ABSTRACT

The Attention Training Technique and Worry: Testing Theoretical Underpinnings

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The attention training technique (ATT) is a component of metacognitive therapy for emotional disorders that is designed to reduce self-focused attention (SFA) and worry. SFA refers to the sustained focus on negative, self-relevant thoughts and is related to increased emotional distress. Despite the purported impact of ATT on SFA and worry, whether ATT causally reduces SFA and worry remains relatively unexplored among individuals particularly prone to those phenomena (i.e., individuals reporting high trait worry). The present study examined the causal effects of ATT on SFA and worry reduction using a randomized lab-based component study among a selected sample of 115 undergraduate students who endorsed high trait worry. The present study design included a worry provocation and randomization to one, of three, single-session intervention groups: ATT (n = 39), mindful breathing (n = 40), and neutral control (n = 36). Study tasks included completing a worry provocation, followed by the completion of a single session of ATT, mindful breathing, or the neutral control. Self-report measures assessed SFA and worry before and after completion of the respective single session

intervention strategy. Study results indicated that each task led to significant reductions in worry, with there being no differences in the level of worry change across the three groups. Study results further indicated that only ATT significantly reduced SFA; however, changes in SFA unexpectedly did not relate to changes in worry in the ATT group. The present results provide further indication that ATT is useful for reducing SFA, with study implications for future research examining ATT discussed.

The Attention Training Technique and Worry: Testing Theoretical Underpinnings

by

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CHAPTER ONE

Introduction

Anxiety

Anxiety disorders and depression are two of the most frequently experienced psychological disorders. According to a 2005 national survey by the World Health Organization, the 12-month prevalence rates of anxiety disorders and depression are 18% and 8%, respectively (Kessler, Chiu, Demler, & Walters, 2005). The average age of onset of anxiety disorders and depression is 15 years and these disorders are usually chronic if left untreated (Kessler & Greenberg, 2002). Anxiety disorders and depression are associated with considerable impairment in terms of social, family, and occupational functioning (Hoffman, Dukes, & Wittchen, 2008). Both disorders lead to substantial societal costs, including an increased strain on healthcare resources, prescription medication costs, decreased work productivity, and absenteeism (Hoffman et al., 2008). In fact, anxiety disorders and depression are the costliest psychological disorders among people in their early to middle years of life (Murray & Lopez, 1996), with estimated overall annual economic costs exceeding $100 billion (Kessler et al., 2002). Given such high prevalence rates and associated burden, researchers have sought to better understand the nature of both disorders in the service of ultimately improving associated treatment efforts.

Although anxiety disorders and depression are classified as different categories of disorders (American Psychiatric Association, 2013), it is becoming increasingly apparent that they are more similar than different (Mineka, Watson, & Clark, 1998). For example,

it is estimated that over half of individuals with a principal anxiety disorder or depression have at least one additional anxiety or depressive disorder, increasing to nearly 76% of individuals when considering lifetime diagnoses (Brown, Campbell, Lehman, Grisham, & Mancill, 2001). One reason for their high rate of co-occurrence is that anxiety disorders and depression are both characterized by frequent, negative emotions. Additionally, anxiety disorders and depression share similarities in terms of etiology (Barlow, 2002), overlap in diagnostic criteria (e.g., sleep disturbance, fatigue, restlessness; Brown, 2007; Brown et al., 1998), and underlying pathology (Barlow, Allen, & Choate, 2004; Harvey, Watkins, Mansell, & Shafran, 2004). Specifically, anxiety disorders and depression share the temperamental vulnerability known as negative affect (i.e., the propensity to experience negative emotions; Clark, Watson, & Mineka, 1994). Negative affect appears to be heritable (Costa & McCrae, 1998), suggesting that anxiety disorders and depression may share biological vulnerabilities as well.

The overlap among anxiety disorders and depression is so great that researchers proposed combining these disorders under a unifying category labeled "emotional disorders" (Barlow et al., 2004). The term emotional disorders is adopted throughout this document to refer to disorders characterized as principal anxiety disorders and depression. The most current (i.e., fifth) edition of the *Diagnostic and Statistical Manual for Mental Disorders* [DSM] (DSM-5; American Psychiatric Association, 2013) splits obsessive-compulsive disorder (OCD) and posttraumatic stress disorder (PTSD) into new diagnostic categories. Emotional disorders is used to encompass OCD and PTSD as well because both disorders functionally parallel anxiety disorders (Stein et al., 2010; Zoellner, Rothbaum, & Feeny, 2011).

Disorder-Specific Classification

Despite the recent shift towards focusing on shared elements of emotional disorders, historically the focus has been on their distinctive features. For example, since the introduction of the third edition of the DSM (DSM-III; American Psychiatric Association, 1980), emotional disorders have been broken down into a large number of individual disorders defined by a specific set of criteria assumed to be unique to each disorder. The DSM-5 does not take theoretical models into account when establishing criteria for emotional disorders, leaving researchers with the task of creating conceptual models after the fact (Parker, 2006). Given that the current disorder-specific approach "splits" each emotional disorder into separate diagnoses, researchers have created separate, disorder-specific models in an attempt to account for the etiological and maintaining factors within each diagnosis. The development of disorder-specific models is a substantial undertaking given the large number of emotional disorders in the DSM-5. Several prominent disorder-specific models exist with substantial empirical support, including cognitive-behavioral models for major depressive disorder (Beck, 1976), panic disorder (Clark, 1986), social anxiety disorder (Clark & Wells, 1995), generalized anxiety disorder (GAD; Dugas, Gagnon, Ladouceur, & Freeston, 1998), OCD (Salkovskis, 1985), and PTSD (Foa & Meadows, 1997), respectively.

Disorder-specific models have substantially increased our understanding of emotional disorders and, most importantly, our ability to develop efficacious treatments grounded in theoretical frameworks. Disorder-specific models argue that the causal and maintenance processes differ across emotional disorders and, thus, require unique treatment interventions. Such models have led to the development of separate treatment

protocols for each disorder (Clark & Beck, 2010), with those protocols targeting the causal and maintaining processes putatively specific to each disorder. These highly effective therapies have withstood rigorous clinical trials and have greatly increased our knowledge of emotional disorders (Butler, Chapman, Forman, & Beck, 2006; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). Disorder-specific therapies have also increased access of care to millions of individuals suffering from emotional disorders. As with any approach, however, disorder-specific models and treatments are associated with limitations.

As noted, the co-occurrence of emotional disorders has become increasingly apparent (Kessler et al., 2005). The issue of comorbidity complicates the disorder-specific approach because disorder-specific models rarely address consistent findings that emotional disorders cluster together (Watson, 2009). For example, depression has been shown to be highly comorbid with anxiety disorders, such as GAD (Brown et al., 2009). Because disorder-specific models focus on differentiating characteristics of emotional disorders, less focus is given to shared characteristics that may be driving their co-occurrence. In terms of treatment limitations, specific manuals for each emotional disorder tend to be less effective when patients present with multiple disorders, which tends to be the norm rather than the exception (Craske, 2012). For example, clinicians may have to learn and sequentially apply two different treatment protocols when seeing a client with depression and co-occurring GAD. The use of such an approach delays treatment of co-occurring disorders. Another challenging aspect is the dissemination and implementation of a large number of disorder-specific interventions. Disorder-specific interventions require training in multiple protocols and are costly for clinical care systems

in terms of training, supervision, implementation, and evaluation (Craske, 2012). It follows that, despite the large evidence base for disorder-specific interventions, research indicates low levels of successful dissemination of these interventions in both clinical practice settings (Stewart & Chambless, 2007) and in graduate and internship training programs (Weissman et al., 2006). Without successful dissemination and implementation, disorder-specific interventions are limited in their utility.

Transdiagnostic Models and Treatments

In an attempt to address limitations of disorder-specific models, research has started to focus on processes that may play a role in multiple disorders, known as transdiagnostic processes (Barlow et al., 2004; Harvey et al., 2004; Ehring & Watkins, 2008; Mansell, Harvey, Watkins, & Shafran, 2009). In contrast to disorder-specific models, transdiagnostic models of emotional disorders emphasize processes that are common to emotional disorders that contribute to the development and/or maintenance of symptoms (Harvey et al., 2004). Better understanding these transdiagnostic processes can contribute to our understanding of emotional disorders and also can inform the development of therapeutic interventions that target these processes.

Transdiagnostic models of emotional disorders have advantages over disorder-specific models. For example, transdiagnostic models take into account that certain dysfunctional processes are present across a number of disorders rather than each disorder being marked by putatively disorder-specific processes. Within transdiagnostic models, the dysfunctional processes are believed to vary along a continuum, such that individuals with emotional disorders experience a given process with greater frequency or intensity relative to individuals without those disorders (Barlow et al., 2004; Harvey et

al., 2004; Ehring & Watkins, 2008; Mansell et al., 2009). An additional advantage is that transdiagnostic models help explain the comorbidity among emotional disorders. More precisely, comorbidity can be explained, in part, by the same dysfunctional processes spanning across co-occurring disorders (Barlow et al., 2004). Perhaps the greatest advantage of transdiagnostic models is that they inform the development of treatments that can be used to broadly treat emotional disorders rather than relying on specific, distinct treatments for each emotional disorder (Barlow et al., 2004; Harvey et al., 2004; Ehring & Watkins, 2008; Mansell et al., 2009).

Transdiagnostic treatments are designed to treat a range of diagnoses by targeting shared processes that maintain symptoms across disorders. These interventions move away from treatments specialized by diagnosis and instead focus on factors that are causally related to two or more disorders. Transdiagnostic treatments may result in time savings and cost effectiveness because clinicians are able to treat separate diagnoses simultaneously if they share the same processes. In contrast, as noted, disorder-specific interventions require sequential delivery of interventions when treating clients experiencing co-occurring disorders. Thus, transdiagnostic approaches may offer a more efficient way to treat patients simultaneously experiencing co-occurring emotional disorders relative to disorder-specific interventions (Mansell, Harvey, Watkins, & Shafran, 2008). Transdiagnostic treatments also may alleviate difficulties in disseminating empirically supported, disorder-specific treatments (McHugh & Barlow, 2010; McHugh, Murray, & Barlow, 2009). For example, practitioners could become proficient in one transdiagnostic protocol that may then be used in the treatment of any

emotional disorder rather than having to become proficient in separate disorder-specific protocols (McHugh et al., 2009; Mansell et al., 2008; Clark & Taylor, 2009).

