically, a single case quasi-experimental design was used to assess the effectiveness of integrating multiple nature-based interventions into an acceptance and commitment therapy (ACT) intervention for two individuals. ACT was chosen because of the large body of research supporting its use with individuals with anxiety disorders (e.g., Codd et al., 2011; Forman et al., 2007; Wetherell et al., 2011) and because of the ease of repeating the simple format used in future studies. Using ACT with individuals who have comorbid medical conditions was chosen because of its use of experiential rather than physical methodology. Using an exercise that is derived from the relaxation and sensory focus exercise used in the Radar (2008) study was
chosen because it is short, practical, and research supports the use of it to lessen anxiety. A variety of nature-based homework experiences were chosen for increasing mindfulness and lessening anxiety because research has yet to come to a consensus as to an exact nature-based activity or length of time to use with individuals with anxiety. The flexible nature of the homework activities helped to accommodate for special needs due to existing medical conditions. It was hypothesized that through the intervention, individuals in the study would experience the following at post-treatment and at 3-month follow-up in comparison to pre-treatment:

1. A clinically significant decrease in symptoms of anxiety as measured by the BAI
2. A clinically significant increase in mindfulness as measured by the MAAS
3. A clinically significant decrease in experiential avoidance as measured by the AAQ-II
4. A clinically significant increase in general health as measured by the DUKE
Method

Design

A single case quasi-experimental design was used in this study. According to Hayes (1981), clinicians who engage in single case experimental designs need to measure behaviors repeatedly, establish variability within the participant, clearly specify the independent variable, engage in replication, and use a dynamic interaction approach. Single case experimental designs use randomized assignment while this study did not; this was a quasi-experimental study. As participants were chosen due to convenience and feasibility, a semi-structured assessment instrument (see below) was used to verify diagnosis before treatment group assignment in an attempt to control for this lack of randomization. Levels of behavior including anxiety, mindfulness, experiential avoidance, and general health were tracked at pre-treatment, post-treatment, 3-month follow-up, and before every session. The independent variable was the treatment which consisted of the psychotherapy session, the 5-minute nature-based exercise, and the 15 minutes spent in nature every day. Variability was established in the treatment through changing session themes. While the treatment design was established, it was always tentative, dynamic, and ready to change if questions arose.

Participants in the study completed four self-report measures before treatment, before every session, at the end of treatment, and at a 3-month follow-up in order to track the four dependent variables. The measures used are described below. Data from these four self-report measures were plotted on a graph (explained in further detail below) in order to track general score variability. While these scores were tracked over the course of the intervention in order to inform treatment, clinically significant change was not measured before every session. While determining the clinically significant change resulting from each session can be useful in some
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studies, it was determined that the fluid nature of the ACT intervention and the overlap of content from previous sessions did not lend well to this form of measurement. Instead, clinically significant change (discussed below) was measured between pre-treatment and post-treatment, as well as between pre-treatment and the 3-month follow-up. At the start of treatment, participants were given a journal to track nature-based and mindfulness-based experiences and to respond qualitatively to three questions. The journal is described below.

**Participant Characteristics and Presenting Problems**

One participant who met criteria for GAD and a comorbid medical diagnosis was recruited from an HMO-based medical facility located in a medium-sized urban setting. This participant was recruited in the winter and completed treatment in early spring. Although every effort was made to recruit a second participant with GAD, this did not occur. Instead, the participant pool was expanded and one participant who met criteria for another anxiety disorder, Posttraumatic Stress Disorder (PTSD), was recruited from an integrative health clinic located in a large urban environment. This participant was recruited in the spring and completed treatment in early summer. Like GAD, burgeoning research supports the use of ACT with PTSD (Batten & Hayes, 2005; Codd, Twohig, Crosby, & Enno, 2011; Orsillo & Batten, 2005; Twohig, 2009).

Because a substantial subset of individuals with anxiety often also have a comorbid medical diagnosis which has been shown to be associated with a broad variety of negative outcomes in the literature (Belik et al., 2009; Kawachi et al., 1994; Sareen et al., 2006), each participant recruited also had at least one comorbid medical diagnosis. Conducting research on participants with an anxiety disorder and a comorbid medical diagnosis is essential given the high rates of these clients seen in clinical practice. Diagnosis was confirmed through the use of
the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I; First, Spitzer, Gibbon, & Williams, 1997).

**Participant with GAD and obesity.** Alice (a pseudonym) is a single heterosexual female of European descent in her early 50s. She currently lives alone and is employed as a QSA at a residential facility for individuals with disabilities. Alice presented with symptoms related to GAD and was diagnosed with this disorder. She described experiencing anxiety on and off for many years at an average intensity of approximately 6 out of 10 (where 10 = severe anxiety). She describes the duration as lasting the “entire day.” Alice described her feelings as irritable, anxious, and tearful. She also described worried thoughts like "who's gonna take care of me" and various critical thoughts about herself. She reported having trouble controlling these feelings, feeling restless and keyed up, and tiring easily. She also reported having trouble concentrating, muscle tension, and difficulty sleeping. Alice reported that a variety of stressors have been exacerbating her symptomatology including her mother’s cancer, tension at work, and difficulty affording car payments. Alice reported that these feelings stop her from engaging in activities with others. She reported that she has experienced moderate to severe obesity for “many years.” She reported that she has avoided exercise over the course of her life and uses food to avoid uncomfortable feelings. She denied taking any medication.

Alice stated that she does not drink alcohol currently. In the past, she used to drink heavily approximately three to four times per week with her husband. She stated that she would often drink three glasses of liquor per sitting. Alice reported that she has also used methamphetamine for approximately 10 years but stopped 18 years ago. She stated that she currently smokes approximately one pack of cigarettes per day. Alice reported that she was emotionally abused during her marriage, which eventually led to its end. She also reported that
she had been physically abused two times by her ex-husband in the past. Alice reported that she has experienced multiple traumas in her life. These traumas include her father passing away, being robbed at a Circle-K approximately five times, and having someone break into her house. Alice reported that she currently has five friends, although she stated that they are more like “acquaintances.” She stated that she often avoids socialization because it is “uncomfortable.” She reported that she was married for 26 years from the age of 17 until 43. She stated that she is divorced at this time and currently single. Alice reported that she currently has two sons, ages 35 and 30, who live on their own. She reported that she has a good relationship with them and that they communicate every day. She also reported that she has four grandchildren whom she sees once a week. She reported that she has a good relationship with all four. She reported that she is currently living alone in a manufactured house in a park. She reported that she would like to move to a new living space in the near future. Alice reported that she enjoys floating down the Santiam River with her kids, camping, watching television, and watching movies for leisure. She reported that she enjoys spending time with her grandchildren and playing games on social media.

*Case conceptualization.* This case conceptualization was based on an acceptance and commitment therapy model of anxiety. Alice has suffered a variety of traumatic events in her past, including the passing of her father, being robbed multiple times at Circle-K, and a house break-in. As a result, she likely experiences the world as an unsafe place leading to symptoms of anxiety. Stressors such as her mother’s cancer, tension at work, and difficulty affording car payments exacerbate her current symptomatology. In the past she has used substances such as alcohol and methamphetamine to avoid uncomfortable feelings. Currently, she engages in experiential avoidance through worry, social isolation, sedentary lifestyle, and eating unhealthy
food. Although these methods of pushing away uncomfortable feelings might have been effective in the short-term, they have exacerbated her symptomatology in the long-term and have prevented her from living congruently with her values. These various forms of experiential avoidance likely contribute to the maintenance of her symptoms. Alice often experiences worried thoughts about the future rather than spending time in the present moment. Her critical thoughts about herself and worried thoughts about the future likely cause her a great amount of distress. She believes that these thoughts are true rather than seeing these thoughts as something the brain is creating and not necessarily true or helpful. She also appears to have lost clarity into what she values and rarely spends time in the present moment. Not spending time in the present moment makes it difficult for her to behave according to the few values of which she experiences clarity. Although she enjoys spending time in nature, she spends little time in such environments.

