Enhancing Mindfulness

in a Written Emotional Expression Exercise

A Thesis

Submitted to the Faculty

of

Drexel University

by

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in partial fulfillment of the

requirements for the degree

of

Master of Science in Psychology

May 2010

Acknowledgments

I would like to thank the members of my committee, Jacqueline Kloss, Ph.D., Lamia Barakat, Ph.D., and LeeAnn Cardaciotto, Ph.D. for your support throughout this project. Dr. Kloss, without your persistence in creating a project that was in line with my interests, your support, mentorship and enthusiasm, this project would not have been possible. Dr. Barakat, your guidance, encouragement and thoughtful advice have been invaluable resources. Dr. Cardaciotto, I am especially grateful for your expertise in mindfulness that has really helped refine my research questions and interpretations. I would like to thank those who have made this research possible: the students who took the time to participate and the Health Psychology research team for providing feedback. Lastly, I would like to thank my family and friends, for their love and support throughout this process.

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Abstract

Enhancing Mindfulness in Written Emotional Expression

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Written emotional expression has garnered significant evidence as a therapeutic tool for the processing of traumatic life events (Frattaroli, 2006; Pennebaker, 1997). However, its underlying mechanisms are still not fully understood or clearly defined. In this study, we predicted that written emotional expression exercises could serve as a mindfulness process. The goals of this study were (a) to test whether the writing process enhances mindfulness levels and (b) whether we can enhance mindfulness levels by building on a traditional writing instruction. To pilot this exercise, we modified the instructions of the traditional writing exercise to instruct individuals how to exercise mindfulness in their writing. Participants (N = 40) were randofmly assigned to either the traditional-writing group (TG) based on the Pennebaker instructions (Pennebaker, Kiecolt-Glaser, & Glaser, 1988) or to the mindfulness-enhanced group (MG), which incorporated mindfulness-based instructions (Levitt et al., 2004; Hayes & Smith, 2005) for writing about students' most stressful life experience. The Toronto Mindfulness Scale (TMS) was used to measure reports of curiosity and decentering before and after the writing exercise. Results revealed that *decentering* increased after participants engaged in the traditional writing exercise but not the mindfulness-enhanced exercise. Contrary to our prediction, curiosity reports did not change significantly overtime, and the mindfulness-enhanced writing did not differentially enhance individuals' mindfulness levels compared to the traditional writing exercise. These findings provide preliminary evidence that decentering may serve as an underlying mechanism in expressive writing. Future studies should replicate these findings and assess mindfulness changes in expressive writing over the course of several days.

I. Introduction

Written Emotional Expression

Written emotional expression serves a central role in the study and practice of therapeutic change for both mental and physical health. A growing body of literature suggests that emotional expression has beneficial health effects (Esterling, Antoni, Kumar & Schneiderman, 1990; Fawzy et. al., 1993). By disclosing emotional, traumatic, or stressful experiences, individuals may free their mind of unwanted thoughts, help to make sense of upsetting events, better regulate their emotions, habituate to negative emotions, and improve their connections with their social world, all of which can lead to beneficial effects on health and well-being (Smyth, 1998).

The first experimental manipulation to test its efficacy was conducted by the father of written emotional expression, James Pennebaker. In 1986, James Pennebaker and Sandra Beall randomly assigned participants to write either about traumatic events or about neutral topics for several consecutive days, and found that, several weeks after writing, the trauma group experienced a reduction in illness-related doctor's visits. This finding that disclosing one's thoughts and feelings concerning a traumatic event can lead to objectively measured health improvements was both theoretically and clinically intriguing. Such findings launched a wide range of experiments on the parameters, facets, mechanisms, outcomes, and applications of written emotional expression (Frattaroli, 2006).

Review of Past Research

Early research on experimental written emotional expression was conducted primarily with healthy college students and asked them either to disclose their most

stressful or traumatic experiences or to discuss their (presumably stressful) experience of having recently started a new life at college. Some of the striking benefits of disclosure among the college population included improvements in immune functioning (Pennebaker, Kiecolt-Glaser, & Glaser, 1988), a reduction in health center visits (Pennebaker, Colder, & Sharp, 1990), improved grade point average (Pennebaker & Francis, 1996), and decreased self-reported upper respiratory problems (Greenberg, Wortman, & Stone, 1996).

Field studies revealed that experimental disclosure could also help adults. Interesting benefits of disclosure found in community samples included helping unemployed engineers find jobs faster (Spera, Buhrfeind, & Pennebaker, 1994), helping female caregivers reduce posttraumatic stress symptoms (Campbell, 2003), reduced absenteeism rates from work in a community sample (Francis & Pennebaker, 1992), helping incarcerated men take fewer trips to the infirmary (Richards, Beal, Seagal, & Pennebaker, 2000), and helping a clinical sample reduce the overall severity of avoidance of traumatic symptoms in psychosis-related posttraumatic stress disorder symptoms (Bernard, Jackson, & Jones, 2006).

This paradigm was extended to include testing on people with medical ailments. Kelley, Lumley, and Leisen (1997) examined the effects of experimental disclosure on arthritis-related problems in rheumatoid arthritis patients and found that patients in the writing group reported less physical and affective dysfunction in the weeks following writing. Smyth and colleagues (1999) later confirmed that experimental disclosure was helpful for both rheumatoid arthritis and asthma patients. Other findings include a reduction in cancer-related doctor visits in breast-cancer patients (Stanton,

Danoff-Burg, Sworowski, Collins, Branstetter, Rodriguez-Hanley, et al., 2002), a reduction in distress for migraine headache (McKenna, 1997), a reduction in depressive symptoms for community members with Type I diabetes who disclosed thoughts and feelings about their illness (Bodor, 2002), and in a sample of participants with a small punch biopsy wound, the disclosure exercise impacted wound healing (Weinman, Ebrecht, Walburn, and DysOn, 2008).

Studies testing the efficacy of the written emotional expression with participants with psychiatric and psychological problems yielded mixed results. Russ (1992) found that disclosure improved psychological and physical health for college students with a history of anxiety. In a recent study with clients of outpatient psychotherapy, emotional disclosure writing homework, in conjunction with outpatient psychotherapy facilitated therapeutic process and outcome (Graf, Gaudiano, & Geller, 2008). These results offer evidence and promise for the salutary effects of emotional expression across populations and conditions. In contrast, others found that disclosure may actually be harmful for certain clinical samples, such as men receiving treatment for posttraumatic stress disorder (Gidron, Duncan, Lazar, Biderman, Tandeter, & Shvartzman, 2002). Two case studies in which written disclosure was used as an intervention for trauma-related psychotherapy, the writing disclosure procedure resulted in significant symptom improvement for one individual but not for the other (Sloan & Marx, 2006). A few studies have found null effects for disclosure (e.g., Kloss & Lisman, 2002), including participants with negative body image (Earnhardt, Martz, Ballard, & Curtin, 2002), and those with suicidal tendencies (Kovac & Range, 2002). These conflicting results suggest that moderating variables, population discrepancies and conditions may affect the therapeutic effects of

written emotional expression. Also, the exact mechanism(s) of the underlying processes that yield change and betterment have not been fully identified. Little attention has been paid to understanding the underlying mechanism of the effects elicited through the written exposure exercise. Several theories have been proposed to explain why written emotional expression is successful. Potential mechanisms and major theories proposed to underlie the emotional expression paradigm are outlined below.

Proposed Mechanisms

Inhibition theory. Early explanations of the benefits of experimental disclosure extrapolate from Freud's description of the benefits of catharsis, suggesting that the inhibition of thoughts and feelings regarding an upsetting event is harmful and that, consequently, expression of those inhibited thoughts and feelings can reduce stress and improve a host of physical and psychological health outcomes (see Frattaroli, 2006 for review). Similarly, Pennebaker (1989) speculated that the inhibition of emotion resulted in increased stress on the body's immune system, which in turn, results in health problems. He further suggested that writing about the once-inhibited feelings leads to a reduction in stress and, consequently, improved health. Collectively, studies examining the written disclosure paradigm have shown that writing leads to improvement in immune functioning, mainly the growth of T-helper cells, antibody responses to Epstein-Barr virus and hepatitis B vaccinations (Esterling, Antoni, Fletcher, Margulies, & Schniederman, 1994; Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995). However, some findings for the emotional inhibition theory have been more equivocal. For example, Sloan and colleagues (2004)

reviewed the literature and asserted that the emotional inhibition theory has not received much support as an underlying mechanism of the written disclosure paradigm.