In summary, disorder-specific approaches to psychopathology have led to important advances in our understanding and treatment of a wide range of psychological disorders, providing relief for many individuals suffering from psychopathology. However, certain limitations exist within disorder-specific approaches, especially in the conceptualization and treatment of emotional disorders. Issues related to comorbidity and symptom overlap between emotional disorders and limited dissemination efforts due to the volume of disorder-specific treatments have prompted research efforts to focus on shared factors across diagnoses, known as transdiagnostic processes. Transdiagnostic models and treatments of emotional disorders have addressed important limitations of disorder-specific approaches and continue to be evaluated in their effectiveness. In fact, preliminary research suggests that transdiagnostic treatments demonstrate efficacy across emotional disorders with effect sizes being comparable to or exceeding those for disorder-specific treatments (Norton & Paulus, 2016; Farchione et al., 2012; Norton, 2012). As our understanding of the influence of transdiagnostic factors in emotional disorders increases, the relative merits of utilizing a transdiagnostic approach over a disorder-specific approach will become clearer. As the evidence continues to build, it is important to further refine and expand our understanding of transdiagnostic models of emotional disorders to guide treatment approaches.

The Metacognitive Model of Emotional Disorders

One transdiagnostic model of emotional disorders is Wells's (2009) metacognitive model. The theoretical basis for this metacognitive model is the self-

regulatory executive function (S-REF) model proposed by Wells and Matthews (1996). The S-REF model posits that sustained, inflexible styles of thinking in response to negative thoughts, feelings, and beliefs lead to long-term emotional distress (Wells & Matthews, 1996). Thus, it is the way in which people respond to thoughts, and not the content of their thoughts per se, that contributes to the development and maintenance of emotional disorders (Wells, 2009). For example, two individuals may experience the belief "I will fail" and experience negative emotions as a result of this thought. One individual may relatively easily dismiss this thought and negative emotions associated with this thought may consequently dissipate. Alternatively, the other individual may repetitively focus on the meaning and implications of the thought with the underlying beliefs that this sustained processing style will be helpful (e.g., "If I worry about failing, it will be less likely to happen"). As a result of perseverating on the thought, the individual is likely to experience sustained negative emotions. Wells and Matthews termed the process by which individuals repetitively focus on negative thoughts, feelings, and beliefs as the cognitive attentional syndrome (CAS).

The CAS is marked by self-focused attention (SFA), which is a transdiagnostic process implicated in the development and maintenance of emotional disorders (Ingram, 1990). SFA refers to the sustained, internal, and rigid focus on negative, self-relevant thoughts at the expense of being able to flexibly engage in the present moment. Within Wells's (2009) metacognitive model, heightened SFA contributes to emotional disorders because it maintains unhelpful beliefs about thinking, draws attention to threat, and makes it more difficult for individuals to process neutral or competing information from the environment. It is important to note that SFA itself is not necessarily dysfunctional,

as SFA becomes dysfunctional when an individual is unable to flexibly shift to an external focus of attention (EFA) when the situation warrants (Ingram, 1990).

The sustained, inflexible experience of SFA may be particularly problematic when an individual frequently worries. Worry is defined as a chain of negative and uncontrollable future-oriented thoughts (Borkovec et al., 1983). Although a cardinal symptom of GAD (American Psychiatric Association, 2013), worry plays a prominent role across emotional disorders (Brown et al., 1998; Brown & Barlow, 2009; Barlow, 2002; Olatunji, Wolitzky-Taylor, Sawchuh, & Ciesielski, 2010). As such, worry has transdiagnostic importance to emotional disorders and is also a cardinal feature of the CAS within Wells's (2009) metacognitive model. According to the metacognitive model, worry purportedly exacerbates and maintains negative emotions, in part, by contributing to a heightened focus on threatening information (Wells, 2009).

Consider, for example, a 30-year woman who recently gave birth to a daughter and experienced self-defeating thoughts (e.g., "I am going to be a terrible mother"). This woman initially worried in response to her thoughts, potentially because she held beliefs about the usefulness of worry (e.g., "if I worry enough, it means that I will be a better mother"). Given prior research linking worry to negative emotions (Olatunji, Broman-Fulks, Bergman, Green, & Zlomke, 2010), it is not surprising that this woman would be at risk to experience greater distress as a result of her worry. As her worry grew, she may have become increasingly self-focused (e.g., focused her attention on her internal feelings; Mor & Winquist, 2002). She may have been unable to successfully disengage from a self-focused state and consequently felt that her worry had become uncontrollable (e.g., "worrying will make me lose my mind"). Further, her self-focused state may also

have led her to experience diminished opportunities to engage with her environment in a way that may have helped mitigate her distress (e.g., meaningfully engage in the present moment with her child). As a result of this manifestation of the CAS (i.e., worry), this woman may have ultimately felt a loss of control over her cognitions and emotions. Ultimately, in this example, the CAS may result in the development of an emotional disorder that causes clinically significant distress and impairment. One way this disorder could be treated is through mitigating the CAS.

Wells's (2009) metacognitive therapy (MCT) directly targets the CAS in the service of reducing the burden of emotional disorders. Wells (2009) developed MCT as a transdiagnostic treatment and, to date, research supports MCT as an efficacious treatment for emotional disorders (Normann, van Emmerik, & Morina, 2014). As noted, a prominent goal of MCT is to reduce the CAS. Although it remains important to continue to examine MCT in its entirety, one component of MCT – labeled the attention training technique (ATT) – holds particular promise in reducing the CAS and is the focus of the present study.

The Attention Training Technique (ATT)

ATT was originally intended to be used as a single treatment component of MCT (Wells, 2009), but it has recently gained attention as a viable standalone intervention (Fergus & Bardeen, 2016; Knowles, Foden, El-Deredy, & Wells, 2016; Papageorgiou & Wells, 2000; Wells, 2007; Wells, White, & Carter, 1997). ATT was developed as a tool to reduce the unhelpful thought processes that individuals get "locked into" and find difficult to bring under control. More precisely, ATT seeks to disrupt prolonged, inflexible, self-focused, worry-based thinking styles that maintain psychological distress

(Wells, 2009). By redirecting attention away from such cognitive events, ATT provides a means for interrupting the CAS. ATT involves listening to a brief series of sounds designed to encourage flexible attention to external auditory stimuli. By intentionally using non-self-relevant sounds (e.g., sounds from a clock and train rather than drawing attention to internal bodily sensations), ATT attempts to strengthen EFA, thereby reducing worry.

Individuals are instructed to attend to these sounds using selective attention, rapid attention switching, and divided attention, which are practiced in a single 12-minute exercise (Wells, 2009). Selective attention consists of attending to specific individual sounds while resisting distraction by competing sounds in the environment. Rapid attention switching consists of rapidly shifting attention between individual sounds with increasing speeds. ATT ends with the divided attention component, which consists of attending to multiple sounds simultaneously. Overall, ATT is demanding of attentional resources in an effort to foster more flexible, externally-focused attention styles (Wells, 2009). ATT comes in two forms: self-generated and automated. The self-generated version requires therapists and patients to create the sounds in their environment, whereas the automated version has the sounds embedded in a recording. The automated version of ATT offers advantages over the self-generated version, including in terms of its practicality and standardization (Fergus & Bardeen, 2016). Because of the relative benefits and extant data supporting the use of the automated version of ATT (Callinan, Johnson, & Wells, 2015; Calkins, McMorran, Siegle, & Otto, 2015; Donald, Abbott, & Smith, 2014; Fergus, Wheless, & Wright, 2014; Nassif & Wells, 2014; Siegle, Ghinassi,

& Thase, 2007; Siegle et al., 2014) the automated version of ATT was used in the present study.

Distinctiveness of ATT

ATT and MCT, more broadly, are forms of cognitive-behavioral therapy (CBT). As discussed by Fergus and Bardeen (2016), ATT shares similarities with existing interventions, including traditional CBT, mindfulness-based therapies, and attention bias modification treatment (ABMT). However, ATT has important differences from these therapies that make it a distinctive intervention. ATT differs from traditional CBT in that it operates on the assumption that an individual's *response* to thoughts, regardless of the content, determines emotional outcomes. ATT is a process-focused intervention that targets responses to unwanted internal experiences, such as SFA, in hopes of reducing the CAS (Fisher & Wells, 2009). Although ATT and mindfulness-based therapies both target FOA, ATT seeks to reduce an unhelpful form of internal FOA, while mindfulness-based therapies aim to increase an adaptive form of internal FOA (Fergus et al., 2014). ATT does not require SFA, and, instead, emphasizes flexible attention to external auditory stimuli (Wells, 2002). Additionally, ATT does not require observation of internal sensations as in commonly-used mindfulness techniques. Finally, ATT differs from forms of ABMT that target attentional bias to threat, given that ATT seeks to alter FOA and not an attentional bias for threat per se (Hallion & Ruscio, 2011; Wells, 2009). Overall, ATT appears meaningfully distinct from related interventions and has been empirically investigated as such.

Evidence for ATT as a Possible Transdiagnostic Treatment

Several studies have found therapeutic benefits of ATT as a part of a broader

treatment package across a number of symptoms (Wells, 2007), with benefits maintained as long as 3 to 12 months posttreatment (Papageorgiou & Wells, 1998, 2000; Wells, 1990; Wells et al., 1997). ATT alone has demonstrated moderate to large effects in reducing panic symptoms (Wells, 1990), social anxiety (Wells et al., 1997), health anxiety (Papageorgiou & Wells, 1998), state cognitive anxiety (Fergus et al., 2014), depressive symptoms (Papageorgiou & Wells, 2000), and posttraumatic stress symptoms (Callinan et al., 2015). Evidence suggests that ATT is at least equivalent to established treatments for certain emotional disorders (Donald et al., 2014; Siegle et al., 2007, 2014; Weck, Neng, & Stangier, 2013) and superior to control tasks (Callinan et al., 2015; Calkins et al., 2015; Nassif & Wells, 2014). Based on guidelines by Chambless and Hollon (1998), ATT is currently considered a possibly efficacious treatment (Fergus & Bardeen, 2016). However, most studies evaluating the effectiveness of ATT have combined ATT with other therapeutic techniques (Donald et al., 2014; Weck et al., 2013; Siegle et al., 2007, 2014), which is problematic because any specific effect of ATT cannot be isolated (Wells, 2007). Fergus and Bardeen (2016) called for future studies to evaluate ATT as a standalone intervention. Until the effects of ATT are isolated from preexisting treatments, the true value of using ATT as a standalone intervention cannot be established.