**Participant with PTSD, chronic pain, and diabetes.** Carl (a pseudonym) is a single heterosexual male of European descent in his late 40s. He currently lives alone and is unemployed. At the time of the intake, Carl met criterion for PTSD resulting from a traumatic car accident in 1990 and losing his leg due to an infection in 2010. He reported that he experiences anxiety at an average intensity of approximately 6 or 7 out of 10. He reported that he relives the above traumatic events through persistent memories and dreams. Carl stated that he frequently avoids thoughts, feelings, and talking about the traumatic events and avoids areas of the city because they remind him of the events. He also reported that he cannot remember large portions of the events, experiences a loss of interest in other activities, feels detached from others, has trouble sleeping, and experiences frequent irritability. While Carl reported experiencing symptoms of sadness, he did not meet criterion for a mood disorder during this
treatment episode. Carl reported that he also experiences chronic pain throughout his body as a result of breaking 27 bones during the car accident. He reported that his pancreas was damaged in the car accident leading to Type I diabetes. In 2009, Carl reported that a MRSA infection entered his blood stream resulting in the removal of his left leg. He reported that he currently takes insulin for his diabetes, Celexa for depression, and a high dose of Ibuprofen for his pain. He denied taking any other medication.

Carl reported that he currently drinks two or more glasses of beer nightly to “control” his symptoms. He stated that he has worked as a chef for many years, discontinued work when he lost his leg, and is interested in finding work again in this industry. Carl stated that he has engaged in bicycling for many years for both pleasure and exercise. Although he stated that he cannot yet ride a bike because his leg has yet to heal to a degree where he could use the appropriate prosthesis for biking riding, he reported that he is greatly looking forward to riding his bike in the future. Although Carl reported that he is currently single, he stated that he has had many long-term relationships and was interested in becoming involved in a new relationship in the near future. At the time of intake, Carl stated that his mother was very sick and would likely die soon.

**Case conceptualization.** This case conceptualization was also based on an acceptance and commitment therapy model of anxiety. Carl has experienced a variety of traumatic events over the course of his lifetime including the loss of his leg resulting from an infection and a car accident that dramatically effects his current physical functioning. As a result, he experiences the world as an unsafe place. He experiences many worried thoughts about the future rather than spending time in the present moment. Rather than seeing these thoughts as something the brain is creating, Carl believes these thoughts to be true thus leading to increases in sadness and
Carl also engages in various forms of experiential avoidance in order to keep uncomfortable feelings away. For example, he reported that he drinks two or more glasses of beer daily to “control” his symptoms, and avoids thoughts, feelings, memories, and places associated with the traumatic events. This type of behavior, keeps him from engaging in an existence that is aligned with his values and likely increases his distress in the long-term. Carl also experiences a great amount of stress resulting from these traumatic events and the thoughts associated with them. Rather than engaging in stress reduction activities such as spending time in nature, he engages in activities that increase his stress such as worrying about the future. His worried thoughts about his mother’s pending death, frequent recurring memories of the past events, and various forms of experiential avoidance maintain his symptomology. While Carl had some clarity in regard to his values, he was not behaving congruently with these values due to experiential avoidance (as mentioned above). In some areas of his life, he lacked clarity in regard to what he truly valued.

**Measures**

**Anxiety.** The Beck Anxiety Inventory (BAI; Beck, Brown, Epstein, & Steer, 1988) is a widely used measure that consists of 21 self-report items. Participants respond on a 4-point scale, which ranges from 0 to 3. The total of the items generates the sum score. Possible scores ranged from 0-63. It was designed to “address the need for an instrument that would reliably discriminate anxiety from depression while displaying convergent validity” (Beck et al., 1988, p.893). The clinical mean was found to be 24.59 (S.D. = 11.41; Beck et al., 1988) while the non-clinical mean was found to be 13.41 (S.D. = 8.96; Osman, Kopper, Barrios, Osman, & Wade, 1997).
Research has shown the BAI to be both a valid and reliable instrument. For instance, among a sample of 160 psychiatric outpatients, the BAI was shown to have high internal consistency ($\alpha = .92$) and one-week test-retest reliability ($r = .75$; Beck et al., 1988). It was also shown to have high convergent validity (with the Hamilton Rating Scale for Anxiety-Revised [HARS-R] and Cognition Checklist [CCL-A]) and high discriminant validity (with the Cognition Checklist-Depression Subscale [CCL-D], Hopelessness Scale [HS], and Hamilton Rating Scale for Depression-Revised [HRSD-R]; Beck et al., 1988). Further support for the discriminant validity of the BAI was shown through research that its items load more highly on a different factor than items from the Beck Depression Inventory (Hewitt & Norton, 1993; Wetherell & Arean, 1997). The BAI has been found to have two factors: cognitive and somatic symptoms (Hewitt & Norton, 1993).

**Mindfulness.** The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) consists of 15 items to which participants respond on a 6-point Likert-type scale, where 1 = almost always and 6 = strongly agree (see Appendix A). To score, the tally from all 15 items is divided by 15 (the number of items). Possible scores ranged from 1-6. It was designed to measure the frequency of mindful states in day-to-day life, using both general and situation-specific statements. Higher scores indicate greater mindfulness (Mackillop & Anderson, 2007). In a large U.S adult sample, the average MAAS score was 4.22 ($S.D. = 0.63$; Brown & Kasser, 2004) while the clinical sample mean was 4.08 ($S.D. = .74$; Carlson & Brown, 2005).

Researchers have found the MAAS to be both a valid and reliable instrument. The construct validity of the MAAS was examined using exploratory factor analysis (EFA) in a clinical population. In each sample, EFA on the MAAS using the principal factors method showed a clear single-factor structure with comparable item loadings across samples (Carlson &
A unidimensional factor structure was also found in a study of a large university sample (n = 711; Mackillop & Anderson, 2007). The criterion validity of the MAAS was examined through Structural Equation Modeling (SEM). The researchers used SEM to assess the criterion validity of the scale and the structural invariance of a mindfulness–well-being model across samples. The cancer patients in this study had diminished MAAS scores and higher stress and mood disturbance across most of the Profile of Mood States (POMS) and Symptoms of Stress Inventory (SOSI) subscales. However, higher MAAS scores were related to lower scores on POMS and SOSI (Carlson & Brown, 2005). Discriminant validity and convergent validity of the MAAS was supported through significant correlations with a variety of well-being scales (Brown & Ryan, 2003).

Cronbach’s alpha for the MAAS indicated good internal reliability in multiple studies. For instance, in a study on a large university sample, Cronbach’s alpha was found to be \( \alpha = .89 \) (Mackillop & Anderson, 2007) whereas in another study of undergraduate students (n = 414) Cronbach’s alpha was found to be \( \alpha = .88 \) (Van Dam, Earlywine, & Borders, 2010). Test-Retest Reliability was supported through an analysis of 60 introductory college students that found that the mean scale scores, taken four weeks apart, were not significantly different between Time 1 (3.78) and Time 2 (3.77), \( t(59) = .11, \) ns (Brown & Ryan, 2003).

**Experiential avoidance.** The Acceptance and Action Questionnaire (AAQ-II; Hayes et al., 2004) consists of seven items in which individuals respond on a 7-point Likert-type scale, where 1 = *never true* and 7 = *always true* (see Appendix B). It was designed to measure psychological inflexibility, or experiential avoidance. The non-clinical population mean has been found to be 17.34 (S.D. = 4.37) while the clinical mean has been found to be 28.34 (S.D. = 9.92; Bond et al., 2011).
Preliminary research performed by Bond et al. (2011) has found the AAQ-II to be both a valid and reliable instrument. For instance, among a sample of 2,816 participants, the AAQ-II was found to have a high internal consistency (α = .84) and 3- and 12-month test-retest reliability (r = .81, r = .79; Bond et al., 2011). Although initial exploratory analysis supported a two-factor solution, various tests comparing the external and internal validities led to its rejection. Thus, support for a unidimensional factor of psychological inflexibility was found (Bond et al., 2011). In support for convergent validity, the researchers found that higher levels of psychological inflexibility were associated with more symptoms of depression (on both the DASS and the BDI-II), a greater amount of anxiety symptoms (on the BAI and DASS), more stress (on the DASS), and lower overall health (on the SCL-90-GSI [DeRogatis, 1992] and GHQ [Goldberg, 1978]; Bond et al., 2011). Discriminant validity was also supported through showing that it was not significantly correlated with social desirability (Bond et al., 2011).

