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# INVESTIGATING THE ROLE THAT COGNITIVE DEFUSION PLAYS WITHIN MINDFULNESS

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INVESTIGATING THE ROLE THAT COGNITIVE DEFUSION PLAYS WITHIN

MINDFULNESS

by

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DISSERTATION

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**Abstract**

Mindfulness has been shown to lead to reductions in psychological distress and improved well-being, but there is limited research on the mechanism of change. A cognitive shift in perspective has been suggested as a possible mechanism of change. Three different terms appear to refer to this shift in perspective: 1. Decentering, developed from cognitive behavioural therapy, involves the ability to observe one's thoughts and feelings as solely being events of the mind. 2. Defusion, developed from acceptance and commitment therapy, focuses on the ability to separate or distance from one's thoughts, and 3. Metacognitive awareness, developed from mindfulness-based cognitive therapy, involves experiencing negative thoughts as mental events rather than as fact. This dissertation empirically examines this cognitive shift in perspective over three studies. In Study 1, we found a modest association between trait measures of decentering and fusion (the counter process to defusion) although neither was found to be associated with metacognitive awareness. There were some similarities with regards to the strength of correlations with variables such as depression and social anxiety, but differences also emerged with variables such as mindfulness and cognitive reappraisal, suggesting that perhaps the measurement tools are capturing constructs more differently than expected. In Study 2, we examined whether it was possible to induce state changes in decentering and defusion. To do this, an exercise from each of the aforementioned research traditions was selected. We found that the defusion and metacognitive awareness exercises led individuals to be less fused with their thoughts compared to the decentering exercise. There were no significant differences found on our decentering outcome measure. These findings suggested that being fused in thoughts may be easier for individuals to report. Finally, for Study 3 we experimentally manipulated defusion after individuals received one of three audio interventions (mindfulness, relaxation, or control).

Against what was expected, results suggest that when combined mindfulness + defusion led to more fusion and more post-event rumination for individuals with high social anxiety. Collectively, these three studies provide insight into three constructs that are used interchangeably in the literature. Study 3 also helps to contribute to our understanding about whether cognitive defusion is one of the mechanisms through which mindfulness is leading to favourable outcomes.

**Acknowledgements**

"You may encounter many defeats, but you must not be defeated. In fact, it may be necessary to encounter the defeats, so you can know who you are, what you can rise from, how you can still come out of it" - Maya Angelou

These past 7 years have had a profound impact on me both professionally and personally. I have felt defeated. I have been defeated. Out of those defeats, now comes a sense of accomplishment.

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**General Introduction**

Mindfulness refers to a state of attending to the present moment and doing so with a non-judgmental and open attitude (Kabat-Zinn, 1990). Introduced to Western psychology by Jon Kabat-Zinn in the 1970s, its popularity continues to grow, with mindfulness now being touted as one of the secrets to happiness and well-being (Pickart, 2014). Although initially developed to treat individuals with chronic pain, mindfulness-based interventions have been used to treat a variety of psychological conditions such as depression (Teasdale, Segal, & Williams, 1995), social anxiety (Kocovski, Fleming, Hawley, Huta, & Antony, 2013), and eating disorders (Butryn et al., 2013). Given its popularity, it is not surprising that research has predominately focused on the effectiveness of these mindfulness-based interventions. Once this first generation of research examining its effectiveness began to accumulate, a second generation of research began with researchers turning their focus towards examining *how* the effects of mindfulness develop. Although numerous processes have been suggested, the main purpose of the current work was to explore whether mindfulness leads to a cognitive shift in perspective thereby leading to decreased levels of distress.

**Mindfulness**

Mindfulness is a concept that is rooted in Eastern meditation. Although the conceptualization of mindfulness does vary amongst researchers, the commonality between them is that it refers to a process of redirecting attention towards the present moment while cultivating a non-judging acceptance towards whatever may be occurring in that moment (Bishop et al., 2004; Desrosiers, Klemanski, & Nolen-Hoeksema, 2013; Kabat-Zinn, 1990; Schmertz, Masuda, & Anderson, 2012). As this definition suggests, there are two important components: 1. Focusing on present moment experiences such as thoughts and emotions, and 2. Approaching these

experiences with a non-judgmental attitude regardless of valence (i.e., whether they are positive, negative, or neutral). The instructions used to typically teach mindfulness are in line with these two components. Individuals are instructed to focus their attention on the present moment and to pay particular attention to the thoughts and emotions they may be experiencing (Sauer & Baer, 2010). Individuals are then asked to approach such experiences with openness, kindness and compassion regardless of how positive or negative the experience may be.

Clinical treatments that are based on training in mindfulness skills have increased in both frequency and popularity over the last few decades (i.e., acceptance and commitment therapy, mindfulness-based cognitive therapy). There has been a shift from trying to change the content of one's thoughts and emotions to instead trying to change the relationship one has with their thoughts and emotions. This idea asserts that the problem may not necessarily be what you are thinking but how you are relating to the thoughts and emotions you are having (Herzberg et al., 2012). By being able to direct attention to the present moment, the individual will then become aware of not only their internal thought processes but also external situational factors (Edenfield & Saeed, 2012). Further, when individuals are taught how to be mindful in their daily lives, it has been found to lead to reductions in psychological distress, stress and anxiety while simultaneously encouraging the development of self-compassion, acceptance and insight (Gecht et al., 2014). Therapies in which mindfulness plays a central role have been used to treat a wide variety of psychological conditions including depression (Ma & Teasdale, 2004; Segal, Williams, & Teasdale, 2002; Teasdale et al., 2001), post-traumatic stress (King et al., 2013) and generalized anxiety (Evans et al., 2008; Kabat-Zinn et al., 2017).

Much of the research on mindfulness-based treatments over the last 20 years has answered questions regarding its efficacy. Zanna and Fazio (1982) suggest that there is a

systematic pattern to the questions that are asked when it comes to psychological phenomenon. First generation questions tend to ask: Is there an effect? There is an extensive amount of mindfulness research that has all sought to address this first-generation question. In other words, up until this point most research has sought to answer the question: "Are mindfulness-based interventions effective?"

Having established efficacy, Zanna and Fazio (1982) argue that researchers should then move on to asking second and third generation questions. Second generation questions seek to answer questions regarding boundary conditions. In relation to mindfulness research, these questions seek to investigate under what conditions would mindfulness influence individuals? Are there certain circumstances in which mindfulness is more effective? Third generation questions, according to Zanna and Fazio (1982), tend to ask: What mediates the effect? With mindfulness research, these are questions that tend to focus on *how* exactly do mindfulness-based interventions work? Third generation questions such as this are critical to understanding what the active ingredients are within mindfulness-based interventions and how these ingredients are contributing to the change that has already been established in the literature (Shapiro, Carlson, Astin, & Freedman, 2006). Although, the focus of the current work is on third generation questions, Zanna and Fazio (1982) suggest that second and third generation questions should be asked simultaneously and that only then will we truly understand a phenomenon.

As mindfulness research shifts from asking first generation to second and third generation questions, numerous mechanisms have been proposed. Mindfulness may lead to less rumination (Kearns et al., 2015), more acceptance (Kabat-Zinn, 1990), more tolerance towards negative emotional states (Baer, 2003), and it may help individuals to recognize what is meaningful and valuable in life (Shapiro et al., 2006). These changes may, in turn, lead to increased well-being.

In addition to these mechanisms, several authors have suggested that mindfulness may lead to cognitive changes such as changes in thought patterns or in the attitudes one has about their thoughts (Baer, 2003; Bernstein et al., 2015; Kabat-Zinn, 1990; Shapiro et al., 2006; Teasdale 1995). One of the core principles of mindfulness is that it involves attending to one's thoughts with openness and without judgement and it is suggested that one of the key ways in which mindfulness may achieve this change is through a cognitive shift in perspective (Bernstein et al., 2015; Shapiro et al., 2006). This cognitive change in perspective reflects the capacity to shift focus from within one's subjective experiences onto more present moment experiences. This shift, facilitated through mindfulness, is thought to result in greater clarity, perspective, as well as greater objectivity (Shapiro et al, 2006). Given its benefit, research examining this cognitive shift in perspective is essential.

Three constructs – decentering (Fresco et al., 2007b), defusion (Gillanders et al., 2014), and metacognitive awareness (Teasdale et al., 2002) have been suggested to represent this cognitive shift in perspective and there is some research that has supported each as a mechanism of change. The following sections provide detailed descriptions of decentering, defusion, and metacognitive awareness along with a review of the main measures for each. A summary of the empirical support linking these processes with mindfulness as well as the support for these processes as mechanisms of change within mindfulness-based practices is provided.

**Decentering**

Safran and Segal (1990) define decentering as the ability to take a present focused stance and to observe one's thoughts and feelings as temporary events of the mind. This is in direct opposition to experiencing thoughts and feelings as direct reflections of the self which are always true. Mindfulness incorporates a broader awareness of both internal and external stimuli and

although decentering may appear to be conceptually similar, it is distinct in that it focuses explicitly on the awareness one has of their thoughts and emotions (Naragon-Gainey & DeMarree, 2017).

The ability to decenter is thought to be a necessary component for healthy cognitive, psychological, as well as social development (Sorenson, 2016). Being able to take a decentered view can allow the individual to broaden his or her perspective and reduce the chances of becoming entangled in their own thoughts and emotions. Conversely, the inability to decenter is thought to increase an individual's susceptibility to both psychological and social problems (Fresco et al., 2007b). Decentering can be viewed as an individual difference variable that is amenable to change; therefore, a goal of therapy for individuals with psychological disorders is often to increase decentering. When individuals experience gains in decentering, it may represent the mark of a long-lasting and successful treatment intervention (Fresco et al., 2007b).

*Measuring Decentering*

Decentering has been typically measured using the Experiences Questionnaire (EQ; Fresco et al., 2007b; see Appendix A), which is a self-report measure that consists of 11 items with higher scores representing higher levels of decentering. According to Fresco and colleagues (2007b), decentering contains three facets - the ability to view oneself and one's thoughts as distinct, the ability to not automatically react to one's negative experiences and the capacity to be self-compassionate. These three facets represent changes thought to occur following treatment and were each included in the development of the Experiences Questionnaire (Fresco et al., 2007b), which contains items from each (e.g., "I can separate myself from my thoughts and feelings", "I can take time to respond to difficulties" and "I can treat myself kindly"). Fresco et al. (2007b) suggest that decentering contains these three facets, but they all map onto one

overarching construct.  Using confirmatory factor analysis (CFA), Fresco and colleagues (2007b) found support for a unifactorial structure with both a student and clinical sample.

The EQ demonstrated adequate to good internal consistency on both a student ($n = 519$) and clinical ($n = 220$) sample with alpha coefficients of .83 and .90, respectively. Consistent with original predictions, the EQ had a positive correlation with cognitive reappraisal (the ability to reconstrue an emotional event in such a way that it changes its impact; Gross & John, 2003; $r = .25$), and significant negative associations with experiential avoidance (psychological inflexibility; $r = -.46$), suppression (the ability to inhibit emotions; Gross & John, 2003; $r = -.31$), and depression ($r = -.40$; Fresco et al., 2007b).

*Decentering as a Mechanism of Change*

Decentering has been recognized as a possible mechanism of change within cognitive behavioral therapy (CBT). One central aspect of cognitive therapy is challenging thoughts, often with the use of a thought record that guides individuals to identify their negative automatic thoughts and then challenge them (Bennett-Levy, Lee, Travers, Pohlman, & Hamernik, 2003). Although the primary goal of completing a thought record is to challenge thoughts and not necessarily on decentering, another possible mechanism by which individuals may be able to achieve change may be through how well they are able to take a decentered perspective (Fresco, Segal, Buis, & Kennedy, 2007a). Therefore, decentering has been suggested to be a possible mechanism of change within not only mindfulness-based treatment approaches but various other therapeutic approaches such as cognitive behavioural therapy. Fresco et al. (2007a) showed that depressed individuals who responded to CBT had greater increases in decentering compared to depressed individuals who responded only to medication.

Previous literature has demonstrated increases in decentering after mindfulness practice

(either a single session or a full program). Feldman, Greeson, and Senville (2010) examined the effect that a brief mindfulness exercise had on levels of decentering in a sample of undergraduates. Results showed, that in comparison to a relaxation and loving kindness meditation, individuals in the mindfulness condition reported greater decentering. Orzech, Shapiro, Brown, and McKay (2009) sought to examine the impact that an intensive mindfulness intervention (10-12 hours of practice per day) would have on a community sample. These authors found significant increases in decentering pre-to post mindfulness training when compared to waitlist controls. Carmody, Baer, Lykins, and Olendzki (2009) also showed that individuals enrolled in a Mindfulness-Based Stress Reduction (MBSR) program experienced significant increases in decentering, and self-regulation pre-to post treatment. James and Rimes (2017) found that following a Mindfulness-Based Cognitive Therapy (MBCT) program, individuals with elevated levels of perfectionism, had significantly higher levels of decentering post-treatment in comparison to a self-help group. Bieling et al. (2012), using a clinical sample, found significantly higher levels of decentering following a MBCT program compared to both a medication and a placebo group.

There have been several studies to examine decentering as a mechanism of change within mindfulness-based treatments. Using a MBSR program, Hoge et al. (2015) discovered that increases in decentering mediated the relationship between mindfulness and reductions in anxiety among individuals with generalized anxiety disorder. Using a community sample, Adair, Fredrickson, Castro-Schilo, Kim, and Sidberry (2017) found that gains in mindfulness predicted gains in decentering which in turn predicted greater social connection and greater positive affect following a 6-week mindfulness (versus health promotion) course. Shoham, Goldstein, Oren, Spivak, and Bernstein (2017) showed that decentering mediated the relationship between

mindfulness and emotional arousal in a sample of novice meditators. Specifically, individuals assigned to receive a series of mindfulness-based skills training demonstrated increases in decentering which in turn led to reduced emotional arousal. This particular study did not include a comparison group (i.e., a control group) and therefore the findings should be interpreted with caution.

Hayes-Skelton and Graham (2013) examined the relationship between decentering, mindfulness and social anxiety in a correlational study involving a non-clinical sample and found that higher levels of mindfulness were associated with higher levels of decentering. Decentering was also found to significantly overlap with both mindfulness and social anxiety, suggesting that decentering may be one mechanism that links mindfulness to psychological outcomes such as social anxiety (Hayes-Skelton & Graham, 2013). Also examining mindfulness in a non-clinical sample, Tanay, Lotan, and Bernstein (2012) found that when using a brief mindfulness intervention greater levels of decentering were associated with decreases in depression-related dysfunctional attitudes. Finally, Pearson, Brown, Bravo, and Witkiewitz (2015), in a non-clinical sample, found that decentering partially mediated the relationship between mindfulness and anxiety symptoms. They suggested that mindfulness may help to shift the focus off of the internalizations that are typically accompanied by anxiety and may do so through decentering.

These previous studies are not without their limitations. In most cases decentering was not experimentally manipulated, and in many instances, it was measured at the same time as mindfulness violating temporal precedence. Overall though, these studies provide support for the relationship between mindfulness and decentering, and more specifically that decentering may play a mediating role between mindfulness and various outcomes (such as anxiety, dysfunctional attitudes, perfectionism, emotional arousal, social connection, and affect). These findings support

the notion that decentering may be one of the mechanisms of change for mindfulness interventions.

**Defusion**

Defusion, which developed from acceptance and commitment therapy (ACT; Hayes Strosahl, & Wilson, 1999), is defined psychologically as separating or distancing from our thoughts, letting them come and go rather than being caught up in them (Gillanders et al., 2014). A central principle of ACT is that much of human suffering is due to the tendency to suppress negative emotions and thoughts. ACT strives to lesson this tendency by teaching individuals to abandon attempts to control their thoughts and feelings, and instead observe them in a more mindful way without judgment (Hayes, Strosahl, & Wilson, 1999).

This approach focuses on accepting thoughts and emotions without avoidance while engaging in behaviours that are consistent with values and goals. Rather than allowing our thoughts to impact how we approach situations, ACT argues that we should, in turn, observe these thoughts in a more separated or distanced manner (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Cognitive fusion is the counter process to cognitive defusion and refers to over-identifying with our thoughts or getting caught up or entangled in them (Hayes et al., 1999; Roemer & Orsillo, 2010).

From an ACT perspective, cognitive fusion is seen as a detrimental process in which thoughts are taken literally. Therefore, defusion interventions typically aim to separate thoughts from actions and to create psychological distance between a person and their thoughts. For instance, a therapist might ask a client to repeat the word *milk* over and over again. This exercise is based on the premise that eventually the word will lose all associations and become simply a series of meaningless sounds (Titchener, 1916). The exercise can then be repeated using a word

that has a strong negative self quality (e.g., fraud, ugly). The purpose of this exercise is to reduce the literal function of the thought by changing its context so what might previously be perceived as threatening or important may become unimportant (Masuda, Hayes, Sackett, & Twohig, 2004). This allows the individual to acquire more flexible and effective coping strategies limiting the need to use avoidance behaviours (Hayes, 2005). Just as with decentering, defusion is thought to interact with and develop alongside skills such as mindfulness and acceptance (Naragon-Gainey & DeMarree, 2017).

*Measuring Defusion*

Cognitive fusion has been typically assessed using the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014; see Appendix B). The CFQ was originally intended to have items that assess both defusion and fusion but the defusion items were not adequate in terms of their reliabilities, so they were eventually removed. However, Gillanders and colleagues (2014) argue that the relationship one has with their thoughts runs on a continuum from being fused (i.e., entangled, taken literally) to defused (i.e., psychologically separate or distanced). The CFQ is a 7-item self-report measure with lower scores representing cognitive defusion and higher scores representing cognitive fusion. For the purpose of the current work, the term fusion will be used in lieu of defusion given this measure will be used and it captures increases in fusion rather than defusion.

The Cognitive Fusion Questionnaire (Gillanders et al., 2014) contains items such as "My thoughts cause me distress or emotional pain" and "I struggle with my thoughts". The CFQ demonstrated good internal consistency on both a student ($n = 1040$) and a clinical sample ($n = 215$) with alpha coefficients of .90 and .88, respectively. Consistent with the authors' original predictions, the CFQ correlated highly with experiential avoidance ($r = .72$), mindfulness ($r =$

-.50), frequency of automatic thoughts ($r = .61$) and depression ($r = .69$; Gillanders et al., 2014).

It also demonstrated good temporal stability in a community sample that was tested at two

different time points, separated by 4 weeks ($r = .81$).

*Defusion as a Mechanism of Change*

Defusion has been noted to be one of the key processes within not only the ACT

framework but with other therapeutic approaches such as CBT. Hayes, Levin, Plumb-Vilardaga,

Villatte, and Pistorello (2013) suggest that treatment should focus on processes such as defusion

in order to create a more present and flexible approach to experiences. This idea has been backed

up by research. Arch, Wolitzky-Taylor, Eifert, and Craske (2012) demonstrated that increases in

cognitive defusion predicted decreases in behavioral avoidance from pre-to post treatment for

individuals assigned to either an ACT treatment group or a traditional CBT group. A similar

finding was noted in Zettle, Rains, and Hayes (2011) in that defusion was found to mediate

differences in depression between individuals in both an ACT treatment group and a cognitive

therapy group.

Given that the treatments used in these aforementioned studies used numerous

component protocols to examine their impact on psychological problems, we are not able to

disentangle the singular effects of specific components (such as defusion) on outcomes.

However, research by Hinton and Gaynor (2010) and Ritzert, Forsyth, Berghoff, Barnes-Holmes,

and Nicholson (2015) speaks to this point. Hinton and Gaynor (2010) found that when university

students who reported elevated levels of distress, were given therapy that specifically targeted

cognitive defusion (i.e., taught to notice their thoughts without getting caught up in them), they

showed decreases in depressive symptomology and greater psychological flexibility compared to

a waitlist control. Ritzert et al. (2015) found that following a cognitive defusion intervention,

individuals high in spider fears reported significantly lower distress compared to those given a distraction or an active control intervention.

There have also been several studies to support that defusion plays a mediating role between mindfulness and a variety of clinical outcomes. Butryn et al. (2013) found that higher scores on eating disorder symptomatology were significantly associated with lower awareness, acceptance, and higher cognitive fusion among patients seeking treatment for eating disorders. However, individuals who experienced the greatest improvements in present-moment awareness, nonjudgmental acceptance, and cognitive fusion also showed the most improvement in eating disorder symptoms pre- to post mindfulness treatment (Butryn et al., 2013). Using the Cognitive Fusion Questionnaire, Taney et al. (2012) found that decreases in cognitive fusion was associated with decreases in depression-related dysfunctional attitudes for university students who underwent a short mindfulness intervention compared to a control. Nitzan-Assayag, Aderka, and Bernstein (2015) examined whether cognitive fusion would mediate the link between mindfulness and negative outcomes associated with trauma exposure. Findings suggest that cognitive fusion does play a mediating role between mindfulness and outcomes such as negative affect and depression for individuals who have experienced a traumatic event.

As with the research surrounding decentering, these previous studies are not without their limitations. Again, in many instances defusion was not experimentally manipulated and was often measured at the same time as other process or outcome variables violating temporal precedence. However, these studies do support the link between defusion and mindfulness. This research also suggests that defusion may play a mediating role between mindfulness and outcomes such as behavioral avoidance, depression, eating disorder symptomology and depression-related dysfunctional attitudes but not social anxiety. Therefore, these studies help to

provide preliminary support that defusion could be another mechanism of change for mindfulness interventions.

**Metacognitive Awareness**

Metacognitive awareness has been suggested to be a mechanism of change in Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002), and has been defined as a cognitive set in which thoughts and feelings are experienced as passing events rather than as inherent or true representations of the self (Teasdale et al., 2002). These authors argue that metacognitive awareness involves a change in the relationship an individual has with thoughts. Rather than experience the thoughts as reflections of reality, we should instead experience thoughts as conjectures that are not necessarily real.

MBCT integrates principles of cognitive behavioural therapy and elements of mindfulness. It was originally developed for use with patients with a history of depression with its initial aim being to keep formerly depressed patients from relapsing (Teasdale et al., 2001). MBCT aims to prevent relapse by drawing attention to the negative thinking patterns an individual may have while teaching key skills such as how to disengage from the ruminative response styles typically associated with depression (Ma & Teasdale, 2004).

These authors suggest that through therapies like MBCT, individuals are able to approach negative thoughts and feelings through a detached perspective. They argue that recalling times in which thoughts and feelings were experienced as passing events (i.e., through a detached or distanced perspective) can help bolster the effects of treatment in preventing relapse (Teasdale et al., 2002). Teasdale, Segal, and Williams (1995) further suggest that one of the benefits of the cognitive change associated with adopting mindfulness skills is that these skills can be practiced anytime and can applied to all thoughts regardless of valence. This is thought to help maintain

treatment gains (Fresco et al., 2007b; Teasdale et al., 1995).

*Measuring Metacognitive Awareness*

Metacognitive awareness has been assessed using the Measure for Awareness and Coping in Autobiographical Memory (MACAM; Moore, Hayhurst, & Teasdale, 1996). The procedure for this measure involves presenting individuals with eight mildly depressing vignettes (see Appendix C). For each vignette presented, individuals are asked to mentally put themselves into the situation and to feel the feelings that are elicited. Individuals are then asked to describe a personal situation in which they may have experienced similar feelings to those elicited by the previously presented vignette. These responses are tape recorded. The interviewer then rates those descriptions for their level of metacognitive awareness on a scale of *1*: minimal discrimination of thoughts and feelings to *5*: extensive distancing from thoughts and feelings with higher scores indicating greater metacognitive awareness. The rater uses a manual and is given instructions on how to interpret participant responses (see Appendix D).

The MACAM (Teasdale et al., 2002) demonstrated poor internal consistency on a clinical sample ($n = 60$) with a split half estimate of reliability of .47. Consistent with the authors' original predictions though, lower levels of metacognitive awareness predicted earlier relapse for individuals who had recent major depression. The MACAM was also found to distinguish between depressed individuals and healthy controls. However, given the time-consuming nature of this measure and perhaps because of its poor reliability, it has not been widely used in the literature.

*Metacognitive Awareness as a Mechanism of Change*

Metacognitive awareness has been noted to be one of the key processes within Mindfulness-based Cognitive Therapy (MBCT) as well as other therapeutic approaches such as

Cognitive Behavioural Therapy (CBT). Teasdale et al. (2002) argue that interventions should focus on getting individuals to change the relationship they have with their thoughts and feelings (i.e., adopt a more metacognitive mindset) rather than trying to modify the thought or feeling. Teasdale et al. (2001) demonstrated that increases in metacognitive awareness predicted decreases in relapse rates from pre-to post treatment for individuals assigned to receive cognitive therapy rather than a medication only group.

As with decentering and defusion, there is some evidence to suggest a link between mindfulness and metacognitive awareness. Using the MACAM, Hargus, Crane, Barnhofer, and Williams (2010) found that following MBCT, depressed individuals had higher levels of metacognitive awareness compared to those participants allocated to a delayed treatment as usual group.  There has also been some research that has examined metacognitive awareness and its mediating role between mindfulness and depression. Teasdale et al. (2002) found that, at baseline, patients who were at a high risk of relapse of major depression show significantly less evidence of metacognitive awareness. However, following MBCT, patients had increased metacognitive awareness and, in turn, were less likely to relapse compared to those individuals who sought treatment from alternative sources (i.e., a family doctor).

Although limited, this research using the MACAM suggests a link between mindfulness and metacognitive awareness and provides some support of metacognitive awareness mediating the relationship between mindfulness interventions and outcomes such as depression. Further research is warranted to elucidate the relationships among mindfulness, metacognitive awareness and various outcomes.

**How do decentering, defusion, and metacognitive awareness compare?**

Taken together, these three constructs – decentering, defusion, and metacognitive

awareness share a number of features including an awareness of one's internal experiences and being able to see the transient nature of one's thoughts rather than seeing them as accurate representations of reality (Bernstein et al., 2015). Further, all three constructs have been found to be associated with healthy psychological functioning and have been found to mediate the link between mindfulness-based interventions and reductions in a variety of psychological outcomes such as anxiety, depression, eating disorder symptomology etc.

There are also some conceptual differences between decentering, defusion, and metacognitive awareness that should be noted. For instance, when examining the theoretical framework from which each of the primary assessment tools was derived, a subtle pattern of differences emerges. For instance, the definition of decentering includes both thoughts and emotions with decentering being referred to as the ability to take a present focused stance to one's thoughts and feelings (Safran & Segal, 1990). This original definition does not contain a self-compassion focus. However, Fresco et al. (2007b) created the Experiences Questionnaire which does in fact contain self-compassion items. Further, self-compassion is not a component of the assessment tools that are used to capture fusion and metacognitive awareness. Similar to decentering, the definition of metacognitive awareness also contains both thoughts and emotions. Metacognitive awareness as defined by Teasdale and colleagues (2002) is being able to distance yourself from both the thoughts and/or emotions you are experiencing. The assessment tool (i.e., the MACAM) relies on this definition.

Whereas the literature on decentering and metacognitive awareness is broader and focuses on both thoughts and emotions, the literature on cognitive fusion narrowly focuses on thoughts. According to Gillanders et al. (2014) fusion refers to a process in which a person acts and reacts to their thoughts as if they are true representations of reality. These authors suggest

that fusion runs on a continuum from being fused to defused. As such, the Cognitive Fusion Questionnaire (Gillanders et al., 2014) is thought to capture being fused with thoughts. Therefore, it is possible that although decentering, defusion, and metacognitive awareness may have originally appeared to have been defined similarly, upon closer examination the definitions contain different elements and, as such, the assessment tools for each likely stress both similar and dissimilar aspects in accordance with these definitional differences and different historical traditions.

**Summary and Overarching Goals of the Present Research**

Even though research has suggested that mindfulness may lead to a shift in perspective (i.e., decentering, defusion, & metacognitive awareness) and this shift may, in turn, lead to greater well-being/ less distress, we are unable to conclusively suggest a causal relationship because the variable of interest was not specifically isolated. Past research has shown that mindfulness leads to increased decentering, defusion, and metacognitive awareness with research supporting each of these constructs as a mechanism of change.

Therefore, the overarching goal of the current work was to isolate and manipulate this cognitive shift in perspective to address the question as to whether this process is, in fact, responsible for changes in levels of psychological distress. As a first step, a more systematic examination was required to understand whether the scales that purport to measure similar constructs (i.e., decentering, defusion, and metacognitive awareness) are in fact empirically related to one another. Even with definitional similarities, little is known about how these measures and the constructs they are thought to assess relate to each other.

The present work explored three major aims: 1. To examine the degree of overlap between trait measures of decentering, defusion, and metacognitive awareness 2. To examine

whether it is possible to induce state changes in decentering, defusion or metacognitive awareness. And 3. To examine whether mindfulness leads to a cognitive shift in perspective thereby leading to decreased levels of distress. Each of these were addressed in turn over the course of three studies.