Mechanisms of ATT: Focus of Attention

As discussed above, the accumulating empirical evidence for ATT has demonstrated therapeutic benefits. However, in addition to understanding that ATT works, it is also important to understand why it works (Fergus & Bardeen, 2016). FOA has received preliminary support as a particularly important variable for understanding

the therapeutic benefits of ATT. Studies have indicated that ATT is associated with changes in FOA, which, in turn, may lead to a reduction of the CAS and subsequent reductions in symptoms of emotional disorders (Donald et al., 2014; Nassif & Wells, 2014; Sharpe et al., 2010). This association may be best understood in terms of the theoretical rationale for ATT. As described earlier, and stated here briefly, the theoretical basis of ATT lies partly in the deleterious nature of the CAS (Wells, 2009). Hallmark features of the CAS are perseverative forms of negatively-valenced thinking, including worry. Theoretically, ATT has been proposed to encourage EFA (Wells & Matthews, 1996). This shift towards EFA has been described as a crucial component in reducing preservative thinking and has even been described as a marker for treatment efficacy within MCT (Wells, 2009).

Various studies have empirically supported that ATT is associated with, and more specifically causes, reductions in SFA (Donald et al., 2014; Nassif & Wells, 2014; Sharpe et al., 2010). Two additional studies highlight the potential role of FOA as a candidate mechanism of change underlying ATT. For example, Wells et al. (1997) found support for the impact of ATT on reduced SFA and subsequent anxiety reduction among patients with social anxiety disorder. Using a reversal design, Wells et al. (1997) demonstrated therapeutic reductions in SFA and anxiety immediately following ATT, which were then reversed by implementing an intervention that fostered SFA. After reintroducing ATT, Wells et al. found reductions in SFA and anxiety. These data thus demonstrated that reinstating SFA reversed the effects of ATT, which lends support to SFA being a candidate mechanism of change within ATT. Further support for the importance of SFA was demonstrated by results from Fergus et al. (2014), who examined the effects of ATT

on SFA and state anxiety in a single-session, lab-based component study. Fergus et al. found that ATT caused a significantly greater reduction in SFA relative to a control task. These researchers further found that changes in SFA were related to changes in anxiety following ATT. Overall, extant studies provide evidence that ATT may produce changes in FOA and those changes likely relate to the therapeutic benefits of ATT.

ATT and Worry

As described earlier, worry is a defining characteristic of the CAS (Wells, 2009). According to the S-REF model, worry maintains and exacerbates emotional distress (Wells & Matthews, 1996). In support of this aspect of the model, worry prospectively predicts anxiety (Calmes & Roberts, 2007) and mediates longitudinal associations among emotional disorders (Drost, Does, Hemert, Penninx, & Spinhoven, 2014). Given the prominent, maladaptive role of worry within CAS and its association with emotional disorders, it is important to examine if ATT causally changes worry. Previous studies have examined the impact of ATT on worry by including a measure of cognitive anxiety (Fergus et al., 2014), which broadly encompasses worry, intrusive thoughts, and lack of concentration (Ree et al., 2008). As of yet, no known study has included a more fine-grained assessment of worry per se. Including a worry-specific measure may provide a more detailed analysis of the influence of ATT on worry and if those changes in worry relate to changes in FOA. Thus, in addition to measuring a broad marker of worry like cognitive anxiety, it is informative to include a specific measure of worry to better understand the impact of ATT on worry and potential mechanisms of ATT on worry reduction.

In sum, prior studies have demonstrated that ATT is associated with, and more specifically causally related to, changes in FOA, potentially even in as little as one session (Donald et al., 2014; Nassif & Wells, 2014; Sharpe et al., 2010; Fergus et al., 2014). Promoting an EFA through ATT has been theorized to weaken the CAS. To more fully examine if ATT in fact reduces the CAS through changes in FOA, further studies need to assess changes in the processes that make up the CAS, such as worry. It may be helpful for such studies to include both broad and specific markers of worry when measuring changes in worry following ATT. Additionally, the existing knowledge base of ATT and changes in FOA in general is relatively underexplored, as a result of ATT often being combined with other MCT treatment components.

Purpose of the Present Study

The present study aimed to specifically address the previously mentioned gaps in the ATT literature, particularly through examining the causal effects of ATT on worry reduction in a laboratory-based component study. Although it remains important to examine the therapeutic benefits of multiple sessions of ATT, to date, the extant literature suggests that laboratory-based component studies are informative for understanding ATT (Fergus et al., 2014; Sharpe et al., 2010). Laboratory-based experimental research designs have been shown to be appropriate for examining theory and potential change mechanisms of other interventions as well (Levin, Hildebrandt, Lillis, & Hayes, 2012). Advantages of laboratory-based study designs over traditional treatment outcome research include: (a) greater control and manipulation of sample characteristics, treatment intervention, and variables of interest, (b) increased feasibility (e.g., more precise assessment methods that may not be possible in treatment outcome study settings), and

(c) increased cost effectiveness (e.g., smaller, shorter, less costly; Levin et al., 2012). Furthermore, utilizing a laboratory component-based design in the present study allowed for an examination of a central theoretical tenet of Wells's (2009) MCT. Namely, that ATT is useful for reducing worry. Although utilizing a laboratory-based component study design does not allow for an examination of the efficacy of ATT as a standalone treatment intervention, such a study design is theoretically informative and increases our understanding of how ATT works.

The present study replicated and extended findings from Fergus et al. (2014). Fergus et al. found that, compared to a mindfulness-based task involving progressive muscle relaxation (Orsillo & Roemer, 2011), one session of ATT caused an increase in EFA. Changes in FOA from ATT were related to a reduction in a broad marker of worry (i.e., cognitive anxiety), which supports the theoretical effects of ATT on the CAS (Wells, 2009). Fergus et al. found an *increase* in SFA following the mindfulness-based task; however, this increase in SFA led to a reduction in worry. This finding was attributed to conclusions that increased SFA may actually decrease worry if it occurs within a mindfulness-based context (Fergus et al., 2014). Overall, Fergus et al.'s study demonstrated that ATT fostered an EFA (relative to a mindfulness-based task) that was associated with less worry, which supports Wells's (2009) assertion as to how ATT exerts anxiety-reducing effects.

A central limitation of Fergus et al.'s (2014) study is that did not include a worry provocation before participants completed ATT or the control task. Because the study demonstrated changes in SFA and worry from a natural response to ATT, it seems reasonable to test these changes under a consistently higher state of worry. Furthermore,

given that the prior study utilized an unselected sample of participants, the generalizability of the findings to individuals consistently experiencing high levels of the CAS (e.g., individuals endorsing high trait worry) is unclear. This limitation may be particularly important considering ATT is commonly used as a treatment component for individuals high in worry severity (Wells, 2009), as these individuals are more likely to present for treatment. Thus, it is warranted to examine whether the proposed causal mechanisms of ATT on worry reduction operate similarly in individuals with higher overall worry severity. Another limitation related to examining worry in Fergus et al.'s study related to the measurement of worry. Fergus et al. included a broad marker of worry (i.e., cognitive anxiety, measured by the STICSA-C), which limited the extent to which worry could be examined specifically. To account for this limitation and to better understand the impact of ATT on worry, the present study included a worry-specific measure (i.e., WVAS), in addition to the cognitive anxiety measure used by Fergus et al.

Another limitation was that Fergus et al.'s (2014) mindfulness-based task involved progressive muscle relaxation. Researchers have questioned whether progressive muscle relaxation is conceptually consistent with the concept of mindfulness (Bishop et al., 2004). Traditional definitions of mindfulness interventions emphasize passive awareness of internal sensations, without attempts to produce or alter a particular state (Shapiro, Carlson, Astin, & Freedman, 2006; Bishop et al., 2004). Under this conceptualization, progressive muscle relaxation may not qualify as a genuine mindfulness technique because it attempts to induce a state of relaxation by purposefully tensing and relaxing muscle groups. As recommended by Fergus et al. (2014), it is worthwhile to investigate ATT compared to a more standard mindfulness-based task.

One such task is mindful breathing, which is not designed to actively change internal states, but, instead, encourages the observation of internal experiences while maintaining a focus on breath sensations (Kabat-Zinn, 1990). Mindful breathing captures a central feature of mindfulness practice, mainly paying attention to moment-by-moment experience with a nonjudgmental, accepting attitude (Kabat-Zinn, 1994; Shapiro et al., 2006).

Another limitation of Fergus et al.'s (2014) study was that it did not include a comparison group to identify whether the effects following ATT and the mindfulness-based task were relatively specific to the respective task. For example, because ATT and the mindfulness-based task performed similarly in terms of worry reduction, it is unclear from that study if either task would perform better than another task. It is thus important to compare ATT and the mindful breathing task to a third, neutral control condition. Previous studies have employed the use of neutral music and guided imagery of neutral events to evaluate anxiety outcomes (Marzillier & Davey, 2005; Nederlof, Muris, & Hovens, 2014) and demonstrate no significant impact on emotions (e.g., anger, anxiety, happiness) after listening to neutral music and reading neutral vignettes. A neutral reference condition was included to strengthen findings in the event that worry and FOA following ATT and mindful breathing were found to be significantly different than the neutral condition.