**Health.** The Duke Health Profile (DUKE; Parkerson, Broadhead, & Chiu-kit, 1990) is a widely used measure that consists of 17-items which measure six health measures (e.g., physical health, mental health, social health, general health, perceived health, and self-esteem) and four dysfunction measures (e.g., anxiety, depression, pain, and disability). The general health measure, comprised of social health, mental health, and physical health, was used in this study. For items 1-7, individuals mark one of three responses (e.g., “Yes, describes me exactly,” “Somewhat describes me,” or “No, doesn’t describe me at all”). For items 8-16, individuals mark one of three responses (e.g., “None,” “Some,” or “A lot”). For item 17, individuals mark either “None,” “1-4 Days,” or “5-7 Days.” Scores range from 0.0 (poorest health) to 100.0 (best health). The clinical mean, which was made up of individuals presenting to primary care with painful physical symptoms, on the general health component of the scale was found to be 66.1
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\( S.D. = 14.6; \) Parkerson et al., 1990). The non-clinical mean, which was made up of individuals presenting to primary care for “health maintenance,” on the general health component of the scale was found to be 77.4 \( S.D. = 13.1; \) Parkerson et al., 1990).

Research has shown the DUKE to be both a valid and reliable instrument. For instance, in a sample of 683 primary care adults, the DUKE was shown to have acceptable internal consistency \( (\alpha = .55 \text{ to } .78; \) Parkerson et al, 1990). The general health component had an internal consistency of .78 (Parkerson et al., 1990). Test-retest reliability for the DUKE, as measured over an 8-week period, was found to be acceptable \( (r = .50 \text{ or above}) \) for all measures except for disability and pain \( (r = .30 \text{ to } .78; \) Parkerson et al., 1990). The general health component had a test-retest reliability of .78 (Parkerson et al., 1990). The DUKE was also shown to have adequate convergent validity (with the Duke-UNC Health Profile [DUHP; Parkerson et al., 1981] and very good discriminant validity with a physical dimension of health and emotional behavior (Sickness Impact Profile [SIP; Gibson et al., 1975]). Clinical validity was supported through scores of patients with clinically different problems of health (Parkerson et al., 1990).

**Diagnosis clarification.** The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I; First et al., 1997) is a semi-structured assessment instrument for clinical disorders. The SCID I was used to verify each participant’s anxiety disorder diagnosis.

Research has shown the SCID I to be a reliable instrument. In a sample of 151 participants, Lobbestael, Leurgans, and Arntz (2011) found fair to excellent inter-rater reliability for the SCID I with Kappa values of 0.61 to 0.83, with a mean Kappa of 0.71. Although minimal support for the validity of the SCID I was found in the literature, Basco et al. (2000) showed support for convergent validity through a study with 200 psychiatric outpatients in which scores on the SCID I were shown to be associated with more accurate Axis I diagnoses.
Journal. Participants in the study were asked to complete a journal. They were also asked to respond to three questions every week between sessions and to describe their experiences. Journals were chosen in order to enrich the quantitative findings and potentially provide further insight into the effect that nature had on the individual. The three questions included: Did you notice any changes in your ability to pay attention or in your level of anxiety after spending time in nature this week? Are there any challenges or successes you had this week regarding spending time in nature that you think are worth noting? Are there any other challenges or successes you had this week regarding your mindfulness practice that you think are worth noting?

Journal data was analyzed at the conclusion of treatment by this researcher. Both journals were scrutinized and content was organized into themes. The content of the journal was noted as a common journal theme for both participants if the theme arose at least once in the journal of both participants. Content was noted as an individual participant theme if it was noted in at least two journal entries over the course of treatment for that individual. These themes were drawn from both the question responses and from participant free-writing.

Treatment

Treatment was administered in an 8-session format derived from the ACT Made Simple: An easy-to-read primer on acceptance and commitment therapy (Harris, 2009) text. Although the content was divided into 8 sessions, participants also engaged in an intake assessment session and a 3-month follow-up session. A nature-based exercise, derived from the relaxation and sensory focus exercise (Radar, 2009) was integrated into the ACT format at the beginning of each session starting with session 2. This was a 5-minute guided meditation exercise that used natural stimuli as a way to increase both internal and external awareness. The hope was that this
experience might help the individual to become more present in order to facilitate the ACT intervention conducted subsequently in session. It was also hoped that this intervention might help individuals to practice being present in nature to draw from when spending 15 minutes in nature every day throughout the week (discussed below). Although the exercise was facilitated within an urban setting, the space used included all four attributes of a restorative environment (being away, fascination, extent, and compatibility) supported by attention restoration theory (ART). This particular nature-based intervention was chosen because research has shown that it has aided individuals in lessening anxiety (Radar, 2009). For Carl, the exercise was conducted alongside gardens out front of nearby neighborhood homes to the clinic. For Alice, the exercise was conducted in a green space located near the rear of the medical facility.

Beginning after session 2, participants in the study were also asked to spend at least 15 minutes in nature every day and practice some of the new skills they were learning in session. Although the type of nature they chose to spend time in varied (e.g., park, garden, yard), they were encouraged to find environments that met the criterion of a restorative environment set by ART. Carl spent time in both a nearby park and in his backyard, a secluded environment. Alice chose to spend time in two different parks, one near her house and another near her work. A session-by-session outline was created by this researcher as a guide (see Appendix C). At a 3-month follow-up, all four self-report measures were administered to both participants. At this time, this researcher interviewed the participants and gained a detailed narrative of how their behaviors and how life in general has changed since treatment.
Results

Course of Treatment

Participant with GAD and obesity. As treatment progressed, Alice became more willing to experience uncomfortable feelings if it meant engaging in a life that was in-line with her values. For instance, she was able to use the “opening up” exercise to make room for the uncomfortable feelings that arose when contacting an old friend. Alice also learned to “defuse” or change her relationship with her thoughts so that she was less caught up in unhelpful thoughts. She was able to learn various ways to effectively spend more time in the present moment. Spending more time in nature and using exercises such as the “notice 5-things” and the “3-minute breathing space” were helpful in this regard. Alice was able to gain greater clarity into her values and take steps in a direction that was aligned with what truly mattered. She gained an enhanced appreciation for her love of painting, exercise, partnership, and spending time with friends. She was able to take steps towards regularly engaging in each of these behaviors. She also engaged in the value-based behavior of spending time in nature regularly. However, spraining an ankle and experiencing inclement weather became challenges for Alice on multiple occasions to live according to these values.

After 3-months, it was clear that the integrated nature-based ACT intervention continued to affect Alice. She indicated that the intervention was “so helpful” and conveyed some recent valued changes to her life. While Alice also indicated that she continued to spend time in nature regularly, she stated that her ankle had healed and she was exercising regularly. She also reported that she was now in a healthy romantic relationship with an “old friend.” Considering that it has been many years since her last relationship, this was a big deal. She also stated that her son was jailed over the holidays due to domestic violence. She stated that although this event
was stressful, she was able to be mindful of her values, be supportive to her daughter-in-law, and communicate her needs and thoughts effectively to the social worker. In addition, she stated that she made only one medication error at work and was able to directly take accountability with her supervisor after the error was made. She indicated that she re-engaged with a previous mentor and was “ecstatic” about regaining her support. It was clear from the 3-month follow-up that Alice was living congruently with her values.