**Study 1**

Although much is written about decentering, (de)fusion and metacognitive awareness, very little work draws them together. The primary aim of Study 1 was to assess these three variables and examine the degree to which they are referring to the same construct. A related aim was to compare the assessment tools that are considered the "best" operationalizations of each underlying construct.

Based on the very similar definitions of decentering, (de)fusion and metacognitive awareness, it was hypothesized that there would be substantial overlap among them as demonstrated by high intercorrelations between their measures. It was expected that decentering and metacognitive awareness would be positively correlated with the five mindfulness subscales, and cognitive reappraisal (the ability to reconstrue an emotional event in such a way that it changes its impact; Gross & John, 2003) whereas fusion would be negatively correlated with them. Further, it was hypothesized that decentering and metacognitive awareness would be negatively correlated with experiential avoidance (psychological inflexibility), cognitive suppression (the tendency to suppress unwanted thoughts; Wegner & Zanakos, 1994), anxiety, and depression whereas fusion would be positively correlated with them.

A secondary goal of the current study was to examine the factor structure of the decentering and fusion measures. Given the nature of the metacognitive awareness measure (i.e., the MACAM) and a lack of statistical power because it was only administered to a subsample of

individuals, it was not included in this factor analysis. With the conceptual similarity between decentering and (de)fusion, it was hypothesized that the items used to assess them would all load onto one factor. Alternatively, given that the decentering measure items all have a positive valence whereas the defusion (i.e., fusion) measure items all have a negative valence, it was also deemed possible that a method effect could emerge resulting in separate decentering and fusion factors.

**Method**

**Participants**

In total, 232 university students were recruited to participate in this study. Of these, only a subset of participants ($n = 56$) completed the measures in-lab, with the rest completing them online. Due to the nature of the metacognitive awareness measure (described above), only those participants brought into the lab completed it. Participants' ages ranged from 18-56 ($M = 20.59$, $SD = 4.06$), with the majority being female (74%), and single (88.8%). Participant's self-identified race was as follows: 67.7% White, 18.1% Asian, 3.9% Black/African Canadian, .4% First Nations, 9.9% "other". Participants were granted partial course credit toward the research component of their psychology class.

**Measures**

**Decentering**. The Experiences Questionnaire (EQ) was used to assess decentering (Fresco et al., 2007b; see Appendix A). The EQ is an 11-item measure in which participants indicate their level of agreement to statements such as "I can separate myself from my thoughts and feelings" on a 5-point scale ranging from "never" to "all the time" with higher scores indicating greater decentering. The EQ was evaluated for reliability on an undergraduate sample and it demonstrated good internal consistency with an alpha coefficient of .83. The EQ had a

positive correlation with cognitive reappraisal ($r = .25$), and a significant negative association with depression ($r = -.40$; Fresco et al., 2007b).

**Fusion**. The Cognitive Fusion Questionnaire (CFQ) was used to assess cognitive fusion which is thought to be the counter process to cognitive defusion (Gillanders et al., 2014; see Appendix B). The CFQ is a 7-item measure for which participants indicate how true of them statements were, such as "I tend to get very entangled in my thoughts" using a 7-point scale ranging from "never true" to "always true", with higher scores indicating greater fusion and lower scores indicating greater defusion. The CFQ was evaluated for reliability on a sample of male and female adults. It demonstrated excellent internal consistency with an alpha coefficient of .90. The CFQ was positively correlated with depression ($r = .45$), and negatively associated with mindfulness ($r = -.50$; Gillanders et al., 2014).

**Metacognitive awareness**. A modified version of the Measure for Awareness and Coping in Autobiographical Memory (MACAM) was used to assess metacognitive awareness (Moore et al., 1996; see Appendix C). At the time the study was conducted, the MACAM was thought to be the only known measure of metacognitive awareness which is why it was selected for Study 1. The MACAM is a semi-structured interview that presents participants with eight vignettes of mildly depressing situations via audiotape. Following each vignette, participants are asked to put themselves into the situation and to try and feel the feelings that were elicited. Participants are then asked to bring to mind and describe a personal situation that may have elicited a similar emotion to that triggered by the taped situation. After all eight vignettes are presented, the interviewer goes over each one, eliciting detailed descriptions of the personal events using predesigned prompts (e.g., "How long did you feel like that?"), in order to understand how the individual coped with the situation. The interviewer (along with another

independent rater) rates those audio taped descriptions for their level of metacognitive awareness on a scale of 1 (no distance from thoughts) to 5 (extensive distance from thoughts). Each vignette receives one rating. In order to improve coding reliability, coders are provided with detailed descriptions of the scale and anchor points.

For the purposes of the current study, the MACAM was modified in two ways. First, the original MACAM consisted of two sets of eight vignettes with the researcher selecting one set or the other to present. These vignettes were designed to elicit feelings of sadness. For the current study, rather than selecting one of the two sets of vignettes, eight vignettes across both sets were selected based on their personal relevance to students (i.e., vignettes that contained themes of shopping, going for coffee with a friend, or having an argument with a family member were selected). Eight vignettes in total were presented to participants. This was done to ensure that participants would be able to recall a similar situation to the one being presented. Second, given that the original measure was constructed in Britain, the eight selected vignettes were modified to reflect Canadian English norms.  For example, phrases such as "you have arranged to meet a friend for a cup of tea in the cafe in a department store" and "you fritter away the evening without calling them until it's too late" were replaced with "you have arranged to meet a friend for a *cup of coffee* in the cafe in a department store" and "you *waste* away the evening without calling them until it's too late."

**Mindfulness**. The Five Facet Mindfulness Questionnaire (FFMQ) was used to assess dispositional mindfulness and contains five subscales thought to represent being mindful in daily life: 1. observe (noticing internal and external experiences), 2. describe (labeling experiences with words), 3. act with awareness (attending to the present), 4. non-judgment of experience (taking a non-evaluative role towards internal experiences) and 5. non-reactivity to inner

experience (allowing thoughts and feelings to come and go) (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; see Appendix E). The FFMQ is a 39-item measure for which participants indicate the frequency of statements such as "When I'm walking, I deliberately notice the sensations of my body moving" using a 5-point scale ranging from "never" to "very often". The FFMQ has demonstrated modest to high internal consistency with alpha coefficients that range from .75 to .91 and the subscales have been found to positively correlate with measures of self-compassion (Baer et al., 2006).

**Experiential avoidance**. The Acceptance and Action Questionnaire (AAQ-II) was used to assess experiential avoidance (Bond et al., 2011; see Appendix F). The AAQ-II is a 7-item measure for which participants are asked to indicate how true of them statements were, such as "My painful experiences and memories make it difficult for me to live a life that I would value" using a 7-point scale that ranges from "never true" to "always true", with higher scores indicating greater experiential avoidance or psychological inflexibility. The AAQ-II has demonstrated high internal consistency with an alpha coefficient of .88 and higher scores have been associated with greater emotional distress (Bond et al., 2011).

**Emotion regulation**. The Emotion Regulation Questionnaire (ERQ) was used to assess cognitive reappraisal and contains two subscales: reappraisal (the ability to reconstrue an emotional event in such a way that it changes its impact) and suppression (the tendency to inhibit emotions; Gross & John, 2003; see Appendix G). The ERQ is a 10-item measure (6 reappraisal items and 4 suppression items) for which participants indicate the level of agreement to statements such as "I keep my emotions to myself" using a 7-point scale that ranges from "strongly disagree" to "strongly agree". The ERQ has demonstrated good internal consistency

with an alpha coefficient of .79 for reappraisal and .73 for suppression. Further, higher scores on

the reappraisal subscale have been associated with greater positive affect (Gross & John, 2003).

**Cognitive Suppression**. The White Bear Suppression Inventory (WBSI) was used to

assess cognitive suppression (Wegner & Zanakos, 1994; see Appendix H). The WBSI is a 15-

item measure for which participants indicate their agreement to statements such as "There are

things I prefer not to think about" using a 5-point scale that ranges from "strongly disagree" to

"strongly agree", with higher scores indicating greater thought suppression. Higher scores on the

WBSI have been associated with depression and anxiety and the WBSI has demonstrated high

internal consistency with an alpha coefficient of .89 (Wegner & Zanakos, 1994).

**Depression**. The Beck Depression Inventory (BDI-II) was used to assess the severity of

depressive symptomology (Beck, Steer, & Brown, 1996; see Appendix I). The BDI-II is a 21-

item measure for which participants indicate the frequency of symptoms such as "Hopelessness"

using a 3-point scale, with higher scores indicating more severe depressive symptoms. The BDI-

II has been found to have strong psychometric properties, with an alpha coefficient of .91 (Beck

et al., 1996).

**Social anxiety**. The Social Phobia Inventory (SPIN) was used to assess social anxiety

(Connor et al., 2000; see Appendix J). The SPIN is a 17-item measure for which participants are

to indicate the frequency of statements such as "I am afraid of people in authority" using a 4-

point scale that ranges from "not at all" to "extremely", with higher scores indicating greater

social anxiety. The SPIN has good internal consistency, with an alpha coefficient of .94 and

higher scores have been found to be associated with other measures of social anxiety (Connor et

al., 2000).

**Procedure**

Participants were recruited to take part in a study on gaining distance from thoughts. Participants were tested using either computerized data collection software (Qualtrics) or in lab using paper and pencil. The self-report measures were completed by all participants but the MACAM was only administered to participants who completed the study in lab. The self-report measures were administered in the following order: decentering, fusion, mindfulness, experiential avoidance, emotional regulation, suppression, social anxiety and depression. Following these measures, the MACAM was administered with participants being asked to listen to a series of eight vignettes. Following each vignette, participants were asked to imagine themselves in a similar situation to those that were presented in the audio recording and then report their expected feelings. These responses were audio-recorded. Following the MACAM, in lab participants were asked to write about a time that they experienced joy or happiness as well as to describe a happy memory (see Appendix K). The purpose of this second exercise was to counteract any negative emotions the MACAM may have evoked. The data for this mood booster was not analyzed. All participants were fully debriefed upon completion of the study.

## Results

**Descriptive Statistics and Internal Consistency**

Means and standard deviations are presented in Table 1. The internal consistency reliabilities (i.e., Cronbach's alpha) for all scales used in the current study are presented in Table 1. These reliabilities are in line with previous research with the exception of the Experiences Questionnaire being lower than Fresco et al. (2007b) found. Overall, the scales and subscales demonstrated adequate reliability.

Table 1

*Descriptive Statistics for Study 1*

| | Min | Max | Mean | SD | α |
|---|---|---|---|---|---|
| Experiences Questionnaire (Decentering) | 25 | 55 | 37.31 | 4.77 | .73 |
| Cognitive Fusion Questionnaire (Fusion) | 7 | 49 | 27.50 | 7.93 | .90 |
| Measure for Awareness and Coping (Metacognitive Awareness) | 1.5 | 4.29 | 2.83 | .77 | .71 |
| Five Facet Mindfulness Observe subscale | 8 | 38 | 25.19 | 4.87 | .76 |
| Five Facet Mindfulness Describe subscale | 9 | 40 | 25.76 | 5.31 | .85 |
| Five Facet Mindfulness Act Aware subscale | 10 | 40 | 24.69 | 5.04 | .84 |
| Five Facet Mindfulness Nonjudgment subscale | 12 | 40 | 25.10 | 5.65 | .86 |
| Five Facet Mindfulness Nonreactivity subscale | 7 | 31 | 20.42 | 3.70 | .70 |
| Acceptance and Action – II (Experiential Avoidance) | 7 | 49 | 23.85 | 8.75 | .91 |
| Emotion Regulation – Reappraisal subscale | 6 | 42 | 28.74 | 5.60 | .82 |
| Emotion Regulation – Suppression subscale | 4 | 28 | 15.26 | 4.75 | .75 |
| White Bear Suppression | 15 | 76 | 51.74 | 10.90 | .88 |
| Beck Depression Inventory- II | 0 | 57 | 14.85 | 11.31 | .91 |
| Social Phobia Inventory | 0 | 63 | 24.15 | 13.00 | .92 |

*Note.* $N = 232$ except for the Measure for Awareness and Coping $N = 56$.

**MACAM**

When examining the MACAM data, results revealed that 60% of participants scored greater than three, on the five-point scale (i.e., they demonstrated that they were able to show some distance between themselves and the situation) on over half of the vignettes. As these participants scored greater than the midpoint on over half of the vignettes, this could be taken to suggest that participants overall demonstrated an ability to gain distance from their thoughts.

For the MACAM, Teasdale et al. (2002) suggest calculating an odd-even split-half estimate of the reliability. However, given that this particular estimate underestimates the actual reliability of the measure, the traditional method of calculating reliability was deemed to be acceptable (see Table 1).

A second independent rater (a doctoral student in social psychology) coded 20% of the participant responses to the MACAM. Inter-rater reliability was good with an intraclass correlation coefficient (ICC) of .78 ($p = .012$).

**Online vs. In-lab**

A series of univariate ANOVAs were conducted using all scales and subscales to test whether or not there were differences between participants who completed measures online versus in-lab (see Table 2). Individuals who completed measures online compared to in-lab scored significantly lower on the Emotion Regulation Questionnaire cognitive reappraisal subscale ($F(1, 220) = 10.15$, $p = .002$), the mindfulness observe subscale ($F(1, 222) = 5.95$, $p = .015$), the mindfulness act with awareness subscale ($F(1, 221) = 5.23$, $p = .023$) and decentering ($F(1, 220) = 8.23$, $p = .005$). Further, individuals who completed measures online scored significantly higher on social anxiety ($F(1, 220) = 5.50$, $p = .020$) and experiential avoidance

Table 2

*Means and Standard Deviations for all Scales and Subscales for the Online versus In-Lab Sample for Study 1*

| Variables | Online ($n = 176$) | In-Lab ($n = 56$) |
|---|---|---|
| Decentering | $36.81_a$ (4.78) | $38.94_b$ (4.41) |
| Fusion | 27.93 (8.04) | 26.22 (7.33) |
| *Mindfulness* | | |
| Five Facet Mindfulness Observe subscale | $24.75_a$ (4.60) | $26.60_b$ (5.50) |
| Five Facet Mindfulness Describe subscale | 25.39 (5.08) | 26.92 (5.85) |
| Five Facet Mindfulness Act Aware subscale | $24.26_a$ (4.63) | $26.06_b$ (6.03) |
| Five Facet Mindfulness Nonjudgment subscale | 24.85 (5.56) | 25.90 (5.91) |
| Five Facet Mindfulness Nonreactivity subscale | 20.34 (3.64) | 20.68 (3.83) |
| *Experiential Avoidance* | | |
| Acceptance and Action - II | $24.61_a$ (8.58) | $21.42_b$ (8.92) |
| *Emotion Regulation* | | |
| Emotion Regulation – Reappraisal subscale | $28.09_a$ (5.60) | $30.83_b$ (5.06) |
| Emotion Regulation- Suppression subscale | 15.54 (4.36) | 14.34 (5.75) |
| White Bear Suppression | 51.27 (10.38) | 53.25 (12.33) |
| *Psychopathology* | | |
| Beck Depression Inventory | 15.60 (11.90) | 12.45 (8.88) |
| Social Phobia Inventory | $25.75_a$ (12.95) | $19.15_b$ (11.73) |

*Note.* Means in the same row that do not share subscripts differ significantly at $p < .05$.

($F(1, 216) = 10.88$, $p = .001$) compared to in-lab individuals. These sample differences are further explored in the correlation section.

**Correlations**

The correlations with decentering, fusion, and metacognitive awareness and all scales and subscales for the total sample are shown in Table 3. Further, the correlations for decentering, fusion, and metacognitive awareness and all scales and subscales for only the in-lab sample are presented in Table 4.

Correlational strengths for the in-lab sample are similar in magnitude to those for the total sample for most of the scales and subscales. There were a few exceptions. For the in-lab sample, decentering was modestly correlated with cognitive reappraisal while the total sample was not. For the mindfulness facet observe, decentering was weakly correlated in the total sample but modestly correlated in the in-lab sample. Fusion modestly correlated with the mindfulness facet observe in the total sample but did not correlate in the in-lab sample. For depression and social anxiety, decentering correlated modestly in the total sample but was not correlated in the in-lab sample. Given these were the only differences, all presented correlations in the following sections represent the total sample.

We originally expected that there would be substantial overlap among decentering, fusion, and metacognitive awareness. However, decentering and fusion only demonstrated a modest relationship ($r = -.46$, $p < .001$) with each other and were not significantly correlated with metacognitive awareness ($r = -.05$, $p = .69$ and $r = -.17$, $p = .21$), respectively.

**Mindfulness.** As expected, decentering, was positively associated with all five of the mindfulness subscales, metacognitive awareness was positively associated with four of the five whereas fusion was negatively correlated with four of the five of them. However, for some of

Table 3

*Correlations between Decentering, Fusion, Metacognitive Awareness and all other Scales and Subscales for the Total Sample for Study 1*

| *Variables* | Decentering | Fusion | Metacognitive Awareness |
|---|---|---|---|
| | (*n* = 232) | (*n* = 232) | (*n* = 56) |
| *Mindfulness* | | | |
| Five Facet Mindfulness Observe subscale | .16* | .26** | -.18 |
| Five Facet Mindfulness Describe subscale | .36** | -.21** | .21 |
| Five Facet Mindfulness Act Aware subscale | .16* | -.41** | .29* |
| Five Facet Mindfulness Nonjudgment subscale | .29** | -.66** | .16 |
| Five Facet Mindfulness Nonreactivity subscale | .40** | -.19** | .17 |
| | | | |
| *Experiential Avoidance* | | | |
| Acceptance and Action - II | -.40** | .74** | -.17 |
| | | | |
| *Emotion Regulation* | | | |
| Emotion Regulation – Reappraisal subscale | .08 | .02 | .28* |
| Emotion Regulation- Suppression subscale | -.10 | .21** | .24 |
| White Bear Suppression | -.27** | .69** | -.11 |
| | | | |
| *Psychopathology* | | | |
| Beck Depression Inventory | -.42** | .45** | -.34* |
| Social Phobia Inventory | -.34** | .46** | -.12 |

*Note. N* = 232 except for correlations involving the metacognitive awareness measure *N* = 56. ** = *p* < .001, * = *p* < .05.

Table 4

*Correlations between Decentering, Fusion, and all other Scales and Subscales for the In-Lab Sample for Study 1*

| Variables | Decentering | Fusion |
|---|---|---|
| *Mindfulness* | | |
| Five Facet Mindfulness Observe subscale | .43* | .05 |
| Five Facet Mindfulness Describe subscale | .40** | -.41** |
| Five Facet Mindfulness Act Aware subscale | -.03 | -.32* |
| Five Facet Mindfulness Nonjudgment subscale | .24 | -.66** |
| Five Facet Mindfulness Nonreactivity subscale | .60** | -.29** |
| | | |
| *Experiential Avoidance* | | |
| Acceptance and Action - II | -.32** | .62** |
| | | |
| *Emotion Regulation* | | |
| Emotion Regulation – Reappraisal subscale | .31* | -.17 |
| Emotion Regulation- Suppression subscale | -.06 | .21 |
| White Bear Suppression | -.12 | .65** |
| | | |
| *Psychopathology* | | |
| Beck Depression Inventory | -.09 | .43** |
| Social Phobia Inventory | -.15 | .43** |

*Note.* $N = 56$. ** $= p < .001$, * $= p < .05$.

these correlations, the strengths of the correlations differed. For example, for the mindfulness facet nonjudgment, fusion was found to correlate highly (although negatively) whereas decentering and metacognitive awareness showed weak to modest positive correlations. Fisher's r to z transformation was used to test whether two correlations obtained from the same sample, with two correlations sharing one measure in common, were significantly different from one another (Meng, Rosenthal, & Rubin, 1992). In order to compare correlations, the absolute value of each was taken. Results indicated that for the mindfulness facet nonjudgment, the correlation with fusion was significantly different from the correlations with decentering and metacognitive awareness ($z$s = 6.51 and 6.95 respectively, $p < .01$) but the latter correlations did not differ significantly from one another ($z = 1.48$, $p = .14$).

**Experiential avoidance**. As hypothesized, decentering and metacognitive awareness were negatively correlated with experiential avoidance whereas fusion was positively correlated with it. Again, the strengths of these correlations differed. Decentering and metacognitive awareness showed modest correlations with experiential avoidance while fusion showed a strong correlation with it. Fisher's z transformation revealed that for experiential avoidance, the correlation with fusion was significantly different from the correlations with decentering and metacognitive awareness ($z$s = 6.68 and 8.46, respectively $p < .01$) and the correlation with decentering was significantly different from the correlation with metacognitive awareness ($z = 2.70$, $p = .01$).

**Emotion regulation- cognitive reappraisal/cognitive suppression.** It was originally hypothesized that decentering and metacognitive awareness would be positively associated with cognitive reappraisal and negatively associated with cognitive suppression. Further, fusion was expected to negatively correlate with cognitive reappraisal and positively correlate with

cognitive suppression. For cognitive reappraisal, metacognitive awareness was found to have a weak but positive association with cognitive reappraisal while decentering and fusion did not significantly correlate with it.

Using the White Bear Suppression Inventory (WBSI), fusion was found to have a high and positive correlation with cognitive suppression, while decentering and metacognitive awareness showed low to modest negative correlations with cognitive suppression. The direction of these correlations aligned with our original predictions, yet the strengths of the correlations differed. Fisher's z transformation revealed that for cognitive suppression (using the WBSI), the correlation with fusion was significantly different from the correlations with decentering and metacognitive awareness ($z$s = 7.48 and 8.09 respectively, $p < .01$) but the latter correlations did not differ significantly from one another ($z = 1.80$, $p = .07$). Further, the correlation between the two suppression measures (the WBSI and Emotion Regulation Questionnaire suppression subscale) was .24.

**Psychopathology.** As expected, decentering, and metacognitive awareness were negatively correlated with depression and social anxiety while fusion was positively correlated with them. Fisher's z transformation for depression revealed no significant differences among the strengths of the correlations for decentering, fusion, and metacognitive awareness. For social anxiety, decentering and fusion were found to correlate modestly, while metacognitive awareness showed a low correlation. Fisher's z transformation for social anxiety revealed no significant difference between the strength of the correlations for decentering and fusion ($z = 1.96$, $p = .06$) but both were significantly different from the metacognitive awareness correlation ($z$s = 4.28 and 2.51 respectively, $p < .01$).

**Factor Analysis**

Given the conceptual similarity between decentering and defusion, we originally hypothesized that the items used to assess each of them would all load onto one factor. Alternatively, we did predict that a method effect could emerge resulting in separate decentering and (de)fusion factors given the valence difference between these measures. In order to ascertain if the items were all tapping the same construct, we ran an exploratory factor analysis (EFA) using the cognitive fusion and decentering items. Given that only 56 participants completed the MACAM, it was not included in the factor analysis. The initial Scree plot indicated a four-factor solution. The factors accounted for 29%, 8.5%, 3.6% and 2.7% of the variance. Two factors accounted for a significant portion of the total variance (37.5%), whereas the other two factors contributed relatively little (6.3%). Further, factors 3 and 4 had very few items loading greater than .35 (3 and 2 items). Thus, the analysis was re-run extracting only two factors and a principal axis factor (PAF) analysis was utilized with an oblique rotation given the fact that the factors were expected to correlate given their definitional similarities. The correlation between the two factors was -.48; see Table 5 for factor loadings with loadings above .35 in bold.

To further investigate whether it was meaningful to retain 2 factors, we conducted a Parallel Analysis (O'connor, 2000). This analysis involves comparing the eigenvalues extracted from the actual dataset to eigenvalues that are extracted from random data. These matrices parallel the actual dataset in terms of the number of observations and distributions of the variables. The eigenvalues that are derived from the actual data are compared to the eigenvalues that correspond to the 95th percentile of the distribution of random data eigenvalues. All eigenvalues that fall above the 95th percentile can be retained.

Table 5

*Factor loadings for the items of the Cognitive Fusion Questionnaire (CFQ) and the Experiences Questionnaire (EQ) for Study 1*

| Item Content | Factor 1 | Factor 2 |
|---|---|---|
| *Factor 1 (Fusion)* | | |
| CFQ1 My thoughts cause me distress or emotional pain. | **.77** | -.00 |
| CFQ2 I get so caught up in my thoughts I am unable to do the things that I most want to do. | **.75** | -.01 |
| CFQ3 I over-analyze situations to the point where it's unhelpful to me. | **.78** | .19 |
| CFQ4 I struggle with my thoughts. | **.80** | -.06 |
| CFQ5 I get upset with myself for having certain thoughts. | **.76** | -.03 |
| CFQ6 I tend to get very entangled in my thoughts. | **.79** | .04 |
| CFQ7 It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful. | **.78** | .03 |
| | | |
| *Factor 2 (Decentering)* | | |
| EQ1 I am better able to accept myself as I am. | -.27 | **.40** |
| EQ2 I can observe unpleasant feelings without being drawn into them. | -.13 | .09 |
| EQ3 I notice that I don't take difficulties so personally. | -.12 | **.48** |
| EQ4 I can treat myself kindly. | -.08 | **.55** |
| EQ5 I can separate myself from my thoughts and feelings. | -.08 | **.51** |
| EQ6 I have the sense that I am fully aware of what is going on around me and inside me. | .03 | **.46** |
| EQ7 I can slow my thinking at times of stress. | -.28 | .25 |
| EQ8 I can actually see that I am not my thoughts | .03 | **.42** |
| EQ9 I am consciously aware of a sense of my body as a whole. | .11 | **.65** |
| EQ10 I can take time to respond to difficulties. | .01 | **.42** |
| EQ11 I view things from a wider perspective. | .14 | **.41** |

*Note.* Factor loadings > .35 in bold.

The scree plot yielded by this analysis can be seen in Figure 1. Looking at the scree plot, it is clear that the first and second eigenvalue fall above the 95th percentile line. This analysis supports that a two-factor solution should be retained.

**Additional Analyses**

Because fusion demonstrated very strong correlations with the mindfulness subscale nonjudgment, thought suppression, and experiential avoidance, a regression analysis using fusion as the criterion variable was conducted to further investigate what the relationship may be among these variables. The predictor variables were mean centered for the purpose of this analysis. The mindfulness subscale nonjudgment ($b = -.29$, $t(206) = -3.50$, $p = .001$), cognitive suppression ($b = .21$, $t(206) = 4.80$, $p < .001$), and experiential avoidance ($b = .37$, $t(206) = 7.45$, $p < .001$) all significantly predicted fusion scores. Further, these three predictors explained a significant and very high proportion of the variance in fusion scores, $R^2 = .65$, $F(3, 203) = 124.27$, $p < .001$.

As a comparison analysis, a second regression analysis was conducted using the same three predictor variables but with decentering as the criterion variable. Experiential avoidance significantly predicted decentering, $b = -.21$, $t(204) = -4.26$, $p < .001$, but the mindfulness subscale nonjudgment and cognitive suppression did not ($p$'s $> .05$). Further, this model accounted for a relatively small proportion of the variance in decentering scores, $R^2 = .17$, $F(1, 204) = 14.03$, $p < .001$. A similar analysis was not conducted with metacognitive awareness as the criterion variable given the limited sample size.