A final limitation of previous studies investigating ATT is that expectancies for changes in FOA and anxiety reduction have not been examined as a potential explanation for changes in study variables. Previous literature suggests that treatment expectancy (i.e., one's belief that they will benefit from receiving a particular type of treatment) is

positively associated with treatment engagement and response to treatment in individuals with anxiety disorders (Newman & Fisher, 2010; Vorstenbosch & Laposa, 2015). From these research findings, it may be possible that changes in worry and FOA following ATT may be accounted for, in part, by an individual's expectancy for change. Recognizing the role of expectancy in treatment response, the present study included items designed to measure potential associations between treatment expectancy and responses to study tasks (i.e., expectations that ATT, MB, or the neutral control would lead to changes in worry and FOA, respectively).

In sum, the present study utilized a similar methodology to Fergus et al.'s (2014) study, but utilized an anxiety provocation in a selected sample of high worriers. It also included mindful breathing as an active treatment control group, rather than a task that includes progressive muscle relaxation. The present study also included a third neutral control condition, which was used to compare worry outcomes following ATT and mindful breathing. Both a broad (i.e., cognitive anxiety) and specific marker of worry were included as criterion variables. Finally, expectancies for change were examined.

Hypotheses

The following hypotheses were proposed:

Hypothesis 1: ATT and mindful breathing will both cause significant reductions in worry.

Hypothesis 1.1: ATT and mindful breathing will cause significantly greater reductions in worry compared to the neutral control group.

Hypothesis 1.2: ATT and mindful breathing will cause statistically equivalent reductions in worry.

Hypothesis 2: ATT and mindful breathing will cause differential changes in FOA.

Hypothesis 2.1: ATT will cause a significant pre-to-post increase in EFA.

Hypothesis 2.2: Mindful breathing will cause a significant pre-to-post increase in SFA.

Hypothesis 2.3: The neutral control group will not cause a significant pre-to-post change in FOA.

Hypothesis 3: Changes in FOA will differentially relate to changes in state worry following the tasks.

Hypothesis 3.1: An increase in EFA following ATT will be associated with decreased worry.

Hypothesis 3.2: An increase in SFA following mindful breathing will be associated with decreased worry.

Hypothesis 3.3: There will be no relation between FOA following the neutral control group and worry.

Hypothesis 4: Changes in study variables will not be the result of expectancies.

Hypothesis 4.1: Changes in FOA and following ATT and MB will not be accounted for by statistically controlling for expectancies for changes in FOA.

Hypothesis 4.2: Changes in worry following ATT and MB will not be accounted for by statistically controlling for expectancies for changes in worry.

CHAPTER TWO

Methods

Participants

A total of 1,201 undergraduate students were screened for eligibility. Of those students screened, 296 were eligible and invited to participate in the study, and 120 individuals participated in the study. See Table 1 for descriptive statistics. There were no differences in ethnicity (i.e., white vs. nonwhite) ($\chi^2_{(1)} = 0.14$, $p = .720$), age ($t_{(294)} = -0.49$, $p = .623$), or gender ($\chi^2_{(1)} = 0.01$, $p = .568$) between those who were eligible and invited and who did not participate versus those who participated. There were no differences in trait worry ($t_{(294)} = 0.52$, $p = .604$) between those who were eligible and invited and who did not participate versus those who participated. The mean number of days between completing the online screening in phase 1 and completion of phase II was 19.99 days ($SD = 15.46$).

Table 1. *Descriptive Statistics among Participants who were Eligible*

Group	Variable						
	N	Age	White	Non-White	Female	Male	PSWQ
		Mean (SD)	%	%	%	%	*Mean (SD)*
Completed Study	120	18.93 (1.75)	57.50	42.50	87.50	12.5	69.08 (4.80)
Did Not Complete Study	176	19.02 (1.17)	59.66	40.34	87.50	12.5	68.77 (5.21)

Of the initial sample of 120 participants, 41 participants were randomized to the ATT group, 40 were randomized to the mindful breathing group, and 39 were randomized to the control group. Of the 120 subjects, five participants reported

decreased state worry following the worry induction task. Of those five participants, three were in the control group and two were in the ATT group. Because the worry induction task appeared to have an unintended effect (i.e., worry reduction) among these five participants, they were removed from subsequent analyses. The percentage of participants reporting reduced worry following the worry induction task did not significantly differ across the three conditions ($\chi^2_{(2)} = 3.01$, $p = .223$). The final sample consisted of 115 undergraduate students who reported elevated trait worry. The mean age of the sample was 18.9 years ($SD = 1.77$) and the majority of the sample self-identified as female (87%). Approximately 58.5% of the sample identified as White, 20.9% as Latino, 10.4% as Asian, 4.3% as African American, 5.2% as bi- or multi-racial, and 0.9% as "other" race/ethnicity. There were no significant age ($F_{(2, 112)} = 0.29$, $p = .749$), ethnicity ($\chi^2_{(2)} = 2.16$, $p = .339$) or gender ($\chi^2_{(2)} = 3.77$, $p = .152$) group differences.

Measures

Trait Worry

The Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) was administered to an online subject pool as a screening measure to determine study eligibility. The PSWQ is a 16-item self-report measure that assesses worry severity (e.g., "My worries overwhelm me") using a 5-point scale (1= not at all typical of me, 5= very typical of me). The PSWQ correlates significantly with other anxiety measures ($r = .64$) in student populations (Meyer et al., 1990). Prior research has identified a cutoff score of 62 on the PSWQ for detecting individuals with heightened worry severity within student populations (Behar, Alcaine, Zuellig, & Borkovec, 2003). Following from Behar

et al.'s (2003) findings, participants reporting scores equal to or greater than 62 on the PSWQ during the online screening were eligible to participate in the present study.

State Worry

State worry was assessed using the Worry Visual Analogue Scale (WVAS; Wichelns, Renna, & Mennin, 2016). The WVAS contains two sheets, an anchor sheet and a score sheet. The anchor sheet allows participants to define worry in their own words on an anchor sheet by asking them to describe five situations that represent differing degrees of worry, ranging from 0 (a situation that would not cause any worry) to 100 (a situation that would cause extreme worry). Situations 25, 50, and 75 range between these two extremes. The anchors are used to increase consistency in reporting across time points. The most worrisome situation listed on the anchor sheet was later used as the worrisome topic throughout the rest of the study. On a separate score sheet, participants report current feelings of worry in comparison to their established anchors. The WVAS asks participants to write down their level of worry "at its greatest level right now" using a scale from 0 to 100, with higher scores indicating greater worry. This design allowed for moment by moment tracking of worry across experimental time points. The WVAS has been shown to correlate with other measures of anxiety, including the PSWQ (r = .41), in unselected undergraduate samples (Wichelns et al., 2016).

State worry was also assessed using the cognitive anxiety scale of the state version of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, French, MacLeod, & Locke, 2008). The STICSA is 21-item measure that assesses cognitive anxiety (e.g., "I feel agonized over my problems") and somatic anxiety (e.g., "I

feel shaky"). The cognitive anxiety scale was the STICSA scale of interest in the present study. The cognitive anxiety scale is a broad measure of worry, in that, in addition to worry, it also measures related facets of cognitive anxiety (e.g., difficulties with concentration). The STICSA uses a 4-point scale (1 = not at all, 4 = very much so), with higher scores indicating greater anxiety. The scale shares large convergent correlations (*r*s of .53 and .63) with another measure of state anxiety (Grös, Antony, Simms, & McCabe, 2007).

Focus of Attention

FOA was assessed using a standard one-item marker (Wells, 2009) that asks participants to report "at this moment in time how much is your attention focused on yourself or your external environment?" using a 7-point scale ranging from -3 to 3 (-3 = entirely externally focused, 0 = equal amounts, 3 = entirely self-focused). Lower scores indicate greater EFA and higher scores indicate greater SFA. Prior studies have used this item to measure FOA and have demonstrated changes in response to ATT and other interventions (Nassif & Wells, 2014; Sharpe et al., 2010; Fergus et al., 2014).

Expectancy

Because no previous studies have yet examined expectancies in response to one session of ATT, MB, and the neutral control task, expectancies were assessed using two items developed by the researcher. The instructions for the item designed to measure expectations of changes in FOA were as follows: "How much did you expect the audio task to change your focus of attention?" Similarly, instructions for the item designed to measure expectations of changes in worry were "How much did you expect the audio

task to change your level of worry?" Responses were recorded using a 5-point scale ranging from 1 to 5 (1 = I did not expect the task to change my FOA/worry; 5 = I expected the task to change my FOA/worry a great deal). Higher scores indicate greater treatment expectancy.

Procedures

See Figure 1 for an overview of the procedures for the present study. The PSWQ was administered to an online subject pool as a screening measure to determine study eligibility. Individuals high in worry (i.e., scoring 62 or greater on the PSWQ) were invited to participate in the in-person portion of the study. Participants read and signed an informed consent statement that described the nature of the study. The FOA index, the STICSA, and the WVAS were administered to assess baseline levels of FOA and state worry, respectively. Next, the worry induction task was completed. The worry induction task encouraged participants to spend 5 minutes worrying about the worrisome situation identified as 100 on the WVAS ("close your eyes and worry about your most worrisome topic as intensely as you can and in your usual fashion. If your attention wanders, bring it back to your topic of worry"). This worry induction had been used in previous studies and has been shown to cause worry (Borkovec & Inz, 1990; Behar, Zuellig, & Borkovec, 2005; Oathes et al., 2008; Ray et al., 2009; McLaughlin, Borkovec, & Sibravia, 2007). Following the worry induction, the FOA index, the STICSA, and the WVAS were administered again to assess changes in FOA and worry, respectively. These measures were used as a baseline comparison (Pre-Task Measures) before completing the experimental conditions.

Next, participants were randomly assigned to complete ATT, mindful breathing, or listen to neutral music with neutral vignettes. ATT and the mindful breathing task were presented using recordings developed by the creators of the respective technique (Kabat-Zinn, 1990; Wells, 2009). During ATT, participants initially listened to a brief rationale, followed by the presentation of auditory stimuli consisting of five minutes of selective attention, five minutes of attention switching, and two minutes of divided attention (Wells, 2009). Participants in the mindful breathing group listened to a brief rationale, followed by a recording of mindful breathing, which focused on self-acceptance and awareness of the breath. This 15-minute task was adapted from the sitting mindfulness meditation script developed by Kabat-Zinn (1990) and has been previously used in a laboratory study investigating mindfulness and worry (Archer & Craske, 2006). Participants in the neutral control group engaged in guided imagery of neutral events while listening to neutral music through headphones for 11 minutes. The task began with 60 seconds of Chopin's 'Waltz 12', followed by 10 vignettes of neutral situations presented on the computer at 60-second intervals. Example vignettes included "you go for a walk and meet someone you know. You talk about the weather and your plans for the weekend" and "you get up in the morning, get dressed, and have your usual breakfast." This task has been associated with neutral mood states in laboratory studies (Nederlof et al., 2014; Marzillier & Davey, 2005).