Exposure theory. Written disclosure was also hypothesized to serve as a context for exposure to aversive conditioned stimuli. Foa and Kozak (1986) have argued that for exposure-based treatments to be successful, individuals should initially experience intense negative affect when confronted with a highly aversive stimulus followed by gradual decreases in affect within and across stimulus presentations. This was later posited by Bootzin (1997), who explained that when a person repeatedly confronts, describes, and, in essence, relives the thoughts and feelings about his or her negative experience, this repetition and exposure should eventually lead to extinction of those thoughts and feelings, leading to beneficial outcome. However, in their investigation of exposure-based therapy, Kloss and Lisman (2002) found only limited support for the hypothesis that exposure best explains the effects of written self-disclosure. Hence, the review conducted by Sloan and colleagues (2004) concluded that it is important to collect data on emotional reactions to the writing sessions in order to evaluate whether negative emotional responses are being elicited adequately and to further examine the exposure hypothesis.

Self-regulation theory. Another proposition is that experimental disclosure can be thought of as a mastery experience. Lepore and colleagues (2002) proposed that it allows people to observe themselves expressing and controlling their emotions. This may give people a new or stronger sense of self-efficacy for emotional regulation. They may feel that their traumas, stressors, or challenges are more controllable, which should serve to reduce negative affect and lead to other well-being improvements (Lepore, Greenberg,

Bruno, & Smyth, 2002). Similarly, King (2002) hypothesized that any task that serves to elicit the process of self-regulation should be helpful for the writer. She explained that traumatic experiences can be seen as disrupting the normal self-regulation process, and through writing, the well-regulated individual experiences emotions that clearly inform him or her regarding the status of his or her goals. Cameron and Nichols (1998) found that among optimists, both the self-regulation task and the disclosure task reduced illness-related clinic visits during the following month; among pessimists, only the self-regulation task reduced clinic visits. In general, the self-regulation task beneficially affected mood state and college adjustment whereas the disclosure task increased grade point averages. Overall, experimental disclosure tasks allow the participant to make sense of the event, explore sources of emotion, clarify goals, and restore the self-regulation feedback system.

Cognitive-processing theory. Cognitive processing of a traumatic experience requires changing existing schemas by reestablishing a conceptual system in which the experience is assimilated into the old set of assumptions (Janoff-Bulman, 1992). Cognitive processing of a traumatic experience allows an individual to provide structure, organization and cohesion to the traumatic memory (Pennebaker, 1997). In the writing literature, this theory has typically been tested by examining the relative percentages of words used in the written essays that fall into various categories; insight-related, causation-related, negative-emotion, and positive-emotion words. Pennebaker and colleagues have found that increases in the use of causal and insight-related words across the writing sessions are related to improved physical health at follow-up (e.g., Pennebaker & Francis, 1996). Also, writing about a trauma produces a decrease in

intrusive thoughts and this decrease is related to increases in working memory (Klein & Boals, 2001). Sloan and Marx (2004) did not find consistent support for a cognitive model of the written disclosure paradigm and identified a number of factors that may account for the inconsistent findings. These include the difficulty of measuring cognitive changes, and the possibility that cognitive changes may be an outcome of successful exposure by which any changes in cognitive processes may also be explained by an exposure model (Foa & Kozak, 1986).

Theorists have speculated that the effects of disclosure are best explained by processes that involve both emotional expression and cognitive processing. According to these formulations, emotional and cognitive involvement may play complementary roles in moderating and mediating processes associated with adjustment to traumatic or stressful events. For example, following a stressful event, negative emotions may serve to alert an individual to ways in which the traumatic event has challenged the meaning of his or her subjective world, whereas cognitive work is necessary to restore meaning. Emotional distress may provide motivation for the deliberate, effortful cognitive work required for positive growth following trauma (Calhoun & Tedeschi, 1998).

Some of the effects of written disclosure can be explained by both emotional and cognitive processing aspects of written disclosure. Pennbaker and Beall (1986) found that individuals who focused on both facts and emotions demonstrated the greatest improvements in health. They later suggested that emotional expression facilitates cognitive processing of the traumatic memory which leads to affective and physiological change (Pennebaker, 1993). More specifically, “the process of written emotional expression leads to the transduction of the traumatic experience into a linguistic structure

that promotes assimilation and understanding of the event, and reduces negative affect associated with thoughts of the event" (Pennebaker, Mayne, & Francis, 1997, pp. 864). The extent of cognitive and emotional involvement during verbal disclosure has been shown to be related to greater resolution of a stressful traumatic event (Lutgendorf & Antoni, 1999). However, it is plausible that a number of mechanisms may underlie the writing paradigm. For some people, one type of writing process may be active or pertinent, whereas a different mechanism may be operative for others.

Mindfulness theory. In this study, we propose a mindfulness-based approach derived from the cognitive and emotion regulation theories. We hypothesize that a mindfulness-enhanced writing instruction may enable a combination of cognitive and self-regulative processes in the processing of individual experiences. This includes, making sense of the event, exploring sources of emotions, thoughts and sensations, clarifying goals *and* observing these experiences without judgment. The theory behind the mindfulness literature suggests that mindfulness appears to be related to intentional states of introspection and self reflectiveness motivated by curiosity rather than involuntary states of rumination or self-consciousness (Lau et al., 2006). This may be helpful in bolstering mindfulness skills in a writing exercise through instructing individuals to practice an intentional and curious introspection of their experiences, with an openness to evaluating these experiences without judgment.

Mindfulness

Mindfulness is defined as "paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). It is when internal thoughts are brought into the present moment and

acknowledged with acceptance as opposed to being judged (Baer, 2003; Hayes, Follette, & Lineham, 2003). The writing may serve as a mindfulness process by evoking a state of present-moment attention to the writing and allowing opportunity for observation and processing. It may also foster individuals' curiosity and desire to learn more about their experiences without judgment. Other descriptions refer to observing thoughts, emotions, and sensations as they come and go while maintaining an attitude of curiosity and acceptance (Baer & Krieteneyer, 2006).

Mindfulness assessment. Over the past several years, efforts to operationalize the mindfulness construct have resulted in the development of several reliable and valid self-report measures. Mindfulness has been defined as the general tendency to be attentive and aware of the present-moment experience in daily life (MAAS; Brown & Ryan, 2003). Others assess nonjudgmental present-moment observation and openness to negative experience (FMI; Buchheld, Grossman, & Walach, 2001). The Kentucky Inventory of Mindfulness Skills measures four elements of mindfulness: observation, describing, acting without awareness, and accepting without judgment (KIMS; Baer, Smith, & Allen, 2004). Measures also assess attention, awareness, present-focus, and acceptance with respect to thoughts and feelings in general daily experience (CAMS; Feldman, Hayes, Kumar, & Greeson, 2004). The overarching definition and assessment of mindfulness includes cognitive awareness to present experiences in an accepting/non-judgmental manner. This definition has been further expanded to incorporate constructs like decentering, curiosity, cognitive awareness, acceptance, cognitive defusion and distancing, discussed below.

Cognitive defusion. Cognitive defusion may first be best understood by the concept introduced by Beck in the traditional CBT known as *cognitive distancing*. Beck recommended the use of cognitive distancing strategies that involve "stepping back" from dysfunctional thoughts and noticing them as beliefs rather than hard facts (Beck 1970). Unlike cognitive restructuring, cognitive defusion techniques are not intended to *change* the way people think about their experience. Rather, they are meant to disrupt the verbal processes that give rise to problematic and dysfunctional thoughts (Blackledge, 2007). Within ACT, defusion techniques involve a variety of actions designed to expose thoughts simply as thoughts rather than binding realities. Mindfulness and cognitive distancing are also used to help individuals experience problematic thoughts in a new context- where the debilitating functions of such thoughts are disrupted even when the form of these thoughts remains the same (Blackledge, 2007). Defusion strategies in ACT are also used to facilitate more effective movement toward individual values by expanding the repertoire to include responses that were previously prevented through rigid cognitive fusion. In a writing paradigm, the writing can provide a medium for cognitive flexibility and exploring new thoughts and ideas that were previously ignored or avoided. This flexibility allows individuals to evaluate experiences in a new context that is more accepting and harmonious with their value system.