### Discussion

Study 1 sought to assess the overlap between decentering, defusion, and metacognitive awareness, as each has been suggested to represent a cognitive shift in perspective. Though it appears that these three terms are referring to a similar concept, with each being proposed to be a
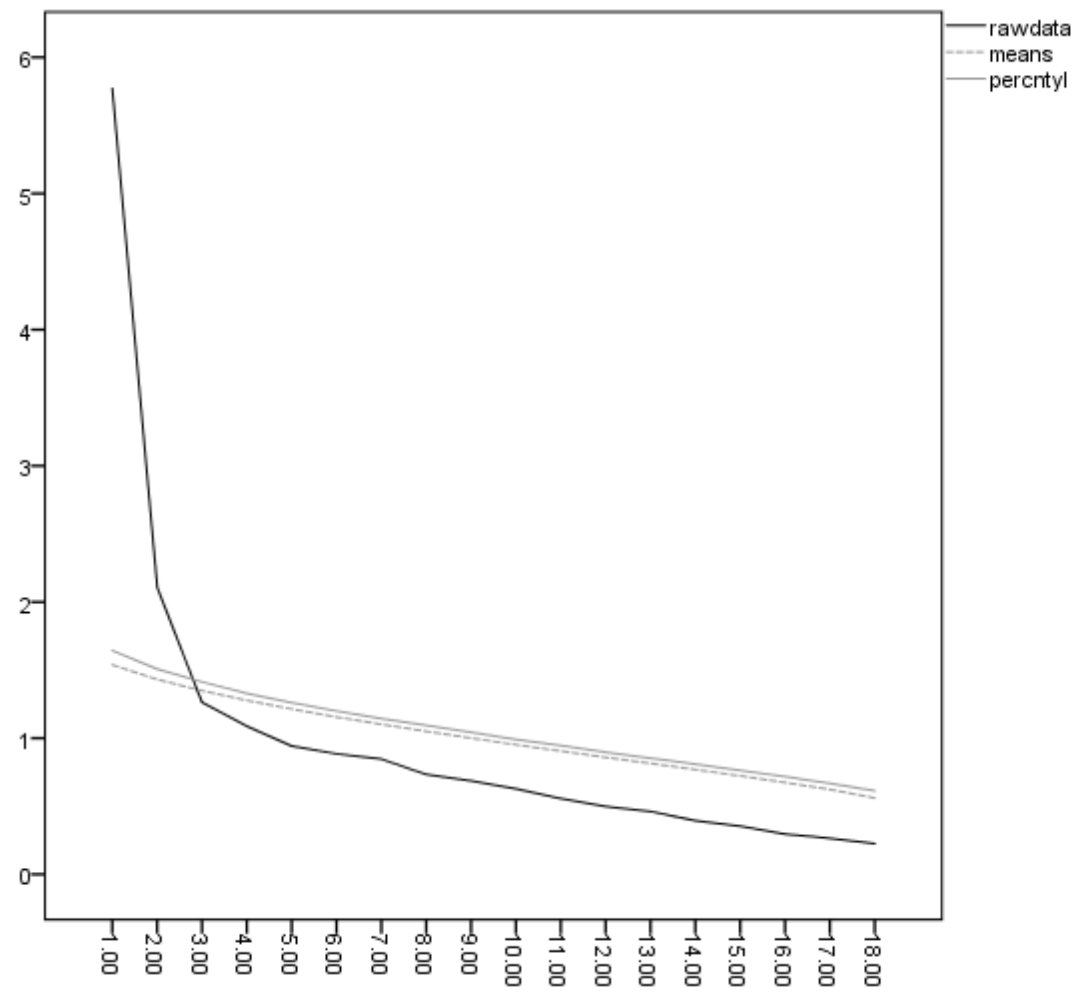
*Figure 1*. Experiences Questionnaire (EQ) and Cognitive Fusion Questionnaire (CFQ) parallel

analysis plot for Study 1. This figure shows the observed eigenvalues (black solid line),

estimated eigenvalues (grey solid line) and the mean of the random data eigenvalues (grey dotted

line). The point at which the black solid and grey solid lines intersect indicates that a two-

factored solution.

mechanism of change within mindfulness-based interventions, previous research comparing them is limited. Further, each term has a different assessment procedure and thus another aim of the current study was to compare the assessment tools that are considered the "best" operationalizations of each underlying construct.

Overall, results indicate modest to no significant associations between the three terms of interest: decentering, fusion, and metacognitive awareness. Specifically, decentering and fusion were found to correlate modestly with each other and not at all with metacognitive awareness. This is against what was previously hypothesized. If, as mentioned, these three constructs represent a similar shift in perspective then a high association should be seen between them. Results from the current study suggest otherwise and instead suggest that perhaps decentering, (de)fusion, and metacognitive awareness are more different than originally thought.

As expected, decentering, fusion, and metacognitive awareness correlated in the predicted directions with most of the mindfulness facets, experiential avoidance, and depression. These similarities support previous hypotheses suggesting that there is some overlap between the three terms of interest. However, results also revealed different patterns with regards to the strength of the correlations between these constructs and constructs such as the mindfulness facet nonjudgment, experiential avoidance, cognitive reappraisal, cognitive suppression and social anxiety.

Strong correlations were also noted between fusion and experiential avoidance. Both of these constructs were developed within Acceptance and Commitment Therapy. The Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) was intended to measure a broader construct (i.e., experiential avoidance or psychological inflexibility) but results from Study 1 suggest that this might not be the case given the strong correlation found between it and

cognitive fusion. Further, the mindfulness subscale nonjudgment, cognitive suppression, and experiential avoidance explained a large proportion of the variance in fusion scores.

These findings are against what was originally hypothesized but align with the differences previously noted with how each term has been conceptualized and how each assessment tool has been designed. The original definitions of decentering and metacognitive awareness include both thoughts and emotions while the definition of fusion focuses more on thoughts (Fresco et al., 2007b; Gillanders et al., 2014; Teasdale et al., 2002). In fact, Gillanders et al. (2014) allude to this potential difference and suggest that perhaps fusion is more narrow in its definition when compared to decentering and metacognitive awareness. So although decentering, fusion, and metacognitive awareness may have originally appeared to have been defined similarly, in actuality the definitions do contain different elements. As a result of these differences, the assessment tools for each may have diverged capturing constructs that are slightly different from one another. This would help to explain the correlational strength differences noted within the current study. Specifically, if the tools are in fact capturing slightly different constructs then a pattern of correlational strength differences would emerge when they are compared to one another.

Factor analysis revealed that the decentering and the fusion measures loaded differentially onto two factors with only a modest association. Further, even though the fusion factor contained fewer items, it still accounted for significantly more variance (29%) when compared to the decentering factor (8.5%). Overall, the factor analysis results suggest that the decentering and fusion assessment tools may be capturing different underlying constructs. However, this finding must be interpreted with caution as these differences could simply be a result of a method effect because these measures are scored oppositely.

A limitation of the present study is that metacognitive awareness (using the MACAM) was only assessed for participants who completed the study in-lab, but decentering and fusion were assessed for participants who completed the study in-lab and those who completed the study online. Therefore, the sample size for any analyses involving the MACAM is smaller. This could have impacted the correlations found. Further, results indicate that overall, the in-lab sample may have been psychologically healthier (higher cognitive reappraisal, higher decentering, lower social anxiety and lower experiential avoidance) in comparison to the online sample. However, these differences did not seem to impact the overall pattern of results given the fact that when looked at separately, the majority of the correlations for the in-lab and online sample were similar.

In sum, when examining the original literature for decentering, defusion, and metacognitive awareness, the conclusion one may draw is that they are all very similar terms that can be used interchangeably. The same conclusion may be drawn with a cursory look at the related assessment tools. However, the results of Study 1 suggest otherwise. Although there are some similarities across the three tools examined in the present study, there are also important distinctions that were noted.

Study 1 utilized existing trait measures of the cognitive shift in perspective thought to result from mindfulness-based practices. In order to help disentangle the differences noted among these constructs in Study 1, Study 2 examined whether or not it is possible to induce state changes in these variables. Various therapeutic approaches have taken into consideration how it is that we relate and shift our mental experiences and, as such, numerous tools have been generated that may assist individuals in shifting their perspective. Study 2 uses these tools in order to examine how it is that they may impact a cognitive shift in perspective.

**Study 2**

In Study 1, our primary focus was on measuring the ability to shift perspective in more of a "trait" way. Specifically, Study 1 utilized trait measures of decentering, defusion, and metacognitive awareness in order to examine the differences and similarities between them. The focus of Study 2 was to move away from this "trait" perspective and instead look at whether or not it is possible to induce state changes in levels of these constructs. Decentering, defusion, and metacognitive awareness all emerged from different approaches to psychotherapy and for Study 2 an exercise was selected from these three differing psychotherapy approaches.

As decentering developed within the context of cognitive behavioral therapy, a cognitive restructuring exercise thought to evoke a shift in perspective was selected. For defusion, exercises meant to increase an individual's capacity to defuse from their thoughts were selected from acceptance and commitment therapy (ACT; Hayes et al., 1999). Finally, due to the fact that metacognitive awareness developed within mindfulness-based cognitive therapy (MBCT; Segal et al., 2002), a mindfulness exercise focused on bringing attention to the present moment was selected. The primary aim of Study 2 was to examine the impact these exercises have on levels of fusion and levels of decentering. Due to the nature of the metacognitive awareness measure used previously (i.e., the MACAM; Teasdale et al., 2002), it was not administered for Study 2. The MACAM utilizes a lengthy semi-structured interview technique to uncover the level of metacognitive awareness an individual has experienced following eight past situations. Given the context of the current study was to induce state changes in individual's levels of decentering and defusion, and the fact that the MACAM focuses on the specific memories an individual has regarding past events, this particular measure was deemed not applicable and was not included.

Study 1 provided evidence that trait measures of decentering and fusion were only modestly correlated with one another and that they had different correlational strengths with other constructs. Therefore, in Study 2 we hypothesized that the trait measures of decentering and fusion would be modestly correlated with each other but would demonstrate different correlational strengths with variables such as some of the mindfulness facets and experiential avoidance and similar correlations with depression and social anxiety.

Given that the defusion exercises selected for Study 2 explicitly focused individuals on defusing from their thoughts more so than the cognitive restructuring and mindfulness exercises, it was expected that those individuals assigned to the defusion condition would have lower fusion (or higher defusion) post-exercise when compared to those individuals in the other two conditions.

For decentering, it was hypothesized that those individuals in the mindfulness and defusion conditions would have higher decentering post-exercise when compared to those individuals who completed the cognitive restructuring. The primary purpose of cognitive restructuring exercises such as the one selected for the current study is to help individuals learn how to challenge their negative thoughts (Bennett-Levy et al., 2013). A secondary purpose of these exercises is that they may allow individuals to shift their perspective and take more of a detached view of their thoughts and feelings (Fresco et al., 2007a).  As a result, although individuals in the cognitive restructuring condition were expected to experience gains in decentering, it was expected that the mindfulness and defusion conditions would lead to greater gains given those exercises more strongly focus on being able to shift perspective.

**Method**

**Participants**

University students ($N = 133$) were recruited to participate in a study on gaining distance from thoughts. Participants' ages ranged from 17-34 ($M = 18.97$, $SD = 1.70$). The majority of participants were female (69.5%), and single (88.5%). A majority of participants (59.5%) self-identified as White, 19.8% as Asian, 6.1% as Black/African Canadian, and 6.1% identified as "other". Participants were granted partial course credit in exchange for their participation.

**Baseline Measures**

The same trait measures that were utilized in Study 1 were also used in Study 2. They were as follows: Decentering (Experiences Questionnaire; Fresco et al., 2007b; see Appendix A), fusion (Cognitive Fusion Questionnaire; Gillanders et al., 2014; see Appendix B), mindfulness (Five Facet Mindfulness Questionnaire; Baer et al., 2006; see Appendix E), experiential avoidance (Acceptance and Action Questionnaire; Bond et al., 2011; see Appendix F), emotion regulation (Emotion Regulation Questionnaire; Gross & John, 2003; see Appendix G), depression (Beck Depression Inventory; Beck et al. 1996; see Appendix I) and social anxiety (Social Phobia Inventory; Connor et al., 2000; see Appendix J).

**Outcome Measures**

**State Decentering.** State decentering was assessed using a modified version of the Experiences Questionnaire (MEQ; Fresco et al., 2007b; see Appendix L). The instructions were modified from "we are interested in your recent experiences" to "we are interested in **what you just experienced**". Further, all of the items from the Experiences Questionnaire were modified to reflect state changes. For example, items such as "I can observe unpleasant feelings without being drawn into them" and "I am better able to accept myself as I am" were modified to be "I

**observed** unpleasant feelings without being drawn into them" and "I **was** better able to accept myself as I am". Reliability for the modified Experiences Questionnaire was .87 for the current sample.

**State Fusion.** State fusion was assessed using a modified version of the Cognitive Fusion Questionnaire (MCFQ; Gillanders et al., 2014; see Appendix M). The instructions were modified from "please rate how true each statement is for you" to "please rate how true each statement is for **what you just experienced**". All items from the Cognitive Fusion Questionnaire were modified to reflect state changes. For example, items such as "my thoughts cause me distress or emotional pain" and "I struggle with my thoughts" were modified to be "my thoughts **caused** me distress or emotional pain' and "I **struggled** with my thoughts". Reliability for the modified Cognitive Fusion Questionnaire was .93 for the current sample.

**Mindfulness.** The Toronto Mindfulness Scale (TMS) was used to assess state mindfulness. It contains two subscales: 1. Decentering, defined as being able to shift from personally identifying with thoughts to having a greater awareness of one's overall experience and 2. Curiosity, defined as having an interest in learning more about one's experiences (Lau et al., 2006; see Appendix N). This scale was based on two dimensions of mindfulness, one that captures a cognitive shift in perspective (i.e., decentering) while the other dimension captures connecting with thoughts and emotions with non-judgment and acceptance (i.e., curiosity). Given it measures state changes, the Toronto Mindfulness Scale may be more useful in discerning when decentering is occurring in situations.

The Toronto Mindfulness Scale is a 13-item measure that has demonstrated high internal consistency with an alpha coefficient of .87 for the decentering subscale and .86 for the curiosity subscale (Lau et al., 2006). Consistent with original predictions, mindfulness practice was related

to increases in curiosity and decentering. Lau et al. (2006) found that when individuals completed a mindfulness-based stress reduction (MBSR) program, they had higher scores on both mindfulness subscales. Further, gains in decentering were found to predict lower levels of stress post-treatment (Lau et al., 2006).

**Exercises**

For each of the following exercises, participants were first asked to "recall a specific situation that may have evoked negative feelings such as sadness or anger" (see Appendix O). They were then given a series of questions in order to make the situation recalled more salient (i.e., where you were, who you were with, what happened, what emotions you may have been feeling etc.). They were asked to describe each of these questions and were given space to write their respective responses.

**Cognitive Restructuring**. Individuals in the cognitive restructuring condition were given 10 minutes to complete a cognitive restructuring exercise called a thought record (Greenberger & Padesky, 1995; see Appendix P). For this exercise, individuals were instructed to focus on the particular situation they brought to mind previously. Using this situation as a guide, individuals were instructed to describe what was going on in their minds at the time and what automatic thoughts they may have had. They were then guided to challenge those thoughts (i.e., asked to provide evidence for and against) and arrive at a balanced thought.

**Defusion.** Individuals in the defusion condition were first given a definition of defusion and were then asked to work through a series of exercises (Hayes, 2005; see Appendix Q) using the thoughts related to the situation they identified previously. Exercises such as thought "labeling" (e.g., "I am having the thought that I'll be too nervous to speak") and "vocalizations" (e.g., Say the thought very slowly, say it in a different voice, sing it, etc.) were given in order to

help reduce the literal function of their thoughts by changing its context (Hayes, 2005).

Following each defusion exercise, individuals were asked to record what they noticed about the experience.

**Mindfulness Meditation.** Individuals in the mindfulness condition listened to a 10-minute guided meditation. This exercise was taken from the MBCT literature (Segal, Williams, & Teasdale, 2002; see Appendix R) and instructed individuals to focus mindfully on their breath, body, sound and thoughts. They were asked to pay particular attention to the thoughts related to the situation identified previously and to be mindful of those thoughts as they listened to the meditation.

**Manipulation Check**

To check whether the manipulation was successful, all individuals were asked six questions. They were asked to what extent they were able to challenge their thoughts, separate and distance themselves from their thoughts, acknowledge their thoughts without judgment. Individuals were also asked whether they found the exercise easy and helpful. These items were rated on a Likert scale from 0 (*not at all*) to 4 (*very much*).

**Procedure**

Participants were recruited to take part in an in-lab study on gaining distance from thoughts. Participants were run individually. Following informed consent, participants completed all baseline measures. Participants were then given the following instructions: "Please think of a specific situation that may have evoked negative feelings such as sadness, anxiety or anger. Bring it to mind now, getting a clear picture of where you are, who you are with, and what you are doing". They were then given a series of questions in order to make the situation recalled more salient (i.e., where you were, who you were with, what happened, what emotions you may

have been feeling etc.). They were asked to describe each of these questions and were given space to write down their responses. Participants were then randomly assigned to complete one of three exercises (cognitive restructuring, defusion or mindfulness). Each exercise took approximately 10 minutes to complete. For the cognitive restructuring exercise, participants were asked to focus on the situation recalled earlier as they worked through the thought record. For the defusion exercise, participants worked through the series of defusion exercises. Finally for the mindfulness exercise, participants listened to the 10-minute prerecorded audio mediation. Once participants had completed their exercise, they completed all outcome measures and manipulation check items. All participants were fully debriefed upon completion of the study.

## Results

### Descriptive Statistics and Internal Consistency

Means and standard deviations for the full sample are presented in Table 6. Reliabilities for all scales used in the study are also presented in Table 6. These reliabilities are in line with previous research and are similar to those found in Study 1. The comparison of means and standard deviations across conditions are presented in Table 7. There were no significant differences between conditions on all baseline measures except for the Emotion Regulation Questionnaire suppression subscale: participants in the mindfulness condition had significantly lower scores when compared to participants in the defusion and the cognitive restructuring conditions. All subsequent analyses control for this difference.

### Factor Analyses on Modified Measures

Given we were interested in the factor structure of our modified measures, two separate factor analyses, using the total sample, were conducted on both the modified Experiences Questionnaire and the modified Cognitive Fusion Questionnaire. This was done in order to

Table 6

*Descriptive Statistics for Study 2*

|  | Min | Max | Mean | SD | α |
|---|---|---|---|---|---|
| *Baseline Measures* | | | | | |
| Experiences Questionnaire (Decentering) | 25 | 52 | 37.60 | 6.22 | .81 |
| Cognitive Fusion Questionnaire (Fusion) | 8 | 48 | 27.01 | 9.86 | .93 |
| Five Facet Mindfulness Observe subscale | 13 | 38 | 25.50 | 5.54 | .75 |
| Five Facet Mindfulness Describe subscale | 10 | 40 | 26.22 | 7.05 | .91 |
| Five Facet Mindfulness Act Aware subscale | 8 | 39 | 24.52 | 6.22 | .88 |
| Five Facet Mindfulness Nonjudgment | 9 | 40 | 26.69 | 7.23 | .91 |
| Five Facet Mindfulness Nonreactivity | 7 | 32 | 20.26 | 4.51 | .79 |
| Acceptance and Action – II (Experiential Avoidance) | 7 | 47 | 22.81 | 9.92 | .92 |
| Emotion Regulation – Reappraisal subscale | 11 | 42 | 29.77 | 5.68 | .76 |
| Emotion Regulation – Suppression subscale | 4 | 28 | 15.55 | 5.38 | .80 |
| Beck Depression Inventory - II | 2 | 41 | 14.37 | 8.85 | .89 |
| Social Phobia Inventory | 4 | 57 | 19.56 | 10.45 | .88 |
| *Outcome Measures* | | | | | |
| Modified Experiences Questionnaire (Decentering) | 11 | 55 | 39.03 | 8.10 | .87 |
| Modified Cognitive Fusion (Fusion) | 7 | 48 | 20.55 | 10.71 | .93 |
| Toronto Mindfulness – Curiosity subscale | 2 | 24 | 16.03 | 5.00 | .87 |
| Toronto Mindfulness – Decentering subscale | 4 | 28 | 17.44 | 4.99 | .79 |

*Note. N* = 133.

Table 7

*Means (and Standard Deviations) on Each of the Scales, Subscales and Outcome Variables across Conditions for Study 2*

| | Condition | | |
|---|---|---|---|
| | Cognitive Restructuring ($n = 43$) | Defusion ($n = 45$) | Mindfulness Meditation ($n = 45$) |
| *Baseline Measures* | | | |
| Experiences Questionnaire (Decentering) | 37.43 (6.35) | 37.82 (6.07) | 37.53 (6.37) |
| Cognitive Fusion Questionnaire (Fusion) | 27.28 (10.12) | 26.75 (9.41) | 27.00 (10.25) |
| Five Factor Mindfulness Observe subscale | 26.23 (5.67) | 24.29 (5.71) | 26.02 (5.15) |
| Five Factor Mindfulness Describe subscale | 26.63 (7.68) | 24.69 (6.54) | 27.36 (6.78) |
| Five Factor Mindfulness Act Aware subscale | 24.53 (7.69) | 25.27 (5.93) | 23.42 (6.48) |
| Five Factor Mindfulness Nonjudgment subscale | 26.49 (6.86) | 27.96 (6.86) | 25.62 (8.03) |
| Five Factor Mindfulness Nonreactivity subscale | 20.42 (4.34) | 19.73 (4.44) | 20.64 (4.78) |
| Acceptance and Action – II (Experiential Avoidance) | 24.14 (9.84) | 20.86 (9.34) | 23.44 (10.46) |
| Emotion Regulation – Reappraisal subscale | 29.70 (5.51) | 28.78 (5.58) | 30.84 (5.88) |
| Emotion Regulation – Suppression subscale | 15.98$_b$ (5.32) | 17.00$_b$ (4.99) | 13.66$_a$ (5.38) |
| Beck Depression Inventory | 13.95 (8.82) | 14.40 (8.60) | 14.77 (9.29) |
| Social Phobia Inventory | 19.51 (9.99) | 18.69 (9.85) | 20.51 (11.61) |
| *Outcome Measures* | | | |
| Modified Experiences Questionnaire (Decentering) | 38.88 (8.60) | 38.04 (8.30) | 40.16 (7.44) |
| Modified Cognitive Fusion (Fusion) | 24.95$_a$ (11.22) | 18.75$_b$ (10.03) | 18.53$_b$ (9.85) |
| Toronto Mindfulness – Curiosity subscale | 16.02 (4.70) | 15.33 (5.34) | 16.73 (4.96) |
| Toronto Mindfulness – Decentering subscale | 16.51 (4.36) | 17.11 (5.61) | 18.62 (4.73) |

*Note.* $N = 133$. Means in the same row that do not share subscripts differ significantly at $p < .05$.

assess whether the factor structure of these modified scales was similar to that found for the original scales. In line with the original validation of the Cognitive Fusion Questionnaire (Gillanders et al., 2014), a one-factor solution emerged for the modified Cognitive Fusion Questionnaire with all seven items loading highly onto Factor 1 (all factor loadings > .40).

For the modified Experiences Questionnaire, three factors emerged rather than the one factor found in the original scale validation by Fresco and colleagues (2007b). To investigate whether it was meaningful to retain 3 factors, we conducted a Parallel Analysis (O'connor, 2000). The scree plot yielded by this analysis can be seen in Figure 2. Looking at the scree plot, it is clear that the first eigenvalue falls above 95th percentile line. The second factor also appears to be very close to this cutoff but may be explained as being driven by a well-known artifact called a doublet factor (Rummel, 1988). A doublet factor represents a pairwise association over and above those that are hypothesized to be present in the data. These spurious factors can distort the actual number of factors present (Rummel, 1988). Taking this into account, this analysis supports that a one-factor solution should be retained.

**Correlations**

The correlations between all baseline measures are shown in Table 8. At baseline, decentering and fusion demonstrated a modest-to-strong correlation with each other. Although decentering and fusion correlated in the predicted directions with variables such as mindfulness, experiential avoidance and emotional regulation, for some of the scales and subscales, the strength of these correlations differed as in Study 1. For instance, as in Study 1, for the mindfulness facet nonjudgment, decentering was found to correlate modestly, whereas fusion correlated highly with it. Fisher's r to z transformations were again used to test whether the correlations were significantly different from one another (Meng et al., 1992). In order to
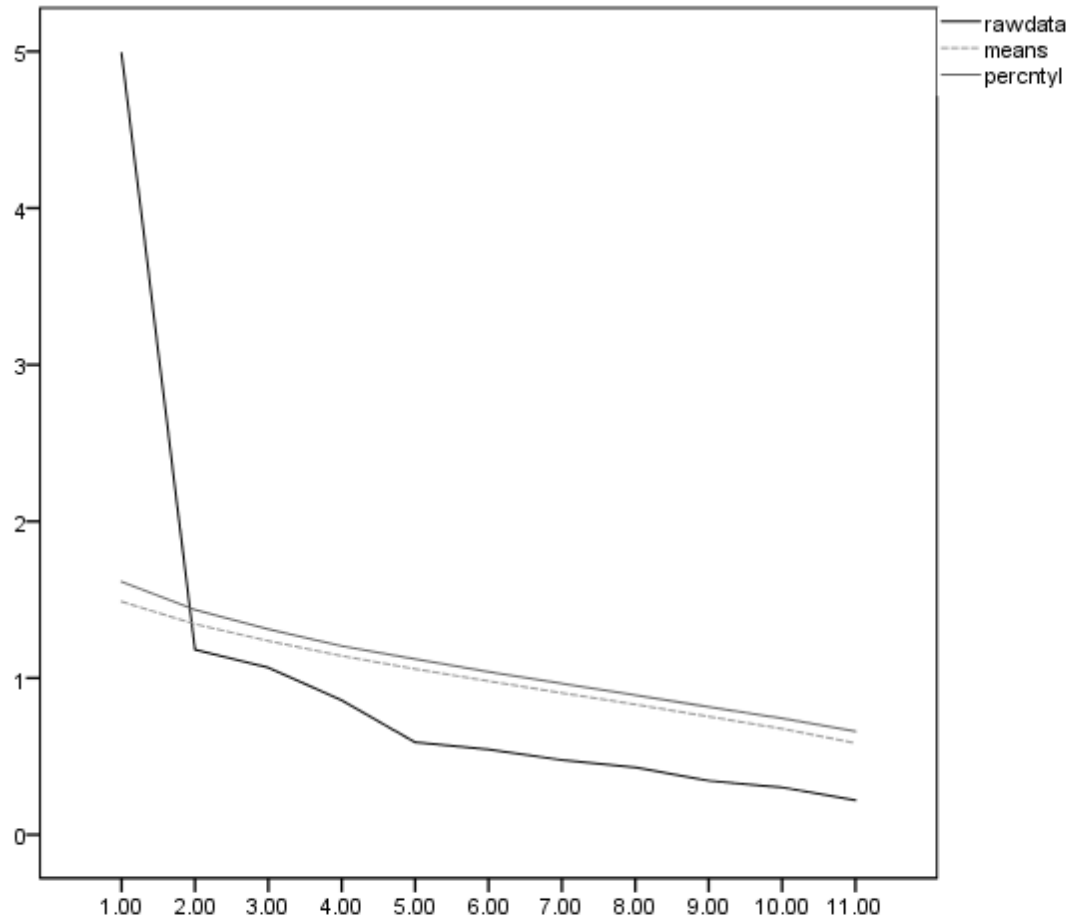
*Figure 2*. Modified Experiences Questionnaire parallel analysis plot for Study 2. This figure

shows the observed eigenvalues (black solid line), estimated eigenvalues (grey solid line) and the

mean of the random data eigenvalues (grey dotted line). The point at which the black solid and

grey solid lines intersect indicates that a one-factored solution be retained.

Table 8

*Correlations among all Baseline Measures for Study 2*

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Experience Questionnaire (Decentering) | ---- | | | | | | | | | | |
| 2. Cognitive Fusion Questionnaire (Fusion) | -.59** | ---- | | | | | | | | | |
| 3. Five Factor Mindfulness Observe subscale | .14 | .05 | ---- | | | | | | | | |
| 4. Five Factor Mindfulness Describe subscale | .46** | -.41** | .27** | ---- | | | | | | | |
| 5. Five Factor Mindfulness Act Aware subscale | .44** | -.49** | .00 | .31** | ---- | | | | | | |
| 6. Five Factor Mindfulness Nonjudgment | .44** | -.66** | -.08 | .34** | .43** | ---- | | | | | |
| 7. Five Factor Mindfulness Nonreactivity | .48** | -.34** | .34** | .35** | .32** | .13 | ---- | | | | |
| 8. Acceptance and Action- Experiential Avoidance | -.64** | .80** | .05 | -.38** | -.56** | -.70** | -.29** | ---- | | | |
| 9. Emotion Regulation – Reappraisal subscale | .40** | -.25** | .25** | .30** | .17 | .08 | .27** | -.21** | ---- | | |
| 10. Emotion Regulation – Suppression subscale | -.07 | .18* | .08 | -.30** | -.14 | -.23** | .10 | .17 | -.11 | ---- | |
| 11. Beck Depression Inventory | -.60** | .56** | .00 | -.41** | -.58** | -.43** | -.30** | .66** | -.29** | .14 | ---- |
| 12. Social Phobia Inventory | -.37** | .43** | .05 | -.36** | -.32** | -.40** | -.14 | .48** | -.21 | .23** | .47** |

*Note.* $N = 133$.
** = $p < .001$, * = $p < .05$.

compare correlations, the absolute value of each was taken. Results indicated that the correlation with fusion was significantly different than the correlation with decentering ($z = 4.66$, $p < .001$). A similar pattern emerged for experiential avoidance, with decentering correlating modest-to-strongly and fusion correlating strongly with it. Fisher's r to z transformation revealed that for experiential avoidance, the correlation with fusion was significantly different than the correlation with decentering ($z = 4.46$, $p < .001$). As expected, decentering and fusion correlated with depression and social anxiety and the correlational strengths were similar and in the hypothesized direction.

The correlations between all outcome measures are shown in Table 9. The two state decentering measures (the modified Experiences Questionnaire and the Toronto Mindfulness - decentering subscale) had a modest-to-strong correlation with each other. State decentering and state fusion were found to be modestly correlated.