**Participant with PTSD, chronic pain, and diabetes.** As treatment progressed, Carl also became more willing to experience uncomfortable feelings in order to live congruently with his values. He took steps towards “living with uncomfortable feelings” more often although this continued to be a challenge for him at times. He also decided to discontinue his pain medication (with his PCPs approval) because he thought it was interfering with the full expression of other human feelings. Unfortunately, Carl continued to be “kicked around” by thoughts about the loss of his leg, difficulties with finding a job, chronic pain, and the pending loss of his apartment. Like Alice, Carl was also able to learn various ways to be more fully in the present moment through spending time in nature and using exercises such as the “notice 5-things” and the “3-minute breathing space”. Carl was also able to gain greater clarity into what truly mattered and began to take steps in a direction that was aligned with his values. He developed a deeper awareness of his fondness for holding dinner parties at his apartment and began to have friends and family over on Mondays. Carl also spent time in nature on a regularly basis, a value-based behavior. Carl’s initial level of anxiety appeared to remain present which may be associated with the occurrence of multiple stressors over the course of treatment. Shortly after beginning treatment, his mother passed away. He also was denied multiple job opportunities which he believed were due to his health problems. Because he was not able to obtain a job, he had little
money and was constantly dealing with the reality of losing his current apartment. He also was have difficulty accepting that he now only had one leg and continued to experience a high degree of stress about the negative impacts this disability would have on his life. He experienced two diabetic emergencies, leading to a loss of consciousness, a partial loss of vision in his right eye, and time in the emergency department of the hospital. Carl considered these life events as traumatic and they likely influenced the results of this study.

At 3-month follow-up, Carl also indicated that the integrated nature-based ACT intervention continued to be useful. For instance, Carl conveyed that the concept of “defusion has especially been helpful” with letting unhelpful thoughts go. He also stated that spending time in nature which he engaged in daily, continued to aid him in being “more present.” At the time of the follow-up, Carl indicated that he had not yet obtained a job. He stated that this has not only been a source of stress, but has acted as a barrier to engaging in valued activities such as spending time with friends and buying a new bicycle. Although jobless, Carl indicated that he volunteered as a chef for 2 and ½ months at a local shelter, where he engaged in the valued behaviors of helping others and preparing food.

**Analyses of Clinically Significant Change**

In order to test the hypotheses regarding clinically significant change each participant was administered the BAI, MAAS, AAQ-II, and the DUKE immediately before the first session (pre-treatment), 1 week after the conclusion of treatment (post-treatment), and 3 months after treatment (follow-up). To test hypotheses regarding clinically significant change, the following adaptation of the method proposed by Jacobson, Roberts, Berns, & McGlinchey (1999) was used to compute reliable change and an appropriate cutoff score which participants must have passed after treatment.
\[ RC = \frac{x_{\text{post}} - x_{\text{pre}}}{\sqrt{2(s_{\text{pre}}\sqrt{1 - r_{xx}})^2}} \]

\[ C = \frac{S_{\text{nonclinical}}M_{\text{clinical}} + S_{\text{clinical}}M_{\text{nonclinical}}}{S_{\text{clinical}} + S_{\text{nonclinical}}} \]

Unlike the original method in which test-retest reliability was used in the denominator of the reliable change formula, estimates of internal consistency (i.e., Cronbach’s alpha) were used in this study because the time frames for test-retest reliability for a majority of the outcome measures were not consistent with the time frame in the current study. The reliable change index (RC) helped to determine if the improvement over time reported by the individual was due to true change (i.e., treatment impact) and not simply measurement error or random variation (Jacobson et al., 1999). The cutoff score was derived using a method (c) which estimates the point the participant needs to cross at post-treatment to be classified as changed to a clinically significant level (Jacobson et al., 1999). This point is halfway between the functional and dysfunctional population means. The results of these analyses allowed this researcher to classify participants on each dependent variable as either recovered (i.e., reliable change and crossed the cutoff score), improved (i.e., reliable change but did not cross the cutoff score), no change (i.e., change was not reliable and did not cross the cutoff score) or deteriorated (i.e., a reliable change that is greater than 1.96 in the direction of dysfunction; Jacobson et al., 1999). This method of establishing a cutoff score was chosen because both the clinical and non-clinical norms were
available in the literature with overlapping score distributions (Jacobson & Truax, 1991). In addition, this method in comparison to others was neither too strict nor lenient in estimating meaningful change (Jacobson & Truax, 1991). This particular method of determining clinical significance was chosen because it is objective, psychometrically sound, and provided criteria for demonstrating that the participant has moved from the dysfunctional to the functional range (Jacobson et al., 1999). Also, because the participants did not have severe pathology (e.g., schizophrenia), the cutoff points were realistic (Jacobson et al., 1999). The hope was that evidence of this functional transition would help provide support for the positive effects of integrating nature and the ACT intervention.

To test the hypothesis that participants would experience a clinically significant reduction in anxiety, the BAI was administered before treatment, following treatment, and at the 3-month follow-up. Additionally, the participants completed the measure before each session and the scores are plotted in Figure 1. Consistent with hypothesis 1, Alice did exceed the required value of 1.96 indicating that true change occurred and the difference between scores is not solely due to measurement error at post-treatment ($RC = -2.19$) and at the 3-month follow-up ($RC = -2.84$; See Table 1). At both post-treatment and at the 3-month follow-up, her decrease in anxiety was not only reliable but clinically significant ($c = 3.65$), indicating that she recovered. Inconsistent with hypothesis 1, Carl did not exceed the required value of 1.96 indicating that reliable change did not occur at post-treatment ($RC = 1.31$) or at the 3-month follow-up ($RC = -.88$; See Table 1). While not clinically significant, these scores signify that change occurred in the direction of dysfunction at post-treatment and in the direction of function at the 3-month follow-up, as negative change signifies progress with this measure.
Table 1

**Participant Scores on the Beck Anxiety Inventory**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>Reliable Change</th>
<th>3-month Follow-up</th>
<th>Reliable Change</th>
<th>Cutoff Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>13.00</td>
<td>3.00*</td>
<td>-2.19</td>
<td>0.00*</td>
<td>-2.84</td>
<td>3.65</td>
</tr>
<tr>
<td>Carl</td>
<td>21.00</td>
<td>27.00</td>
<td>1.31</td>
<td>17.00</td>
<td>-.88</td>
<td>3.65</td>
</tr>
</tbody>
</table>

*Note.* * = Clinically Significant Change.

Figure 1. Changes in scores on the Beck Anxiety Inventory

To test the hypothesis that participants would experience a clinically significant increase in mindfulness, the MAAS was administered before treatment, following treatment, and at the 3-month follow-up. Additionally, the participants completed the measures before each session and
the scores are plotted in Figure 2. Consistent with hypothesis 2, Alice did exceed the required value of 1.96 indicating that true change occurred and the difference between scores is not solely due to measurement error at post-treatment ($RC = 5.14$) and at the 3-month follow-up ($RC = 6.11$; See Table 2). At both post-treatment and at the 3-month follow-up, her increase in mindfulness was not only reliable but clinically significant ($c = 4.15$) indicating that she has recovered. Inconsistent with hypothesis 2, Carl did not exceed the required value of 1.96 indicating that no reliable change occurred at post-treatment ($RC = -1.29$) or at the 3-month follow-up ($RC = -.17$; See Table 2). While not clinically significant in the direction of dysfunction, these negative scores signify that change occurred in the direction of dysfunction, as positive change signifies progress with this measure. It is important to note that his scores at pre-treatment and 3-month follow-up were within the non-clinical functioning range, while his score at post-treatment was close to non-clinical functioning ($c = 4.15$).