Awareness and acceptance. Bishop and colleagues (2004) focused on two components of mindfulness: sustained attention to present experience, and an attitude of openness, curiosity and acceptance. This definition of mindfulness was later expanded by Lau and colleagues (2006) to incorporate the intentional self regulation of attention to facilitate greater awareness of bodily sensation, thoughts and emotions; and a specific

quality of attention characterized by endeavoring to connect with each subject in one's awareness (e.g. bodily sensation, thought and emotion) with curiosity, acceptance and openness to experience. These definitions highlight two key constructs: (a) the behavior that is conducted, i.e. ongoing awareness and (b) how the behavior is conducted, i.e. acceptance.

The awareness component is characterized as a continuous monitoring of current experience or heightened attention (Deikman, 1996; Kosslyn & Rosenberg, 2001). Hence, experiences outside of attention are actively ignored or disregarded. The second component of mindfulness is the way in which present-moment awareness is conducted: nonjudgmentally, with an attitude of acceptance, openness, and even compassion toward one's experience (Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008). This allows for increased contact with distressing stimuli, which has been shown to be associated with various positive benefits. For example, patients with panic disorder instructed to accept anxiety sensations were significantly less anxious and avoidant, and were more willing to participate in the task again (Levitt, Brown, Orsillo, & Barlow, 2004). Similarly, participants in an acceptance condition exposed to an irritant (two 10-min periods of 10% carbon dioxide enriched air) were less avoidant behaviorally and reported less intense fear, cognitive symptoms, and fewer catastrophic thoughts than controls during inhalations (Eifert & Heffner, 2003). It may be interesting to capture the levels of individuals' present-moment awareness and acceptance in a writing paradigm. That is, the ability to bring one's attention to their present thoughts and emotions, and conduct this awareness with acceptance and compassion towards these experiences.

Curiosity and decentering. Lau and colleagues (2006) defined mindfulness based on a two-component model: (a) the self regulation of attention that is focused on experiences in the present moment allowing greater awareness of thoughts, emotions and sensations and (b) relating to experiences with an orientation of curiosity, acceptance and openness (Bishop et al., 2004). This two-component model was measureded using The Toronto Mindfulness Scale which assesses *curiosity* and *decentering*. Curiosity captures an individual's stance of wanting to learn more about one's experiences. Decentering relates to not personally identifying with thoughts and feeling rather than being overly absorbed in one's internal experiences (Lau et al., 2006).

The Toronto Mindfulness Scale was primarily developed to assess changes in mindfulness levels immediately preceding a meditation exercise session. The TMS items reflect the subjective aspects of attentional self-regulation and a quality of attention characterized by curiosity, acceptance, and openness to experiences with all items referring to an immediately preceding meditation session. *Curiosity* refers to the attentional state characterized by intellectual curiosity regarding one's experiences, for example, "I was curious about each of the thoughts and feelings I was having." *Decentering* refers to the cognitive distancing "stepping back" from dysfunctional thoughts which expands the cognitive repertoire, enables acceptance, and is believed to result in more effective movement toward individual values. An example item is "I experienced myself as separate from my changing thoughts and feelings." The authors of the Toronto Mindfulness Scale (TMS) predicted that the TMS would be positively correlated with measures of reflectiveness and openness to experience and unrelated to ruminative self-focused attention and self consciousness (Lau et al., 2006). This may

provide a good measure for assessing changes in curiosity and decentering in a writing exercise.

There has been a lack of rigorous investigation in the form of randomized control trials and basic research on mindfulness mechanism (Bishop et al., 2004). Hence, this pilot aims to identify a mindfulness-based mechanism in writing, which will also help us understand the mechanisms of mindfulness interventions. Coupled with the literature on the efficacy of mindfulness, this literature base may provide a new efficacious tool to develop mindfulness-based skills interventions. As a recent meta-analytic review of mindfulness interventions, which include techniques such as meditation and self-directed attention, revealed that they are significantly helpful in the treatment of diverse physical and mental disorders, including chronic pain, binge-eating, fibromyalgia, psoriasis, depression, and anxiety disorders, with medium to large effect sizes (see Baer, 2003 for review).

Mindfulness and Expressive Writing

For the purpose of this study, we are interested in testing the mindfulness based process of written emotional expression. Second, we are also interested in developing a mindfulness-based writing instruction in an emotional expression exercise. Some of the identified commonalities between mindfulness interventions and the expressive writing task is that participants are writing about their current feelings regarding their past experience, and as they write, they may vividly relive the experience, as if they were experiencing it in the present (Brody & Park, 2004). In addition, a list of methods used in mindfulness interventions generated by Roemer and Orsillo (2002) include attending to present internal and external experience, normalizing negative thoughts and feelings, and

accepting experiences in nonjudgmental ways. The normalization and acceptance of feelings may be processes or an acquired set of skills that happen with repeated writing as well, especially when the implicit audience (of the writing) is imagined as accepting and nonjudgmental.

Brody and Park (2004) also suggest that the psychological mechanisms of change underlying the mindfulness and writing paradigms may be similar. The processes previously addressed by Sloan and Marx (2004) as underlying narrative writing effectiveness, disinhibition, exposures to negative affect, and shifts in cognitive coping, are all potential processes that may also underlie the effectiveness of mindfulness interventions. Brody and colleagues (2004) illustrate this candidacy by explaining that by becoming increasingly attentive to one's thoughts, feelings, and responses, writers would (a) expose themselves to negative affect, potentially leading to diminished future avoidance, (b) make new cognitive connections or associations between verbal and nonverbal material and between previously unconnected sets of events both in the past and the present, and (c) become less inhibited about acknowledging their experiences (Brody & Park, 2004). These identified shared features guide the conceptual bases of this study, and warrant our goal to instruct mindfulness- based skills in the writing exercise.

To our knowledge, decentering and curiosity have not been studied in narratives. However, researchers have begun to code mindfulness in certain areas of their work, and their work can serve as a model for how to study mindfulness processes in expressive writing. For example, Teasdale and colleagues (2002) have coded autobiographical memoires for metacognitive awareness using a qualitative system entitled the Measure of Awareness and Coping in Autobiographical Memoires. Exploring whether narrative

writing encourages people to think in novel ways was also investigated by looking at changes in the structure and content of narratives themselves over time (Campbell & Pennebaker, 2003). Additionally, Bishop et al. (2004) proposed that mindfulness is similar to a skill that can be developed with practice; hence it is our assumption that developing the skill through a writing exercise may allow one to develop mindfulness skills over time and perhaps practice a mindful state more often.

For the purpose of our study, we hypothesized that writing operates on presented mindfulness constructs. We were specifically interested in measuring the levels of curiosity and decentering in writing, then exploring whether we can enhance curiosity and decentering through instructing participants to exercise mindfulness skills in their writing. We expected that writing may evoke an attentional state to one's thoughts, feelings and sensations. This attentional state may serve as a meta-cognitive process of thinking about one's thoughts and emotions that triggers a desire to learn more about these experiences. This desire to learn more about present-moment experience is measured by *curiosity*. We also expect that writing serves as a self-regulative process by which individuals are able to distance themselves from the emotional content of the writing and observe their experiences with openness and acceptance. This "stepping" back from dysfunctional thoughts expands individuals' cognitive repertoire, enables acceptance, and is believed to result in more effective movement toward individual values. The ability to conduct the awareness of experiences without judgment is measured by *decentering*.

We utilized The Toronto Mindfulness Scale (TMS) as a state measure to determine changes in the reports of curiosity and decentering after engaging in a mindful

writing exercise. The scale includes items reflecting the subjective aspects of attentional self-regulation and a quality of nonelaborative attention characterized by curiosity, acceptance and openness to experience with all items referring to an immediately preceding meditation session (Lau el at., 2006). For this study, we adapted the scale to refer to the immediately preceding writing session instead of a meditation session. Additionally, we utilized the Philadelphia Mindfulness Scale (PHLMS), which captures the levels of an individual's present-moment awareness and acceptance, to determine the level of mindfulness as an acquired trait before the writing exercise.