**Manipulation Check**

Surprisingly, separate one-way analyses of variance (ANOVAs) with condition (cognitive restructuring, defusion, or mindfulness) as the independent variable and scores on the six manipulation check items as the dependent variables revealed no significant differences between groups (all $p$'s > .05; see Table 10).

**Fusion**

It was originally expected that those individuals assigned to the defusion condition would have lower fusion post-exercise when compared to those individuals in the other two conditions. After controlling for baseline cognitive fusion and for the Emotion Regulation Questionnaire suppression subscale, an ANCOVA with condition as the independent variable and state cognitive fusion as the dependent variable revealed that participants in the cognitive restructuring

Table 9

*Correlations among Outcome Measures for Study 2*

_____

| *Variables* | 1 | 2 | 3 |
|---|---|---|---|

_____

| | | | |
|---|---|---|---|
| 1.  Modified Experiences Questionnaire (Decentering) | ---- | | |
| 2.  Modified Cognitive Fusion (Fusion) | -.45** | ---- | |
| 3.  Toronto Mindfulness – Curiosity subscale | .37** | -.04 | ---- |
| 4.  Toronto Mindfulness – Decentering subscale | .62** | -.35** | .68** |

_____

*Note. N* = 133.

** = *p* < .001, * = *p* < .05.

Table 10

*Descriptive Statistics for Manipulation Check Questions for Study 2 across conditions*

|  | Condition | | |
|  | Cognitive Restructuring ($n = 43$) | Defusion ($n = 45$) | Mindfulness Meditation ($n = 45$) |
| --- | --- | --- | --- |
| Challenge Thoughts | 2.47 (1.01) | 2.36 (.77) | 2.11 (.91) |
| Separate Thoughts | 2.44 (.96) | 2.51 (1.06) | 2.67 (.71) |
| Gain Distance | 2.44 (.91) | 2.53 (1.04) | 2.67 (.80) |
| Acknowledge | 2.84 (1.00) | 2.60 (.86) | 2.67 (.97) |
| Find Easy | 2.02 (1.06) | 2.11 (.93) | 2.30 (1.12) |
| Find Helpful | 2.23 (1.17) | 2.30 (1.02) | 2.40 (.99) |
| Use in Everyday Life | 1.91 (1.29) | 1.93 (1.39) | 2.13 (1.10) |

*Note. N* = 133.

condition had significantly higher fusion scores when compared to the mindfulness and the defusion conditions ($F(2,126) = 7.09$, $p = .001$, partial $\eta^2 = .101$; see Figure 3). The defusion and mindfulness conditions did not significantly differ from one another.

**Decentering**

It was originally hypothesized that those individuals in the mindfulness and defusion conditions would have higher decentering post-exercise when compared to those individuals who completed the cognitive restructuring exercise. After controlling for baseline decentering and the Emotion Regulation Questionnaire suppression subscale, two separate one-way ANCOVAs with condition as the independent variable and the two state decentering measures as the dependent variable revealed no significant effects. Although not included in our main predictions, there were also no significant differences between conditions on the Toronto Mindfulness - curiosity subscale.

## Discussion

Study 1 helped to elucidate the similarities and differences between decentering, defusion, and metacognitive awareness when assessed at the trait level. The primary aim of Study 2 was to move away from this trait perspective and instead focus on the degree to which it was possible to induce state changes in levels of decentering and fusion. In order to do this, Study 2 used three exercises selected from three differing psychotherapy approaches. Similar to Study 1 and consistent with our first hypothesis, trait measures of decentering and fusion were found to be modestly correlated. Further, as in Study 1, results from the current study demonstrated that trait measures of decentering and fusion correlated in the predicted directions with variables such as some of the mindfulness facets, experiential avoidance, and
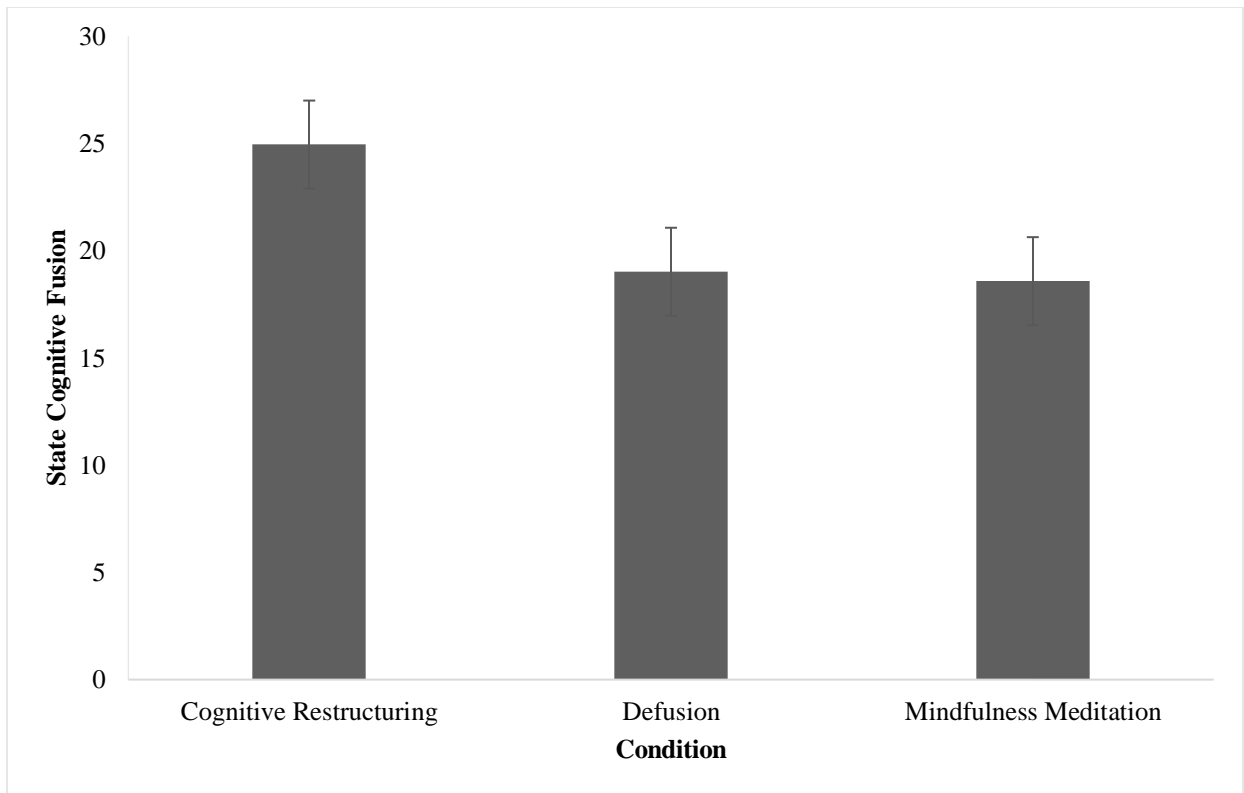
*Figure 3.* Impact of condition on state cognitive fusion for Study 2. The y axis represents state

cognitive fusion measured by the modified Cognitive Fusion Questionnaire (MCFQ).

emotional regulation; but for some of the scales and subscales, the strengths of these correlations differed.

With respect to whether it is possible to induce state changes in fusion, results from the current study partially support our original hypothesis. As hypothesized, results indicate that the defusion exercise led individuals to be less fused with their thoughts in comparison to the cognitive restructuring exercise. However, the mindfulness exercise also led to less fusion in individuals when compared to the cognitive restructuring exercise. The main purpose of defusion exercises such as those selected for the current study, was to focus the individual on changing the context of an otherwise threatening thought (Masuda et al., 2004). In relation to the current findings, if by working through a series of defusion exercises, individuals were able to take what may have previously been a threatening thought and make it unimportant they were then able to report less fusion.

Also, if one of the primary mechanisms within mindfulness-based interventions is cognitive defusion, then it makes sense that those individuals who were instructed to focus mindfully on their breath, body, sound and thoughts would also report being less fused with their thoughts (Taney et al., 2012). Given the fact that the cognitive restructuring exercise (i.e., the thought record) focuses more on challenging thoughts (Bennett-Levy et al., 2003), it is not surprising that it was not as helpful in reducing fusion. However, a limitation of the current study is that there was no control condition. Given this, it is not possible to comment on whether the cognitive restructuring exercise led individuals to experience less fusion than a control condition would.

With regards to whether it is possible to induce state changes in decentering, results are against what was originally expected. Specifically, there were no significant differences noted

between conditions on both decentering outcome measures (the modified Experiences Questionnaire and the Toronto Mindfulness – decentering subscale). Perhaps a reason for this result may be that being fused or entangled in thoughts is easier for individuals to answer questions on when compared to questions on being distanced or separated from thoughts. For example, it may be easier for individuals to respond to a fusion item such as "My thoughts caused me distress or emotional pain" versus a decentering item such as "I separated myself from my thoughts and feelings.". Although, the first item refers to more of a concrete process (i.e., one based on facts in the present), the second is more abstract (i.e., one based on ideas that are not physically present). Studies have shown that abstract concepts are more complex and require more cognitive resources to understand when compared to concrete concepts (Markovits & Vachon, 1990; Venet & Markovits, 2001). This idea backs up the measurement issues noted within Study 1 and perhaps speaks to the fact that individuals may have a hard time verbalizing when they are distanced or separated from their thoughts when compared to being fused or entangled with thoughts. Future research could address this issue by modifying these scales to include both positive and negatively worded items that are abstract versus concrete. Doing so, may help to understand the degree to which it is either a measurement issue or an issue with understanding the underlying construct.

An alternative possibility for the current decentering results is that all three conditions led to increases in decentering. If as previous research suggests, decentering, defusion, and metacognitive awareness are all mechanisms of change, then exercises that target each of these constructs should produce similar outcome gains. However, due to the fact that we did not include a control condition we are not able see whether all three exercises led individuals to experience more decentering gains when compared to a control condition. This represents a

limitation of the current study. Future studies could reconcile this issue by including a true control condition. Doing so, might help to elucidate whether decentering is amenable to change as we originally expected. An additional possibility is that because participants scored within the normal range at baseline on decentering and defusion, perhaps there was little room for their scores to change. Had we preselected for individuals with low levels of decentering, and/or defusion, we may have seen the expected effects.

Another limitation of the present study was that a measure of metacognitive awareness was not included. Due to the nature of the previously used measure (i.e., the MACAM; Moore et al., 1996), an a priori decision was made not to include it within the current study. Not including a measure of metacognitive awareness limits the interpretations we can make. A consideration for future research would be to include a measure of metacognitive awareness along with decentering and defusion in order to see what the impact may be on that particular outcome. The Metacognitive Awareness Questionnaire (MAQ; Teasdale et al., 2001; see Appendix S), discovered, by the authors, after this study was completed, could be used in future research to help understand whether or not it is possible to induce changes in this particular construct, in addition to decentering and defusion. This is a 9-item self-report measure with higher scores indicating greater metacognitive awareness. The MAQ asks individuals to report on whether they saw their thoughts and feelings as reflections of reality with items such as "If something has upset me, I try to put my judgments on hold for a while" and "I can't trust my judgments about myself when I feel down." The MAQ has been found to have adequate internal consistency in a clinical sample ($n = 139$) with an alpha coefficient of .71. The MAQ was found to be significantly and negatively correlated with depression and need for approval. However, research using this measure is limited and further there is no research comparing the MAQ to the

MACAM.

Another limitation of the present study is that the manipulation check items presented did not work out as intended with no significant differences between conditions. There are two potential reasons as to why this may have occurred. These manipulation check questions were at the end of the study rather than right after the manipulation and so, perhaps the effects of the manipulations were too distant in time from the manipulation check questions to capture the effects well. It is also plausible that the lack of differences on these questions may speak more to the question content rather than manipulation itself. For instance, individuals were asked a single question about the extent to which they challenged or separated from their thoughts. The intention behind these questions was to try and parse out any condition differences that may exist. However, when examining the means for these questions (see Table 10) it seems that most individuals, regardless of condition, responded similarly. This could then suggest that perhaps it is not necessarily that the manipulations did not work, but perhaps the questions were not adequate at distinguishing between the three conditions. Future research could take this into account by presenting multiple questions, rather than just one, that clearly delineate each condition. Given individuals in the cognitive restructuring and defusion condition worked through a series of exercises, it would also be possible to code these responses to understand whether or not they fully understood what was being asked of them. This would help to understand what exactly individuals are doing within each condition and help to understand whether or not they were employing the targeted strategy.

In sum, findings from Study 2 suggest that being fused with thoughts may be more sensitive to change based on the condition differences noted. There are a few reasons as why this may be. It could be that this finding, as in Study 1, is more related to the assessment tools

utilized rather than the constructs themselves given that the fusion measure is more strongly focused on being fused with thoughts whereas the decentering measure contains other components (i.e., self-compassion[1]). Also, it could be that valence is important when understanding these constructs. If the decentering measure assessed an absence of decentering rather than the presence of decentering it is possible that we would we find similar results to the fusion measure. Alternatively, the lack of decentering effects may simply speak to the fact that we did not include a control condition and that perhaps decentering increased in all conditions due to the similarity between them. However, given that the current results suggest that fusion may be amenable to change, Study 3 investigates the degree to which defusion is the active ingredient that is leading to positive change within mindfulness-based interventions. To do this, Study 3 experimentally manipulated defusion after individuals receive one of three audio conditions (mindfulness, relaxation, or control).

**Study 3**

Study 2 revealed that both the defusion and the mindfulness exercises led individuals to be less fused with their thoughts compared to the cognitive restructuring exercise. Additionally, we had no significant findings on our decentering outcomes. Therefore, Study 3 examined the degree to which defusion was the primary mechanism through which mindfulness may be leading to decreased psychological distress. For the current study, we wanted to isolate the effects of the cognitive defusion present within mindfulness interventions in order to see its impact on psychological distress. To do this we experimentally manipulated defusion following a mindfulness intervention.

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[1] Another set of analyses was run without the self-compassion items from the decentering scale and results revealed a similar pattern to when those items were included.

One form of psychological distress that has been shown to benefit from mindfulness and acceptance-based treatment is social anxiety (Kocovski, Fleming, & Rector, 2009; Kocovski et al., 2013). Research has shown that when individuals are able to approach situations more mindfully, they report less social anxiety (Hayes-Skelton & Graham, 2013). Social anxiety has been defined as the constant worry of being evaluated negatively in social situations. According to Clark and Wells (1995), individuals who have social anxiety, when presented with an evaluative situation, shift their attention from external situational cues onto more internal processes. This internal focus may then lead the individual to become preoccupied with thoughts about what they perceive to be a social failure that has either happened or is going to happen (Hayes-Skelton & Graham, 2013). This preoccupation has been found to lead to an increase in anxiety which may then interfere with how the individual processes external situational cues such as other people's behaviours (Clark, 2001; Clark & Wells, 1995).

This interference and increased anxiety can then lead the individual to want to avoid these situations. This avoidance may only serve to perpetuate the cycle of anxiety (Hayes-Skelton & Graham, 2013). Also, perpetuating this avoidance is the fact that even when the social situation is over, research has shown that individuals often ruminate about what they believe to be a perceived failure of the interaction (Rachman, Grüter-Andrew, & Shafran, 2000). This post-event rumination has been found to be related to maladaptive processes such as more negative thoughts, an increase in negative affect as well as maladaptive beliefs (Kocovski, MacKenzie, & Rector, 2011; Wong & Moulds, 2009).  It has been posited that one of the ways in which mindfulness may help reduce this post-event rumination is through a shift in perspective. Based on the findings from Study 2, the primary aim of Study 3 was to isolate defusion in order to test

whether it is a mechanism of change, in this case leading to reduced post-event rumination among individuals with elevated levels of social anxiety.

As found in Studies 1 and 2, we hypothesized that in Study 3 trait measures of decentering and fusion would be modestly correlated with each other and as found in Study 1, only weakly correlated with metacognitive awareness. For the current study, individuals were first asked to give an impromptu speech. Following this, individuals were randomly assigned to one of three audio conditions (mindfulness, relaxation, and control), followed by one of two writing conditions (defusion or control). We hypothesized that individuals in the mindfulness audio + defusion writing condition would have the highest levels of state decentering and the lowest levels of state fusion and post-event rumination compared to the other conditions. If defusion is the mechanism that is leading to change within mindfulness interventions, then we expect to see the most gains for those individuals who are given both the mindfulness audio and the defusion writing exercises as compared to the other condition combinations (i.e., relaxation audio + defusion writing).

For Study 3, we were most interested in whether defusion is the one of the mechanisms through which mindfulness may be leading to favourable outcomes. We hypothesized a moderated mediation model such that the mindfulness audio condition would lead to decreased levels of fusion which would then lead to decreases in post-event rumination 24 hours later and this would be moderated by writing exercise.

**Method**

**Participants**

Undergraduate students ($N = 115$) were invited to participate in a two-part study examining how mindfulness works. Part one was administered individually and in-lab. Part two

was administered 24 hours after Part one and was online. Participants were granted course credit in exchange for their participation. All participants completed Part one and Part two. Participant's ages ranged from 17-22 ($M = 18.59$, $SD = 1.01$). The majority of participants were female (82.5%) and single (97%). Participants were also asked to self-identify their race with the majority identifying as White (56.5%) and Asian (24.3%). For the current study, only those individuals with elevated levels of social anxiety were invited to participate. To meet eligibility criteria, participants had to score 34 or higher on the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998; see Appendix T) and had to score 30 or higher on the Social Phobia Inventory (SPIN; Connor et al., 2000; see Appendix J). These cut-offs have been used previously to distinguish those with elevated levels of social anxiety.

**Baseline Measures**

The same trait measures utilized in Study 1 and 2 were also used in Study 3. They were as follows: Decentering (Experiences Questionnaire; Fresco et al., 2007b; see Appendix A), fusion (Cognitive Fusion Questionnaire; Gillanders et al., 2014; see Appendix B), mindfulness (Five Facet Mindfulness Questionnaire; Baer et al., 2006; see Appendix E), experiential avoidance (Acceptance and Action Questionnaire; Bond et al., 2011; see Appendix F), emotion regulation (Emotion Regulation Questionnaire; Gross & John, 2003; see Appendix G), depression (Beck Depression Inventory; Beck et al. 1996; see Appendix I) and social anxiety (Social Phobia Inventory; Connor et al., 2000; see Appendix J).

The following measures were not utilized in the previous two studies and as such they are described in greater detail.

**Metacognitive Awareness.** Metacognitive awareness was assessed in Study 3 using the Metacognitive Awareness Questionnaire (MAQ; Teasdale et al., 2001; see Appendix S). This is a

9-item measure with higher scores indicating greater metacognitive awareness. The MAQ has been found to have adequate internal consistency with an alpha coefficient of .71.

**Social anxiety**. Social anxiety in Study 3 was assessed using two measures of social anxiety. The Social Phobia Inventory (SPIN; Connor et al., 2000; see Appendix J) was described in Study 1. The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998; see Appendix T) was added to Study 3 to ensure individuals met social anxiety eligibility criteria. The SIAS is a 20-item measure in which greater scores indicate greater social anxiety. The SIAS has been found to have excellent internal consistency with an alpha of .94 (Mattick & Clarke, 1998).

**Subjective Units of Distress**. The Subjective Units of Distress Scale (SUDS; Wolpe, 1969; see Appendix U) is a one-item scale that measures subjective levels of distress in relation to a specific situation. Higher scores indicate higher levels of distress.

**Rumination.** Rumination was assessed using the Rumination and Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999; see Appendix V), which is 24-item measure with two subscales (rumination and reflection). For the current study, only the rumination items were used with higher scores on this subscale indicating greater rumination. The internal consistency of the rumination subscale has been found to be excellent with an alpha coefficient of .90 (Trapnell & Campbell, 1999).

**Affect.** Positive and negative affect were assessed using the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix W). The PANAS has two subscales (positive and negative) and presents individuals with a series of adjectives (10 positive and 10 negative) and asks them to rate the degree to which they feel that way at the present moment. Higher scores on each of the subscales indicates more positive or negative affect. The

PANAS has been found to have high internal consistency with alphas ranging from .86 to .90 for the positive affect subscale and .84 to .87 for the negative affect subscale (Watson et al., 1988).

**Outcome Measures**

The same outcome measures utilized within Study 2 were used for Study 3. Namely, the Toronto Mindfulness Scale (TMS; Lau et al., 2006; see Appendix N), the modified Experiences Questionnaire (MEQ; see Study 2 for full scale details; see Appendix L) and the modified Cognitive Fusion Questionnaire (MCFQ; see Study 2 for full scale details; see Appendix M).

The following outcome measures were not used in the previous two studies and as such are described in greater detail.

**Post-event Rumination.** Post-event rumination was assessed using two measures. The Extended - Post-Event Processing Questionnaire (E-PEPQ; Fehm, Hoyer, Schneider, Lindermann, & Klusmann, 2008; see Appendix X) is a 17-item measure but for the current study, the final item was split into two to assess positive and negative memories separately. This measure utilizes a 0-100 scale, with total scores calculated as an average across all items. Higher scores on the Extended PEPQ indicate greater post-event rumination. The E-PEPQ has been found to have excellent internal consistency with an alpha coefficient of .90 (Fehm et al., 2008). This measure was administered in both Part one and Part two. The Thoughts Questionnaire (TQ; Edwards, Rapee, & Franklin, 2003; see Appendix Y) assesses the tendency to engage in post-event rumination following a speech task. It contains two subscales: negative thoughts (16 items) and positive thoughts (11 items) as well as two general items that were not used in the current study. This measure was administered in Part two, one day after individuals gave their speech. Internal consistency has been found to be excellent for the TQ.

**Audio Condition Exercises**

All three audio conditions were narrated by the same voice.

**Mindfulness.** Individuals in the mindfulness audio condition listened to the same 10-minute guided meditation used in Study 2 (see Appendix R). This meditation instructed individuals to focus mindfully on their breath, body, sound and thoughts.

**Relaxation.** Individuals in the relaxation audio condition were guided through a 10-minute progressive relaxation in which they were asked to relax different muscle groups one by one. For instance, they were first guided to relax their right hand, followed by their left hand and then their face and neck and so on. This exercise has been used previously (Vinci et al., 2014; see Appendix Z) and has been found to be effective at increasing relaxation.

**Active Control.** Individuals in the active control audio condition were instructed that they were going to do an exercise that involved letting their minds flow. They were then guided to simply let their minds wander freely and to think about whatever came to mind. These instructions were then repeated every 30-60 seconds for 10 minutes (see Appendix AA). Although these instructions encourage mind wandering, Arch and Craske (2006) suggest that they do not encourage individuals to pay attention to the present moment thereby promoting a state that is distinct to that found in mindfulness-based exercises. Further, the instructions were designed to mirror the length and pacing of the other conditions.

**Writing Condition Exercises**

**Defusion.** Individuals in the defusion writing condition were given similar exercises to those used in Study 2 (see Appendix Q). As in Study 2, they were first given a brief definition of defusion and were then asked to work through a series of exercises such as thought labeling and

vocalizations (Hayes, 2005). Following each exercise, individuals were also asked to record what they noticed about the experience.

  **Control.** Individuals in the control writing condition were asked to work through a series of questions regarding the speech they were previously asked to give. Questions such as "what was your speech topic?", "why is your speech topic important", and "what was your overall main point"? were asked to increase the saliency of the individual's thoughts surrounding their past speech (see Appendix BB).

  **Manipulation Check.** To check whether these manipulations were successful, all individuals were asked five manipulation check questions. They were asked to what extent: they judged their speech performance, had negative thoughts about their speech, acknowledged their thoughts without judgment, were distracted by their thoughts and feelings, and were able to take a step back and gain distance from their thoughts. These items were rated on a Likert scale from 1 (*not at all*) to 5 (*very much*).

## Procedure

  Participants were recruited to take part in a two-part study on how mindfulness works. Prior to signing up for the study, participants were informed that they would be asked to give a speech and that this speech would be video recorded.

  **Part one.** Upon arriving to the lab and following informed consent, participants completed all baseline measures. They were then told that they would be giving a speech on one of two topics (either thoughts about distracted driving or cell phone use in the classroom; see Appendix CC). Participants were allowed to select which speech topic they wished to give a speech on. They were given no time to prepare. Participants were then told that their speech would be evaluated by both the primary researcher and the researcher's supervisor. Asking

participants to give an impromptu speech in front of a video camera with the evaluative threat component has been found to elicit feelings of anxiety (Kocovski et al., 2011). They were then asked to record their SUDS regarding their upcoming speech. Participants then delivered a three-minute impromptu speech that was recorded on a video camera. Speeches were not analyzed. Following their speech, participants were asked to rate their highest level of SUDS that they experienced during their speech.

Next, a 3 (audio: mindfulness, relaxation, and active control) x 2 (writing: defusion and control) design was used resulting in six conditions. Participants were randomly assigned to an audio condition and then again randomly assigned to a writing condition. For the mindfulness audio, participants were guided to bring awareness to their body, breath, sounds and thoughts. For the relaxation audio, participants were instructed to physically relax each muscle group. Finally, for the active control audio, participants were guided to let their minds wander. For the defusion writing, participants completed a series of defusion exercises (such as externalizing their mind and thanking their mind) and for the control writing, participants wrote about the content of their speech. Once participants completed their writing exercise, they completed all outcome measures including the manipulation check, and demographic questions. Affect was measured before the audio manipulation and after the writing exercise manipulation. Since this was a two-part study, participants were only partially debriefed before leaving the lab.

**Part two.** One day later participants were invited via email to complete all previously administered outcome measures (i.e., the modified Experiences Questionnaire, the modified Cognitive Fusion Questionnaire, and the Extended Post-event Processing Questionnaire) and the Thoughts Questionnaire online (via Qualtrics). Finally, all participants were fully debriefed online.

**Results**

**Descriptive Statistics and Internal Consistency**

Means and standard deviations for the full sample are presented in Table 11 and a breakdown by condition are presented in Tables 12 and 13. Reliabilities for all scales used in the study are also presented in Table 11. These reliabilities are in line with previous research and are similar to those seen in Study 1 and 2. Overall, the scales and subscales had adequate reliability with some scales and subscales demonstrating excellent reliability. The only exception was the Metacognitive Awareness Questionnaire (MAQ; Teasdale et al., 2001; see Appendix S) which was found to have poor internal consistency. There were no significant differences between conditions on all scales and subscales at baseline.

**Correlations**

The correlations between all baseline measures are shown in Table 14. At baseline and as expected, trait measures of decentering and fusion demonstrated a modest-to-strong correlation with each other. This was similar to what was found in Study 2. Against what was predicted, decentering had a negative and poor association with metacognitive awareness whereas fusion did not correlate with metacognitive awareness. For trait decentering and fusion, correlations were in the predicted directions and were found to be similar to those seen in Studies 1 and 2.

Although trait decentering and fusion correlated in the predicted directions with variables such as mindfulness, rumination, and depression, for some of the scales and subscales, the magnitudes of the correlations differed as in the previous two studies. For instance, fusion was found to significantly and strongly correlate with rumination whereas decentering correlated modestly with it. As in Studies 1 and 2, Fisher's r to z transformations were used to test whether the correlations were significantly different from one another (Meng et al., 1992). The absolute

Table 11

*Descriptive Statistics for Study 3*

|  | Min | Max | Mean | SD | α |
|---|---|---|---|---|---|
| *Baseline Measures* | | | | | |
| Experiences Questionnaire | 21 | 47 | 34.90 | 5.35 | .81 |
| Cognitive Fusion Questionnaire | 11 | 48 | 30.85 | 7.83 | .92 |
| Metacognitive Awareness Questionnaire | 10 | 49 | 32.79 | 5.81 | .58 |
| Five Facet Mindfulness - Observe | 14 | 39 | 26.06 | 4.92 | .73 |
| Five Facet Mindfulness - Describe | 9 | 35 | 23.00 | 5.74 | .90 |
| Five Facet Mindfulness - Act Aware | 10 | 35 | 22.80 | 4.39 | .80 |
| Five Facet Mindfulness - Nonjudge | 10 | 37 | 22.43 | 5.74 | .87 |
| Five Facet Mindfulness – Nonreact | 9 | 30 | 18.96 | 3.75 | .73 |
| Rumination Responses Questionnaire | 20 | 56 | 44.39 | 6.50 | .82 |
| Beck Depression Inventory - II | 0 | 54 | 17.81 | 11.47 | .93 |
| Social Phobia Inventory | 23 | 83 | 51.44 | 12.64 | .90 |
| Social Interaction Anxiety Scale | 26 | 95 | 61.45 | 14.60 | .92 |
| *Outcome Measures – Part One* | | | | | |
| Modified Experiences Questionnaire | 12 | 49 | 31.53 | 7.09 | .84 |
| Modified Cognitive Fusion | 7 | 28 | 15.32 | 5.01 | .90 |
| Toronto Mindfulness - Curiosity | 0 | 24 | 12.69 | 5.18 | .91 |
| Toronto Mindfulness - Decentering | 0 | 26 | 12.62 | 4.32 | .72 |
| Post-event Rumination (E-PEPQ) | 5 | 100 | 50.05 | 21.03 | .94 |
| *Outcome Measures – Part Two* | | | | | |
| Modified Experiences Questionnaire | 14 | 47 | 28.99 | 7.46 | .86 |
| Modified Cognitive Fusion | 7 | 28 | 15.05 | 5.32 | .92 |
| Post-event Rumination (E-PEPQ) | 3 | 96 | 41.54 | 23.30 | .96 |
| Thoughts Questionnaire – Negative | 9 | 39 | 19.68 | 5.95 | .93 |
| Thoughts Questionnaire – Positive | 14 | 69 | 40.98 | 12.11 | .83 |

*Note.* $N = 115$. E-PEPQ = Extended Post-event Processing Questionnaire.