Table 2

*Participant Scores on the Mindful Attention Awareness Scale*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>Reliable Change</th>
<th>3-month Follow-up</th>
<th>Reliable Change</th>
<th>Cutoff Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>3.26</td>
<td>5.06*</td>
<td>5.14</td>
<td>5.40*</td>
<td>6.11</td>
<td>4.15</td>
</tr>
<tr>
<td>Carl</td>
<td>4.46</td>
<td>4.00</td>
<td>-1.29</td>
<td>4.40</td>
<td>-.17</td>
<td>4.15</td>
</tr>
</tbody>
</table>

*Note.* * = Clinically Significant Change.
To test the hypothesis that a clinically significant decrease in experiential avoidance would occur as a result of the intervention, the AAQ-II was administered before treatment, following treatment, and at the 3-month follow-up. Additionally, the participants completed the measure before each session and the scores are plotted in Figure 3. Consistent with hypothesis 3, Alice did exceed the required value of 1.96 indicating that true change occurred and the difference between scores is not solely due to measurement error at post-treatment ($RC = -2.14$) and at the 3-month follow-up ($RC = -3.92$; See Table 3). At both post-treatment and at the 3-month follow-up, her decrease in experiential avoidance was not only reliable but clinically significant ($c = 20.70$), indicating that she recovered. Inconsistent with hypothesis 3, Carl did not exceed the required value of 1.96 indicating that reliable change did not occur at post-treatment ($RC = .36$) or at the 3-month follow-up ($RC = .53$; See Table 3). While not clinically significant, these
positive scores signify that change occurred in the direction of dysfunction, as change in the negative direction signifies progress with this measure.

Table 3

*Participant Scores on the Acceptance and Action Questionnaire-II*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>Reliable Change</th>
<th>3-month Follow-up</th>
<th>Reliable Change</th>
<th>Cutoff Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>30.00</td>
<td>18.00*</td>
<td>-2.14</td>
<td>8.00*</td>
<td>-3.92</td>
<td>20.70</td>
</tr>
<tr>
<td>Carl</td>
<td>25.00</td>
<td>27.00</td>
<td>.36</td>
<td>28.00</td>
<td>.53</td>
<td>20.70</td>
</tr>
</tbody>
</table>

*Note.* * = Clinically Significant Change.

*Figure 3.* Changes in scores on the Acceptance and Action Questionnaire-II
To test the hypothesis that participants would experience clinically significant increase in
general health, the DUKE was administered before treatment, following treatment, and at the 3-
month follow-up. Additionally, the participants completed the measure before each session and
the scores are plotted in Figure 4. Inconsistent with hypothesis 4, Alice’s score on the general
health component of the DUKE did not exceed the required value of 1.96 indicating reliable
change did not occur at post-treatment ($RC = .69$; See Table 4). While not clinically significant,
these scores signify that change occurred in the direction of function at post-treatment, as
positive change signifies progress with this measure. At the 3-month follow-up Alice did exceed
the required value of 1.96 ($RC = 3.79$, See Table 4). This indicates that true change occurred, the
difference between scores is not solely due to measurement error, and that she has recovered.
Inconsistent with hypothesis 4, Carl’s score on the general health component of the DUKE did
not exceed the required value of 1.96 indicating that reliable change did not occur at post-
treatment ($RC = .69$) or at the 3-month follow-up ($RC = 1.37$; See Table 4). Although not
clinically significant, these scores indicate that change occurred in the direction of function at
both post-treatment and at the 3-month follow-up, as positive change represents progress with
this measure.

Table 4

*Participant Scores on the Duke Health Profile (General Health)*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>Reliable Change</th>
<th>3-month Follow-up</th>
<th>Reliable Change</th>
<th>Cutoff Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>43.33</td>
<td>50.00</td>
<td>.69</td>
<td>80.00*</td>
<td>3.79</td>
<td>72.06</td>
</tr>
<tr>
<td>Carl</td>
<td>40.00</td>
<td>46.67</td>
<td>.69</td>
<td>53.33</td>
<td>1.37</td>
<td>72.06</td>
</tr>
</tbody>
</table>

*Note. * = Clinically Significant Change*
Common Journal Themes for Both Participants

This journal analysis revealed multiple themes. These themes were drawn from both the question responses and from participant free-writing. Some themes arose in both participants while others appeared as themes throughout the course of individual treatment. Participants were asked to elaborate on salient journal entries in session and this information is also discussed below.

Increased sense of calmness. Both participants indicated that spending time in nature lowered either their stress level or anxiety, thus increasing their sense of calmness. For instance, Carl wrote that he notices a “calmness” when he spends time in nature and feels like it “lowers his blood pressure just to be outside.” Alice wrote that she felt “calmer” and “less anxiety” during the week when she spent time in nature. She wrote that she thinks “nature is really
helping” her anxiety. At one point, Alice wrote that she went and spent time in nature after feeling angry and upset at work. She stated that upon returning, she “felt so much better” and a co-worker even commented that she looked “so serene.”

**Increased present moment awareness with insight.** Both participants indicated that spending time in nature increased their present moment awareness and subsequent personal insight. For instance, through spending time in nature, Alice wrote that “my thoughts are slowing down where I can make sense of events and move on.” She went on to write that she was able to experience an “epiphany” that “I am ok” and the “shame” she felt during an interaction with her ex-husband was unfounded. Carl wrote that spending time with and feeding the birds while in nature helped him to realize that he feels his “best” when “taking care of others.” At the same time, he wrote that he needs to be careful not to focus too much on others because he realized that this can sometimes act as a “way to not focus on oneself."

**Individual Participant Journal Themes**

**Increased ability to pay attention.** Alice indicated that spending time in nature increased her ability to pay attention throughout her course of treatment. For instance, she stated that “I was able to pay attention to tasks much easier at work” and “I was able to focus on what I wanted to change in myself.” She also wrote that her “attention to detail has improved” and “I don’t have too many things on my mind which distract me.”

**Increased connection to the natural world.** Carl indicated that he felt more connected to various aspects of nature after spending time in the natural world throughout his course of treatment. For instance, he wrote that “whatever is on my mind, I feel better as soon as the crows show up.” When asked to elaborate on this journal entry in session, Carl stated that
spending time in nature has allowed him to “connect to the larger energy force” of the natural world and he has “connected with the animals in the area.”

**Barriers to spending time in nature.** Although there are a wide variety of potential barriers to spending time in nature, inclement weather, fatigue, and a perception of not having enough time arose as themes. For instance, Alice stated that she neglected to spend time in nature at times because she “feels pressed for time.” Alice wrote that she was not able to spend time in nature on one day due to “getting ready for her daughter’s baby shower.” Weather presented as a challenge often throughout Alice’s course of treatment. She wrote that she was not able to spend time in nature because of “the rain,” that it was “very cold outside,” and that “snow is coming.” She also stated that she was not able to spend time in nature on specific days because after work she felt “like I need to go home and take a nap” and like she would “rather relax.”

While barriers to spending time in nature were present, the participants spent at least 15 minutes in nature on most days. Time spent in these natural environments provided an opportunity to not only reap the benefits of restorative environments, but also practice ACT homework assignments. It is believed that integrating nature-based interventions into the ACT protocol was complimentary to the ACT process.
Discussion

In this dissertation, the effectiveness of integrating nature-based interventions into an ACT protocol for individuals with an anxiety and comorbid medical diagnosis was assessed. It was hypothesized that both participants would experience a clinically significant increase in mindfulness and general health. It was also hypothesized that both participants would experience a clinically significant decrease in anxiety and experiential avoidance. The results confirmed these hypotheses for participant one and rejected them for participant two. Various themes derived from participant journals also provided rich and useful qualitative information to apply to future studies.