Writing Instructions

Typical instructions. The written emotional expression paradigm typically involves asking participants to write about the most traumatic or stressful event of their lives over three to five consecutive sessions for about 20 minutes per session. Participants are usually instructed to write about either the same or different traumatic events during each writing session. Participants in this experimental condition are usually compared against a group of participants assigned to a control writing condition, for example, writing about how they spend their time each day with no emotions or feelings (Sloan & Marx, 2004).

Studies have subsequently varied in the writing instructions and in the degree to which disclosure instructions included directed questions and specific examples. Some researchers have instructed participants to "write about the most traumatic experiences of your life" (Booth et al., 1997, p. 27), whereas other researchers have given directed questions, such as "How did you feel at the time of the experience?" (Barry & Singer, 2001, p. 291) or specific examples such as the death of a loved one, breakup of a relationship, failure and so forth (Kloss & Lisman, 2002).

Additionally, other studies examined the effect of changing the instructional set for written disclosure on psychological and physical health reports. Sloan and colleagues (2007) found that among traumatized college students, participants assigned to focus on emotional expression reported significant improvements in psychological and physical health one month following the writing sessions relative to the insight and cognitive assimilation and control conditions. King and Miner (2000) examined the potential benefits of writing about the positive side of painful life events and found that those who wrote only about trauma or perceived benefits showed significantly fewer health center visits for illness three months after writing. Cameron and Nichols (1998) assessed the effectiveness of a writing task designed to foster self-regulatory coping with stressful experiences and found that among optimists, both the self-regulation task and the disclosure task reduced illness-related clinic visits during the following month; among pessimists, only the self-regulation task reduced clinic visits. It is imperative to note how these findings underscore the importance of examining how modifying the written disclosure protocol can affect outcomes (Sloan, Marx, Epstein, & Lexington, 2007). These findings also highlight the complex nature of the mechanisms of the writing process including the interplay of moderating and mediating variables which may affect outcomes variably depending on the instructional style. Therefore, in developing written emotional expression exercises, we need to be mindful of both the theoretical underpinnings and the instructional style to maximize the potential benefit.

The Proposed Study

Written emotional expression is an evidence-based therapeutic tool for the processing of traumatic life events (Frattaroli, 2006; Pennebaker, 1997). In this study, we

proposed that narrative-based exercises may serve as a mindfulness process. Hence we planned to both test and build on this theory. The goals of this study were to test (a) whether the traditional paradigm of the written emotional expression process enhances mindfulness levels and (b) whether we can enhance mindfulness levels by building on a traditional writing instruction. This helped us determine whether (a) individuals are indeed participating in mindfulness in written emotional expression, and (b) the degree to which we can enhance mindfulness in expressive writing. To pilot this latter investigation, we modified the instructions of the writing exercise to instruct individuals how to exercise mindfulness in their writing. That is, we sought to test whether we can facilitate participants' openness about their thoughts, emotions and experiences in a non-judgmental manner and with an awareness characterized by intellectual curiosity.

Participants were randomly assigned either to the traditional Pennebaker instructions group inquiring about students' most stressful life experience (Pennebaker, Kiecolt-Glaser, & Glaser, 1988) or to the mindfulness-enhanced group which incorporated mindfulness-based instructions (Hayes & Smith, 2005;Levitt et al., 2004) for writing about students' most stressful life experience. Participants in both groups were given the opportunity to debrief and review the principles of their writing. The aim of this study was to test whether the mindfulness-enhanced writing could differentially enhance individuals' mindfulness levels compared to the traditional writing exercise, controlling for baseline levels of mindfulness.

Hypothesis 1a. Participants in the mindfulness-enhanced writing group are expected to report higher levels of *curiosity* as measured by the TMS than participants in the traditional writing group after engaging in the writing exercise.

Hypothesis 1b. Participants in the mindfulness-enhanced writing group are expected to report higher levels of *decentering* as measured by the TMS than participants in the traditional writing group after engaging in the writing exercise.

Hypothesis 1c. Participants in the mindfulness-enhanced writing group are expected to report higher levels of *total mindfulness* as measured by the TMS than participants in the traditional writing group after engaging in the writing exercise.

I. Method

Participants

Forty participants were recruited from the undergraduate population of Drexel University. The inclusion criteria included students enrolled in psychology courses at Drexel University. The age range for participation was 18-25 years. Exclusion criteria included individuals on psychotropic medications and self-reported mental health diagnosis (e.g. mood disorder, anxiety disorder, psychotic disorder, or substance abuse disorder). The eligibility criteria were announced during recruitment. Participants were recruited through the SONA system, which is an online system used to recruit volunteers for participation in research studies that the Department of Psychology has adapted for Undergraduate research participants. Research assistants also recruited volunteers through the psychology classes at Drexel University. Participants were self-screened and information was verified again by the research assistant once the participant signed up for the study. Participants were informed that involvement in the study comprised committing to one writing session that lasted for about one hour. In agreement with the psychology department policy, participants were compensated with 2 extra credit points toward their psychology course.

Sample Characteristics

Demographic information is presented in Table 1. Forty undergraduate students participated in the study, ranging from age 18 – 25 with a mean of 20.51 years (*SD* = 3.55). Among the sample, 38.5% were males (*n* = 15). Fifty percent of our sample (*n* = 20) reported prior participation in meditation or yoga. Thirty-six percent of our sample were Caucasian (*n* = 14), 20.5% Asian American (*n* = 8), 23% other (*n* = 9), 15.4% African American (*n* = 6), and 5.1% Hispanic (*n* = 2). The sample was well distributed among class standing; 25% of our sample were seniors (*n*= 10), 23% freshmen, 23% sophomores (*n*= 9), 20.5% juniors (*n*=8), and 7.7% pre-juniors (*n*= 3).

Materials and Procedure

Research assistants met with participants in a private room in the Psychology building for the consent, baseline assessment process, a writing session and post-assessment measures. The session lasted for approximately one hour. The research assistant explained that participation was voluntary, and in the event of distress and discomfort, participants could discontinue their participation. Research assistants also informed participants that a protocol has been developed in case of an emergency (such as contacting the counseling center and/or the Principal Investigator on the study, a clinical psychologist who could provide further advisement)

During this session the research assistant explained the purpose of the study and reviewed the informed consent form with the participant. Upon consenting, participants were randomly assigned to either the traditional writing group or the mindfulness-enhanced writing group using a random table of numbers. Participants completed the Positive Affect and Negative Affect Scales (PANAS), the Philadelphia Mindfulness

Scale (PHLMS) and the Toronto Mindfulness Scale (TMS). The research assistant explained the respective writing instruction and participants were then asked to read the instructions of the writing exercise very carefully before beginning the writing process. Participants were given 20-30 minutes to complete the writing exercise. Upon completion, participants completed the TMS and the PANAS. The research assistant then provided her contact information and informed participants that they could contact her or the PI with any questions/concerns after the session.

Measures

Demographics Form. The form includes information on the participant's age, gender, ethnicity, class standing, living arrangement, prior and current participation in any type of meditation or yoga/relaxation training (known to teach mindfulness).

Writing Instructions. The writing instructions in the traditional writing group were adapted from traditional Pennebaker instructions inquiring about students' most stressful experience (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). The writing instructions in the mindfulness-enhanced group included mindfulness-based strategies adapted from the study by Levitt and colleagues (2004) and the workbook developed by Hayes and Smith (2005) to bolster mindfulness levels among participants in writing about their most stressful experiences. Participants in both groups wrote about their most stressful experience, reported when it occurred and rated their level of distress when the event occurred. Participants also rated their current level of distress before and after the writing (i.e. please rate how distressed **you are** about this event now) on a 5-point likert scale 1(not at all) to 5(extremely) distressed. They were also given the opportunity to debrief and comment on the writing assignment (see Appendix A).