Participants then completed the FOA index, the STICSA, and the WVAS to assess changes in FOA and worry, respectively (Post-Task Measures). Participants also completed an item designed to measure expectancies of changes in worry and FOA

resulting from study tasks. Finally, participants were debriefed about the study purposes and thanked for their participation.

Data Analytic Strategy

Independent samples *t*-tests were used to examine pre-task group differences in sociodemographic variables, FOA, and state worry. Paired samples *t*-tests were used to evaluate the effectiveness of the worry induction procedure pooled across groups, as measured by significant changes in WVAS scores before and after the worry induction. A series of repeated-measures analysis of variances (ANOVAs) was used to examine differential changes in study variables across the three groups. In those analyses, FOA and worry were the within-subjects variables and group (ATT, mindful breathing, neutral control) were the between-subjects variable.

It was predicted that there would be a significant within-subjects by between-subjects interaction on worry. Post-hoc analyses were used to compare changes in worry across groups. It was predicted that ATT and mindful breathing would cause a greater change in worry than the neutral control. It was further predicted that worry reduction following ATT and mindful breathing would not differ. Paired sample *t*-tests were used to examine changes within the respective groups. The expected pattern was that worry would significantly decrease from pre-task to post-task in ATT and mindful breathing, but no changes in worry would be seen in the neutral control.

It was predicted that there would be a significant within-subjects by between-subjects interaction on FOA. Post-hoc analyses were used to compare changes in FOA across groups. It was predicted that all three groups would differ from one another in changes in FOA, such that ATT would cause EFA than the mindful breathing and neutral

control. It was further predicted that mindful breathing would cause grater SFA than the neutral control. Paired sample *t*-tests were used to examine changes within the respective groups. The expected pattern was that SFA would significantly *increase* from pre- to post-mindful breathing, SFA would significantly *decrease* from pre- to post-ATT, and there would be no changes in FOA in the neutral control.

It was predicted that main study predictions would not be attributed to treatment expectancies (i.e., expectations that ATT, MB, or the neutral control task would alter FOA and worry). Repeated-measures analysis of covariance (ANCOVA) was used to determine whether differences in expectancies accounted for predicted changes in worry and FOA following study tasks. In those analyses, FOA and worry were the within-subjects variables, group (ATT, MB, and control) was the between-subjects variables, and the two expectancy items were covariates.

A regressed change score approach (Cohen, Cohen, West, & Aiken, 2003) was used to examine study predictions of associations between changes in FOA and changes in worry. A regressed change score approach statistically removes the variance attributable to pre-scores by including these scores in a regression model. In one set of those analyses, the post-task worry measures were the criterion variables and the statistical predictors were the pre-task worry measures, the pre-task FOA index, and the post-task FOA index. Of interest were the association between the post-task FOA index and the post-task worry measures. These analyses were run separately in the three groups. In the MB group, it was predicted that greater SFA would be associated with less worry. In the ATT group, it was predicted that greater EFA would be associated with

less worry. In the neutral control group, it was predicted that there would be no association between FOA and worry.

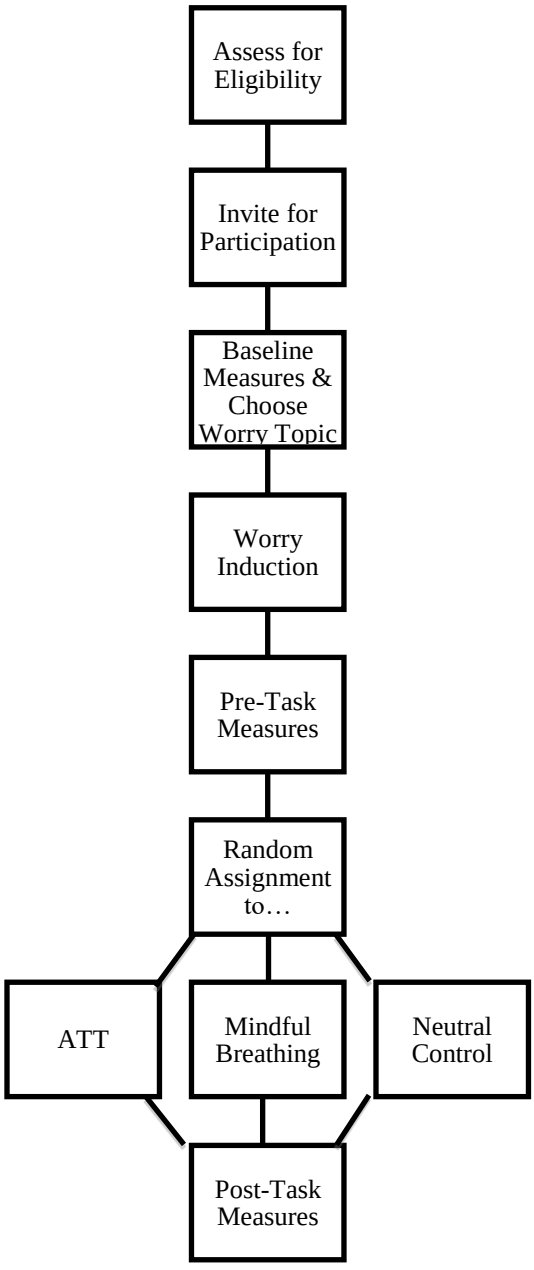


Figure 1. Procedures

CHAPTER THREE

Results

Preliminary Statistics

There was incomplete data for one participant. More specifically, one response item of the STICSA, which was an item for the cognitive subscale, was missing. To account for this missing item, a response estimate using estimation maximization (EM), a technique that is often used in data analysis to manage missing data (Rubin, Witkiewitz, Andre, & Reilly, 2007; Scheffer, 2002), was computed. Results suggested imputing a value of 17 for the STICSA-Cognitive.

At baseline, there were no significant differences among groups for worry (WVAS: $F_{(2, 112)} = 1.44$, $p = .241$; STICSA-C: $F_{(2, 112)} = 1.39$, $p = .254$) and FOA ($F_{(2, 112)} = 0.39$, $p = .681$). Descriptive statistics for pre- and post- worry induction are provided in Table 2. Repeated measures ANOVA results for the changes in study variables after the worry induction procedure are presented in Table 3. In the analyses, the within-subjects factor was time (baseline and post-induction) and the between-subjects factor was group (ATT, MB, and control). There was a main effect of time, indicating that across all groups there were statistically significant increases in worry (WVAS: $d = 2.18$; STICSA-C: $d = 1.90$) and heightened SFA ($d = 1.02$) after the worry induction. As such, the induction appeared to have its intended effect.

Table 2. *Pre- and Post- Manipulation Descriptive Statistics*

Variable	Condition			
	ATT *n* = 39 *Mean (SD)*	MB *n* = 40 *Mean (SD)*	Control *n* = 36 *Mean (SD)*	Total *n* = 115 *Mean (SD)*
FOA				
Pre-induction	0.85 (1.27)	0.85 (1.46)	1.08 (1.25)	0.92 (1.33)
Post-induction	1.79 (1.49)	1.78 (1.31)	1.50 (1.76)	1.70 (1.52)
Post-task	-0.21 (2.09)	1.30 (1.62)	.97 (1.21)	-0.21 (2.09)
WVAS				
Pre-induction	51.23 (27.87)	55.68 (26.36)	45.03 (27.85)	50.83 (27.45)
Post-induction	71.92 (22.35)	80.58 (21.00)	68.50 (23.00)	73.86 (22.49)
Post-task	36.46 (29.45)	38.90 (24.59)	37.63 (24.83)	37.68 (26.20)
STICSA- Cognitive				
Pre-induction	20.00 (6.76)	21.83 (6.90)	22.56 (6.99)	21.43 (6.91)
Post-induction	24.41 (7.13)	26.95 (6.51)	26.58 (6.27)	25.97 (6.69)
Post-task	15.92 (5.45)	17.25 (6.95)	19.17 (6.67)	17.41 (6.48)

Table 3. *Repeated Measures ANOVA, Post-Worry Induction*

Variable	Effect					
	Time			Time*Group		
	df	*F*	*Significance*	df	*F*	*Significance*
FOA	1, 112	30.28	< .001	2, 112	1.52	.22
WVAS	1, 112	134.61	< .001	2, 112	0.40	.67
STICSA- C	1, 112	102.20	< .001	2, 112	0.52	.60

Note. WVAS is the Worry Visual Analogue Scale, FOA is focus of attention, and *STICSA* is the State Trait Inventory of Cognitive and Somatic Anxiety; * indicates significant using alpha = .05 level.

Main Study Predictions

Repeated measures ANOVA results examining changes in the study variables from post-induction to post-task are presented in Table 4. In the analyses, the within-

subjects factor was time (post-induction and post-task) and the between-subjects factor was group (ATT, MB, and control). There was a main effect of time, indicating that across all groups there were statistically significant changes in worry (WVAS: $d = 2.64$; STICSA-C: $d = 2.55$) and FOA ($d = 0.92$) after the tasks. There was no interaction between time and group for worry, indicating that the rate of change in worry from pre- to post-task did not differ among groups. Follow-up analyses indicated that both indices of worry significantly decreased from pre- to post-task in each group: ATT (WVAS [$t_{(38)} = 6.81$, $p < .001$, $d = 1.48$], STICSA-C [$t_{(38)} = 7.17$, $p < .001$, $d = 1.29$]); MB (WVAS [$t_{(39)} = 10.44$, $p < .001$, $d = 1.85$], STICSA-C [$t_{(39)} = 8.72$, $p < .001$, $d = 1.46$]); and neutral control (WVAS [$t_{(35)} = 8.12$, $p < .001$, $d = 1.31$], STICSA-C [$t_{(35)} = 8.24$, $p < .001$, $d = 1.16$]). The change in worry was large in magnitude across all three groups.