Table 12

*Means (and Standard Deviations) on Each of the Scales, Subscales at Baseline across Conditions for Study 3*

| Audio Condition | Mindfulness | | Relaxation | | Active Control | |
|---|---|---|---|---|---|---|
| Writing Exercise | Defusion (*n* = 20) | Control (*n* = 19) | Defusion (*n* = 19) | Control (*n* = 18) | Defusion (*n* = 19) | Control (*n* = 20) |
| Experiences Questionnaire | 35.15 (4.60) | 37.75 (4.29) | 34.26 (6.36) | 33.16 (4.23) | 34.68 (5.49) | 34.75(6.42) |
| Cognitive Fusion Questionnaire | 31.75 (7.23) | 28.79 (7.80) | 32.16 (7.88) | 30.27 (7.25) | 31.42 (7.60) | 30.65 (9.47) |
| Metacognitive Awareness | 31.65 (7.08) | 33.10 (7.57) | 33.36 (4.70) | 31.83 (4.78) | 31.73 (4.01) | 34.95 (5.75) |
| Five Facet Mindfulness - Observe | 26.05 (4.71) | 26.94 (4.46) | 27.31 (3.88) | 24.77 (5.50) | 25.74 (5.83) | 25.50 (5.24) |
| Five Facet Mindfulness - Describe | 24.80 (5.05) | 23.16 (6.00) | 20.63 (5.70) | 22.83 (6.83) | 23.74 (5.11) | 22.70 (5.60) |
| Five Facet Mindfulness - Act Aware | 22.25 (3.60) | 24.73 (4.80) | 21.68 (4.46) | 24.44 (4.16) | 21.47 (3.76) | 22.40 (4.84) |
| Five Facet Mindfulness - Nonjudge | 20.85 (5.30) | 25.16 (5.89) | 22.84 (6.37) | 21.33 (6.34) | 21.84 (4.68) | 22.60 (5.65) |
| Five Facet Mindfulness – Nonreact | 19.45 (3.45) | 19.52 (4.30) | 18.63 (4.03) | 19.00 (3.71) | 18.94 (3.99) | 18.25 (3.35) |
| Rumination Responses Question | 46.15 (7.42) | 44.05 (4.81) | 46.21 (5.69) | 44.27 (9.13) | 46.68 (6.68) | 45.80 (9.40) |
| Beck Depression Inventory – II | 19.60 (10.05) | 13.05 (4.64) | 19.52 (9.90) | 18.88 (13.18) | 16.47 (9.56) | 17.10 (13.71) |
| Social Phobia Inventory | 34.95 (11.60) | 33.58 (8.54) | 37.52 (12.06) | 32.22 (13.75) | 31.42 (14.50) | 36.35 (15.71) |
| Social Interaction Anxiety Scale | 42.70 (9.85) | 39.31 (12.14) | 44.42 (14.36) | 42.83 (14.90) | 39.68 (14.52) | 42.20 (27.41) |

*Note.* *N* = 115.

Table 13

*Means (and Standard Deviations) on Each of the Scales, Subscales of Outcome Variables across Conditions for Study 3*

| Audio Condition | Mindfulness | | Relaxation | | Active Control | |
|---|---|---|---|---|---|---|
| Writing Exercise | Defusion ($n = 20$) | Control ($n = 19$) | Defusion ($n = 19$) | Control ($n = 18$) | Defusion ($n = 19$) | Control ($n = 20$) |
| *Outcome – Part One* | | | | | | |
| Modified Experiences Questionnaire | 31.45 (6.25) | 31.83 (8.81) | 31.84 (6.00) | 29.00 (7.75) | 32.10 (7.51) | 30.80 (8.24) |
| Modified Cognitive Fusion | 16.70 (3.92) | 13.10 (4.55) | 16.68 (4.77) | 13.11 (5.64) | 14.63 (5.14) | 16.40 (5.07) |
| Toronto Mindfulness - Curiosity | 13.85 (4.14) | 13.05 (4.64) | 12.73 (5.39) | 11.27 (6.31) | 13.26 (5.81) | 11.90 (4.91) |
| Toronto Mindfulness - Decentering | 12.65 (7.42) | 12.16 (4.74) | 13.90 (4.65) | 12.16 (3.96) | 13.16 (4.66) | 11.75 (5.13) |
| Post-event Rumination (E-PEPQ) | 57.21 (16.06) | 41.85 (17.12) | 58.78 (24.07) | 42.80 (19.74) | 43.95 (20.07) | 54.68 (23.06) |
| *Outcome – Part Two* | | | | | | |
| Modified Experiences Questionnaire | 29.90 (6.64) | 31.83 (8.81) | 27.80 (7.18) | 26.38 (7.08) | 30.68 (7.24) | 27.40 (7.24) |
| Modified Cognitive Fusion | 14.10 (4.40) | 12.83 (4.50) | 17.63 (5.75) | 13.55 (5.75) | 14.74 (5.40) | 16.00 (5.23) |
| Post-event Rumination (E-PEPQ) | 42.56 (22.35) | 33.22 (20.12) | 50.10 (23.37) | 40.01 (26.62) | 35.75 (22.34) | 47.16 (22.48) |
| Thoughts Questionnaire – Negative | 40.80 (10.86) | 38.61 (11.10) | 49.52 (10.22) | 36.38 (13.56) | 39.84 (12.20) | 40.40 (11.82) |
| Thoughts Questionnaire – Positive | 18.80 (5.35) | 19.88 (4.40) | 19.16 (5.91) | 18.00 (6.04) | 21.05 (6.91) | 21.10 (6.82) |

*Note.* $N = 115$. E-PEPQ = Extended Post-event Processing Questionnaire.

Table 14

*Correlations among all Baseline Measures for Study 3*

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Experiences Questionnaire | ---- | | | | | | | | | | |
| 2. Cognitive Fusion Questionnaire | -.59** | ---- | | | | | | | | | |
| 3. Metacognitive Awareness Questionnaire | -.29** | .12 | ---- | | | | | | | | |
| 4. Five Facet Mindfulness Observe subscale | .12 | -.18 | -.17 | ---- | | | | | | | |
| 5. Five Factor Mindfulness Describe subscale | .28** | -.12 | -.13 | -.04 | ---- | | | | | | |
| 6. Five Factor Mindfulness Act Aware subscale | .33** | -.36** | -.15 | .02 | .17 | ---- | | | | | |
| 7. Five Factor Mindfulness Nonjudgment | .35** | -.66** | -.01 | -.26* | .06 | .25* | ---- | | | | |
| 8. Five Factor Mindfulness Nonreactivity | .51** | -.41** | -.09 | -.04 | .13 | .13 | .25** | ---- | | | |
| 9. Rumination Responses Questionnaire | -.45** | .72** | .10 | .24* | -.04 | -.26** | -.46** | -.41** | ---- | | |
| 10. Beck Depression Inventory – II | -.66** | .62** | .21* | .13 | -.24* | -.40** | -.52** | -.30** | .47** | ---- | |
| 11. Social Phobia Inventory | -.35** | .54** | .11 | .27** | -.21** | -.26** | -.35** | -.12 | .47** | -.48** | ---- |
| 12. Social Interaction Anxiety Scale | -.36** | .47** | .11 | .23* | -.29* | -.21* | -.25* | -.21* | .47** | .41** | .82** |

*Note.* $N = 115$.
** $= p < .001$, * $= p < .05$.

value of each correlation was taken. Results indicated that the correlation with fusion was significantly different from the correlation with decentering ($z = 6.01$, $p < .001$). A similar pattern emerged for the mindfulness facet nonjudgement, with decentering correlating modestly and fusion correlating strongly with it. Fisher's r to z transformation revealed that for the mindfulness facet nonjudgment, the correlation with fusion was significantly different from the correlation with decentering ($z = 6.32$, $p < .001$). This pattern was also seen in both Study 1 and 2.

As expected and as seen in Studies 1 and 2, trait decentering and fusion correlated in the expected directions with depression and social anxiety and the correlational strengths were similar. Further, metacognitive awareness failed to correlate with all presented measures except for depression where a significant small association was found. This finding could in part be due to its poor reliability.

The correlations between all outcome measures administered in Part One are shown in Table 15. The two state decentering measures (the modified Experiences Questionnaire and the Toronto Mindfulness- decentering subscale) had a modest correlation with each other. State decentering (as measured by the modified Experiences Questionnaire) and state fusion were found to be low-to modestly correlated whereas state decentering (as measured by the Toronto Mindfulness - decentering subscale) and state fusion did not correlate significantly with one another. These correlational strengths are weaker than those found in Study 2. Post-event rumination (as measured by the Extended Post-event Processing Questionnaire) was found to correlate strongly with state fusion.

The correlations between all outcome measures administered in Part Two are shown in Table 16. Post-event rumination (as measured by the Extended Post-event Processing

Table 15

*Correlations among Outcome Measures Administered in Part One for Study 3*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. Modified Experiences Questionnaire | ---- | | | |
| 2. Modified Cognitive Fusion | -.25** | ---- | | |
| 3. Toronto Mindfulness - Curiosity | .50** | .14 | ---- | |
| 4. Toronto Mindfulness – Decentering | .47** | .05 | .65** | ---- |
| 5. Post-event Rumination (E-PEPQ) | -.24* | .70** | .13 | .11 |

*Note.* $N = 115$. E-PEPQ = Extended Post-event Processing Questionnaire.
** = $p < .001$, * = $p < .05$.

Table 16

*Correlations among Outcome Measures Administered in Part Two for Study 3*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1.  Modified Experiences Questionnaire | ---- | | | |
| 2.  Modified Cognitive Fusion | -.17 | ---- | | |
| 3.  Post-event Rumination (E-PEPQ) | -.04 | .59** | ---- | |
| 4.  Thoughts Questionnaire – Negative | -.07 | .68** | .64** | ---- |
| 5.  Thoughts Questionnaire – Positive | .42** | .15 | .05 | .09 |

*Note. N* = 115.  E-PEPQ = Extended Post-event Processing Questionnaire.
** = *p* < .001, * = *p* < .05.

Questionnaire) was found to correlate modestly with state fusion. State fusion was also found to correlate strongly with the Thoughts Questionnaire – negative subscale. The two post-event rumination measures (the Extended Post-event Processing Questionnaire and the Thoughts Questionnaire) were also found to correlate strongly with one another.

**Manipulation Check**

Against what was expected, separate one-way analyses of variance (ANOVAs) with condition (both audio and writing exercise) as the independent variable and scores on the manipulation check items as the dependent variables revealed no significant differences between groups (all $p$'s > .05).

**Affect**

A repeated measures one-way ANOVA was run for both positive and negative affect. Affect was measured before the audio manipulation and after the writing manipulation. Results indicated that there was no differences with regards to negative affect from baseline but there was a significant difference in positive affect from baseline ($F(1, 109) = 17.95, p < .001$). Individuals had significantly higher positive affect before the manipulations ($M = 25.50, SD = 7.61$) compared to after ($M = 23.31, SD = 8.41$). However, there were no significant differences on affect by audio or writing exercise conditions.

**Decentering**

**Part one.** In order to test our prediction that individuals in the mindfulness audio + defusion writing condition would have the highest levels of state decentering, a univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on decentering measured in part one. For this model, a separate analysis was run for each decentering measure (the modified Experiences Questionnaire and the Toronto

Mindfulness - decentering subscale) measured on day one. Against what was predicted but similar to Study 2s findings, results revealed no significant main effects or significant interaction effects for both decentering measures. Although not included in our original predictions, there were also no significant main effects or interaction effects for the other Toronto Mindfulness – curiosity subscale.

**Part two.** A univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on decentering (as measured by the modified Experiences Questionnaire) measured in part two. Results again revealed no significant main effects or interaction effects for decentering.

**Over time.** A repeated measures one-way ANOVA was used to test whether there were changes in decentering (as measured by the modified Experiences Questionnaire) from part one to part two. Results indicated that there was a significant difference in decentering from part one to part two ($F(1, 108) = 10.61$, $p < .05$). Individuals had significantly higher decentering in part one ($M = 31.04$, $SD = 7.12$) compared to part two ($M = 28.99$, $SD = 7.46$). However, there were no significant differences by audio or writing condition.

## Fusion

**Part one.** To test the hypothesis that the mindfulness audio + defusion writing condition would have the lowest levels of fusion, a univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on cognitive fusion measured in part one. The overall interaction was significant ($F(2,109) = 3.89$, $p = .02$, partial $\eta^2 = .07$; see Figure 4).

Testing the effect of writing condition between audio conditions found that those individuals given the control writing exercises scored significantly higher in cognitive fusion,

*Figure 4.* Audio x writing exercise on state cognitive fusion for Study 3. The y axis represents

state cognitive fusion measured by the modified Cognitive Fusion Questionnaire (MCFQ)

measured in Part One. Error bars represent standard error of the mean.

when there were in the active control audio ($M$ = 16.40, $SD$ = 5.07), compared to the mindfulness audio ($M$ = 13.10, $SD$ = 4.55, $p$ = .04) and relaxation audio ($M$ = 13.11, $SD$ = 5.64, $p$ = .04) but these two audio conditions did not differ from one another. There were also no significant effects found for the defusion writing exercises between the mindfulness, relaxation, and active control audio conditions. These findings are contrary to what was originally expected.

Testing the effect of writing exercise within audio conditions found that those individuals given the defusion writing exercises scored significantly higher in cognitive fusion in the mindfulness ($M$ = 16.70, $SD$ = 3.92) and relaxation ($M$ = 16.68, $SD$ = 4.77) audio conditions, compared to those individuals in these audio conditions given the control writing exercises (mindfulness: $M$ = 13.10, $SD$ = 4.55, $p$ = .02; relaxation: $M$ = 13.11, $SD$ = 5.64, $p$ = .02). This is again inconsistent with our original predictions. There was no significant effect of writing exercise within the active control audio condition.

**Part two.** A univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on cognitive fusion measured in part two. The interaction approached significance ($F(2,108)$ = 2.51, $p$ = .09, partial $\eta^2$ = .09; see Figure 5).

Testing the effect of writing condition between audio conditions found that those individuals given the defusion writing exercises scored significantly higher in cognitive fusion 24 hours later when in the relaxation audio condition ($M$ = 17.63, $SD$ = 5.75), compared to the active control ($M$ = 14.74, $SD$ = 5.40, $p$ = .09) and mindfulness ($M$ = 14.10, $SD$ = 4.40, $p$ = .04) audio conditions but these two audio conditions did not differ from one another. This is inconsistent with our original predictions. There were also no significant effects found for the control writing exercises between the mindfulness, relaxation, and active control audio conditions.
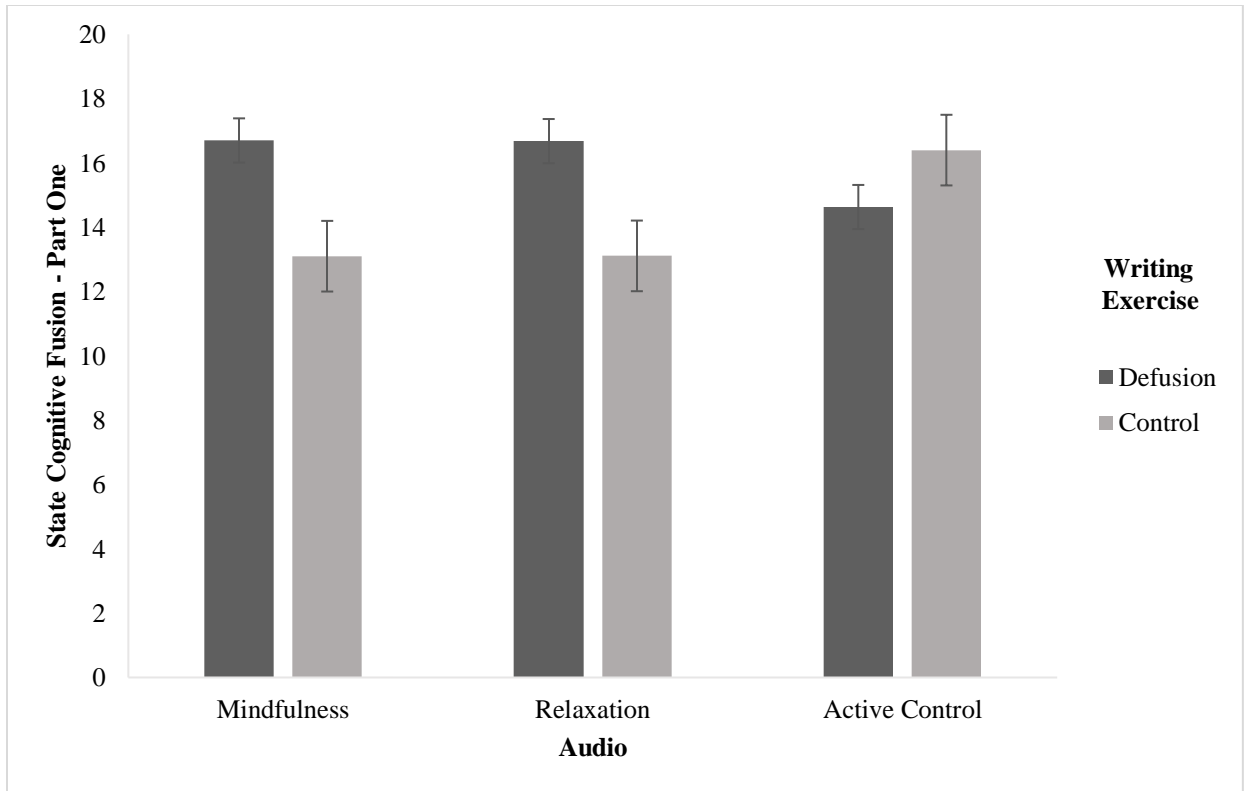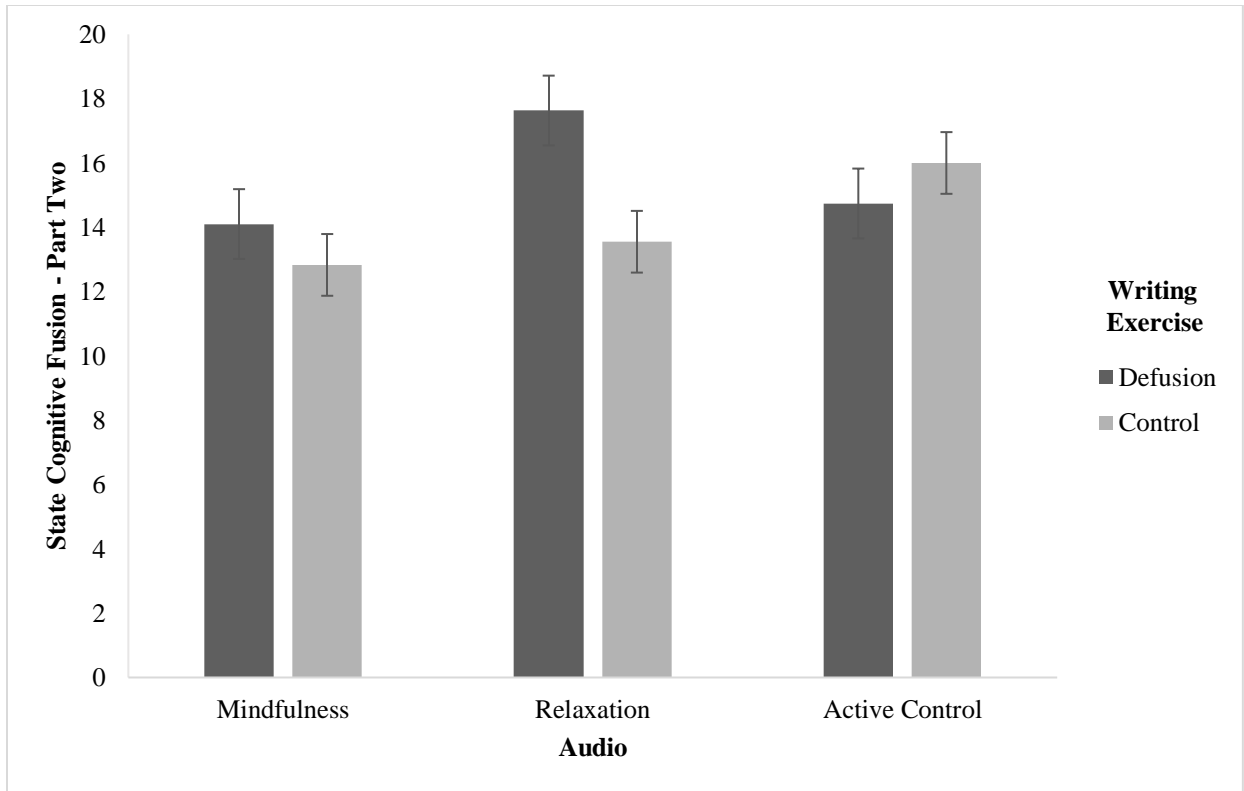
*Figure 5.* Audio x writing exercise on state cognitive fusion for Study 3. The y axis represents

state cognitive fusion measured by modified Cognitive Fusion Questionnaire (MCFQ) measured

in Part Two. Error bars represent standard error of the mean.

Testing the effect of writing exercise within audio conditions found that those individuals in the relaxation ($M$ = 17.63, $SD$ = 5.75) audio condition, when given the defusion writing exercises, are scoring significantly higher in cognitive fusion compared to those individuals in the same condition given the control writing exercises ($M$ = 13.55, $SD$ = 5.75, $p$ = .02). There were no significant effects of writing exercise within the mindfulness and active control audio conditions.

**Over time.** A repeated measures one-way ANOVA was used to test whether there were changes in cognitive fusion from part one to part two. Results indicated that there was no significant difference in fusion from part one to part two by audio or writing condition.

## Post-event Rumination

**Part one.** To test the hypothesis that the mindfulness audio + defusion writing condition would have the lowest levels of post-event rumination in part one, a univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on post-event rumination measured in part one. There was a significant interaction ($F$(2,109) = 5.48, $p$ = .005, partial $\eta^2$ = .09; see Figure 6).

Testing the effect of writing condition between audio conditions and inconsistent with our original predictions, we found that those individuals given the defusion writing exercises scored significantly higher in post-event rumination, when in the mindfulness audio condition ($M$ = 57.21, $SD$ = 16.06) and relaxation audio conditions ($M$ = 58.78, $SD$ = 24.07), compared to the active control audio condition ($M$ = 43.95, $SD$ = 20.07, $p$ = .04 and $p$ = .02). The mindfulness and relaxation audio conditions did not differ from one another. Those individuals given the control writing exercises are scoring significantly higher in post-event rumination, when in the

*Figure 6.* Audio x writing exercise on post-event rumination for Study 3. The y axis represents

post-event rumination measured by the Extended Post-event Processing Questionnaire (E-PEPQ)

measured in Part One. Error bars represent standard error of the mean.

active control audio condition ($M = 54.68$, $SD = 23.06$), compared to the mindfulness audio ($M = 41.85$, $SD = 17.12$, $p = .05$) condition but not the relaxation audio condition.

Testing the effect of writing exercise within audio conditions and again inconsistent with what was originally predicted, we found that those individuals in the mindfulness ($M = 57.21$, $SD = 16.06$) and relaxation ($M = 58.78$, $SD = 24.07$) audio conditions, given the defusion writing exercises, are scoring significantly higher in post-event rumination when compared to those individuals in the same conditions given the control writing exercises (mindfulness: $M = 41.85$, $SD = 17.12$, $p =.02$; relaxation: $M = 42.80$, $SD = 19.74$, $p = .02$). An opposite pattern emerged for those individuals in the active control audio condition such that it is those individuals given the control writing exercises ($M = 54.68$, $SD = 23.06$) who are scoring higher in post-event rumination compared to those individuals given the defusion writing exercise ($M = 43.95$, $SD = 20.07$) but this difference was not significant.

**Part two.** To further test the hypothesis that the mindfulness audio + defusion writing condition would have the lowest levels of post-event rumination in part two, a univariate general linear model was used to test for main effects (audio and writing exercise) and relevant interaction effects on post-event rumination measured in part two. For this model, a separate analysis was run for each post-event rumination measure (the Extended Post-event Processing Questionnaire and the Thoughts Questionnaire).