Positive Affect and Negative Affect Scales (PANAS). The PANAS is a 20-item scale developed by Watson, Clark and Tellegen (1988) to provide independent measures of positive affect and negative affect. The PANAS includes list of 10 descriptors for Positive Affect scale, with a higher score indicative of more positive affect. These descriptors are: *attentive, interested, alert, excited, enthusiastic, inspired, proud, determined, strong and active*, and 10 descriptors for Negative Affect scale with a higher score indicative of more negative affect. These descriptors are: *distressed, upset-distressed; hostile, irritable-angry; scared, afraid-fearful; ashamed, guilty; nervous, and jittery* (Watson, Clark & Tellegen, 1988). The PANAS scale intercorrelations and internal consistency reliabilities are all acceptably high (ranging from 0.86 to 0.90 for PA and 0.84 - 0.87 for NA). This measure was used as an integrity check, as negative affect usually increases after engaging in written emotional expression.

The Toronto Mindfulness Scale (TMS). TMS (Lau et al., 2006) is a 13-item self-report measure designed to assess mindfulness. The TMS is composed of two subscales, *curiosity* and *decentering*. These items reflect the subjective aspects of attentional self-regulation, and a quality of nonelaborative attention characterized by curiosity, acceptance and openness to experience. Higher scores indicate higher levels of curiosity and decentering. The TMS scores increased with increasing mindfulness meditation experience (Lau et al., 2006). The TMS has demonstrated high internal consistency, with an alpha coefficient of 0.95 and an item reliability score of 0.93 and 0.91 for curiosity and decentering respectively. Also, findings show that TMS scores increased following treatment, and decentering scores predicted improvements in clinical

outcome. This measure was used as a state measure to assess changes in decentering and curiosity after the writing.

The Philadelphia Mindfulness Scale (PHLMS). PHLMS (Cardaciotto et al., 2008) is a 20-item self-report measure designed to assess mindfulness. The PHLMS is composed of two subscales, present-moment *awareness* and *acceptance*. Higher scores indicate higher levels of awareness and acceptance. Internal consistency for the PHLMS total mindfulness (Cronbach's alpha = .72), and for the acceptance subscale (Cronbach's α= 0.75 [general psychiatric outpatient sample] and 0.91 [student counseling center sample]) and the awareness subscale (Cronbach's α= -0.75 [general psychiatric outpatient sample] and 0.86 [student counseling center sample]). This measure was used as a baseline measure to assess mindfulness as a trait among participants.

Data Analysis

Prior to conducting the primary analyses, sample characteristics were defined, and variables under investigation were evaluated for reliability. Sample data were compared to published means derived from non-clinical college populations, and when such means were not available, compared to published clinical population means. Analyses of internal reliability on primary measures were conducted using Cronbach's alpha.

Preliminary analyses for the present study included the evaluation of dependent measures, independent measures, and demographic variables for normality, distribution, and descriptive statistics. Additionally, the relations between demographic variables with mindfulness variables (awareness, acceptance, decentering and curiosity) were evaluated. Independent sample t-tests were utilized to evaluate dichotomous variables, correlations to evaluate continuous variables, chi-sqaure tests to evaluate dichotomous variables, and

ANOVAs to evaluate categorical variables. Demographic characteristics that did have a significant relationship with mindfulness variables were controlled for by including them as covariates in the repeated measures ANOVA analysis (or ANCOVAS, where appropriate). Primary hypotheses were investigated primarily using repeated measures ANOVAs. When significant findings emerged, post-hoc analyses were conducted.

II. Results

Means and Normative Analyses

The means and standard deviations of sample scores and normative scores derived from publications for primary measures are reported in Table 2. One sample t-tests reveal that at baseline, curiosity of our sample was lower than normative means in a clinical adult population ($t(39) = -4.67$, $p < 0.05$); decentering reports were lower than normative means ($t(39) = -8.07$, $p < 0.05$); and positive affect lower than normative values ($t(38) = -2.17$, $p < 0.05$). Acceptance, awareness and negative affect were all within the range of normative values.

Reliability Check

Internal consistencies for primary measures are presented in Table 3. Primary measures utilized in the present study were evaluated for internal consistency reliability using Cronbach's alpha, a coefficient utilized for testing the internal consistency of a measure (Cronbach, 1951). With the exception of one subscale (TMS decentering), reliability ranged from adequate to good (.71-.88), which demonstrates high internal consistency, allowing for the confident interpretation of scales. However, the *decentering* demonstrated poor internal consistency at baseline (Cronbach's alpha=.57). If item 8 was deleted, cronbach alpha increased to .61; this item alone does not seem to

account for the poor internal consistency of the measure. Interestingly, internal consistency of the decentering subscale improved after engaging in the writing exercise (Cronbach's alpha= .73). Other studies have shown good reliability (.84) for this measure (Lau et al., 2006), yet reliability with our college sample should still be interpreted cautiously.

Preliminary Analyses

All primary measures were found to be normally distributed, with the exception of Negative Affect on the PANAS. The baseline negative affect distribution of participants was in violation of kurtosis and positively skewed despite z-score transformation. The square root of each data-point was then calculated to help normalize negative affect, but the sample distribution for remained skewed and in violation of kurtosis. Therefore, non transformed data were utilized in evaluating negative affect.

Baseline Data

Baseline Parity. No group differences emerged on any of our primary measures (curiosity, decentering, awareness, acceptance, PHLMS total mindfulness, TMS total mindfulness) at baseline (Table 4). There were also no group differences on any of our demographic variables (gender, current term in school, year in school, living arrangement, number of roommates, ethnic identity, prior or current participation in meditation/yoga). Occurrence of the stressor ranged from present ongoing stressors to stressors that occurred 12 years ago. Fifty-seven percent of our sample wrote about stressors that occurred within the past year, a total of 80% within the past 2 years, and the remaining 20% wrote about events that occurred more than 2 years ago. We compared whether our groups differed on time since the occurrence of the stressful event; on

average participants in the MG wrote about a stressor that occurred within the past year and the half, and participants in the TG wrote about a stressor that occurred within the past 3 years. However, occurrence was not related to decentering or curiosity, and therefore was not included as a covariate.

Analysis of Covariates. Participant gender, current term in school, year in school, living arrangement, number of roommates, ethnic identity, prior or current participation in meditation/yoga, were not associated with mindfulness variables (curiosity, decentering, acceptance, awareness, PHLMS total mindfulness, TMS total mindfulness), (*p*s > .05), and were therefore not included as covariates in analyses.

Type of Stressor

Qualitative analyses of the stressors reported by participants revealed that most students wrote about a break-up/divorce (25%), followed by starting college/study abroad (15%), death of a loved one (12.5%), and financial issues (10%). Other stressors included illness of a loved one, car accident, surgery and domestic abuse. In the traditional group, 30% of participants wrote about a break-up/divorce and 20% wrote about starting college and academic issues. In the mindfulness group, 20% of students wrote about a break-up, 30% wrote about the death or illness of a loved one (murder/death of father, illness of mother) and 20% wrote about academic issues and starting college.

Distress Levels

On a 5-point Likert scale 1 (not at all) to 5 (extremely) distressed, participants reported high levels of distress regarding the event when it occurred (*M*= 4.67, *SD*= .53), and moderate levels of current distress before the writing (*M*= 2.71, *SD*= 1.20) and after

the writing (*M*= 2.84, *SD*= 1.24). No differences emerged between groups on any of the distress variables.

Bivariate Relationships

Pearson correlations were conducted to test associations between total mindfulness and distress levels at baseline. Mindfulness (as measured by the PHLMS) was negatively correlated to current levels of distress regarding the event before the writing (r = -.404, $p < 0.05$). In the TG, mindfulness was also negatively correlated to current distress about the event before the writing ($r = -.462$, $p < 0.05$).

Pearson correlations were then conducted to test associations between our primary measures and to identify covariates (Table 5). Curiosity was associated with decentering ($r = .344$, $p < 0.05$), awareness ($r = .431$, $p < 0.05$) and positive affect ($r = .381$, $p < 0.05$). Hence, awareness was entered as a covariate in the repeated measures ANOVA for curiosity and total mindfulness. Negative affect was related to acceptance ($r = -.654$, $p < 0.05$) and to PHLMS total mindfulness ($r = -.436$, $p < 0.01$). TMS total mindfulness was associated with positive affect ($r = .370$, $p < 0.05$).