Clinically Significant Results

ACT intervention has been found in some studies to lead to a significant reduction in anxiety (Arche et al., 2012; Forman et al., 2007; Wetherell et al., 2011) while others have found no significant reduction (Codd et al., 2011). In this study, Alice showed clinically significant findings related to anxiety at both post-treatment and at the 3-month follow-up, supporting the above research that ACT intervention can lead to reduced anxiety. This research thus does not support the assertion that ACT aids individuals in changing their response to anxiety, rather than lowering anxiety itself (Codd et al., 2011). While this finding is note-worthy, it is important to emphasize that the other participant in this study did not experience a clinically significant reduction in anxiety (as discussed below). Caution should be used when interpreting these results. Alice’s reduced need to control or eliminate uncomfortable internal experiences such as thoughts and feelings, which ACT theory asserts will likely reduce distress, may have contributed to this finding. She experienced a greater willingness for anxiety leading to reduced avoidance behaviors (e.g., worry) and increased values-congruent activities (e.g., exercise). She
was less caught up in worried thoughts as a result of learning defusion skills. Her increase in present-moment awareness likely also led to her decrease in worry and her perception of future threat. In addition to the ACT intervention, including a nature-based component may have also facilitated a reduction in anxiety. Nature-based intervention has been found in the research to lead to reduction in stress (Nisbet, 2013; Ulrich et al., 1991) and anxiety (Berget et al., 2007; Ulrich et al., 1993) through the occurrence of nature-based stress reduction (Doherty, 1999, 2010, 2012). A reduction in anxiety in this study is also congruent with results from research using a similar 5-minute nature-based exercise to facilitate mindfulness (Radar, 2009), lending support to this type of exercise.

Increasing one’s mindfulness via various mindfulness-based interventions has been found in the literature to lead to reductions in anxiety (Kabat-Zinn et al., 1992; Roemer et al., 2008). This is hypothesized to occur because mindfulness-based approaches, with their focus on present-moment and mindful awareness, may help to treat individuals with this future-focused worry through teaching individuals to accept the present moment rather than engaging in avoidance patterns that create distress (Borkovec, 1994). Increasing one’s mindfulness will likely have far-reaching effects on an individual. However, some research has shown that these interventions show no significant increases in mindfulness itself (Evans et al., 2008) representing a need for increased effectiveness. In this study, Alice’s score on the MAAS showed clinically significant improvement in mindfulness at post-treatment and at 3-month follow-up. While this finding is promising, it should be interpreted cautiously as Carl did not experience the same result (as discussed below). However, this result is encouraging for using ACT integrated with nature-based interventions to treat anxiety and in its potential for teaching individuals to be better able to achieve non-judgmental present moment awareness through this method of treatment.
Although this finding is in-line with the research supporting increase in mindfulness following treatment using acceptance-based behavioral therapy (Roemer et al., 2008), it deviates from the research on MBCT that shows no increase in mindfulness following treatment (Evans et al., 2008). Whether, this difference is a result of a differing form of mindfulness-based treatment (e.g., ACT) or a result of integrating nature-based interventions is unknown. However, given the research supporting the use of nature to increase attention (Berto, 2005; Cimprich, 1993; Felsten, 2009; Hartig et al., 2003; Raanaas et al., 2011) and the significant role of attention in mindfulness, it is likely that nature-based interventions may have played a role in the clinically significant change.

According to ACT theory, healthy psychological functioning will likely increase if individuals are able to learn to reduce the struggle with wanting to control or eliminate uncomfortable internal experiences while engaging in valued activities (Wetherell et al., 2011). In this study, Alice showed clinically significant change on the AAQ-II, a measure of experiential avoidance or psychological inflexibility, at both post-treatment and at the 3-month follow-up. Learning new skills such as the “leaves on a stream” exercise and the “opening up” exercise likely helped Alice to become more psychologically flexible in order to increase her valued behaviors of painting, exercise, and spending time with friends. This finding is congruent with findings in the literature (Forman et al., 2007; Roemer et al., 2008) that mindfulness-based interventions such as ACT can lead to meaningful decreases in experiential avoidance. However, similar to the MAAS, this finding should be observed with caution as the other participant in the study, Carl, did not experience clinically significant change (discussed below). Congruent with research regarding the nature’s positive affect on attention (Berto, 2005; Cimprich, 1993; Felsten, 2009; Hartig et al., 2003; Raanaas et al., 2011), nature-based
interventions conducted before session and between sessions may have provided an atmosphere
where Alice could be effectively present and focused in order to properly learn and practice the
interventions.

Research has shown that if individuals are able to learn to accept uncomfortable feelings
while taking action to live according to one’s values, then well-being will be enhanced (Forman
et al., 2007 ). As social, physical, and mental health are all encapsulated in one’s sense of well-
being, scores on general health measures of the DUKE which measures these three domains,
would likely be positively affected. At the 3-month follow-up, Alice’s score on this measure of
the DUKE showed clinically significant change. This may be a reflection of the dramatic life
changes to all three of these domains that Alice made over the course of treatment.
Reconnecting with an old friend and building upon relationships with co-workers likely led to
increases to her social health. Continued progress and even further changes that occurred
between the post-treatment assessment and the 3-month follow-up (e.g., beginning a new
romantic relationship) may have led to the clinically significant scores at that time. Also, various
changes to her mental health such as increase in psychological flexibility, reduced anxiety, and
ability to be more present-focused likely influenced her mental health score. Alice’s physical
health was enhanced through more frequent exercise and the eventual healing of her sprained
ankle. As her level of anxiety significantly decreased and research has demonstrated the close
link between anxiety and physical health (Belik et al., 2009; Bowen et al., 2000; Demyttenaere et
al., 2008; Harter et al., 2003), this may have also influenced her physical health score.

Although its role is unclear, increasing the amount of time Alice spent in nature may have
affected the general health score on the DUKE. As mentioned above, nature may have
influenced her ability to be more present and focused in order to practice the ACT skills. Also,
congruent with research supporting nature-based stress reduction (Nisbet, 2013; Ulrich et al., 1991), spending time in nature may have facilitated the clinically significant reduction in anxiety. These two pathways may have influenced the mental health piece of the general health score on the DUKE. Although the physical health aspect of this score may have been influenced by mental health changes (see Belik et al., 2009; Bowe et al., 2000; Demyttenaere et al., 2008; Harter et al., 2003), the exercise that Alice experienced while spending time in nature may have led to an enhanced physical health score. The effect of spending time in nature on the social health part of the general health score is unclear.

**Clinically Non-Significant Results**

Hypotheses related to all of Carl’s scores were rejected. The results from this study are not congruent with research supporting the use of ACT for PTSD (Batten & Hayes, 2005; Codd et al., 2011; Orsillo & Batten, 2005; Twohig, 2009). Various explanations may account for these non-significant findings. Over the course of treatment, Carl experienced various life stressors that substantially exacerbated his symptomology and made it difficult for him to absorb new information. These stressors included the passing of his mother, the pending loss of his house, struggling to accept his recent loss of leg, and consistent job rejection. He also experienced two diabetic emergencies, leading to a loss of consciousness, a partial loss of vision in his right eye, and time in the emergency department of the hospital. Taking care of his basic needs became more of a priority for Carl rather than mental health treatment. Carl had difficulty becoming more mindful as reflected on the MAAS. Although his life stressors contributed to this non-significant change, it could also be a result of his previous experience with mindfulness meditation and high level of mindfulness at the beginning of treatment. Also, while his self-report indicated positive change, his AAQ-II score reflected that Carl continued to engage in a
similar degree of experiential avoidance. His extremely challenging life circumstances made it difficult to engage in a heightened degree of willingness for uncomfortable internal experiences and instead maintained old avoidance behaviors. These same extreme life stressors affected Carl’s scores on the BAI related to anxiety; he was consistently focusing on and worrying about perceived threat in the future rather than focusing on the present moment. Life stressors related to decreased physical status (e.g., two diabetic emergencies leading to a partial loss of vision in his right eye; difficulty adjusting to losing his leg), and decreased mental health status contributed to his subjective sense of general health.

In addition to the above life stressors, Carl may not have experienced clinical significant change because of challenges inherent to the diagnosis of PTSD that differ from GAD. While individuals with GAD often engage in various forms of experiential avoidance, avoidance of stimuli associated with a traumatic event is an essential and persistent feature of the PTSD experience and may have contributed to Carl’s difficulty with experiencing a willingness for uncomfortable internal phenomena. Furthermore, re-experiencing past trauma through persistent memories and dreams, another core feature of PTSD that diverges from GAD, may have also made it difficult for Carl to be fully present in order to actively engage in the treatment.