For the Extended Post-event Processing Questionnaire, the interaction approached significance ($F(2,108) = 2.76$, $p = .07$, partial $\eta^2 = .05$; see Figure 7). Testing the effect of writing condition between audio conditions found that inconsistent with our predictions, those individuals who were given the defusion writing exercises scored higher in post-event rumination 24 hours later when in the relaxation audio condition ($M = 50.10$, $SD = 23.37$)
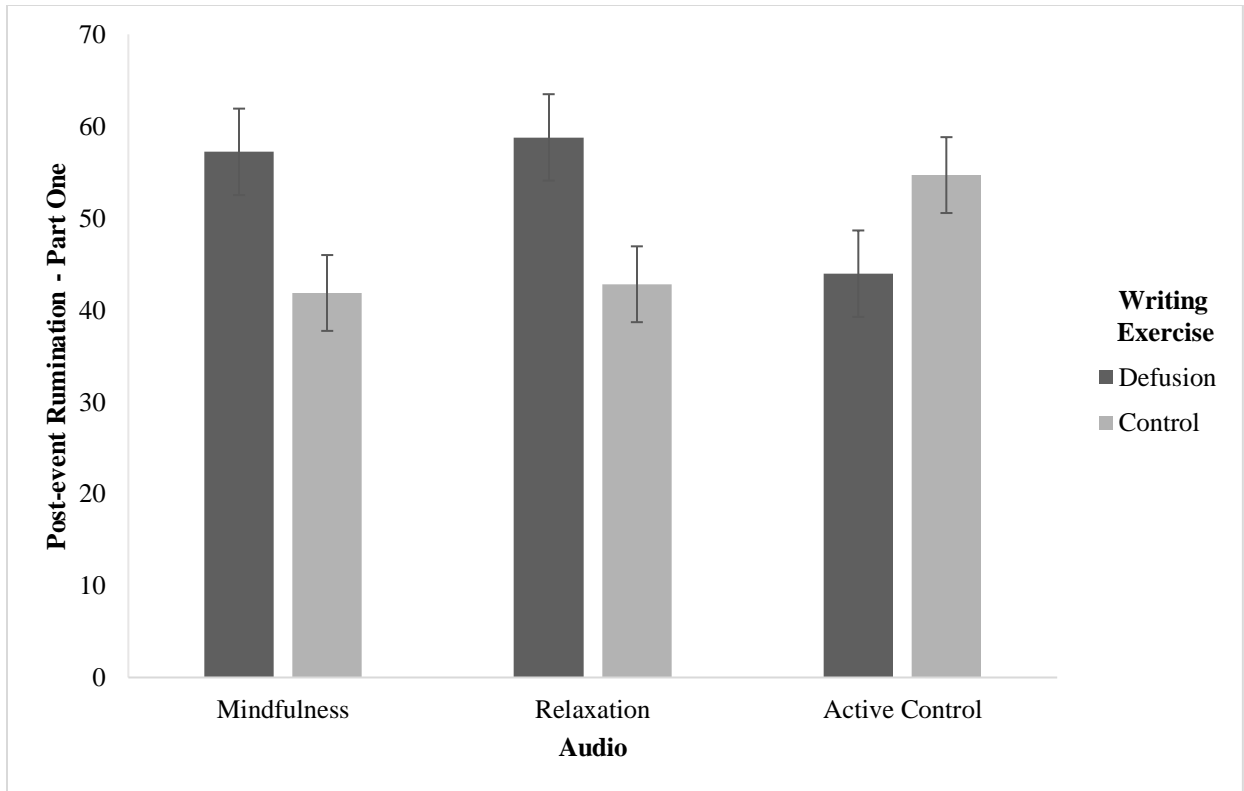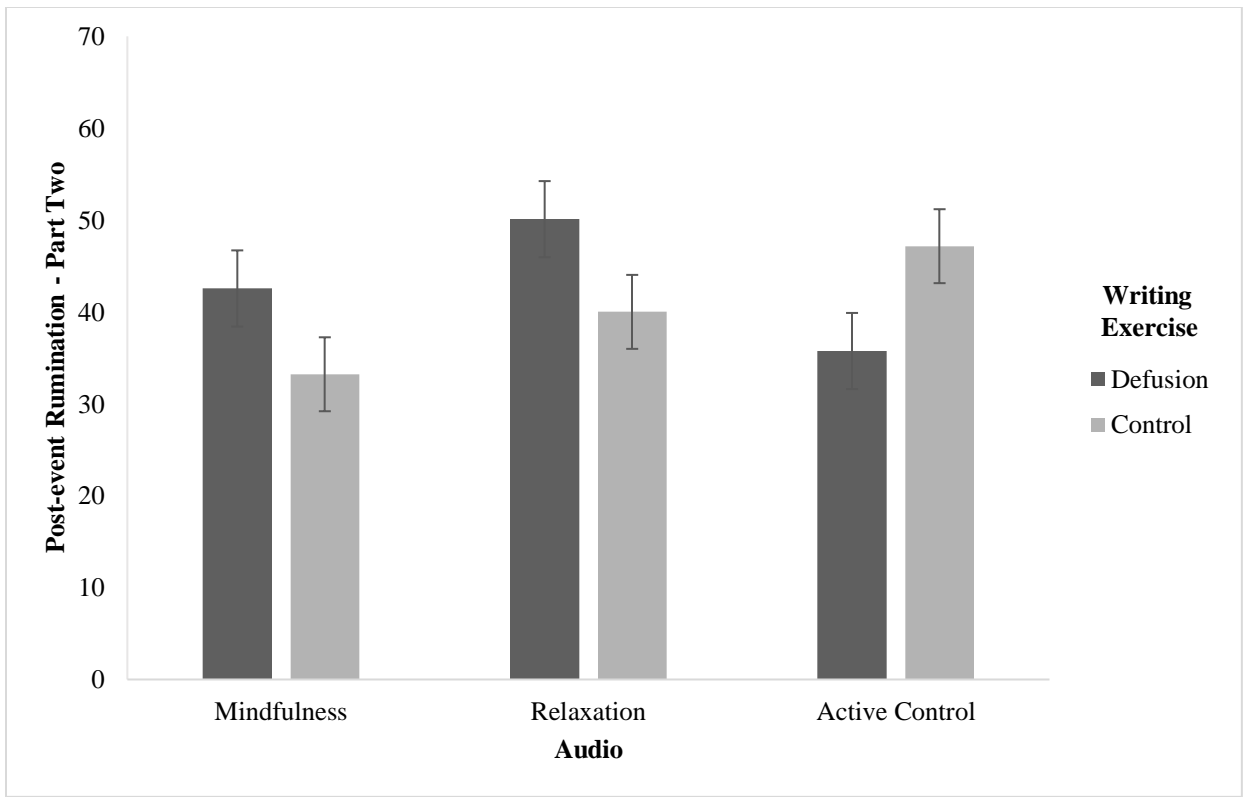
*Figure 7.* Audio x writing exercise on post-event rumination for Study 3. The y axis represents

post-event rumination measured by the Extended Post-event Processing Questionnaire (E-PEPQ)

measured in Part Two. Error bars represent standard error of the mean.

compared to the active control audio condition ($M = 35.75$, $SD = 22.34$, $p = .05$) but not the mindfulness audio condition. Also, the active control audio and mindfulness audio condition did not differ from one another. Those individuals given the control writing exercises scored significantly higher in post-event rumination 24 hours later when in the active control audio condition ($M = 47.16$, $SD = 22.48$) compared to the mindfulness ($M = 33.22$, $SD = 20.12$, $p = .05$) audio condition but not the relaxation condition. There were no significant effects of writing condition between audio conditions.

For the Thoughts Questionnaire – negative thoughts subscale, the interaction term was significant ($F(2,108) = 3.63$, $p = .03$, partial $\eta^2 = .06$; see Figure 8). Testing the effect of writing condition between audio conditions found that, against what was expected, those individuals given the defusion writing exercises scored significantly higher in negative thoughts 24 hours later when in the relaxation audio condition ($M = 49.52$, $SD = 10.22$) compared to the active control audio ($M = 39.84$, $SD = 12.20$, $p = .02$) and the mindfulness audio conditions ($M = 40.80$, $SD = 10.86$, $p = .01$) but the active control and mindfulness audio conditions did not differ from one another.

Testing the effect of writing exercise within audio conditions found that those individuals in the relaxation audio condition, given the defusion writing exercises, scored significantly higher in negative thoughts 24 hours later ($M = 49.52$, $SD = 10.22$) compared to those individuals in the same condition given the control writing exercises ($M = 36.38$, $SD = 13.56$, $p = .001$). There were no significant effects of writing exercise with the mindfulness and active control audio conditions. Although not included in our original predictions, there were also no significant main effects or interaction effects for the other Thoughts Questionnaire subscale – positive thoughts.
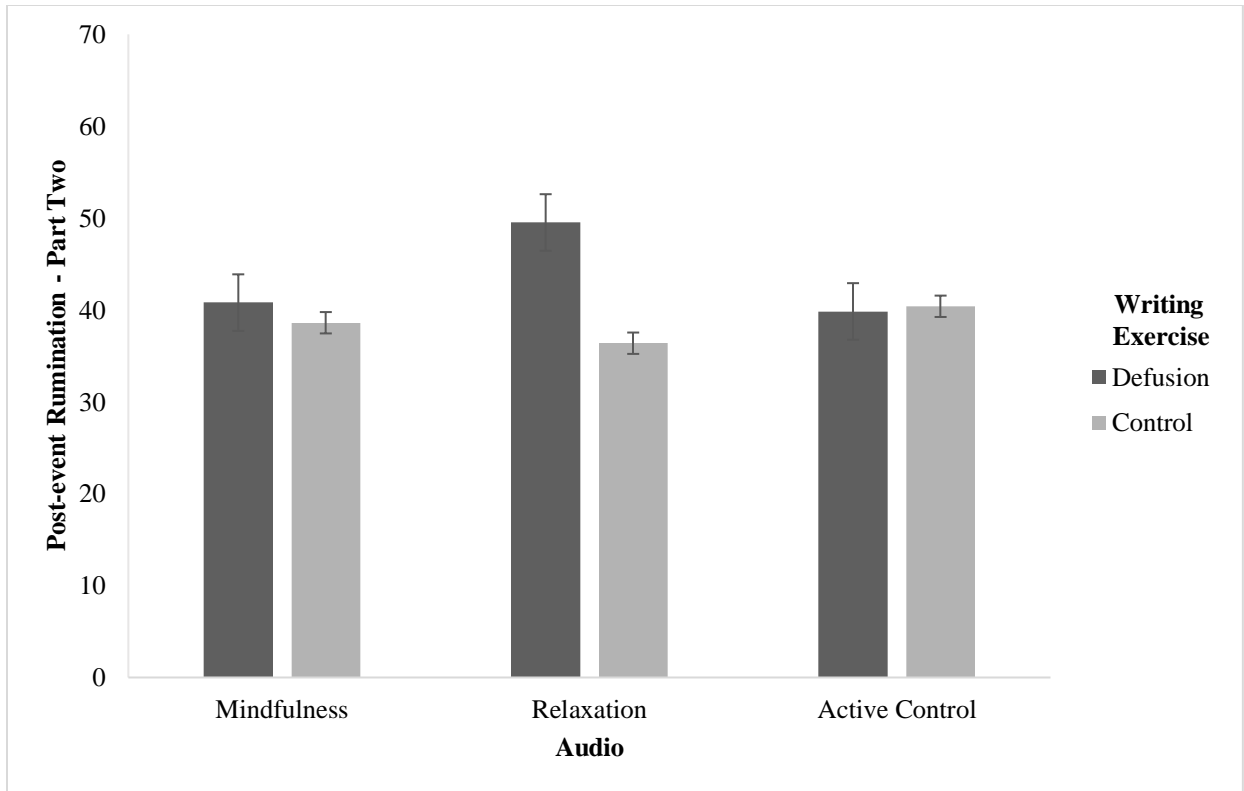
*Figure 8.* Audio x writing exercise on post-event rumination for Study 3. The y axis represents

post-event rumination measured by the Thoughts Questionnaire – negative thoughts subscale

(TQ) measured in Part Two. Error bars represent standard error of the mean.

**Over time.** A repeated measures one-way ANOVA was used to test whether there were changes in post-event rumination (as measured by the E-PEPQ) from part one to part two. Results indicated that there was a significant difference in post-event rumination from part one to part two ($F(1, 108) = 34.92$, $p < .001$). Individuals had significantly higher post-event rumination in part one ($M = 50.06$, $SD = 21.12$) compared to part two ($M = 41.54$, $SD = 23.29$). However, there were no significant differences by audio or writing condition.

## Moderated Mediation Analysis

To test the hypotheses that there would be an indirect effect of mindfulness on post-event rumination (Extended Post-event Processing Questionnaire measured in part two) through cognitive fusion (measured in part one) that would be moderated by writing exercise (defusion versus control), Hayes' PROCESS macro (2013) for SPSS was used (Model 7). This model tests for the indirect effect of mindfulness on post-event rumination (Extended Post-event Processing Questionnaire measured in part two) through cognitive fusion (measured in part one) moderated by writing exercise (defusion versus control) at the first stage of mediation. Namely, the path between mindfulness and cognitive fusion measured in part one (see Figure 9 for the two conceptual models that were run and Figure 10 for the statistical model). Mindfulness was a dummy coded variable that compared either relaxation (coded as 1) with mindfulness (coded as 0) or control (coded as 1) with mindfulness (coded as 0). In this instance mindfulness was the reference group.

*Figure 9.* Conceptual moderated mediation model (Study 3) in which the indirect effect of

mindfulness on post-event rumination (measured in Part Two) through cognitive fusion

(measured in Part One) was moderated by writing exercise. These models were tested separately.

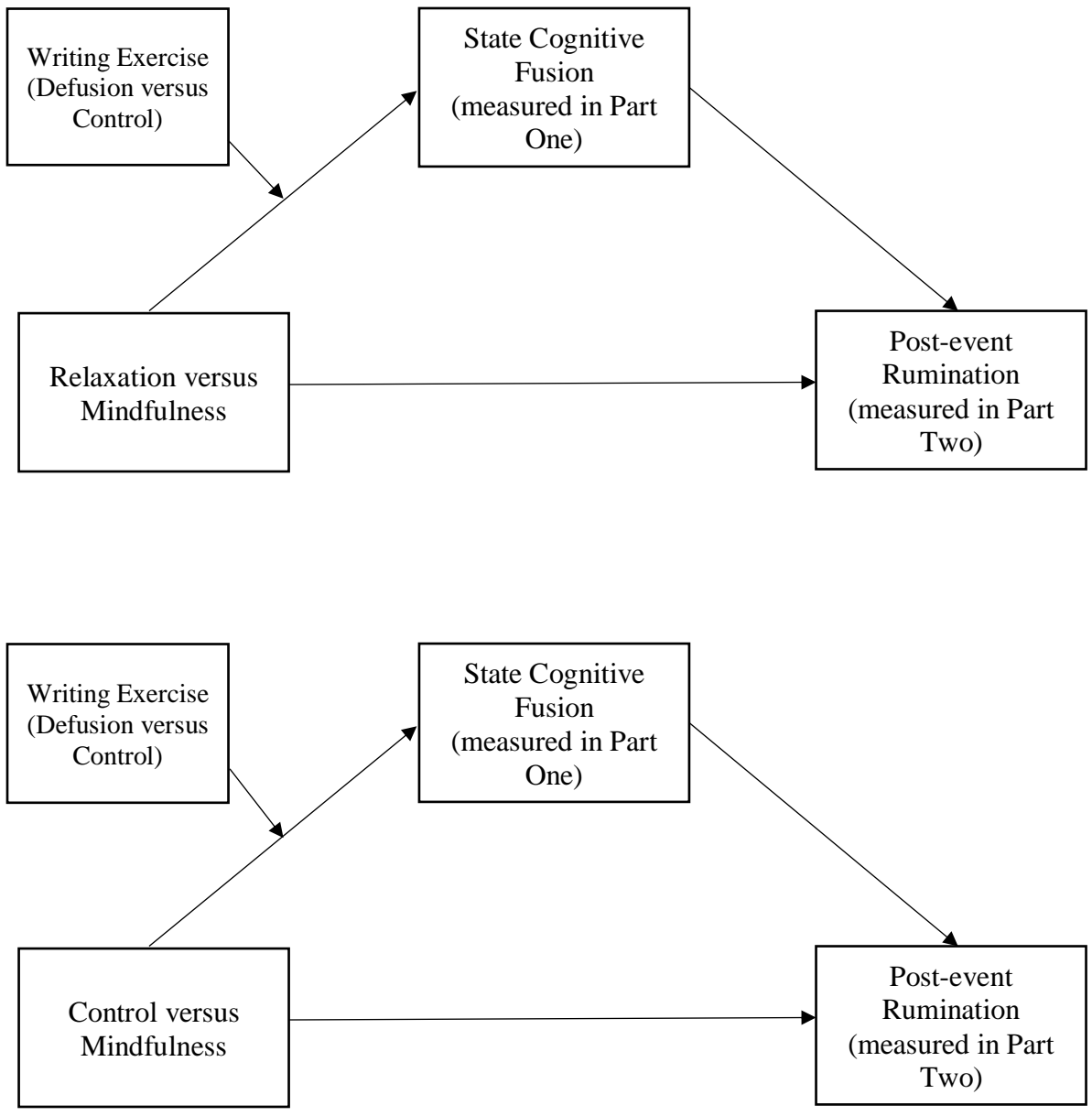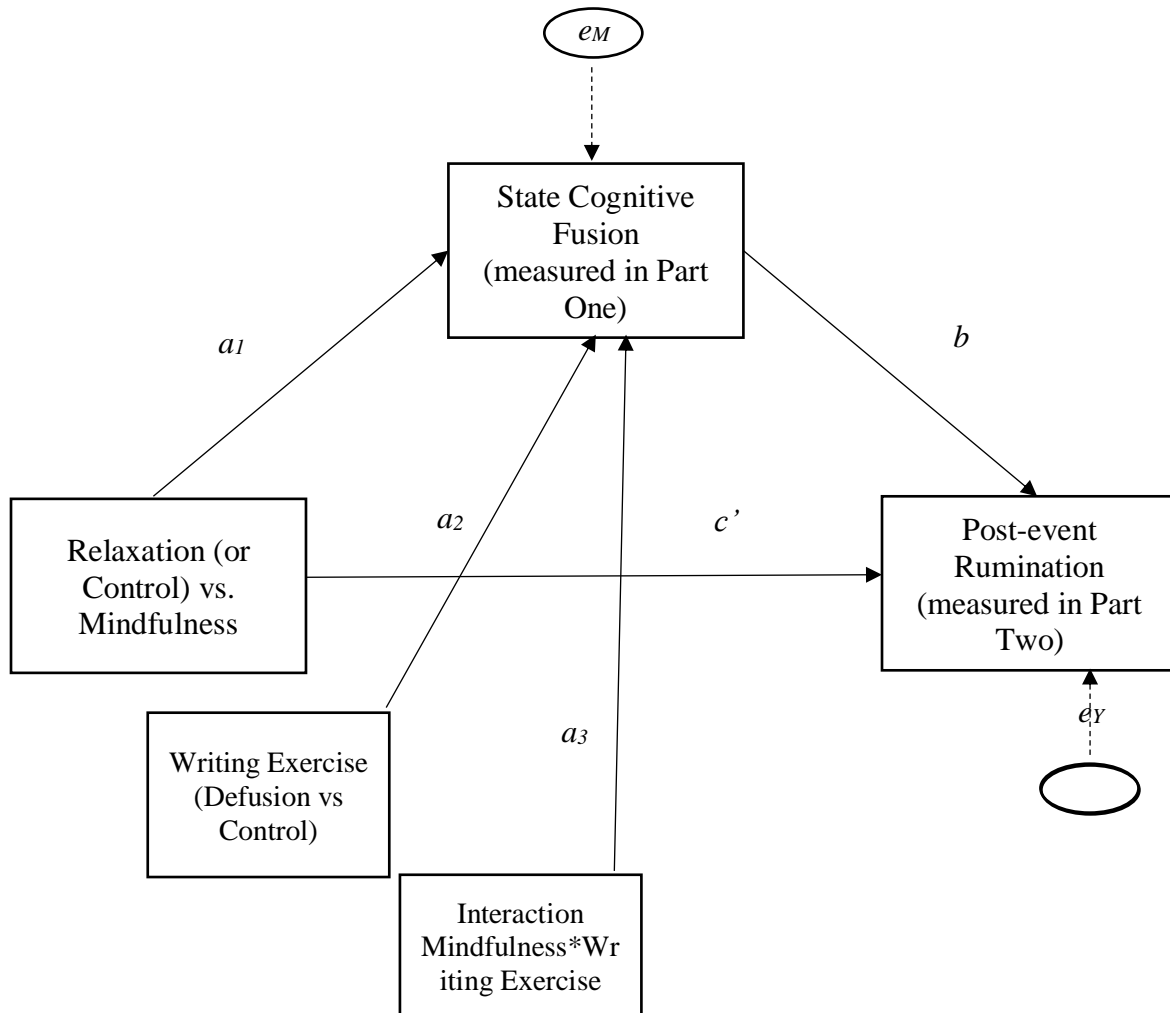*Figure 10.* Statistical diagram of the moderated mediation model (Study 3) in which the indirect

effect of mindfulness on post-event rumination (measured in Part Two) through cognitive fusion

(measured in Part One) was moderated by writing exercise.

Writing exercise was coded as 0 for the defusion writing condition and the control writing condition was coded as 1. Variables were mean centered and the unstandardized model coefficients are reported (see Table 17)[2].

The index of moderated mediation (Hayes, 2015), tests whether the indirect effect varies across the two levels of the moderator (defusion versus control) and was tested using a bias-corrected 95% bootstrap confidence interval based on 5000 samples.

The index of moderated mediation was not significant when looking at the effect of mindfulness versus relaxation on post-event rumination through cognitive fusion moderated by writing exercise, -7.65 ($SE = 5.87$) as indicated by a confidence interval that contained zero, [-19.62, 3.69]. This provides no support for moderated mediation. However, the index of moderated mediation was significant when looking at the effect of mindfulness versus control on post-event rumination through cognitive fusion moderated by writing exercise, 15.41 ($SE = 1307$), as indicated by a confidence interval that did not contain zero, [4.57, 28.53]. Thus, there was support for significant moderated mediation, such that the indirect effect differed across the two writing conditions (defusion versus control) for those in the mindfulness versus control audio conditions. To probe this moderated mediation, the conditional indirect effects were also tested with a bias-corrected 95% bootstrap confidence interval based on 5000 samples (see Table 18). Results showed that for those who were in the defusion writing condition, the confidence intervals for the conditional indirect effect contained zero. Thus, there was not a significant indirect effect of mindfulness on post-event rumination through cognitive

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[2] A second set of analyses was also run using the Thoughts Questionnaire (measured 24 hours later) as the outcome variable. Results revealed a similar pattern compared to when the Extended Post-event Processing Questionnaire was the outcome variable. The unstandardized model coefficients for this set of analyses are reported in Table 19 and the conditional indirect effects are reported in Table 20.

Table 17

*Study 3 Model Coefficients for the Moderated Mediation Model*

| | | Outcome | | | | | | |
| | | Cognitive Fusion | | | | Post-event Rumination (E- PEPQ) | | |
| Predictor | | B | *SE* | *p* | | B | *SE* | *p* |
| Relax vs. Mindfulness | $a_1$ | 1.29 | 1.49 | .39 | *c'* | 7.18 | 4.17 | .08 |
| Cognitive Fusion | | ---- | ---- | ---- | *b* | 2.88 | .34 | < .001 |
| Writing Exercise | $a_2$ | -.91 | 1.12 | .42 | | ---- | ---- | ---- |
| Mindfulness*Writing Exercise | $a_3$ | -.26 | 1.98 | .18 | | ---- | ---- | ---- |
| Constant | | 1.13 | .96 | .24 | | 36.04 | 2.91 | < .001 |
| | | $R^2 = .22$ | | | | $R^2 = .63$ | | |
| | | $F(4,110) = 1.44, p = .22$ | | | | $F(3,111) = 24.92, p < .001$ | | |
| Control vs. Mindfulness | $a_1$ | -2.06 | 1.46 | .16 | *c'* | 1.89 | 4.11 | .64 |
| Cognitive Fusion | | ---- | ---- | ---- | *b* | 2.88 | .34 | < .001 |
| Writing Exercise | $a_2$ | -3.58 | 1.11 | .001 | | ---- | ---- | ---- |
| Mindfulness*Writing Exercise | $a_3$ | 5.35 | 1.91 | .006 | | ---- | ---- | ---- |
| Constant | | 2.43 | .95 | .011 | | 36.04 | 2.91 | < .001 |
| | | $R^2 = .31$ | | | | $R^2 = .63$ | | |
| | | $F(4,110) = 3.02, p = .02$ | | | | $F(3,111) = 24.92, p < .001$ | | |

*Note.* $N = 115$. Relaxation (coded as 1) with mindfulness (coded as 0), control (coded as 1) with mindfulness (coded as 0). Writing exercise was coded as 0 for the defusion writing condition and the control writing condition was coded as 1. E-PEPQ = Extended Post-event Processing Questionnaire. B = unstandardized model coefficients.

Table 18

*Study 3 Conditional indirect effects of mindfulness and cognitive fusion on post-event rumination (E-PEPQ) through writing exercise*

| | Conditional Indirect Effect | | | |
| | Relaxation versus Mindfulness | | Control versus Mindfulness | |
| Moderator | $\omega = (a_1 + a_3 W)b$ | 95% CI | $\omega = (a_1 + a_3 W)b$ | 95% CI |
|---|---|---|---|---|
| Defusion | 3.71 | [-3.53 to 12.26] | -5.94 | [-14.80 to 2.37] |
| Control | -3.94 | [-13.42 to 5.37] | 9.47 | [1.72 to 19.00] |

*Note.* $N = 115$. W = value of the moderator. Mindfulness (coded as 0) with relaxation (coded as 1), or mindfulness (coded as 0) with control (coded as 1). Writing exercise was coded as 0 for the defusion writing condition and the control writing condition was coded as 1. E-PEPQ = Extended Post-event Processing Questionnaire.

Table 19

*Study 3 Model Coefficients for the Moderated Mediation Model*

| | | Cognitive Fusion | | | Outcome | Post-event Rumination (TQ-neg) | | |
|---|---|---|---|---|---|---|---|---|
| Predictor | | B | *SE* | *p* | | B | *SE* | *p* |
| Relax vs. Mindfulness | $a_1$ | 1.35 | 1.49 | .37 | $c'$ | 3.21 | 2.21 | .15 |
| Cognitive Fusion | | ---- | ---- | ---- | $b$ | 1.47 | .18 | < .001 |
| Writing Exercise | $a_2$ | -1.03 | 1.14 | .36 | | ---- | ---- | ---- |
| Mindfulness*Writing Exercise | $a_3$ | -2.53 | 1.99 | .21 | | ---- | ---- | ---- |
| Constant | | 1.07 | .99 | .27 | | 38.91 | 1.56 | < .001 |

$R^2 = .22$
$F(4,109) = 1.51, p = .21$

$R^2 = .62$
$F(3,110) = 23.14, p < .001$

| Predictor | | B | *SE* | *p* | | B | *SE* | *p* |
|---|---|---|---|---|---|---|---|---|
| Control vs. Mindfulness | $a_1$ | -1.98 | 1.46 | .17 | $c'$ | -.65 | 2.19 | .76 |
| Cognitive Fusion | | ---- | ---- | ---- | $b$ | 1.47 | .18 | < .001 |
| Writing Exercise | $a_2$ | -3.74 | 1.11 | .001 | | ---- | ---- | ---- |
| Mindfulness*Writing Exercise | $a_3$ | 5.51 | 1.91 | .005 | | ---- | ---- | ---- |
| Constant | | 2.35 | .95 | .014 | | 36.04 | 1.56 | < .001 |

$R^2 = .33$
$F(4,109) = 3.25, p = .01$

$R^2 = .63$
$F(3,110) = 23.14, p < .001$

*Note. N* = 115. Relaxation (coded as 1) with mindfulness (coded as 0), control (coded as 1) with mindfulness (coded as 0). Writing exercise was coded as 0 for the defusion writing condition and the control writing condition was coded as 1.
TQ-neg = Thoughts Questionnaire – negative subscale. B = unstandardized model coefficients.

Table 20

*Study 3 Conditional indirect effects of mindfulness and cognitive fusion on post-event rumination (TQ-neg) through writing exercise*

| | Conditional Indirect Effect | | | |
| --- | --- | --- | --- | --- |
| | Relaxation versus Mindfulness | | Control versus Mindfulness | |
| Moderator | $\omega = (a_1 + a_3W)b$ | 95% CI | $\omega = (a_1 + a_3W)b$ | 95% CI |
| Defusion | 1.98 | [-1.84 to 6.81] | -2.92 | [-7.43 to 1.05] |
| Control | -1.74 | [-6.83 to 2.84] | 5.20 | [1.18 to 10.10] |

*Note.* $N = 115$. W = value of the moderator. Mindfulness (coded as 0) with relaxation (coded as 1), or mindfulness (coded as 0) with control (coded as 1).  Writing exercise was coded as 0 for the defusion writing condition and the control writing condition was coded as 1.

fusion among those in the defusion writing condition after receiving the mindfulness (versus control) audio.

In contrast, for those individuals in the control writing condition, the confidence interval for the conditional indirect effect did not contain zero, indicating the indirect effect of mindfulness on post-event rumination through cognitive fusion was significant. Specifically, among participants who were exposed to the control audio (versus the mindfulness audio), when they completed the control writing exercises, it led to greater cognitive fusion (50.70; conditional path a)[3], which in turn led to greater post-event rumination measured 24 hours later.

## Discussion

Study 1 helped to elucidate the similarities and differences between measures of decentering, defusion, and metacognitive awareness when assessed at the trait level whereas Study 2 focused on the degree to which it was possible to induce state changes in levels of decentering and fusion. The primary goal of Study 3 was to examine whether defusion was one of the mechanisms through which mindfulness may be leading to decreased psychological distress. To test this, cognitive defusion was isolated and manipulated after individuals received one of three audio conditions (i.e., mindfulness, relaxation, or active control).

Similar to the findings from Study 1 and Study 2 and as hypothesized, trait measures of decentering and fusion were found to be modestly correlated. Further, as in the previous studies, results from the current study demonstrated that trait measures of decentering and fusion correlated in the predicted directions with variables such as mindfulness, experiential avoidance,

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[3] Path a (from the independent variable to the mediator in a first-stage moderated mediation = $a_1 + a_3W$, where W is the value of the moderator.

and emotional regulation but for some of the scales and subscales, the strengths of these correlations differed.

Based on the lack of decentering findings in Study 2, Study 3 tested whether defusion is a mechanism of change, in this case leading to reduced post-event rumination among individuals with elevated levels of social anxiety. Based on prior literature, we originally hypothesized that individuals given the mindfulness audio + defusion writing exercises would experience the most favourable outcomes compared to all other conditions.

Contrary to what was expected, individuals who received the mindfulness audio combined with the defusion writing exercises experienced more fusion and more post-event rumination compared to those who received the mindfulness audio combined with the control writing exercises. Similarly, among individuals who received the relaxation audio, the defusion writing exercises led to more fusion and more post-event rumination compared to the control writing exercises. Finally, for the active control audio, there is evidence that the defusion writing exercises led to less fusion and less post-event rumination compared to the control writing exercises. There are a few potential reasons as to why our results did not align with our previous predictions.

Results indicate that individuals who were in the control condition for the audio exercise or the writing exercise but not both demonstrated better outcomes (i.e., less cognitive fusion and less post-event rumination). It is possible that the combined effect of receiving two intervention strategies was too cognitively demanding for participants, and that, when combined, two strategies placed a high amount of cognitive load on participants. Mindfulness training teaches individuals to increase their awareness of present moment experiences and to do so with an open and accepting attitude. However, this shift in perspective may not occur immediately.  Past

research has demonstrated that for novice meditators, the practice of mindfulness requires that the individual sustain their concentration and therefore their attention throughout the exercise (Grabovac, Lau, & Willett, 2011; Josefsson, Lindwall, & Broberg, 2014). In fact, one of the first skills said to develop when an individual begins mindfulness practice is an improvement in attention regulation. Once this skill is mastered, an individual may then experience a change in perspective (Hölzel et al., 2011).