Integrity Check

As predicted, scores on the Negative Affect Scale before the writing exercise ($M = 16.89$, $SD = 7.38$) increased significantly after the writing ($M = 21.03$, $SD = 9.47$) among all participants ($t\ (35) = -2.14$, $p < 0.01$). This served as our integrity check for engaging in the writing exercise, as participants typically report higher negative affect after engaging in written emotional expression exercise. In the traditional-writing group, the increase in negative affect score trended towards significance ($t\ (19) = -1.88$, $p = .075$). In the mindfulness group, the negative affect scores before the writing ($M = 16.50$,

SD = 8.79) increased significantly after the writing (*M* = 21.50, *SD* = 10.14), [*t* (19) = -3.27, *p* < 0.01)]. However, groups did not vary in the degree of change in negative affect scores after engaging in the writing [*F* (1, 38) = 1.00, *NS*].

Analysis of Hypotheses

We aimed to test whether the mindfulness-enhanced writing could differentially enhance individuals' mindfulness levels compared to the traditional writing exercise, controlling for baseline levels of mindfulness (see Table 6).

Hypothesis Ia. Participants in the MG (*t* (34) = .706, *p* > 0.05) and TG (*t* (19) = .276, *p* > 0.05) reported comparable levels of *curiosity* after engaging in the mindfulness-enhanced writing exercise compared to baseline. Contrary to our prediction, participants in the mindfulness-enhanced writing group did not report higher levels of *curiosity* than participants in the traditional writing group after engaging in the writing exercise [*F* (1, 37)= 0.026, *p* > 0.05] as revealed by repeated measures AVOVA analysis. The observed power was determined to be .06 suggesting that the analysis was underpowered to detect significant effects if they had been present.

Hypothesis Ib. Participants in the traditional group reported higher levels of *decentering* as measured by the TMS after engaging in the writing exercise compared to baseline (*t* (19) = -2.21, *p* < 0.05). Participant reports of *decentering* after the writing (*M* = 16.16, *SD* = 6.18) were higher than reports of *decentering* before the writing (*M* =13.33, *SD* = 4.10), with 15.2% of the change in *decentering* scores accounted for by the writing exercise, suggesting a small effect size (Cohen, 1992). The observed power was determined to be 0.791 suggesting adequate power to detect changes. Participants in the MG also reported comparable levels of *decentering* after engaging in the mindfulness-

enhanced writing exercise compared to baseline (t (19) = -1.53, $p > 0.05$). Hence, participants in the mindfulness-enhanced writing group did not report higher levels of *decentering* than participants in the traditional writing group after engaging in the writing exercise [F (1, 38)= 0.074, $p > 0.05$] as revealed by repeated measures AVOVA analysis. The observed power was determined to be .058 for the interaction effect suggesting that the analysis was underpowered to detect significant effects if they had been present.

Hypothesis Ic. Contrary to our prediction, participants in the mindfulness-enhanced writing group did not report higher levels of *total mindfulness* than participants in the traditional writing group after engaging in the writing exercise [F (1, 37)= 0.088, $p > 0.05$] as revealed by repeated measures AVOVA analysis. The observed power was determined to be .06, suggesting that the analysis was underpowered to detect significant effects if they had been present.

Post-Hoc Analyses

Predisposing characteristics of the sample. We predicted that gender may account for differential findings. Findings showed no gender effect on any of our primary variables (curiosity, decentering, awareness and acceptance) at baseline. We further reran gender as a variable in repeated measures ANOVA to make sure it does not disrupt our findings and found no gender effect on changes in decentering scores (F (1, 35) = .392, $p > 0.05$) or curiosity scores (F (1) = .091, $p > 0.05$).

Writing Activity. Participants rated their level of distress about their stressor immediately before and after the writing on a 5-point Likert scale 1 (not at all) to 5 (extremely) distressed. Repeated measures ANOVA revealed no group effect on distress levels across time (F (1, 35) = .541, $p > 0.05$) and no significant changes in reported

distress after the writing (F (1, 35) = .207, p > 0.05). Participants reported moderate likelihood for participation in this activity again (M = 3.38, SD = 1.04). No group effect emerged for likelihood of participation in this activity again (F (1, 35) = .032, p > 0.05).

III. Discussion

The purpose of this study was to provide a novel approach to understanding the mechanism of change in a written emotional expression exercise. This is the first study of its kind to look at mindfulness as an underlying mechanism of narrative writing. Our two unique aims were to test the degree to which (1) individuals are exercising mindfulness in their writing, and (2) mindfulness can be enhanced in expressive writing. Forty undergraduate students who were randomly assigned to either a traditional writing group or a mindfulness-enhanced group completed measures of mindfulness before and after the writing. Results revealed that decentering reports increased after participation in the traditional writing exercise, but did not increase significantly in the mindfulness-enhanced exercise. Contrary to our prediction, curiosity reports did not change overtime, and the mindfulness-enhanced writing did not differentially enhance individuals' mindfulness reports compared to the traditional writing exercise. These findings provide preliminary evidence that decentering may serve as an underlying mechanism in traditional expressive writing exercises. It may be difficult to enhance mindfulness processes in a one session exercise aimed to increase decentering and curiosity.

Decentering as a Mechanism of Written Emotional Expression

Interestingly, decentering increased after the writing exercise in the traditional group, which suggests that the writing *may* allow participants to disengage from the content of the writing and write about their experiences without judgment. This is

consistent with our prediction that decentering might be at play during the writing process and extends on the cognitive and emotion regulation theories. Whereas cognitive theories suggest that the writing may provide structure, organization and cohesion to the traumatic memory (Pennebaker, 1997), emotion regulation theories propose that it allows people to observe themselves expressing and controlling their emotions, which gives people a new or stronger sense of self-efficacy (Lepore et al., 2002). Our rationale was based on the premise that emotional and cognitive involvement may play complementary roles in moderating and mediating processes associated with adjustment to traumatic or stressful events (Calhoun & Tedeschi, 1998). That is, the writing may help individuals in making sense of the event, exploring sources of emotions, thoughts and sensations, clarifying goals and cognitively processing these experiences without judgment.

Our findings add a crucial component to this model, and suggest that after individuals explore thoughts and sensations and clarify goals, they may be distancing themselves from the emotional content and are more able to cognitively process without judgment. This finding is consistent with the findings of Lau and colleagues (2006) that decentering increases significantly after engaging in a mindfulness-based stress reduction program (MBSR), and findings by Davis and colleagues (2009) that decentering scores increased with increasing meditation experience and scores were higher for meditators than for nonmeditators (Davis, Lau, & Cairns, 2009). Decentering scores increased after one writing session in our study, while increases in decentering were accomplished after 8 weeks of participation in the MBSR program (Lau et al., 2006). Extension of the writing over several days, as opposed to only one day as piloted here, in response to a mindfulness enhancing exercise may allow individuals more opportunity to free their

mind of unwanted thoughts, help to make sense of upsetting events, better regulate their emotions, habituate to negative emotions, and improve their connections to the social world (Smyth, 1998).

Surprisingly, decentering scores did not change significantly in the mindfulness-enhanced group. These results are discrepant from previous findings where patients instructed to accept anxiety demonstrated less anxiety and avoidance (Levitt et al., 2004) and participants in the acceptance group condition exposed to an irritant were less behaviorally avoidant (Eifert & Heffner, 2003). This is consistent with Bishop and colleague's (2004) proposition that mindfulness is similar to a skill that can be developed with practice, and our study design did not allow the opportunity for practice. One writing session may not be effective in both producing content and developing decentering skills for processing the content. Several sessions provide opportunity for practice, and continuous exposure may alleviate the negative affect and enable engagement in mindfulness techniques.

In addition, in the MG, participants may have focused too much on following the instruction that they were not able to really let go and process their experiences without judgment. Some participants separated their writing into sections including feeling, thoughts and sensations and described pertinent experiences in each section. This *over*-attention to the instructions may have hindered the intended purpose of distancing and observing their experiences as floating thoughts, feelings and sensations.

Analyses comparing our two groups revealed no differences among groups on any of our primary measures at baseline, which is consistent with random assignment. Interestingly, the majority of participants in the TG wrote about a break-up or academic

issues, whereas the majority of participants in the MG wrote about the death/murder/illness of a loved one, in addition to academic issues. Although groups did not differ on reports of distress regarding the stressor before or after the writing, writing about more traumatic issues, possibly for the first time, may require additional practice before individuals are able to decenter and process their experiences without judgment.