Unlike the clinically significant change noted at the 3-month follow-up, Alice’s general health did not improve from pre-treatment to post-treatment. Although she made some significant changes to her social health and mental health (two categories within the general health scale), her sprained ankle contributed to her relatively poor physical health score at that time. Also, because she was still single at this time, as compared to the 3-month follow-up when she was involved in a romantic relationship, her social health aspect of this score may have been effected. Although she was determined to exercise and was beginning to do so, she was only at
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the very early stages of such a health behavior change. Her clinically significant change noted at the 3-month follow-up may have been a result of the later effects of this behavior change.

Beyond the potential reasons stated, the above clinically non-significant findings may have resulted from the protocol that this researcher created as well as the researcher himself. Although, it was roughly created from the *ACT Made Simple* text, various nature-based interventions were added by the researcher at the beginning of every session and between sessions. The protocol has not been used in previous research and it is possible that the protocol was not created effectively. The study was also conducted by a student clinician who, although has experience using both nature-based interventions and ACT previously, is relatively inexperienced as a therapist and may have facilitated ineffective psychotherapy.

**Common Journal Themes for Both Participants**

**Increased sense of calmness.** Research indicates that nature can be restorative (Berget et al., 2007; Ingulli & Lindbloom, 2013; Nisbet, 2013; Ulrich et al., 1993) and that anxiety can be reduced through being mindful in nature (Radar, 2009). Doherty’s term of nature-based stress reduction (2009, 2010, 2012) best conveys this experience. Journal entries indicated that both participants experienced an increased sense of calmness through reduced anxiety or stress when spending time in and being present in nature. This finding supports the above research. As Chalquist (2009) professes, spending time in the natural world, may have allowed the participants to connect with an environment which humans lived closely in for thousands of years, leading to a sense of calmness. It is unclear as to whether being mindful in nature was necessary in this study in order to experience nature-based stress reduction. It is also important to note that the natural environments chosen by both participants did not always meet the criterion for a restorative environment and include the elements of being away, fascination,
extent, and compatibility. Although a park was used at times by both participants, Carl spent great amounts of time in his backyard, an environment that likely does not meet the criterion of “being away.” According to Carl and his journal entries, this environment too was restorative. Lastly, although the journal entries of both participants indicated qualitative change in stress and anxiety, it is unclear as to why Carl’s score on the quantitative measure (e.g., BAI) did not indicate clinically significant change.

**Increased present moment awareness with insight.** Burgeoning research and theory has found that spending time in nature enhances an individual’s experience of mindfulness (DeYoung, 2009, Kaplan, 2001, Lay, 2007, Miller, 2011). According to their journal entries, both participants in the study appeared to experience an increase in present moment awareness with insight. This finding supports the research and theoretical support for enhanced mindfulness through spending time in nature. As time in nature is removed from day-to-day distractions and promotes “present moment awareness and opportunity for reflection on the experience” (Lay, 2007, p. 34), it is possible that spending time in nature allowed the participants to achieve greater awareness of their thoughts and subsequent life insight. Although it is unclear as to whether time in nature enhanced some of the core features of the ACT intervention, it is likely that the limited distractions of nature aided participants in becoming more highly skilled at “noticing” their internal experiences. Although Alice’s clinically significant change in mindfulness (MAAS) supports this qualitative finding, it is unclear why Carl’s score does not.
Individual Participant Journal Themes

Increased ability to pay attention. Attention restoration theory (Kaplan, 1995) conveys that attention can be enhanced through spending time in restorative environments. Natural environments have been found to be capable of acting as a restorative environment (Berto, 2005; Cimprich, 1993; Felsten, 2009; Hartig et al., 2003; Raanaas et al., 2011) for one’s attention. Alice’s journal indicated that she experienced an increase in attention at various times throughout the course of treatment. This finding supports attention restoration theory (Kaplan, 1995) and the capacity of nature to act as a restorative environment. This increase in attention positively affected Alice’s work life by making “tasks much easier” and fewer medication errors. It also positively affected her personal life through limiting distractions that drown out clarity thus allowing her to focus on what she wanted to change in herself. Increasing her attention through spending time in nature thus likely facilitated the ACT intervention of helping her to gain clarity of her values (e.g., painting, exercise, spending time with friends) in order to begin taking steps in that valued direction. As attention is also an integral aspect of mindfulness, her perceived increase in attention through spending time in nature likely increased her sense of mindfulness and subsequent score on the MAAS.

Increased connection to the natural world. Indigenous peoples throughout the planet commonly believe that human beings are closely connected to and inseparable from nature (Basso, 1996; Deloria, 1999; Martin, 1999; McCormick, 2005). Through developing this relationship with the natural world and perceiving a non-duality between humans and nature, some researchers have found that an individual will increase the chance of finding peace, wholeness, strength, and meaning (Barlett, 2005; Feral, 1998; Glassman, 1995; Kaplan & Talbot, 1983; Mayer & Frantz, 2004, Merkl, 1995; Wolsko, Lardon, Hopkins, & Ruppert, 2006). Carl’s
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journal indicated that he experienced an increased connection with the natural world over the course of treatment. This finding supports previous research of how spending time in nature can evoke a sense of connection with nature (Mayer & Frantz, 2004). As connection to nature has been linked to various forms of positive mental health, Carl’s experience may have long-term consequence for his mental health that has not been measured in this study.

**Barriers to spending time in nature.** Various aspects of modern day society have been theorized to act as barriers for individuals to spend time in nature (Mayer et al., 2008). These cultural factors, which both influence and reflect the meaning of nature within modern western society (Kaplan & Talbot, 1983), may include living in densely populated urban areas, having busy lives, working in buildings, and driving in climate-controlled cars (Mayer et al., 2008). In this study, Alice noted in her journal that although she spent time in nature on most days, she had difficulty doing so at times over the course of treatment due to inclement weather, perception of not having enough time, and feelings of fatigue. As it is commonly understood that thoughts influence behavior, she became fused to various unhelpful or untruthful thoughts that her brain was creating which subsequently impacted her value-incongruent behavior. Her tendency to avoid uncomfortable experiences may have also impacted her willingness to participate in nature-based behavior. It is unclear whether Alice’s obesity played a role in her thoughts related to feelings of “fatigue” or avoidance of spending time in nature. In hindsight, it would have been useful to spend larger portions of time both preparing her for the possibility of such thoughts and tendency towards experiential avoidance in treatment as they occur. Allowing for such time in future studies may prove useful in increasing value-based behavior.

While unhelpful thoughts and experiential avoidance had an influence on her challenges with spending time in nature every day, potential conflict with her broader cultural context may
have also played a role. Inherent to Alice’s cultural context, nature is often valued as a venue for summer time activities, a time when the weather is generally fair in the Pacific Northwest. For instance, Alice reported that she enjoys engaging in nature activities in the summer (e.g., floating down the Santiam River with her kids and camping) but spends large portions of time the rest of the year engaging in modern indoor activities (e.g., watching television and movies). Asking her to spend at least 15 minutes in nature every day, at a time of year when cold temperatures and rain are common, may have conflicted with her culture and personal norms creating a barrier to spending time in nature. Not having enough time to spend time in nature, another barrier indicated in Alice’s journal, is reflective of her cultural and the normative busyness of life within that context (Mayer et al., 2008). Asking participants to spend regular time in nature may conflict with a wide variety of modern cultures and needs to be considered in future studies.

**Limitations**

A variety of limitations were present in this study. A control group was not used in this study to delineate the effect of integrating nature-based interventions into the ACT protocol. We have little understanding whether the clinically significant changes were a result of the ACT intervention only, the nature based experiences only, or both combined. A further limitation is that the protocol used in this study was created by this researcher and has not been subject to scrutiny in order to determine its integrity. In addition, this study was limited in its application to individuals with anxiety and a comorbid medical diagnosis from the Pacific Northwest. Although the findings from this study can be applied to future studies, the clinically significant findings can only be applied to individuals with these particular challenges from this region on the U.S. In addition, the measures used to assess quantitative change were all self-report. As subjective bias is inherent to self-report measures, the results need to be interpreted as such.
Although every effort was made to obtain two participants with GAD, one participant was diagnosed with PTSD rather than GAD. Although there are many common features to both these diagnoses, the differences limit the generalizability of the findings. As this study included two individuals of Caucasian descent, engaging with research with a more culturally diverse group of participants will also be useful in order to generalize to a broader population.