However, in order to develop this attention regulation, a certain amount of vigilance is required from the individual in the beginning.  Such vigilance, in the case of the current study, may have led to detrimental consequences. If individuals were cognitively overloaded with having to direct their attentional resources towards both the audio (i.e., mindfulness or relaxation) and then the writing exercise (i.e., defusion), it may have had the opposite effect than originally intended. Rather than lead to less fusion and less post-event rumination, it instead led to increased fusion and increased post-event rumination.

An alternative explanation for the current results is also plausible. For example, it could be that the contrast in states (i.e., passive vs. active) may be playing a larger role than we originally anticipated. It is possible that the mindfulness and relaxation audio exercises put individuals into a passive state in which they were attending to the audio tape and had it been left at that, they may have been lower in cognitive fusion or post-event rumination. When individuals approach material with the anticipation of using it, their engagement with that material will be more active. Such active engagement results in greater learning and has been found to lead to an increase in positive affect and cognitions (Benware & Deci, 1984). On the other hand, with passive engagement, individuals are less involved and less active in interpreting and integrating the presented material. For the current studies, when participants were assigned to the defusion

writing condition they went from this passive state to an active state in which they were explicitly told to focus on their thoughts which may have been distressing for them. This contrast in states may have then led to the negative outcomes found. According to this reasoning, individuals who received the active control audio + defusion writing exercises would not have experienced a stark contrast in states. Correspondingly, they would not have experienced the negative effects, and instead, would have only experienced the positive effects of the defusion writing exercise. Based on this explanation, it is possible that the defusion writing exercise is only helpful when individuals are in the right state (i.e., in a more active and engaged state rather than a passive and less involved state).

Given we were primarily interested in testing whether cognitive defusion was a mechanism of change, we also hypothesized that the mindfulness audio would lead to decreased levels of fusion which would then lead to decreases in post-event rumination 24 hours later. However, this hypothesis was not supported. Moderated mediation results instead suggest that individuals in the active control audio plus control writing, had greater levels of cognitive fusion which, in turn, led to greater levels of post-event rumination one day later.  A potential reason for these findings is that the active control audio combined with the control writing exercises may have acted similar to a rumination condition.

To elaborate, following an anxiety provoking situation, individuals with high social anxiety have a tendency to engage in excessive rumination where they tend to focus on the negative aspects of the situation (Abbott & Rapee, 2004), as well as what they perceive to be their own failures. The active control audio in the current work advised individuals to simply let their minds wander while the control writing exercises asked individuals to answer a series of questions regarding their previously given speech. It is possible, that this combination led

individuals to dwell more on what they felt were inadequacies regarding the speech they previously gave. This rumination then may have led them to be more fused with their negative thoughts which in turn led them to engage in more post-event rumination one day later.

There are several limitations that should be considered when interpreting the results from the current study. First, it is possible that some key results were not discovered due to the small sample size. Second, it is possible that recruitment was biased based on how the study was advertised. Individuals were told that the study was going to investigate how mindfulness works. This recruitment method could have impacted the results if those individuals who signed up for the study were more enthusiastic about mindfulness practices. Future work could reduce this bias by instead advertising the study as an examination of personality correlates and by including some sort of measure assessing degree of mindfulness experience. Third, as in Study 2, we did not have an inactive control condition in which participants were not given any instructions. However, it is even more likely that individuals with social anxiety would have naturally engaged in ruminative thinking during an inactive control. Fourth, the sample was skewed on key demographic variables such as gender with more females than males participating. Additionally, individuals had elevated but not clinically diagnostic levels of social anxiety. A direction for future research would be to recruit a sample of individuals with clinical levels of social anxiety that is more representative of the population (i.e., equal distribution of gender). This would allow us to see whether the pattern of results is similar to that of the current work or if these sample differences are accounting for the unexpected findings within Study 3.

In sum, findings from Study 2 suggested that being fused with thoughts was more sensitive to change. Based on these findings, Study 3 investigated whether fusion is the active ingredient that is leading to positive change within mindfulness-based interventions. The

findings from the current study did not support our original predictions and instead suggest that the combination of two intervention strategies led to more cognitive fusion and more post-event rumination for individuals with elevated levels of social anxiety.

**General Discussion**

The main purpose of this dissertation was to investigate how the effects of mindfulness emerge. In particular, we wanted to explore the extent to which mindfulness leads to a cognitive shift in perspective and whether this shift leads to favourable psychological outcomes. Previous research has typically concentrated on the efficacy of mindfulness-based treatments such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT). With an abundance of research supporting its efficacy, researchers have now begun to ask questions regarding what the active ingredients are within mindfulness-based interventions and how these ingredients are contributing to change within individuals. The current work chose to isolate one of the proposed mechanisms of change, namely a cognitive shift in perspective, in order to understand its importance in mindfulness-based interventions.

We addressed a series of research objectives within the current work. Our work examined the overlap between trait measures of decentering, defusion and metacognitive awareness in order to understand whether the scales that purport to measure these constructs are in fact empirically related to one another (Studies 1-3). Further, our work examined whether it was possible to induce state changes in these constructs (Study 2) and finally to address the overarching goal of the current work, we examined whether mindfulness leads to a cognitive shift in perspective thereby leading to decreased levels of distress (Study 3). Several interesting findings emerged from our studies, which are detailed below.

**The Overlap between Decentering, Defusion, and Metacognitive Awareness**

Our first research aim was to examine the degree of overlap between trait measures of decentering, defusion, and metacognitive awareness. We also examined the relationships of these variables with a variety of constructs such as mindfulness, experiential avoidance, depression and social anxiety. We had originally hypothesized that given the very similar definitions of these three constructs, that there would be substantial overlap between them as evidenced by high intercorrelations. However, across all 3 studies, decentering, (de)fusion, and metacognitive awareness were only weakly to modestly associated with one another. Further, throughout all three studies there were correlational strength differences between decentering, (de)fusion, and metacognitive awareness and constructs such as mindfulness, experiential avoidance, and rumination.

There may be three reasons as to why there was not substantial overlap between the three constructs of interest as originally predicted. First, it could be that the tools have diverged from their original definitions and as such are now capturing different constructs. As mentioned previously, decentering, defusion, and metacognitive awareness all seem to refer to a similar concept. However, examining how each tool was conceptualized begins to illustrate subtle differences with the tools used to assess decentering and metacognitive awareness focusing on thoughts and emotions while the tool used to assess defusion focuses strictly on thoughts. These small differences may account for why we are seeing weak to modest associations between the three variables.

Second, item valence could be playing a larger role than originally anticipated. When examining the items used to assess each of the three constructs, it is notable that all of the items used to assess decentering are positively worded such that higher scores indicate greater

decentering while all of the items assessing defusion are negatively worded such that higher scores indicates greater fusion. For metacognitive awareness, the Metacognitive Awareness Questionnaire (utilized in Study 3) contains items that are worded in both directions (i.e., positive and negative). Consequently, this disparity in valence could account for why we are seeing the correlational differences. Literature has suggested that the interpretation of correlations can be biased by the valence of items. Specifically, when valence is similar, correlations will be stronger and when valence is dissimilar, as is the case in the current work, correlations will be weaker (Kam & Meyer, 2015). This lends support to the weak to modest correlations found within the current work as well as the pattern of subtle differences noted between decentering, defusion, and metacognitive awareness and constructs such as mindfulness and experiential avoidance.

Third, one's level of meta-awareness may impact how well an individual is able to report on constructs such as those examined in the current work. Recently, Bernstein et al. (2015) have posited an overarching meta-cognitive process model that they suggest contains three inter-related processes: meta-awareness (e.g., the awareness an individual has of his or her own ongoing mental life), disidentification from internal experience and reduced reactivity to thought content (Bernstein et al., 2015). These authors suggest that these three inter-related processes underlie constructs such as those examined within the current work (i.e., decentering, defusion, and metacognitive awareness). According to this model, the definitions of decentering and metacognitive awareness contain all three of these processes while defusion has been characterized by only one, reduced reactivity to thought content. Bernstein et al. (2015) also note that when it comes to the measures designed to assess these variables, they each tap differing processes. For instance, the tool designed to assess decentering (i.e., the Experiences

Questionnaire) only assesses disidentification from internal experience while the tool for defusion (i.e., the Cognitive Fusion Questionnaire) assesses reduced reactivity to thought content. The current work supports this model and suggests that instead of seeing these processes as iterations of one another, we should instead see them as interwoven, all tapping into one overarching meta-cognitive process. With regards to the current results, given the fact that the measures for these constructs tap into differing meta-cognitive processes, according to the model posited by Bernstein et al (2015), then it makes sense that they do not correlate as strongly as we originally predicted.

Further, Bernstein and colleagues (2015) argue that the awareness an individual has regarding their own mental life, is the necessary prerequisite for any subsequent thought processes (i.e., disidentification from internal experience or reduced thought reactivity). Agreeing with this supposition, Naragon-Gainey and DeMarre (2017) argue that this meta-awareness is critical in that without awareness of one's own thoughts and emotions, accurately appraising such thoughts and emotions is unlikely to occur. As it relates to the current work, if a certain degree of awareness is needed to accurately appraise one's thoughts and emotions it is possible that when presented with a decentering item such as "separate myself from my thoughts and feelings" an individual low in meta-awareness may be unclear on its meaning, which could then lead to unreliable responses.

However, regardless of one's level meta-awareness, if an individual is experiencing distress due to their negative thoughts and emotions, they are most likely aware of this distress and would likewise be able to report on it. Moreover, when presented with a defusion item such as "my thoughts cause me distress or emotional pain", this individual may be more likely to personally identify with it and respond accordingly regardless of their meta-awareness. These

distinctions suggest that some level of insight is needed for individuals to recognize whether they are able to take on a decentered or detached perspective but perhaps this insight may be less important for individuals to identify whether they are fused with their thoughts. This argument, that a certain degree of awareness is needed may help to clarify the disparate findings in Studies 2 and 3.

In sum, the current work examined the overlap between three conceptually similar constructs across 3 studies. There has been some previous work that has shown weak to modest relationships between decentering and defusion (Naragon-Gainey & DeMarre, 2017). Our work extends these findings by demonstrating a weak to modest relationship between not only decentering and defusion, but metacognitive awareness as well. It is possible these differences can be attributed to assessment tool disparities such as item valence or results may suggest that each of these constructs, while they may overlap to some extent, are each tapping into an overarching meta-cognitive process. Further, perhaps a certain amount of awareness is required to understand decentering, and metacognitive awareness while awareness may not be as relevant for defusion. The findings from the current work highlight the importance of carefully examining and selecting tools that are the most relevant for a given purpose. Moreover, results illustrate how challenging it may be to capture decentering, defusion, and metacognitive awareness using pre-existing self-report measures.

**State Changes in Decentering and Defusion**

Our second research aim was to address the degree to which it was possible to induce state changes in decentering and fusion. To do this Study 2 presented individuals with exercises selected from each of the three psychotherapy approaches from which decentering, defusion, and metacognitive awareness were originally derived. For decentering, a cognitive restructuring

exercise thought to evoke a shift in perspective was selected. For defusion, exercises meant to increase an individual's capacity to defuse from their thoughts were selected. Finally, for metacognitive awareness, a mindfulness exercise focused on bringing attention to the present moment was selected.

We hypothesized that those individuals assigned to the defusion condition would have lower fusion (or higher defusion) post-exercise when compared to those individuals in the other two conditions. We also hypothesized that those individuals in the mindfulness condition would have higher decentering post-exercise when compared to those individuals who completed the other two exercises.

We found mixed support for our hypotheses. First, contrary to our initial hypotheses, we found no significant differences between conditions on both of the presented decentering outcome measures (the modified Experiences Questionnaire and the Toronto Mindfulness – decentering subscale). There are a few reasons that could account for this result. It could be that the exercises presented were simply not long enough to enact changes in decentering. If being able to take on a decentered perspective requires a certain level of awareness (Bernstein et al., 2015), as well as a certain amount of cognitive or attentional resources (Markovits & Vachon, 1990; Venet & Markovits, 2001), it could be that a 10-minute exercise was simply not long enough to see the changes in decentering we expected to see.

Moreover, decentering is a complex and challenging construct to assess, with the items used to do so being worded in such a way that individuals may have a hard time relating to them. For instance, an item from the Toronto Mindfulness Scale such as "I was more invested in just watching my experiences as they arose, than in figuring out what they could mean" may have been too broad or general and therefore unable to capture the dynamic changes of decentering.

This would then support the fact that we saw no significant differences between conditions on both of our decentering measures.

Second, we found that as hypothesized, the defusion exercise led individuals to be less fused with their thoughts. The main purpose of defusion exercises such as those selected is to unhook thoughts from actions and to create a certain amount of psychological distance between a person and his/her thoughts (Hayes, 2005). Given the defusion exercises explicitly focused the individual's attention towards the thoughts they were having and provided them with concrete ways on how to defuse from those thoughts, it is not surprising that these exercises led to decreased cognitive fusion.

Our initial hypothesis focused solely on the defusion exercises leading to less cognitive fusion, but we also found that the mindfulness exercise led to less fusion in individuals. This finding does support existing literature that suggests that even brief mindfulness practice such as that presented in Study 2 can reduce the tendency for individuals to become entangled or attached to certain streams of thought. For example, Kiken and Shook (2014) found, that following a brief mindfulness induction, individuals reported fewer negative thoughts. Interestingly, results also indicated that positive thoughts were unaffected.  The main purpose of the mindfulness exercise selected for Study 2 was to draw individual's attention towards their breath, body, sound and thoughts. As the results of the current work suggest, this exercise allowed individuals to not only notice their thoughts, but it also helped to reduce the tendency to become entangled or focused on those thoughts. This led to decreased levels of cognitive fusion among those in this condition. This finding was also replicated in Study 3, with those individuals who received one of these manipulations, so either individuals in the mindfulness audio + control writing or the active control audio + defusion writing exercises, scoring lower on cognitive

fusion and post-event rumination compared to those individuals who received both manipulations.

In sum, the current work examined whether it was possible to induce state changes in levels of decentering and defusion. Our work lends support to the idea that perhaps decentering is not as amenable to change when compared to fusion especially in the context of short-term manipulations such as those utilized within the current work.

**Is Cognitive Defusion the Mechanism of Change within Mindfulness-based Interventions?**

The most relevant research contribution from the current set of studies is its investigation into whether defusion is the mechanism through which mindfulness is leading to decreased levels of distress in individuals (Research Aim 3). Given that Study 2 demonstrated that fusion was more responsive to change with both the mindfulness and defusion exercises leading to less fusion, this construct was selected to investigate the overarching research question about how the effects of mindfulness emerge. To test this, Study 3 employed a 3 (audio: mindfulness, relaxation, or active control) x 2 (writing exercise: defusion or control) design.

Based on prior literature that has suggested that cognitive defusion may be one of the mechanisms through which mindfulness is leading to change, we hypothesized that individuals who received the mindfulness audio + defusion writing exercises would experience more decentering, less fusion, and less post-event rumination when compared to all other condition combinations. However, results did not support these hypotheses. Replicating the findings from Study 2, we did not find any condition effects on any of our decentering outcome measures.

If as the literature suggests, decentering is one of the mindfulness mechanisms responsible for favourable mental health outcomes, the absence of decentering effects across Studies 2 and 3 warrants discussion. In addition to the measurement issues related to decentering

mentioned earlier, another possible reason for the current findings across Studies 2 and 3 could be that the type of exercises utilized were not appropriate to capture changes in decentering. Josefsson et al., (2014) suggest that certain types of mindfulness exercises are more centered on concentration-based skills such as focused attention to the breath, attention to sensory processes as well as attention towards passing thoughts. However, these authors argue that true mindfulness meditation is more of an insight-oriented practice with the individual gaining awareness of their mental and emotional processes. This idea suggests that it is these insight-oriented practices that are going to lead to enhanced decentering and the lack thereof in the current work suggests that perhaps the exercises utilized were not enough to cultivate this skill.

From the results of Study 2, we discovered that both mindfulness audio and the defusion writing exercises separately led to lower levels of cognitive fusion compared to when they were combined. When combined (mindfulness audio + defusion writing), actually led to increased levels of fusion and post-event rumination. This pattern was also similar for those in the relaxation audio + defusion writing condition. This was against what we had originally expected. These results could speak to how mindfulness (and defusion in particular) is a skill that takes time to master.

Findings from Study 3 suggest that perhaps mindfulness and more specifically, defusion may be a difficult skill to learn, understand and put into practice all within a single session rather than the daily practice administered across many weeks as in MBCT or MBSR. Individuals who received more than one strategy (i.e., mindfulness/ relaxation audio + defusion writing) were asked to meet the unpleasant thoughts and emotions they had regarding their speech by turning their attention towards them rather than away from them and did do so for an extended amount of time. It is possible that for individuals who are new to meditation, this actually led them to

have more ruminative thoughts and to be more caught up in their thoughts as the results of Study 3 suggest.

Although our intention was to try and isolate the effects of defusion within mindfulness-based interventions, perhaps the combination of the two strategies was actually a detriment to individuals. Hölzel et al. (2011) suggest that this redirection towards unpleasant thoughts and emotions is counterintuitive for individuals who have never done it before and in some instances may increase an individual's anxiety. However, with more practice these authors suggest that a change in perspective of the self may develop in which these unpleasant thoughts and emotions are gradually replaced with a sense of safety and well-being. As it relates to the current work, if individuals who received two strategies were not accustomed to directing their attention towards their unpleasant thoughts and emotions, rather than leading to favourable outcomes as predicted, proved to be detrimental. This was not the case when individuals only received one of the strategies as demonstrated by the findings in Study 2 and Study 3.

In sum, the current work examined whether cognitive fusion was one of the mechanisms through which mindfulness-based interventions are leading to positive outcomes. Results did not align with original predictions and instead indicated that individuals with high social anxiety who received both the mindfulness audio + defusion writing exercises fared worse than those who only received one of these strategies.

Researchers have begun to agree that more research is needed to help disentangle the mechanisms through which mindfulness may be achieving its well-documented benefits. The current thesis sought to add to this literature by investigating whether mindfulness leads to a cognitive shift in perspective which then leads to favourable outcomes such as reduced post-event rumination. This work has important implications given the fact that mindfulness has been

suggested to contain multiple components. Experimental studies such as those within the current work can and should be used to isolate the effects of these components.

**Limitations and Future Directions**

There are several limitations that ought to be considered in interpreting the results from the current work. Some of the limitations of this research have already been addressed in the discussion sections of each of the three studies. Thus, only those limitations that have not been previously discussed will be mentioned here.

The manipulation checks did not work out as intended in Studies 2 and 3. More specifically, in both studies, there were no condition differences on any of the manipulation check items presented. The intention behind the items in the manipulation checks was to try and parse any condition differences that may have existed. The fact that differences were not found across Studies 2 and 3 could speak to the fact that perhaps the items presented were not appropriately capturing the condition differences that we intended them to. Alternatively, it is possible that individuals were not applying the strategies properly. Future research could potentially mitigate these issues by asking individual to give examples of the kinds of thoughts they had and how they managed these thoughts during the strategy implementation period. These types of questions may allow us to better understand what individuals were doing during this period of time and further allow us to assess whether or not they were using the different strategies correctly.

Another limitation is that the exercises used across Studies 2 and 3 were limited in duration, being only 10 minutes in length, and as such they may not have been long enough to see the changes we were originally expecting to see. Future research could address this issue by offering multiple sessions over an extended amount of time. Doing so, may help to foster a

greater understanding of skills which may then produce greater changes than those seen within the current work. It is also possible that given the short duration of the exercises, the state measures used to assess decentering and defusion failed to capture any subtle changes that may have occurred.

Also, in Study 3, we did not assess previous mindfulness experience among participants. As mentioned, decentering and defusion may be complex skills for individuals to put into practice and this may be especially relevant for novice meditators (Hölzel et al., 2011). However, we are unable to make strong conclusions about whether our findings would be different for samples of novice versus experienced mediators. We suspect that the findings from the current work may be different in a sample of experienced versus novice meditators. For instance, it is possible that when individuals already possess a certain degree of mindfulness skills, working through a defusion writing exercise may not be as detrimental as it seemed to be in Study 3. Therefore, an interesting avenue for future research would be to recruit enough people in order to examine whether mindfulness experience predicted outcome changes following a mindfulness + defusion manipulation. Examining how mindfulness experience differentially impacts how individuals approach a mindfulness-based exercise would then allow us to draw stronger conclusions regarding how the effects of mindfulness emerge.

**Conclusions**

The present work is important as it represents another step to understanding one of the mechanisms of action behind mindfulness-based interventions. Although, the current work focused on addressing third generation questions, it is still critical to examine second generation questions in order to understand under what circumstances mindfulness may be more or less effective.  Across three studies, we have provided evidence that the tools used to assess three

seemingly similar constructs are more different than originally thought. These findings highlight how important it is to empirically examine the relationships between self-report measures because doing so helps to improve our understanding of the underlying construct themselves. Given the fact that decentering, defusion, and metacognitive awareness are all thought to represent a cognitive shift in perspective, research examining the overlap between them is vital.

Since its introduction to Western psychology in the 1970's, the popularity of mindfulness has grown exponentially and so has the research surrounding its benefits. As this field of mindfulness research advances, asking questions regarding potential mediators are critical to our understanding of what processes may underlie mindfulness. The work described in this thesis contributes to this aim by experimentally isolating one of the processes thought to be responsible for some of the changes seen following mindfulness-based practices. Ultimately, the current thesis demonstrates that more work is needed to fully understand the cognitive shift in perspective that may be a result of mindfulness practice.

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Appendix A:  The Experiences Questionnaire (Studies 1-3)

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

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

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Rarely | Sometimes | Often | All the time |

1.  I am better able to accept myself as I am.
2.  I can observe unpleasant feelings without being drawn into them.
3.  I notice that I don't take difficulties so personally.
4.  I can treat myself kindly.
5.  I can separate myself from my thoughts and feelings.
6.  I have the sense that I am fully aware of what is going on around me and inside me.
7.  I can slow my thinking at times of stress.
8.  I can actually see that I am not my thoughts.
9.  I am consciously aware of a sense of my body as a whole.
10. I can take time to respond to difficulties.
11. I view things from a wider perspective.

Appendix B: Cognitive Fusion Questionnaire (Studies 1-3)

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

| Never True | Very Seldom True | Seldom True | Sometimes True | Frequently True | Almost Always True | Always True |
|------------|------------------|-------------|----------------|-----------------|--------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

1. My thoughts cause me distress or emotional pain.
2. I get so caught up in my thoughts that I am unable to do the things that I most want to do.
3. I over-analyze situations to the point where it's unhelpful to me.
4. I struggle with my thoughts.
5. I get upset with myself for having certain thoughts.
6. I tend to get very entangled in my thoughts.
7. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful.

Appendix C: Vignettes for the Measure of Awareness and Coping in Autobiographical Memory
(Study 1)

Example 1:
You are out shopping in town on the weekend and you have arranged to meet a friend for a cup of coffee in the cafe in a department store. You get there in good time and wait outside. It is very busy and the line is spilling out of the door, which makes you feel a bit edgy. You wish your friend would hurry up and arrive. The time you arranged to meet comes and goes. You feel rather slighted that your friend has not made the effort to show up for you and you start to feel a bit low.
**Now please think of a particular time this feeling reminds you of.**

Example 2:
You have just been speaking to a member of the family about some arrangements for meeting up. They were not happy with what you proposed and accused you of always wanting things your own way. As well as feeling angry at them, you wonder whether you were being rather selfish. You begin to feel low as you realise that you do bear some of the blame for the disagreement.
**Now please think of a particular time this feeling reminds you of.**

Example 3:
You have been asked by a friend to help them move some furniture around. You arrive at their house and then start working. You are carrying a small table through the door when it catches on the door handle which makes a small but noticeable scratch on the table top. As you put the table down, you think how careless you have been and your stomach sinks.
**Now please think of a particular time this feeling reminds you of.**

Example 4:
You overhear some work colleagues laughing one day. Suddenly you realise that they are mimicking something you had said to them. You walk away feeling embarrassed and annoyed. You had thought that you got along with these people, but now you're not at all sure. As you think about the way they have put you down, you start to feel weak and miserable.
**Now please think of a particular time this feeling reminds you of.**

Example 5:
You are looking at some brochures, trying to decide where to go on vacation this year. This will be the first time since you had a disagreement with the person you usually g o with. You have hardly seen them since, so there is little chance of them coming with you. You feel bitter as you think about how they let things come between you, and you remember all the upset they caused you.
**Now please think of a particular time this feeling reminds you of.**

Example 6:
You have to cancel an arrangement to meet a friend. This friend does not like to be messed around. As you expect them to be annoyed with you, you feel rather nervous about putting them off and you waste away the evening without calling them until it's too late. You know you should have called them and you feel disappointed in yourself for letting them down. **Now please think of a particular time this feeling reminds you of.**

Example 7:
You are sitting by yourself after talking to a group of people you didn't know very well. You are thinking about how everyone laughed at a comment you made, which had seemed quite sensible to you. Everyone else's comments had been taken more seriously, so after this you had blushed and kept quiet. Thinking about how stupid you must have looked, you start to feel a bit inadequate. **Now please think of a particular time this feeling reminds you of.**

Example 8:
You are hurrying to cook some food before you go out. You put some food in the oven and go and get ready. When you smell burning, you remember the food and rush to turn the oven off. The food is ruined, and reluctantly you throw it away. Just when you needed things to run smoothly, this happens. You sigh dejectedly and wonder how you could have been so careless. **Now please think of a particular time this feeling reminds you of.**

Appendix D: Script for the Measure of Awareness and Coping in Autobiographical Memory
(Study 1)

We're interested in how people cope in situations where they're beginning to feel low or depressed.  On the one hand you can have the situation where actually you don't cope very well at all - the whole thing picks you up and snowballs along, and you feel awful.   On the other hand there is the situation where somehow you can see more clearly what is going on, you can step outside the situation a bit and think 'Hang on, if I look at it like this.....' or 'If I do that.....', and you take control and things don't bother you so.

In order to tap people's memories of when things like this might have happened to them, we've got eight little stories on the tape recorder, each of which describes something that might have happened to you and how you might have felt about it.  I'd like you to listen to each one and try put yourself into that situation and feel the feelings that are being described.  Then try and remember a time when you had that sort of feeling.  It doesn't matter if you are feeling was caused by a different situation - we've put the situations in to make it a bit more realistic.  It doesn't matter whether what you remember happened recently or a long time ago, and it doesn't matter if it's something major or something quite trivial.   But as far as possible, if you could try to tune into the feelings described and then try to focus on one particular time that you felt like that.  So not 'Oh, I always feel like that when I have to go to the supermarket on Fridays' but 'When I went last Friday...'

We'll go through all eight, with at the end of each one, you just telling me briefly what happened to you that you are remembering, and then we'll come back to each one and talk about it in more detail.  It's just easier to get all the remembering over at the beginning.

Appendix E: Five Facet Mindfulness Questionnaire (Studies 1-3)

Please rate each of the following statements using the scale provided.  Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never or very rarely true | Rarely true | Sometimes true | Often true | Very Often or always true |

1.  When I'm walking, I deliberately notice the sensations of my body moving.
2.  I'm good at finding words to describe my feelings.
3.  I criticize myself for having irrational or inappropriate emotions.
4.  I perceive my feelings and emotions without having to react to them.
5.  When I do things, my mind wanders off and I'm easily distracted.
6.  When I take a shower or bath, I stay alert to the sensations of water on my body.
7.  I can easily put my beliefs, opinions, and expectations into words.
8.  I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
9.  I watch my feelings without getting lost in them.
10. I tell myself I shouldn't be feeling the way I'm feeling.
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
12. It's hard for me to find the words to describe what I'm thinking.
13. I am easily distracted.
14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
15. I pay attention to sensations, such as the wind in my hair or sun on my face.
16. I have trouble thinking of the right words to express how I feel about things.
17. I make judgments about whether my thoughts are good or bad.
18. I find it difficult to stay focused on what's happening in the present.
19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
21. In difficult situations, I can pause without immediately reacting.
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
23. It seems I am "running on automatic" without much awareness of what I'm doing.
24. When I have distressing thoughts or images, I feel calm soon after.
25. I tell myself that I shouldn't be thinking the way I'm thinking.
26. I notice the smells and aromas of things.
27. Even when I'm feeling terribly upset, I can find a way to put it into words.
28. I rush through activities without being really attentive to them.
29. When I have distressing thoughts or images I am able just to notice them without reacting.
30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. My natural tendency is to put my experiences into words.

33. When I have distressing thoughts or images, I just notice them and let them go.
34. I do jobs or tasks automatically without being aware of what I'm doing.
35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
36. I pay attention to how my emotions affect my thoughts and behavior.
37. I can usually describe how I feel at the moment in considerable detail.
38. I find myself doing things without paying attention.
39. I disapprove of myself when I have irrational ideas.