Curiosity as a Mechanism of Written Emotional Expression

Curiosity may have been a difficult concept for individuals to grasp. Our results were discrepant from initial findings by Lau and colleagues (2006) who studied an adult clinical sample. Lau and colleagues found that curiosity scores increase with increasing mindfulness meditation experience. However, our results were consistent with findings by Davis and colleagues (2009) that curiosity as a trait did not increase in relation to increasing years of meditation experience in a community sample. Participants in our study were initially asked to report curiosity when they thought about a stressful experience, and thinking about an experience for a few minutes may not produce enough material or content for mindfulness processing. This type of processing requires content (thoughts, feeling, sensations, etc.) and practice (continuous monitoring of this content). Brody and Park (2004) suggested that the psychological mechanisms of change underlying the mindfulness and writing paradigms may be similar, including disinhibition, exposure to negative affect, and shifts in cognitive coping. In this study, participants may have experienced one or more of these processes, but did not produce enough content or have enough time to master these processes. Davis and colleagues (2009) also found that curiosity shows low to moderate correlations with other mindfulness questionnaires which indicate that the TMS may be measuring a previously

unassessed aspect of the mindfulness construct; however, this requires further investigation.

Also, the enhanced exercise focused more on instructing participants to come into awareness with their thoughts and emotions, and write without judgment. The instructions may have not directly elicited curiosity regarding the experiences. This is consistent with interpretations by that the curiosity factor may have a unique relationship with the type of meditation practiced (Davis et al., 2009; Lau et al., 2006), and curiosity may be an inherent trait that is related to the desire to learn meditation rather than a skill that increases as a result of meditation practice (Davis et al., 2009). In our study, this implies that curiosity may be an antecedent to the practice of mindfulness and not a skill that increases as a result of mindfulness instruction. However, instructions can be modified to instruct individuals to note whether they experience an increased desire to learn more about their internal experiences and notice their curiosity regarding their changing thoughts and emotions as they write.

Methodological Considerations

Reliability of the Decentering Measure. Reliability of our primary measures demonstrated high internal consistency with the exception of the decentering subscale. Internal consistency for decentering was lower than reported normative values in a clinical sample with a Cronbach's alpha of .87 (Lau et al., 2006). This discrepancy may be explained by a difference in the degree of exposure to the decentering subscale. Additionally, internal consistency of the decentering subscale improved after engaging in the writing exercise from .57 to .73, suggesting a practice effect. Participants seemed better able to apply their experiences to the scale items after engaging in the writing

exercise. Perhaps participation in the writing exercise provided better context for understanding and being able to respond more consistently to the decentering scale. Future studies should focus on providing more guidance in filling out the measure, either by engaging participants in thinking about their stressor or by providing them with an example in completing the items. That may serve as a context for understating the items and allow the participants to engage with their thoughts and relate more accurately to the scale items.

Sample and Variable Characteristics. All participants reported mindfulness levels within the normative range as measured by the Philadelphia Mindfulness Scale. This means that, overall, participants exhibited comparable levels of acceptance and awareness to other college students. Participants reported significantly lower positive affect than the normative sample, and slightly higher negative affect. Data was primarily collected during winter term, which may have contributed to more negative affect at baseline. Data was also primarily collected towards the end of the term, which is typically a stressful time due to deadlines, final exams and papers. At baseline, our sample reported significantly higher negative affect scores than normative samples. Negative affect may have influenced participants' ability to disengage from the stressful content of the writing and experience an intellectual curiosity about their experiences. This may have led to the null findings for curiosity across groups. Future studies should aim to collect data throughout the academic year and control for term effects.

***Mindfulness Characteristics at Baseline*.** On the TMS, participants reported significantly lower levels of curiosity and decentering at baseline than the normative sample. It is noteworthy, however, that normative values were based on a clinical sample

prior to participation in a mindfulness-based stress reduction program. No normative values were available for the TMS as a state measure in a college sample. Participants reported significantly lower curiosity than normative values at baseline; this small variability in curiosity scores may account for the null results. Also, prior to engaging in the writing exercise, participants in our study were asked to identify a stressful event and rate the degree to which they experience the items on the TMS as relating to that event. It is possible, but not probable, that participants wrote about a different stressor from the one they identified when they completed the measure.

Additionally, it may have been difficult to experience the items on the TMS abstractly, which may explain why the scores were significantly lower than normative samples. For example, the first item on the scale "I experienced myself as separate from my changing thoughts and feelings" might be confusing for individuals who are not fully attuned to their thoughts. Other items like "I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations" describe an experience that requires cognitive and emotional content, and participants may have not fully engaged in processing by merely "thinking" about a stressor. This may have led to the null findings for curiosity across groups. Future studies should engage participants in thinking about their stressful experience prior to completing the measure, and include an integrity check for the thinking-exercise.

Limitations

The TMS assesses mindfulness during a single point in time and thus may not reflect a respondent's true or average capacity to evoke a state of mindfulness. Multiple testing periods should yield an indication of the ability to evoke a mindfulness state.

Authors of the TMS assert that meditation-based treatments may develop the capacity to evoke mindfulness generally, but may fail to do so effectively on a given testing session, resulting in misleading TMS scores (Lau et al., 2006). This may explain our null findings, as individuals may need several sessions to exercise a decentering and curiosity in their writing and acquire is as a state.

Also, the length of writing ranged from 20-30 minutes which may result in some variability in participants' levels of engagement in the writing. However, the writing is effective even at drastically reduced lengths (i.e. 2 minutes; Burton & King, 2004), and a single session of writing for 10-15 minutes has been shown to effectively reduce negative emotions about a traumatic event (see Smyth & Pennebaker, 2008 for review). It is noteworthy, however, that the levels of current distress reported regarding the stressor both before and after the writing was moderate, which may attenuate the degree of benefit from the writing. Future studies should instruct writing about current stressors to account for that limitation.

Additionally, we were unable to explore changes in the structure and content of narratives, as this had been shown successful in exploring whether narrative writing encourages people to think in novel ways (Campbell & Pennebaker, 2003). Overtime, it would be interesting to conduct a content-analysis of the writing and explore changes and discrepancies in the structure and content of the narratives across groups. Finally, the observed power analysis revealed that the interaction effects were too underpowered to detect significant effects if they had been present, perhaps accounting for our null findings. Future studies should be conducted with a larger sample size to account for power limitations.

Conclusions and Future Directions

The concept of decentering has previously been recognized as playing a central role underlying the efficacy of cognitive therapy (Ingram & Holllon, 1986). Decentering can be explained as a shift in one's cognitive perspective which leads to a change in one's relationship to negative thoughts and feelings such that one can see negative thoughts and feelings simply as passing events in the mind rather than reflections of reality (Lau et al., 2006). Our finding provides preliminary evidence that decentering may serve as one potential mindfulness-construct that underlies the process of written emotional expression.

Second, mindfulness has been consistently shown to be effective in the treatment of diverse physical and mental disorders (Baer, 2003); this study proposes a new approach to the understanding and application of mindfulness. Mindfulness was initially introduced in meditation (Goldstein, 2002; Kabat-Zinn, 1998; Kabat-Zinn, 1994) then applied in a wide range of medical and mental health settings. This study launches mindfulness as a potential mechanism of change in written emotional expression. These initial findings suggest that perhaps mindfulness is an intuitive process underlying processes of change that can be nurtured. If we are able to nurture mindfulness processes then we equip individuals with a new tool to process experiences successfully and motivate change.

Bishop et al. (2004) proposed that mindfulness is similar to a skill that can be developed with practice; hence it is our assumption that developing the skill through a writing exercise may allow one to develop mindfulness skills and perhaps practice a mindful state more often. Hence, future research should explore mindfulness changes in a

traditional writing exercise over the course of several writing sessions. Studies should also test whether mindfulness instructions can be better modified to instruct individuals how to exercise mindfulness in their writing without diverting their focus. Finally, studies should inquire into whether the ability to invoke a mindful state during a writing exercise as measured by the TMS generalizes to the degree of mindfulness in everyday life.