There was a statistically significant interactive effect between time and group on FOA ($d = 0.43$), indicating that the rate of change in FOA was different among groups. To determine which groups demonstrated significant differences in changes in FOA, follow-up repeated measures ANOVAs were used to compare changes in FOA between groups. Those follow-up ANOVAs indicated that ATT caused a significantly greater change in FOA relative to MB ($F_{(1, 79)} = 8.71$, $p = .004$) and the control ($F_{(1, 73)} = 8.39$, $p = .005$), with there being no difference in the change of FOA between MB and the control ($F_{(1, 74)} = 0.01$, $p = .906$). Following ATT, participants became significantly more EFA and the rate of change in FOA in that group from post-induction to post-task was large in magnitude ($t_{(38)} = 5.39$, $p < .001$; $d = 1.12$). Following MB, there were no significant changes in FOA from post-induction to post-task ($t_{(39)} = 1.66$, $p = .105$; $d = 0.33$).

Following the control, there were no significant changes in FOA from post-induction to post-task ($t_{(35)} = 1.54$, $p = .134$; $d = 0.36$).

Table 4. *Repeated Measures ANOVA, Post Task*

Variable	Effect					
	Time			Time*Group		
	df	*F*	*Significance*	df	*F*	*Significance*
FOA	1, 112	26.78	< .001	2, 112	6.76	<.001*
WVAS	1, 112	200.03	< .001	2, 112	1.51	.23
STICSA- C	1, 112	186.00	< .001	2, 112	1.11	.33

Note. WVAS is the Worry Visual Analogue Scale, FOA is focus of attention, and *STICSA* is the State Trait Inventory of Cognitive and Somatic Anxiety; * indicates significant using alpha = .05 level.

Expectancies as Covariates

ANCOVA results indicated that there continued to be a statistically significant interactive effect between FOA and group after accounting for differences in expectancies ($F = 6.02$, $p = .003$). This finding indicated that, after controlling for group differences in expectancies, there continued to be significantly different rates of changes in FOA across groups. As with previous results, there was not a statistically significant interactive effect between worry and group after controlling for expectancies (WVAS: $F_{(1,110)} = 1.36$, $p = .260$; STICSA-C: $F_{(1, 110)} = 1.08$; $p = .342$). Changes in study variables across groups after controlling for expectancies remained similar to study results presented earlier. For the ATT group, FOA demonstrated statistically significant changes when controlling for expectancies ($F_{(1,36)} = 12.83$; $p = .001$), as well as worry (WVAS: $F_{(1,36)} = 24.55$, $p < .001$; STICSA-C: $F_{(1,36)} = 44.56$, $p < .001$). Following MB, FOA did not demonstrate statistically significant changes when controlling for expectancies

($F_{(1,37)}$ = 1.43; p = .239), whereas worry did (WVAS: $F_{(1,37)}$ = 15.43; p < .001; STICSA-C: $F_{(1,37)}$ = 14.91, p < .001). Following the control group, there were no significant changes in FOA when controlling for expectancies ($F_{(1,33)}$ = 0.56; p = .459), but there were statistically significant changes in worry after controlling for expectancies (WVAS: $F_{(1,33)}$ = 10.46; p = .003; STICSA-C: $F_{(1,33)}$ = 20.27, p < .001).

Changes in Focus of Attention and Worry

Results from the regressed change analyses are presented in Table 5. Contrary to study predictions, post-task FOA did not relate to post-task worry in either the ATT or MB group. Post-induction FOA unexpectedly related to post-task worry (as measured by the STICSA-C) in the ATT group. Those results indicate that *greater* SFA following the worry induction was associated with *less* worry following ATT. Of note, this pattern of results was specific to the ATT group.

Table 5. *Partial Correlations from Regressed Change Analyses*

Variable	ATT (n = 39) Post-Task		MB (n = 40) Post-Task		Control (n = 36) Post-Task	
	WVAS	STICSA-C	WVAS	STICSA-C	WVAS	STICSA- C
Post-Induction WVAS	.27	-	.41*	-	.53**	
Post-Induction FOA	-.20	-	-.25	-	.07	
Post-Task FOA	-.07	-	-.01	-	.08	
Post-Induction STICSA-C	-	.44*		.49**	-	.63**
Post-Induction FOA	-	-.43**		-.13	-	.08
Post-Task FOA	-	.10		-.11	-	-.04

Note. ** p < .01, * p < .05 (two-tailed).

CHAPTER FOUR

Discussion

Overview

The present study sought to investigate potential changes in worry and FOA in high trait worriers in response to a single session of ATT, MB, or a control task. Specifically, it was hypothesized that ATT and MB would cause significant reductions in worry at similar rates, with no changes in worry in the control group. It was further hypothesized that ATT and MB would cause differential changes in FOA, such that ATT would result in increased EFA and MB would result in increased SFA, whereas the control would not result in changes in FOA. Finally, it was hypothesized that changes in FOA would differentially relate to changes in worry following ATT and MB. Study results surrounding each of these hypotheses are discussed in turn below.

Changes in Worry

As predicted, ATT caused significant reductions in worry. These findings are the first to provide evidence that ATT causally changes worry in individuals endorsing high trait worry severity. While previous research has demonstrated that ATT impacts cognitive anxiety, which includes worry more broadly (Fergus et al., 2014), this study is the first to include a fine-grained, detailed assessment of worry. Understanding the impact on worry, per se, is important, considering the role that worry plays in emotional disorders. For example, worry is a defining feature of the CAS (Wells, 2009) and worry has been shown to maintain and exacerbate emotional distress (Wells & Matthews,

1996). Thus, finding that worry significantly decreased following ATT lends support, more generally, to the treatment goals of MCT (Wells, 2009). MCT is a treatment that aims to disrupt emotional disorders by targeting rigid, self-focused forms of thinking, including worry. ATT, a treatment component of MCT, has been purported to disrupt these patterns of thinking, and the present results suggest that ATT may immediately change these cognitive processes, at least temporarily.

Not only did ATT cause significant reductions in worry, it did so among high trait worriers. This pattern of findings extends Fergus et al.'s (2014) study, which utilized an unselected sample, in that ATT's ability to disrupt the CAS in unselected samples also generalizes to individuals consistently experiencing high trait worry. This generalization to individuals with high trait worry is noteworthy, considering ATT is commonly used as a treatment component for this population (Wells, 2009). Thus, it appears that ATT indeed may be an appropriate method to treat acute worry in both unselected samples and those with high levels of the CAS (e.g., worry).

While previous research suggests that ATT as a part of a broader treatment package decreases anxiety symptom severity (Wells, 2007), it is notable that the present changes in worry were found after a single session of ATT. This pattern of findings adds to existing studies that demonstrate changes in cognitive anxiety following one session of ATT (Fergus et al., 2014; McEvoy et al., in press), particularly by demonstrating that a single session of ATT similarly reduces worry in high trait worriers, as described above. However, it is important to recognize that ATT was not developed as a means to deliberately reduce worry in the moment per se, as using ATT in that way has the potential to lead ATT to be misused as a form of distraction. To account for this

possibility, developer instructions encourage individuals to refrain from using ATT as a means for distraction or from practicing solely during times of distress (Wells, 2009). With these instructions and study results in mind, it may be possible that using ATT in the manner in which it was intended may extend such immediate worry reduction to lasting worry reduction over time. Future studies should include follow-up assessments to further explore the ideal number of sessions needed for long-term worry reduction.

To more fully examine changes in worry following ATT, it was important to include a comparison group that had been shown to impact in-the-moment worry. By including such a comparison group, the magnitude of ATT's impact on worry could be compared to another task that could be used within a single-session and was similar in length. The current study sought to include a comparison group that would also extend Fergus et al.'s (2014) findings by comparing ATT to a more traditional mindfulness task (i.e., MB), rather than a mindfulness-based task that includes muscle relaxation. Similar to the mindfulness-based task used by Fergus et al. that included muscle relaxation, a single session of MB led to immediate worry reduction at a comparable rate to ATT. As such, a more strictly defined mindfulness task like MB appears to be sufficient to reduce worry in the moment. These results align with a growing body of literature that supports ATT and mindfulness-based tasks as being useful in reducing worry (Fergus et al., 2014; Orsillo & Roemer, 2011; Wells, 2009; McEvoy, Graville, Hayes, Kane, & Foster, in press). The present results adds to this body of knowledge by isolating MB by itself, which was not done in previous studies. Because prior research combined MB with muscle relaxation, it was unclear whether the therapeutic effects of Fergus et al.'s mindfulness-based task were due to the mindfulness component of the task or the muscle

relaxation component. The current results suggest that the mindfulness component on its own was sufficient to reduce worry in the moment, and subsequently may be a useful task for targeting worry in the moment. Thus, prior research, in combination with the present study results, indicate that mindfulness-based tasks may be clinically useful for immediately reducing worry among individuals with heightened trait worry severity.

The present study also examined changes in worry in response to a neutral control group. Comparison to a neutral control group was included to identify whether changes in worry following ATT and the mindfulness-based task were relatively specific to each task or potentially the result of passage of time. The neutral control task was also included to further compare whether ATT and MB would perform better than another task that was not specifically designed to alter worry. In addition to MB and ATT, and contrary to study predictions, the neutral control group also demonstrated significant reductions in worry. One possible explanation for this pattern of findings is that the control condition allowed for distraction from distressing internal sensations and worry. In other words, prompting individuals in the control condition to think about neutral situations may have served as a distraction period, leading to temporary decreases in worry.

Previous research supports the anxiolytic effects of distraction for individuals with disorders characterized by high levels of worry, such as GAD (Barlow, Esler, & Vitali, 1998) and specific phobia (Oliver & Page, 2003). While distraction may temporarily provide symptom relief, over the long run, distraction and other control strategies often paradoxically increase worry levels (Lavy & Van Den Hout, 1990; Wegner & Zanakos, 1994) and strengthen the CAS (Wells, 1995). As worry inevitably

returns after a brief period of distraction, individuals may negatively appraise their worry, seeing it as uncontrollable and harmful. These negative beliefs about worry, sometimes referred to meta-worry, purportedly contribute to the development of pathological worry (Wells, 2005). Therefore, the temporary gains from distraction in the present study should be interpreted in light of the research findings indicating long-term deleterious effects of distraction. It is further important to note that, although individuals experienced a temporary reduction in worry following the control condition, these gains may not be maintained with repeated sessions. Future research could address this consideration by including follow-up assessments of worry following distractor tasks.