**Implications and Directions for Future Research**

In this dissertation, an integration of nature-based interventions and ACT was used to treat individuals with anxiety and comorbid medical diagnosis. Meaningful change in anxiety, mindfulness, experiential avoidance, and general health was found for one participant in the study and not for the other. Integrating nature-based interventions into an ACT protocol is complimentary to the intervention and supported by this study. To the knowledge of this researcher, this is the first study to use a combination of nature-based interventions and ACT to treat this population.

While this study lends support to the notion that nature can be effectively integrated with ACT for the treatment of anxiety and comorbid medical diagnosis, further research is needed in various domains. Future randomly controlled study is needed to determine whether there is a true significant difference between using an ACT intervention for this population with or without nature-based interventions. As this intervention appeared to have a more effective outcome for the participant with GAD than PTSD, future research is needed in order to determine if a real difference exists. Studies that more richly explore the impact of the intervention on various life domains for individuals with and without a comorbid medical diagnosis will also be useful. Further research is also needed to decipher which nature-based interventions are most effective and the amount of time necessary to take part in them in order to create a maximum effect. It
will be important to perform research to determine the most effective ways to overcome participant and cultural barriers to spending time in nature. Engaging in research to provide insight into whether all four hypothesized components of a restorative environment are needed for an individual to experience positive effects will also be necessary.

Further research to determine the long-term effects of integrated nature-based intervention into ACT for this population is needed. Although this study included a 3-month follow-up, whether clinically significant changes were maintained for 6 months, 1 year, or longer is not known. Determining the benefits of experiencing a connection to nature for this population will also be salient. The future investigation of whether nature can be effectively integrated with other mindfulness-based interventions (e.g., MBCT, MBSR, DBT) should also receive attention.

While this study provided support for integrating nature-based interventions with ACT for individuals with anxiety and a comorbid medical diagnosis, future research is clearly needed before we can more fully understand how to best embrace nature in the therapeutic process with this population. Subsequent study, which builds upon findings from this dissertation, is essential as the field continues to recognize nature as a restorative environment and its usefulness in the therapeutic realm.
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Appendix A
The Mindful Attention Awareness Scale (MAAS)

Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be.

1=almost always, 2=very frequently, 3=somewhat frequently, 4=somewhat infrequently, 5=very infrequently, and 6=almost never.

1. ____ I could be experiencing some emotional and not be conscious of it until sometime later.
2. ____ I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. ____ I find it difficult to stay focused on what’s happening in the present.
4. ____ I tend to walk quickly to get where I’m going without paying attention to what I experience along the way.
5. ____ I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. ____ I forget a person’s name almost as soon as I’ve been told it the first time.
7. ____ It seems I am “running on automatic” without much awareness of what I’m doing.
8. ____ I rush through activities without being really attentive to them.
9. ____ I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.
10. ____ I do jobs or tasks automatically, without being aware of what I’m doing.
11. ____ I find myself listening to someone with one ear, doing something else at the same time.
12. ____ I drive places on “automatic pilot” and then wonder why I went there.
13. ____ I find myself preoccupied with the future or the past.
14. ____ I find myself doing things without paying attention.
15. ____ I snack without being aware that I’m eating.
Appendix B

**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>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>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
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Appendix C

Treatment Protocol

Session 1: Opening ACT
- Establish Rapport
- Confirm diagnosis through use of the Anxiety and Other Disorders portion of the SCID
- Obtain informed consent for study
- Review Intake Assessment
  - Worksheet: “Bull’s Eye”
  - Look for fusion, avoidance, and unworkable solution
- Agree on initial treatment goals
  - Look for values and value-congruent goals
- Assess baseline anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- Introduce Journal
- Homework:
  - Journal

Session 2: Creative Hopelessness
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Creative Hopelessness
  - Ask Questions: What have you tried?, how has it worked?, what has it cost?
  - Worksheet: “Join the D.O.T.S.”
  - “Pushing against Clipboard” metaphor to demonstrate the cost of attempting to control
- Homework:
  - Spend at least 15 minutes in nature (daily)
  - Journal
  - Notice avoidance or attempts to get rid of unwanted feelings, how it works, and what it costs

Session 3: Defusion
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Defusion
  - “Setting the Mood”- How our minds evolved to think negatively
  - Recap problematic thoughts, clarify the cost when entangled with thoughts, and invite to learn a new way of dealing with them (defusion)
    - Introducing Defusion:
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- Exercises: “I’m having the thought that…”, Thoughts on Card Metaphor, “Letting go” Metaphors (e.g., “Leaves on a stream” and “clouds drifting across sky”)
- Simple summary of Fusion vs. Diffusion

Homework:
- Spend at least 15 minutes in nature (daily)
- Journal
- Notice in what situations you’re mind hooks you and what sort of things does it say?
- Optional:
  - Practice using one of the defusion techniques from the session
  - Notice when the mind attempts to hook you but don’t take the bait, just let it do its thing.

Session 4: Open Up
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Acceptance
  - Review clipboard Metaphor and relate to feelings
  - Introduce Acceptance
  - “Opening Up” Mindfulness Exercise
  - Techniques/Metaphors (Demons on the Boat Metaphor” and “The Struggle Switch”)
- Homework:
  - Spend at least 15 minutes in nature (daily)
  - Journal
  - Practice making room for feelings through using the “Opening Up” exercise

Session 5: Be Here Now
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Contact with the present moment
  - Introduce the Present Moment through the “Time Machine” Metaphor
  - Present-centering exercise (“notice 5 things” and “Dropping anchor”)
  - Being present and life satisfaction
    - “Mindfulness of your hand” and “Mindfully eating a raisin” exercise
- Homework:
  - Spend at least 15 minutes in nature (daily)
  - Journal
  - Practice 5-10 mindful, slow, deep breaths at every opportunity throughout the day
  - Optional:
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- Practice a brief centering technique (from “Simple Ways to Get Present” worksheet) whenever you are “zoning out, flipping out”, when entering a stressful situation, or at every opportunity throughout the day

Session 6: Pure Awareness
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Self-As-Context
  - Introduce Self-As-Context
    - “The Chessboard” metaphor
- Homework:
  - Nature-based Mindfulness Exercise (daily)
  - Focus on noticing who’s noticing throughout each day
  - Journal

Session 7: Know What Matters
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Values
  - Review concept of values
  - Values vs. Goals
    - “The Compass” metaphor, “Getting Married vs. Being Loving” example
  - 5 Key Points About Values
  - Techniques/Exercises for Clarifying Values
    - “Imagine your Eightieth Birthday”,
      - Review “Bull’s Eye” worksheet from 1st session.
- Homework:
  - Spend at least 15 minutes in nature (daily)
  - Journal
  - Writing, thinking about, or meditating on, or discussing values with loved ones.
  - Optional:
    - Notice when you’re acting congruently with your values and what it’s like to do so.

Session 8: Do What It Takes
- Assess anxiety, mindfulness, and health levels through BAI, MAAS, AAQ-II, and the DUKE
- 5-Minute Nature-based Exercise
- Review previous week (session and homework)
- Main Intervention: Committed Action
Use “Setting Values-Based Goals” worksheet
Public Commitment
The tiniest step
Recognize common psychological barriers to making positive life changes
  - F.E.A.R. (Fusion, Excessive goals, Avoidance of discomfort, Remoteness from Values)
  - To address these barriers, use D.A.R.E. (Defusion, Acceptance of Discomfort, Realistic Goals, Embracing values)

- Homework:
  - Spend at least 15 minutes in nature (daily)
  - Journal
  - Take action in the goals you have committed