Appendix F: Acceptance and Action Questionnaire II (Studies 1-3)

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

| Never true | Very Seldom true | Seldom true | Sometimes true | Frequently true | Almost always true | Always true |
|------------|------------------|-------------|----------------|-----------------|--------------------|-------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

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

Appendix G: Emotion Regulation Questionnaire (Studies 1-3)

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly disagree | | | Neutral | | | Strongly agree |

1. When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
2. I keep my emotions to myself.
3. When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.
4. When I am feeling *positive* emotions, I am careful not to express them.
5. When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6. I control my emotions by *not expressing them*.
7. When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.
8. I control my emotions by *changing the way I think* about the situation I'm in
9. When I am feeling *negative* emotions, I make sure not to express them.
10. When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

Appendix H: White Bear Suppression Inventory (Study 1)

This survey is about thoughts. There are no right or wrong answers, so please respond honestly to each of the items below. Be sure to answer every item by circling the appropriate letter beside each.

| A | B | C | D | E |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neutral | Agree | Strongly agree |

1. There are things I prefer not to think about.
2. Sometimes I wonder why I have the thoughts I do.
3. I have thoughts that I cannot stop.
4. There are images that come to mind that I cannot erase.
5. My thoughts frequently return to one idea.
6. I wish I could stop thinking of certain things.
7. Sometimes my mind races so fast I wish I could stop it.
8. I always try to put problems out of mind.
9. There are thoughts that keep jumping into my head.
10. There are things that I try not to think about.
11. Sometimes I really wish I could stop thinking.
12. I often do things to distract myself from my thoughts.
13. I have thoughts that I try to avoid.
14. There are many thoughts that I have that I don't tell anyone.
15. Sometimes I stay busy just to keep thoughts from intruding on my mind.

Appendix I: Beck Depression Inventory II (Studies 1-3)

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the **one statement** in each group that best describes the way you have been feeling during the **past week, including today.** Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

**1. Sadness**
0   I do not feel sad.
1   I feel sad much of the time.
2   I am sad all the time.
3.   I am so sad or unhappy that I can't stand it.

**2. Pessimism**
0   I am not discouraged about my future.
1   I feel more discouraged about my future than I used to be.
2   I do not expect things to work out for me.
3   I feel my future is hopeless and will only get worse

**3. Past Failure**
0   I do not feel like a failure.
1   I have failed more than I should have.
2   As I look back, I see a lot of failures.
3   I feel I am a total failure as a person.

**4. Loss of Pleasure**
0   I get as much pleasure as I ever did from the things I enjoy.
1   I don't enjoy things as much as I used to.
2   I get very little pleasure from the things I used to enjoy.
3   I can't get any pleasure from the things I used to enjoy.

**5. Guilty Feelings**
0   I don't feel particularly guilty.
1   I feel guilty over many things I have done or should have done.
2   I feel quite guilty most of the time.
3   I feel guilty all of the time

**6. Punishment Feelings**
0   I don't feel I am being punished.
1   I feel I may be punished.
2   I expect to be punished.
3   I feel I am being punished.

**7. Self-Dislike**
0   I feel the same about myself as ever.
1   I have lost confidence in myself.
2   I am disappointed in myself.
3   I dislike myself.

**8. Self-Criticalness**
0   I don't criticize or blame myself more than usual.
1   I am more critical of myself than I used to be.
2   I criticize myself for all of my faults.
3   I blame myself for everything bad that happens.

**9. Suicidal Thoughts or Wishes**
0   I don't have any thoughts of killing myself.
1   I have thoughts of killing myself, but I would not carry them out.
2   I would like to kill myself.
3   I would kill myself if I had the chance.

**10. Crying**
0   I don't cry anymore than I used to.
1   I cry more than I used to.
2   I cry over every little thing.
3   I feel like crying, but I can't.

**11. Agitation**

0  I am no more restless or wound up than usual.
1  I feel more restless or wound up than usual.
2  I am so restless or agitated that it's hard to stay still.
3  I am so restless or agitated that I have to keep moving or doing something.

**12. Loss of Interest**

0  I have not lost interest in other people or activities.
1  I am less interested in other people or things than before.
2  I have lost most of my interest in other people or things.
3  It's hard to get interested in anything.

**13. Indecisiveness**

0  I make decisions about as well as ever.
1  I find it more difficult to make decisions than usual.
2  I have much greater difficulty in making decisions than I used to.
3  I have trouble making any decisions.

**14. Worthlessness**

0  I do not feel I am worthless.
1  I don't consider myself as worthwhile and useful as I used to.
2  I feel more worthless as compared to other people.
3  I feel utterly worthless.

**15. Loss of Energy**

0  I have as much energy as ever.
1  I have less energy than I used to have.
2  I don't have enough energy to do very much.
3  I don't have enough energy to do anything.

**16. Changes in Sleeping Pattern**

0  I have not experienced any change in my sleeping pattern.
1a  I sleep somewhat more than usual.
1b  I sleep somewhat less than usual.
2a  I sleep a lot more than usual.
2b  I sleep a lot less than usual.
3a  I sleep most of the day.
3b  I wake up 1-2 hours early and can't get back to sleep.

**17. Irritability**

0  I am no more irritable than usual.
1  I am more irritable than usual.
2  I am much more irritable than usual.
3  I am irritable all the time.

**18. Changes in Appetite**

0  I have not experienced an change in my appetite.
1a  My appetite is somewhat less than usual.
1b  My appetite is somewhat greater than usual.
2a  My appetite is much less than before.
2b  My appetite is much greater than usual.
3a  I have no appetite at all.
3b  I crave food all the time.

**19. Concentration Difficulty**

0  I can concentrate as well as ever.
1  I can't concentrate as well as usual.
2  It's hard to keep my mind on anything for very long.
3  I find I can't concentrate on anything.

**20. Tiredness or Fatigue**

0  I am no more tired or fatigued than usual.
1  I get more tired or fatigued more easily than usual.
2  I am too tired or fatigued to do a lot of the things I used to do.
3  I am too tired or fatigued to do most of the things I used to do.

**21. Loss of Interest in Sex**

0  I have not noticed any recent change in my interest in sex.
1  I am less interested in sex than I used to be.
2  I am much less interested in sex now.
3  I have lost interest in sex completely.

Appendix J: Social Phobia Inventory (Studies 1-3)

Please indicate how much the following problems have bothered you during the past week. Mark only one box for each problem, and be sure to answer all items

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Not at all | A little bit | Somewhat | Very much | Extremely |

1. I am afraid of people in authority.
2. I am bothered by blushing in front of people.
3. Parties and social events scare me.
4. I avoid talking to people I don't know.
5. Being criticized scares me a lot.
6. Fear of embarrassment causes me to avoid doing things or speaking to people.
7. Sweating in front of people causes me distress.
8. I avoid going to parties.
9. I avoid activities in which I am the centre of attention.
10. Talking to strangers scares me.
11. I avoid having to give speeches.
12. I would do anything to avoid being criticized.
13. Heart palpitations bother me when I am around people.
14. I am afraid of doing things when people might be watching.
15. Being embarrassed or looking stupid is among my worst fears.
16. I avoid speaking to anyone in authority.
17. Trembling or shaking in front of others is distressing to me.

Appendix K: Positive Mood Induction (Study 1)

Please answer the questions below. There are no right or wrong answers.

1.  Think about a time in your life when you felt a positive emotion, such as joy or happiness. Please briefly describe the event in the space provided below.
2.  Think about one of your happiest/best memories. Please briefly describe the memory in the space provided below.

Appendix L: The Modified Experiences Questionnaire (Studies 2-3)

We are interested in what you just experienced. Below is a list of things that people sometimes experience. Next to each item are five choices: "not at all", "a little", "moderately", "quite a bit", and "very much". Please darken one of these to indicate how much you experienced something similar to what is being described.

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

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all | A little | Moderately | Quite a bit | Very much |

1. I was better able to accept myself as I am.
2. I observed unpleasant feelings without being drawn into them.
3. I noticed that I didn't take difficulties so personally.
4. I treated myself kindly.
5. I separated myself from my thoughts and feelings.
6. I had the sense that I was fully aware of what was going on around me and inside me.
7. I slowed my thinking.
8. I could actually see that I was not my thoughts.
9. I was consciously aware of a sense that my body was whole.
10. I could take time to respond to difficulties.
11. I viewed things from a wider perspective.

Appendix M: The Modified Cognitive Fusion Questionnaire (Studies 2-3)

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

| Never true | Very Seldom true | Seldom true | Sometimes true | Frequently true | Almost always true | Always true |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

1. My thoughts caused me distress or emotional pain.
2. I got so caught up in my thoughts that I was unable to do the things that I most wanted to do.
3. I over-analyzed the situation to the point where it was unhelpful to me.
4. I struggled with my thoughts.
5. I got upset with myself for having certain thoughts.
6. I tended to get very entangled in my thoughts.
7. It was such a struggle to let go of upsetting thoughts even when I knew that letting go would be helpful.

Appendix N: The Toronto Mindfulness Scale (Studies 2-3)

We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement. Next to each statement are five choices: "not at all," "a little," "moderately," "quite a bit," and "very much." Please indicate the extent to which you agree with each statement. In other words, how well does the statement describe what you just experienced, just now?

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Not at all | A little | Moderately | Quite a bit | Very much |

1. I experienced myself as separate from my changing thoughts and feelings.
2. I was more concerned with being open to my experiences than controlling or changing them.
3. I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.
4. I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.
5. I was curious to see what my mind was up to from moment to moment.
6. I was curious about each of the thoughts and feelings that I was having.
7. I was receptive to observing unpleasant thoughts and feelings without interfering with them.
8. I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.
9. I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.
10. I remained curious about the nature of each experience as it arose.
11. I was aware of my thoughts and feelings without overidentifying with them.
12. I was curious about my reactions to things.
13. I was curious about what I might learn about myself by just taking notice of what my attention gets drawn

Appendix O: Situation Prompts (Study 2)

Please think of a specific situation that may have evoked negative feelings such as sadness, anger or anxiety. Bring it to mind now, getting a clear picture of where you are, who you are with, and what you are doing.

Please briefly describe the situation in the space provided below.

Be sure to describe:

1. Where you were?
2. Who you might have been with?
3. What happened?
4. What are some of the emotions you may have been feeling?
5. What are some physical reactions you may have had to the situation?
6. What are some of the thoughts you may have had?

Appendix P: Cognitive Restructuring Exercise (Study 2)

You'll have 10 minutes to work on something called a thought record. A thought record asks you to focus on a particular situation and your thoughts and feelings surrounding it. There are two pages – one has instructions on how to fill out the thought record, and the other is the actual thought record, with columns for you to fill out your answers. Your job is to fill out columns 1-7, using the instructions on the instruction page and the additional prompts and suggestions at the bottom of each column to help you. You don't need to write full sentences – point form is fine.

How to use the Thought Record

Column 1- Situation: For this thought record, you will focus on the situation you brought to mind earlier.

Column 2 - Moods: Describe how you feel (e.g. sadness, panic, anxiety, sad) and rate each mood's intensity from 1-100%.

Column 3 - Automatic Thoughts: Write down what is going through your mind, including images, related to how you are feeling about the situation. Use the questions on the form to help you. Once you have a list of your thoughts, circle the "hot thought", i.e., the thought that caused your negative emotions to soar the highest.

Column 4 - Evidence 'For': Starting with the "hot thought" you circled in Column 3, look for factual evidence that supports this conclusion. Try to avoid interpretation of facts.

Column 5 - Evidence 'Against': Now look for evidence which does not support your hot thought. If you are having a hard time finding this evidence, try asking: "If my best friend or someone who loves me knew I was having this thought, what would they say to me?".

Column 6 - Alternative Thoughts: Now look at the evidence, for and against. If the evidence does not support your hot thought(s), ask "Is there an alternative way to thinking about or understanding this situation?" Write an alternative view of the situation.
* If your hot thought is partially true, combine the evidence, for and against, into a balanced thought.
** If your hot thought is true, ask yourself: What was the worst outcome? What was the best outcome? What was the most realistic outcome?

Column 7 - Rate New Moods: Finally, rerate the intensity of each feeling and compare to the intensity in Column 2. You might notice that the mood's intensity has decreased.

| 1. Situation | 2. Moods | 3. Automatic Thoughts (Images) | 4. Evidence That Supports the Hot Thought | 5. Evidence That Does Not Support the Hot Thought | 6. Alternative/ Balanced Thoughts | 7. Rate Moods Now |
|---|---|---|---|---|---|---|
| Who were you with? What were you doing? When was it? Where were you? | Describe each mood in one word. Rate intensity of mood (0-100%) | **Answer some of the following questions:** What was going through my mind just before I started to feel this way? What does this say about me? My life? Future? What am I afraid might happen? What is the worst thing that could happen if this is true? What does this mean about how the person feels/thinks about me? What does this mean about the other person or people in general? What images or memories do I have in this situation? | Circle hot thought in previous column for which you are looking for evidence. Write factual evidence to support this conclusion. (Try to avoid mind-reading and interpretation of facts) | Ask yourself questions to help discover evidence which does not support your hot thought. | Ask yourself questions to generate alternative or balanced thoughts. Write an alternative or balanced thought. | Copy the feelings from column 2 Rerate the intensity of each feeling from 0-100% as well as any new feelings |

Appendix Q: Defusion Writing Exercise (Studies 2-3)

When we are very anxious, sad or angry, instead of recognizing or identifying our thoughts for what they are (just thoughts), we sometimes experience them in the same way that we would real-life events.

Defusion refers to being able to distance, disconnect or see our thoughts and feelings for what they actually are (i.e., streams of words or passing sensations). It involves letting those thoughts and feelings come and go without getting caught up in them.

Using the previously wrote about situation and more specifically the thoughts you had surrounding this situation, please work your way through each of the following defusion exercises. You will have ten minutes to work through these exercises.

1. **Label your thoughts as thoughts** (e.g., "I had the thought that I'll be too nervous to speak") or label the type of thought (e.g., "I had the judgment that my voice sounds weird" or "I had the prediction that the salesperson will be annoyed if I return it", etc.).

   Please record what you noticed about your experience with the previous exercise?

2. **Thank it**- Thank your mind when you notice it butting in with worries and judgments (e.g., "Thank you mind. You're doing a great job of catastrophizing today"). This is *not sarcasm*…after all, the mind is doing exactly what it was designed to do all of those thousands of years ago- "problem solve" and avoid danger.

   Name it- Name or label your mind, for example, as "worrying mind", "critical mind", "Doubting Thomas", "Mind Reading Mary", etc. (e.g., "It looks like worrying mind just showed up").

   Externalize it- Treat "the mind" as an external event, almost as a separate person (e.g., "Well, there goes my mind again").

   Please record what you noticed about your experience with the previous exercises?

3. **Use a variety of vocalizations**
   Say the thought very slowly, say it in a different voice, sing it, etc.
   Write the thought or thoughts that you are going to use.

   Say the thought out loud quickly and repeat it until it loses its meaning (e.g., I'm boring, I'm boring, I'm boring, I'm boring, I'm boring, I'm boring, I'm boring,………………..).
   Write the thought or thoughts that you are going to repeat.

   Please record what you noticed about your experience with the previous exercises?

Appendix R: Mindfulness Audio Exercise (Studies 2-3)

Now settling yourself into a comfortable sitting position. Allowing your eyes to close or taking a soft, receptive gaze a few feet in front of you.

Bringing your awareness to the level of physical sensation by focusing your attention on the sensations of touch and pressure where your body makes contact with the chair or the floor. Spend a moment or two focusing on these sensations (15 second pause).

Now bringing awareness to the changing pattern of physical sensations in the lower abdomen as the breath moves in and out of your body.

Noticing the sensations of slight stretching as the abdominal wall rises with each inbreath, and of gentle deflation as it falls with each outbreath. As best you can, following with your awareness the changing physical sensations in the lower abdomen all the way through as the breath enters your body on the inbreath and all the way through as the breath leaves your body on the outbreath (15 second pause).

Sooner or later, your mind will wander away from the focus on the breath in the lower abdomen, this is ok. It is simply what minds do. It is not a mistake or failure. When you notice your awareness is no longer on the breath, gently acknowledge where it has gone, and gently escort your awareness back to the changing pattern of physical sensations in the lower abdomen. (15 second pause).

Now allowing your awareness to expand around the breath to include, as well, a sense of physical sensations throughout the whole body. The mind may wander repeatedly, this is expected, natural. Whenever you notice this, congratulate yourself for noticing, gently note where the mind has gone, whether it be the negative situation you brought to mind earlier or another situation, and refocus your attention to your breathing and the sense of the body as a whole (15 second pause).

As you sit, some physical sensations may be particularly intense, and you may find that awareness is repeatedly drawn to these sensations, and away from the breath and body as a whole. As best you can, explore with gentle and wise attention the detailed pattern of sensations there. What do the sensations feel like? Where exactly are they? Do they vary over time? Not so much thinking about it, but feeling it. (15 second pause).

Now leaving behind the sensations in the body and bringing your awareness to hearing. Bringing your attention to the ears and then allowing the awareness to open and expand, so that there is a receptiveness to sounds as they arise, wherever they arise.

There is no need to go searching for sounds or listening for particular sounds. Instead, as best you can, simply open your mind so that it is receptive to awareness of sounds from all directions as they arise – sounds that are close, sounds that are far away, inside the room, outside the room, outside the building, behind, to the side, in front (15 second pause).

And if your mind wanders, noticing where it has gone and returning your focus of attention to sound (15 second pause).

Whenever you are ready, letting go of the awareness of sound and bringing to mind the situation you described earlier. Where you were, who you were with, what you were doing and the emotions you might have been feeling (15 second pause). Just as with sound, you focused your awareness on whatever sounds arose, noticing them arise, develop and pass away, now, as best you can, focusing on the negative situation you brought to mind earlier – noticing the types of thoughts that arise, focusing awareness on them as they pass through the space of the mind and eventually disappear. There is no need to make thoughts come or go. Just let them arise naturally, in the same way you related to sounds arising and passing away (30 second pause).

It may be helpful to picture your thoughts as written on leaves that are passing down a stream. Imagine you are sitting next to a slow-moving stream where water flows over rocks and leaves that have fallen from trees float down the stream. As a thought comes to mind, imagine the thought written on a leaf. Don't try to make the stream go faster or slower, and don't try to change what shows up on the leaves. Just let the thought appear on the leaf and naturally float down the stream. And, as you are doing this, if your mind wanders or if the stream stops flowing, notice this happened and return to the stream, watching a thought come to mind, appear on a leaf, and float down the stream. (15 second pause)

Whenever you notice that your mind is wandering, gently acknowledge where the mind has gone and as best you can, bringing your awareness back to your thoughts (15 second pause).

It may help to imagine that you are sitting in a movie theater in front of a large blank screen. As thoughts, memories, and mental images appear in your mind, see them projected onto the screen, watching each thought for as long as it remains on the screen.

Thoughts may move slowly or quickly across the screen, some dominating the screen more than others. At times, the screen may go blank; at other times it may be completely filled with thoughts. Whatever is on the screen, remaining curious about the process of thinking itself, noticing your ability to be an impartial observer (30 second pause).

At times you may lose touch with your awareness of thinking, getting caught up in one of the stories unfolding on the screen. When that happens, simply return to the feeling of the breath, not as a way to get away from thoughts or make the mind blank, but as a way to anchor yourself in the present moment, as a way to escort your mind back to its seat, returning to watching your thoughts coming and going. (30 second pause).

And when you are ready, gently coming back to the breath, taking in the sounds in the room, and, allowing your eyes to open.

Appendix S: Metacognitive Awareness Questionnaire (Study 3)

Please answer the following questions based on what you have recently experienced.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Totally disagree | Disagree | Somewhat disagree | Neither disagree nor agree | Somewhat agree | Agree | Totally agree |

1. If something has upset me, I try to put my judgments on hold for a while.
2. When I get low, my feelings show things in their true light.
3. When I get low, I remind myself that I may be seeing things as more negative than they really are.
4. I trust my own way of seeing things when I feel depressed.
5. If I am feeling low, I know my thoughts and feelings are not necessarily realistic.
6. When I am down, I can see things as they really are.
7. When I am depressed, I am aware that there could be other ways of viewing the situation.
8. When I am depressed, I am sure that things really are as bad as they seem.
9. I can't trust my judgments about myself when I feel down.

Appendix T: Social Interaction Anxiety Scale (Study 3)

For each item, please indicate the degree to which you feel the statement is characteristic or true for you.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not at all<br>true of me | Slightly<br>true of me | Moderately<br>true of me | Very<br>true of me | Extremely<br>true of me |

1. I get nervous if I have to speak with someone in authority (teacher, boss).
2. I have difficulty making eye contact with others.
3. I become tense if I have to talk about myself or my feelings.
4. I find difficulty mixing comfortably with the people I work with.
5. I find it easy to make friends my own age.
6. I tense up if I meet an acquaintance on the street.
7. When mixing socially, I am uncomfortable.
8. I feel tense if I am alone with just one person.
9. I am at ease meeting people at parties, etc.
10. I have difficulty talking with other people.
11. I find it easy to think of things to talk about.
12. I worry about expressing myself in case I appear awkward.
13. I find it difficult to disagree with another's point of view.
14. I have difficulty talking to people I'm attracted to.
15. I find myself worrying that I won't know what to say in social situations.
16. I am nervous mixing with people I don't know well.
17. I feel I'll say something embarrassing when talking.
18. When mixing in a group, I find myself worrying I will be ignored.
19. I am tense mixing in a group.
20. I am unsure whether to greet someone I know only slightly.

Appendix U: Subjective Units of Distress Scale (Study 3)

Before Speech:

Please indicate your highest level of distress **while anticipating your speech** from 0-100

Guideline for anxiety rating:

0 |-------------------- 25 ---------------------- 50 -------------------- 75 ----------------------| 100
No distress      Mild distress        Moderate distress      Significant distress      Highest Possible
                                                                                         distress

Please record your level of distress at this moment, while anticipating your speech.
This number can be anywhere from 0 – 100.

After Speech:

Please indicate your highest level of distress **during your speech** from 0-100

Guideline for anxiety rating:

**0 |-------------------- 25 ---------------------- 50 -------------------- 75 ----------------------| 100**
No distress      Mild distress        Moderate distress      Significant distress      Highest Possible
                                                                                         distress

Please record your level of distress at this moment, during your speech.
This number can be anywhere from 0 – 100.

Appendix V: Ruminative Responses Questionnaire (Study 3)

For each of the statements located on the next two pages, please indicate your level of agreement or disagreement by circling one of the scale categories to the right of each statement. Use the scale as shown below:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly disagree | Disagree | Neutral | Agree | Strongly agree |

1. My attention is often focused on aspects of myself I wish I'd stop thinking about
2. I always seem to be "re-hashing" in my mind recent things I've said or done.
3. Sometimes it is hard for me to shut off thoughts about myself.
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened.
5. I tend to "ruminate" or dwell over things that happen to me for a really long time afterward
6. I don't waste time re-thinking things that are over and done with
7. Often, I'm playing back over in my mind how I acted in a past situation.
8. I often find myself re-evaluating something I've done.
9. I never ruminate or dwell on myself for very long.
10. It is easy for me to put unwanted thoughts out of my mind.
11. I often reflect on episodes in my life that I should no longer concern myself with.
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments.

Appendix W: Positive and Negative Affect Schedule (Study 3)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate to what extent you feel this way right now, that is, at the present moment.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Very Slightly | A little | Moderately or not at all | Quite a Bit | Extremely |

| | |
|---|---|
| 1. Interested | 2. Distressed |
| 3. Excited | 4. Upset |
| 5. Strong | 6. Guilty |
| 7. Scared | 8. Hostile |
| 9. Enthusiastic | 10. Proud |
| 11. Irritable | 12. Alert |
| 13. Ashamed | 14. Inspired |
| 15. Nervous | 16. Determined |
| 17. Attentive | 18. Jittery |
| 19. Active | 20. Afraid |

Appendix X: Post-Event Processing Questionnaire (Study 3)

Please rate each statement with regard to the speech you gave earlier today.
Please rate each item by placing a mark along the scale (0-100) to indicate your response.

1. After the event was over, did you think about it a lot?
2. Did your memories and thoughts about the event keep coming into your head even when you did not wish to think about it again?
3. Did the thoughts about the event interfere with your concentration?
4. Did you find it difficult to forget about the event?
5. Did you try to resist thinking about the event?
6. If you repeatedly thought about the event, did your feelings about the event worsen?
7. Have you ever wondered about whether you could have avoided or prevented your behaviour/feelings during the event?
8. Have you ever wished that you could turn the clock back and do it again but better this time?
9. As a result of the event, are you now avoiding similar situations?
10. Did this event reinforce your pre-existing avoidance of similar situations?
11. Did you experience a sense of shame while remembering your behaviour during the situation?
12. Did you think about anxious feelings that you had experienced during the event?
13. When remembering the situation did other instances of past failure that you had experienced in the same way come into your mind?
14. Did you criticize yourself for your behaviour in the situation?
15. Did you think about the event more than you wanted to?
16. Did you think about bodily sensations you had experienced in the situation?
17. In my memories about the event, I saw myself (my behaviour, my attributes) in a positive way.
18. In my memories about the event, I saw myself (my behaviour, my attributes) in a negative way.

Appendix Y: Thoughts Questionnaire (Study 3)

Please rate each statement with respect to the thoughts you had since giving your speech yesterday.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Never | Not often | Sometimes | Often | Very often |

Since my speech, I thought:

1. My speech was good.
2. I could have done much better.
3. How anxious I felt.
4. I should have chosen a different topic.
5. The investigator liked me.
6. If my blushing/sweating/dry mouth/ shaking was obvious.
7. How well I handled it.
8. How bad my speech was.
9. I made a fool of myself.
10. How much I enjoy these situations.
11. How I always do badly in this type of situation.
12. I must have looked stupid.
13. How smoothly it all went.
14. How self-conscious I felt.
15. What a failure I was.
16. That I chose an interesting topic.
17. How many mistakes I made.
18. How confident I felt.
19. I came across as self-assured.
20. How awkward I felt.
21. That I was at my best.
22. How fast my heart was pounding.
23. I didn't make a good impression.
24. Other aspects of the situation.
25. The situation overall.

Appendix Z: Relaxation Audio Exercise (Study 3)

While sitting down in your chair, place your feet flat on the floor. Sit up straight. Relax your shoulders, relax your neck, and place your hands in your lap or on your knees. If you feel comfortable with it, gently close your eyes. Otherwise, just look toward the floor.

For the next several minutes, I would like you to try and relax your body. Start by taking a few deep breaths to relax. As you do so, your body may physically begin to feel more relaxed. Continue to take a few more deep breaths, and let go of any tension you may feel. Just allow yourself to relax.

Draw your attention to the muscles in your right hand and relax them. Release any tension in your hand. You may begin to feel more heavy. Now, relax your left hand. Just let the muscles go. Relax your entire right arm in a similar way. Allow your muscles to feel more and more relaxed. Shift your attention to your left arm and relax it as well. Continue to release any tension in your hands and arms feel.

Relax the muscles in your face and neck. Slowly notice how your body is feeling more and more heavy with relaxation. Continue to allow all the muscles in your face and neck to relax. Your upper body may feel more relaxed now than it did when you first started to relax your muscles.

Draw you attention to your chest and shoulders. Allow your chest and shoulders to relax. Recognize how your body may feel warm and heavy as you continue to relax more deeply. Just let the muscles go. Relax the muscles in on your abdomen and back. Again, just allow all of these muscles to relax. Continue to relax. You may feel less tense and more relaxed.

Attend to the muscles in your upper leg and tell these muscles to relax as well. Notice the relaxation you are experiencing. Continue to relax by relaxing your calves. Your body may be becoming more heavy and relaxed. Let your body relax and release any tension. You may feel more relaxed not than you did initially. Shift your attention to your feet. Again, allow all the muscles around your feet to relax.

While continuing to relax your body, take a few more deep breaths. Your hands, arms, face, and neck may feel more relaxed. Also your chest, shoulders, abdomen and back may be less tense. Finally, the muscles in your legs and feet may also be more relaxed. Take one more deep breath in and out and slowly open your eyes.

Appendix AA: Active Control Audio Exercise (Study 3)

We are going to do an exercise now that involves letting your mind flow. Simply think about whatever comes to mind. Let your mind wander freely.

Appendix BB: Control Writing Exercise (Study 3)

Using the speech you previously gave, please work your way through each of the following questions.

1. What was your speech topic?
2. Why is your speech topic important?
3. Have you given a speech on this topic before? If yes, please describe.
4. What was your overall main point?
5. List the main arguments of your speech.
6. What were your supporting arguments?
7. What was your overall concluding statement?

Appendix CC: Speech Topics (Study 3)

1. What are your thoughts on cell phone use in the classroom?
2. What are your thoughts about distracted driving?