Changes in Focus of Attention

As predicted, ATT led to significant increases in EFA compared to MB and the control group. This finding is consistent with previous studies demonstrating enhanced EFA following ATT (Fergus et al., 2014; Nassif & Wells, 2014; Sharpe et al., 2010; Wells, 2002). However, MB did not lead to heightened SFA as predicted, which diverged from prior findings indicating increased SFA following a mindfulness-based task (Fergus et al., 2014; McEvoy et al., in press). This divergent pattern of findings may be partly due to the differences in comparison tasks across studies. Fergus et al. (2014) and McEvoy et al. (in press) both used a mindfulness-based task that included muscle relaxation. It has been argued that muscle relaxation deviates from traditional definitions of mindfulness because muscle relaxation encourages individuals to alter their physical state by intentionally isolating certain muscle groups (Bishop et al., 2004). It is possible that the muscle relaxation component of the mindfulness-based task contributed to increased SFA in prior studies, whereas MB on its own may not influence FOA to the

same degree. Thus, taking previous research findings into consideration, the present study results support theoretical assumptions that ATT promotes EFA, whereas it is less likely that MB on its own alters FOA in an appreciable way.

Because MB did not change FOA as predicted, it is important to consider other methods by which MB exerts its worry-reducing effects. The existing literature has proposed other factors besides FOA that may be relevant to worry reduction following mindfulness-based tasks. It is possible that present-moment awareness and acceptance are particularly important for the therapeutic effects of MB (Hayes-Skelton, Usmani, Lee, Roemer, & Orsillo, 2012; Bishop et al., 2004). Present-moment awareness includes bringing awareness to one's immediate internal experiences (Kabat-Zinn, 2005) and acceptance generally refers to accepting such internal experiences without attempts to alter them (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Previous research has implicated these two concepts as important mediators of mindfulness-based practices in that they disrupt thought processes characteristic of individuals with anxiety disorders (e.g., having a rigid, judgmental relationship with internal experiences; Roemer & Orsillo, 2009). Present-moment awareness and acceptance may also mediate the effects of mindfulness-based practices in that they reduce experiential avoidance, or the tendency to change one's own uncomfortable internal experiences. Experiential avoidance is characteristic of emotional disorders (Hayes, Stosahl, & Wilson, 1999) and paradoxically increases distress when performed (Salters- Pedneault, Tull, & Roemer, 2004). MB serves to reduce experiential avoidance in that it requires individuals to notice their breathing, nonjudgmentally, even in the presence of anxious emotions. Thus, MB may impact anxiety and related processes, such as worry, through present-moment awareness

and acceptance, which serve to disrupt rigid thought processes and reduce experiential avoidance. Although these aspects were not assessed in the present study, it is possible that they might help explain immediate decreases in worry seen after one session of MB. To better understand the impact of MB on the CAS, future studies may assess present-moment awareness and acceptance following MB and examine whether those changes relate to disruptions in the CAS.

Changes in Focus of Attention after Worry Induction Differentially Related to Changes in Worry Following ATT

In contrast to study predictions, changes in FOA following ATT did *not* relate to changes in worry. These findings are discrepant from previous research demonstrating that changes in FOA after ATT were related to a reduction in worry (Fergus et al., 2014). The present findings are also discrepant from theoretical underpinnings of the therapeutic effects of ATT on worry. Theoretically, worry exacerbates and maintains psychological distress, in part, by contributing to a heightened focus on internally threatening information, a form of SFA (Wells, 2009). ATT is believed to exert its effect on the CAS, in part, by reducing SFA (Wells & Matthews, 1996; Wells, 2009). Thus, if ATT reduces SFA, which maintains worry, it is assumed that reductions in SFA would be associated with reductions in characteristics of the CAS, such as worry.

Although inconsistent with theoretical assumptions as to how ATT operates, the present study findings that changes in FOA following ATT did not relate to changes in worry share similarities to a recent study by McEvoy et al. (in press). McEvoy et al.'s study examined the impact of ATT and a mindfulness-based task on anxiety in high trait anxious individuals. In this study, they found that ATT and the mindfulness-based task led to reductions in state anxiety, while the control group did not alter state anxiety. In

terms of FOA, they found that one session of the mindfulness-based task led to significant increases in SFA, whereas ATT did not demonstrate significant changes in FOA. Because all groups demonstrated similar worry reduction regardless of changes in FOA in their study, McEvoy et al. argued that changes in FOA after ATT and MB are not as important in explaining their therapeutic impact. Thus, the present study, in combination with McEvoy et al.'s results, support the idea that changes in FOA after ATT may not be particularly relevant mechanisms of change for ATT.

If FOA is not a mechanism of change for ATT, it is important to consider other mechanisms that may be more salient to the therapeutic benefits of ATT. McEvoy et al. (in press) suggest that distancing, present-moment awareness, and negative metacognitive beliefs are potentially more relevant mechanisms of change for ATT. Of note, all three of these variables are all purported to maintain the CAS (Wells, 2009). MCT utilizes ATT to promote present-moment awareness, to enhance distancing from negative repetitive thoughts, and to challenge negative metacognitive beliefs surrounding uncontrollability and danger. Thus, because changes in FOA did not differentially relate to changes in worry in the present study, it is possible that these mechanisms (distancing, present-focused attention, and negative metacognitive beliefs) may be more salient to disrupting the CAS seen in high anxious individuals. However, because the present study did not include assessment measures of these processes, it is unclear whether ATT exerted its effects through these mechanisms. Further research is needed to better understand how and why ATT impacts these potential mechanisms, in particular, and how those potential mechanisms contribute to worry reduction. For example, future studies may utilize the worry provocation used in the present study to enhance fusion (the

opposite of distancing) while measuring pre-post changes in distancing and examining whether those potential changes in distancing relate to decreases in worry.

While FOA *following* ATT appears to be less important for worry reduction, the present results raise an interesting possibility that FOA immediately following a period of worry and *prior* to completing ATT relates to changes in worry following ATT. More precisely, in the present study, changes in FOA following the *worry induction* unexpectedly related to changes in worry after ATT, but not MB or the control group. As such, it appears that FOA before completing ATT relates to treatment gains following ATT, but is not as important for MB. The present results indicate that individuals who experienced greater levels of SFA prior to ATT saw greater reductions in worry following ATT. As such, it is possible that ATT may be most useful for individuals who experience increased levels of SFA. Future research should examine this possibility more closely to identify *for whom* ATT is most beneficial, perhaps by examining the relationship between individual differences in trait FOA and the effectiveness of ATT.

Expectancy

Because the current study was primarily focused on understanding the impact of ATT on worry, it was important to consider other factors that may have accounted for potential changes following ATT. As described earlier, treatment expectancy is an important change mechanism for therapeutic techniques (Vorsetnbosch & Laposa, 2015; Newman & Fisher, 2010). Prior research interested in anxiety disorder treatment has shown that one's predictions about the likelihood of change resulting from a particular psychological treatment can actually influence their observed responses to treatment (Newman & Fisher, 2010). With that research in mind, the current study included items

to assess individual's expectancies that study tasks would lead to changes in FOA and worry. The assessment of expectancies allowed for the examination of whether observed changes in worry and FOA were attributable to examined therapeutic techniques, themselves, or to expectation of changes.

The current study found that the main study predictions held after controlling for expectancies of changes in FOA and worry. More specifically, regardless of expectations that ATT may lead to changes in FOA, ATT continued to significantly reduce SFA. By controlling for expectancies, the study findings may be interpreted with more confidence that ATT in fact reduces SFA. In other words, the present study is able to speak to changes in FOA as a result of ATT, not one's expectation that ATT will change their FOA. This finding is of importance, as one of the study aims was to identify if ATT influences FOA, and whether those influences relate to changes in worry. By having a more solid understanding of the extent to which ATT itself, rather than expectancies, influenced FOA, that study aim was more fully examined.

In terms of worry, all study tasks continued to significantly reduce state worry, regardless of expectations that study tasks may lead to changes in worry. This pattern of results is noteworthy, considering previous research indicating that a partial response to anxiety disorder treatments may be attributed to expectancies, rather than the actual treatment (Vorsetnbosch & Laposa, 2015; Newman & Fisher, 2010). Because ATT and MB impacted in-the-moment worry even after accounting for expectancies, it is likely that their effects are, in fact, due to the techniques, themselves, and may be helpful for immediate worry reduction. Overall, this pattern of results deepens our understanding of

ATT and MB worry-reducing effects, in that expectations do not seem to be responsible for worry reduction.

Interestingly, it was found that individuals who participated in the neutral control task had significantly greater expectations that the neutral task would decrease their level of worry compared to the ATT group. This finding may be a result of randomization leading to unequal expectancies across groups. Alternatively, this finding may be a result of the nature of the control task and instructions given. The neutral control task included classical music, which may contain associations of relaxation and worry reduction among individuals in the population (Scheufele, 2000; Labbé, Schmidt, Babin, & Pharr, 2007). Furthermore, the instructions for the neutral task directed individuals to imagine themselves in the neutral situations and remain focused on the task, which may have been interpreted by participants as a form of distraction. Because the expectancy measure was administered *after* the task was completed, it is possible that individuals were led to expect changes in worry based on the nature of the task and instructions. To explore this possibility, future studies may include expectancy measures both before and after study tasks, rather than post-task. However, in the current study, analyses demonstrated that the worry reduction in the control group held even after accounting for their expectations that the task would alter worry. Therefore, differences in worry expectations did not appear to meaningfully account for changes in following the neutral task.

Clinical Implications

While FOA may not be important for understanding *why* ATT works, it may be useful in understanding *for whom* ATT is most helpful. The present findings may provide initial support for the possibility that individuals who are highly self-focused

following worry episodes may see particular benefit in worry reduction following ATT. As such, ATT may be better indicated for individuals that tend to become highly self-focused. Future research examining trait SFA as a moderator of the effects of ATT needs to further investigate this possibility. The S-REF model that ATT is derived from suggests that high levels of SFA contribute to the CAS (Wells, 1995). ATT was specifically developed to target SFA, and the present results support the use of ATT for reductions in SFA. These results are clinically impactful because they indicate that ATT may be particularly useful for high trait worriers and possibly individuals with clinical levels of worry (e.g., GAD; APA, 2013), although clinical diagnoses were not examined in the present study. Overall, the present study results add to our theoretical understanding of ATT by extending Wells's (2009) claims to the population that ATT is often targeted towards (e.g., high worriers).

Although the cardinal symptom of GAD (APA, 2013), as mentioned previously, several emotional disorders are characterized by high levels worry. Additionally, SFA appears to have transdiagnostic importance as well (Ingram, 1990). The present results thus may have implications for emotional disorders more broadly. For example, social anxiety disorder is marked by both heightened levels of worry and SFA (Clark, 2010; Mellings & Alden, 2000). Worry and SFA are often targeted in cognitive-behavioral treatments for social anxiety in an attempt to reduce worry and enhance EFA (Clark, 2010). Considering the present study findings, it is possible that ATT may be a useful intervention strategy for reducing worry and enhancing EFA among individuals experiencing social anxiety

Limitations and Conclusions

Limitations of the study must be acknowledged. Although previous studies have demonstrated benefits from a single-session of ATT (Fergus et al., 2014; Sharpe et al., 2010), the present results cannot speak to the long-term therapeutic long-term benefits of ATT. Future research may consider incorporating follow-up assessments to examine whether a single session of ATT results in long-term changes in worry and FOA. However, the study purposes were to examine causal effects of ATT on worry and SFA, which can be investigated using a single-session. While the ideal dosage of ATT has yet to be established, it may be clinically useful to examine specific therapeutic effects of ATT using more than one session. The developer of ATT recommends utilizing several sessions of ATT throughout the course of MCT (Wells, 2009), but future research is needed to identify the ideal dosage of ATT for optimal therapeutic benefits. Therefore, future studies may wish to investigate ATT as a standalone treatment utilizing Wells's (2009) dosage recommendations of practicing ATT twice daily for at least four weeks.

While ATT is traditionally a component of MCT (Wells, 2009), ATT has demonstrated effectiveness as a standalone treatment (Wells, 1990; Wells et al., 1997; Papageorgiou & Wells, 1998; Fergus et al., 2014; Papageorgiou & Wells, 2000; Callinan et al., 2015). To further isolate the mechanisms of ATT as a standalone treatment, the current study utilized a laboratory-based component study design. Because of this decision, the results are limited in that they cannot directly speak to the broader treatment package of MCT. However, laboratory-based component studies are important when examining a single component of a treatment (Levin et al., 2012). Using a laboratory-based component design further allowed for the examination of the study hypotheses in a

controlled environment and with a worry manipulation. Such a controlled study design enhances the ability to attribute study results to ATT, rather than external influences in the environment, and provides an opportunity to examine the effects of ATT during a worry period. Overall, this design facilitated the examination of the theory and potential mechanisms of change underlying ATT, but limited its generalizability to MCT as whole.

Another study limitation is that the study did not specifically recruit a clinical sample of high worriers, such as those with GAD or emotional disorders more broadly, nor did the study assess for such diagnostic criteria. While worry and SFA may differ in terms of degree, high-anxious individuals continue to experience these variables to a greater extent than low-anxious individuals. (Ingram, 1990; Rusico et al., 2001). Additionally, previous studies have also supported the use of investigating ATT with individuals reporting high trait worry (McEvoy et al., in press). Thus, examining worry and SFA using students with high levels of self-reported trait worry was deemed appropriate and informative for better understanding ATT.

Finally, it is important to address limitations related to study methodology, particularly the induction procedure and single-item assessment measures. It is possible that the laboratory-based procedure may have produced an artificial worry process because the worry period used in this study was five minutes, which may be shorter than worry periods that individuals engage in outside of the laboratory. It is also possible that lengthier worry processes could lead to more intense changes in worry and SFA, but it is unlikely that there would be qualitative changes per se. The other main methodological limitation relates to single-item assessment measures used to measure FOA and worry. Using single-item markers introduces a greater chance for measurement error (Carmines

& Zeller, 1979), which ideally would be avoided through the use of multi-item instruments of FOA and worry. However, the decision to utilize single-item markers was supported by existing research using single-item measures to capture changes in FOA and worry following single-session tasks (Nassif & Wells, 2014; Sharpe et al., 2010; Fergus et al., 2014; Wichelns et al., 2016). Further, while multi-item markers of FOA do not yet exist, a multi-item marker of worry was included as well to more fully assess the domain of worry (i.e., STICSA; Ree et al., 2008). While future studies may benefit from including multi-item and multi-method assessment measures, at the present moment, the use of such single-item markers appears to be warranted and supported by previous research.

Limitations notwithstanding, the current study had several strengths that built on previous research, shedding light on the theory and potential causal mechanisms of ATT. In summary, this study provides further support that ATT causes reductions in worry and SFA. In the case of the present study, these results were found among participants reported high trait worry. The present study adds to existing investigations of potential factors that are relevant for understanding therapeutic gains following ATT. More precisely, study results suggest that FOA may not be an important mechanism of change, but it may be a potential treatment moderator. Other candidate mechanisms that warrant examination in future research were discussed. Understanding why and for whom ATT works in future research will ultimately allow researchers and clinicians to better treat emotional disorders characterized by the CAS.

APPENDICES

APPENDIX A

State Trait Inventory of Cognitive and Somatic Anxiety (STICSA)

DIRECTIONS: Below is a list of statements which can be used to describe how people feel. Beside each statement are four numbers which indicate the degree with which each statement is self-descriptive of your mood at this moment (1 = not at all, 4 = very much so). *Please read each statement carefully and circle the number which best indicates how you feel right now, at this very moment, even if this is not how you usually feel.*

In General…

	Not at All	A Little	Moderately	Very Much So
1. My heart beats fast.	1	2	3	4
2. My muscles are tense.	1	2	3	4
3. I feel agonized over my problems.	1	2	3	4
4. I think that others won't approve of me.	1	2	3	4
5. I feel like I'm missing out on things because I can't make my mind up soon enough.	1	2	3	4
6. I feel dizzy.	1	2	3	4
7. My muscles feel weak.	1	2	3	4
8. I feel trembly and shaky.	1	2	3	4
9. I picture some future misfortune.	1	2	3	4
10. I can't get some thought out of my mind.	1	2	3	4
11. I have trouble remembering things.	1	2	3	4
12. My face feels hot.	1	2	3	4
13. I think that the worst will happen.	1	2	3	4
14. My arms and legs feel stiff.	1	2	3	4
15. My throat feels dry.	1	2	3	4
16. I keep busy to avoid uncomfortable thoughts.	1	2	3	4
17. I cannot concentrate without irrelevant thoughts intruding.	1	2	3	4
18. My breathing is fast and shallow.	1	2	3	4

19. I worry that I cannot control my thoughts as well as I would like to.	1	2	3	4
20. I have butterflies in my stomach.	1	2	3	4
21. My palms feel clammy.	1	2	3	4

APPENDIX B

Penn State Worry Questionnaire (PSWQ)

DIRECTIONS: Please rate each of the following statements on a scale of 1 ("not at all typical of me") to 5 ("very typical of me"). Do not leave any items blank.

	Not at All Typical of Me				Very Typical of Me
1. If I do not have enough time to do everything, I do not worry about it.	1	2	3	4	5
2. My worries overwhelm me.	1	2	3	4	5
3. I do not tend to worry about things.	1	2	3	4	5
4. Many situations make me worry.	1	2	3	4	5
5. I know I should not worry about things, but I just cannot help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts.	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything.	1	2	3	4	5
11. When there is nothing more I can do about a concern, I do not worry about it anymore.	1	2	3	4	5
12. I have been a worrier all my life.	1	2	3	4	5
13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I cannot stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are all done.	1	2	3	4	5

APPENDIX C

Worry Visual Analogue Scale (WVAS) Anchor Sheet

DIRECTIONS: On a scale of 0-100, we would like you to list different situations that make you worry. Under “0”, please list a situation in which you are not at all worried. Under “25”, please list a situation that you may be mildly worried about. Under “50”, please list a situation in which you have some moderate amount of worry. Under “75”, please list a situation that is quite worrisome to you. Under “100”, please list a situation that is extremely worrisome to you.

---0---	---25---	---50---	---75---	---100---
Not Worried	Mildly Worried	Moderately Worried	Very Worried	Extremely Worried

Situation “0”

_____
_____
_____
_____
_____

Situation “25”

_____
_____
_____
_____
_____

Situation “50”

_____
_____
_____
_____
_____

Situation “75”

_____
_____
_____
_____
_____

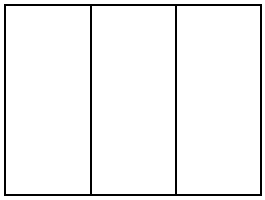
Situation “100”

_____
_____
_____

APPENDIX D

Worry Visual Analog Scale (WVAS)

DIRECTIONS: This measures how much you are worried. Remember, worry involves talking a lot to ourselves about things that we are concerned about happening in the future. Think of the anchors you filled out that correspond with “0”, “25”, “50”, “75”, and “100”. Now, please write down your level of WORRY RIGHT NOW (On a scale of 0 to 100):



APPENDIX E

Focus of Attention Scale

DIRECTIONS: *At this moment in time,* how much is your attention focused on yourself or your external environment? Lower scores indicate greater focus on your external environment, while higher scores indicate greater focus on your internal state. Please circle below.

-3	-2	-1	0	1	2	3
Entirely focused on the environment around me	Mostly focused on the environment around me	Somewhat focused on the environment around me	Equal amounts	Somewhat focused on my thoughts, feelings, or body	Mostly focused on my thoughts, feelings, or body	Entirely Focused on my thoughts, feelings, or body

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