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Appendix A. Figures

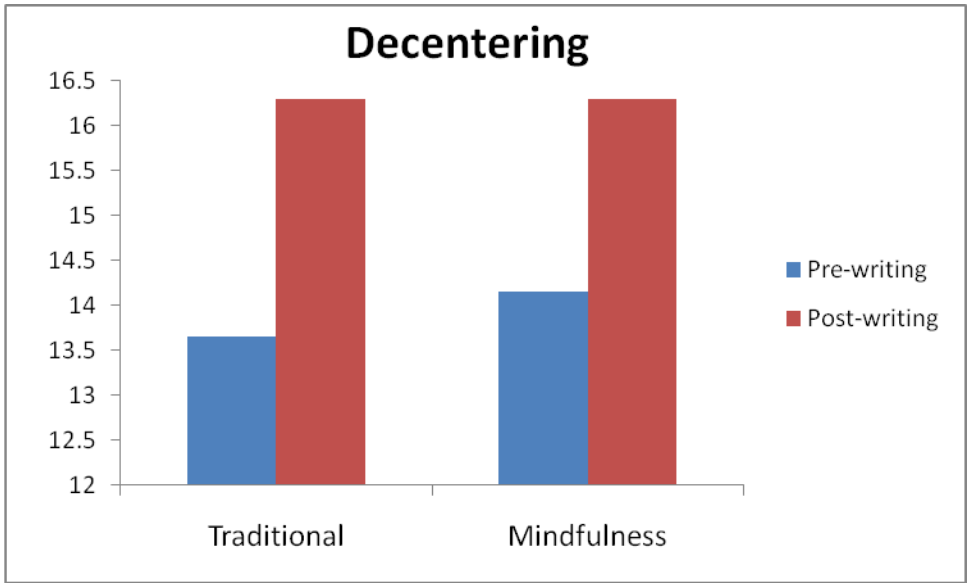

Figure 1. Changes in decentering scores between groups from pre-writing to post-writing.

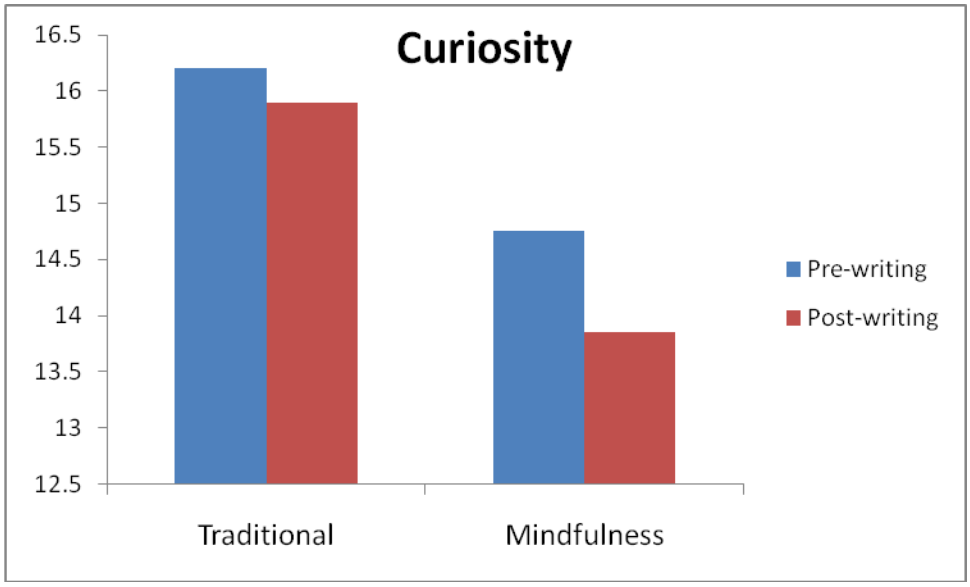

Figure 2. Changes in curiosity scores between groups from pre-writing to post-writing.

Appendix B. Tables

Table 1. Demographic Variables for Sample*

Demographic Variables	Number of Subjects	%
Gender		
Male	15	37.5
Female	24	60.0
Group		
Traditional	20	50.0
Mindfulness-enhanced	20	50.0
Current Term		
Winter	36	90.0
Spring	3	7.5
Year in School		
Freshman	9	22.5
Sophomore	9	22.5
Pre-Junior	3	7.5
Junior	8	20.0
Senior	10	25.0
Prior participation in meditation/yoga		
Yes	19	47.5
No	20	50.0
Current participation in meditation/yoga		
Yes	3	7.5
No	36	90.0
Living Arrangement		
Alone	3	7.5
Housemate(s)	26	65.0
Roommate(s)	10	25.0
Ethnic Identity		
Caucasian	14	35.0
African American	6	15.0
Hispanic	2	5.0
Asian American	8	20.0
Other	9	22.5

N= 40, Mean Age = 20.77 (2.29)

* Data were available for 40 participants on group. However, one participant failed to complete demographic information form.

Table 2. Sample Means Compared to Published Means

Variable	Sample Mean and Standard Deviation	Normative Mean and Standard Deviation	T-test
Philadelphia Mindfulness Scale[1]			
Acceptance	M= 31.65 (7.07)	M= 30.19 (5.84)	*t*(39)=1.31
Awareness	M= 37.52 (4.64)	M= 36.65 (4.93)	*t*(39)=1.19
Positive Affect Negative Affect Scale			
Positive Affect	M= 27.26 (7.03)	M= 29.70 (7.90)	*t*(38)=-2.17*
Negative Affect	M= 16.33 (7.21)	M= 14.80 (5.40)	*t*(39)=1.34
Toronto Mindfulness Scale[1]			
TMS Curiosity[2]	M= 15.48 (5.39)	M= 19.46 (9.74)	*t*(39)=-4.67**
TMS Decentering[2]	M= 13.90 (4.11)	M= 19.15 (8.41)	*t*(39)=-8.07**

*$p < .05$, ** $p < .01$

[1]No normative data is available for total mindfulness scores on these scales.

[2]Lau et al., 2006. Values are based on a clinical adult sample before engaging in a meditation session. No normative data is available for college students.

Table 3. Cronbach's alphas for Primary Scales

Variable	Cronbach's Alpha
Philadelphia Mindfulness Scale	
Total Mindfulness	.81
Acceptance	.88
Awareness	.72
Positive Affect Negative Affect Scale	
Positive Affect	.82
Negative Affect	.88
Toronto Mindfulness Scale	
Total Mindfulness	.76
Curiosity	.82
Decentering	.59

Table 4. Mean Scores of Primary Measures by Condition

Variable	Traditional Writing	Mindfulness-Enhanced Writing	T-test
Philadelphia Mindfulness Scale			
Total Mindfulness	M= 65.30 (9.45)	M= 66.45 (8.73)	*t*(38)= -.400
Acceptance	M= 31.70 (7.25)	M= 31.37 (7.08)	*t*(38)= .044
Awareness	M= 37.00 (4.75)	M= 37.74 (4.58)	*t*(38)= -.712
Positive Affect Negative Affect Scale			
Positive Affect	M= 26.30 (7.58)	M= 28.26 (6.45)	*t*(37)= -.869
Negative Affect	M= 16.15 (5.40)	M= 16.63 (8.79)	*t*(38)= -.152
Toronto Mindfulness Scale			
Total Mindfulness	M= 29.85 (8.14)	M= 28.90 (7.69)	*t*(38)= .379
TMS Curiosity	M= 16.20 (5.45)	M= 14.53 (5.38)	*t*(38)= .847
TMS Decentering	M= 13.65 (4.16)	M= 14.00 (4.16)	*t*(38)= -.380

*$p > 0.05$

Table 5. Correlations between Variables

Variable	1	2	3	4	5	6	7	8
1. Curiosity	-	.344*	.431**	-.148	.381*	.170	.105	.870**
2. Decentering	-	-	.010	-.079	.202	.076	-.057	.762**
3. Awareness	-	-	-	.144	.061	.152	.628**	.302
4. Acceptance	-	-	-	-	-.073	-.654**	-.680**	-.144
5. Positive Affect	-	-	-	-	-	.006	-.026	.370*
6. Negative Affect	-	-	-	-	-	-	-.436**	.157
7. Mindfulness	-	-	-	-	-	-	-	.043
PHLMS	-	-	-	-	-	-	-	-
8. Mindfulness TMS								

*$p < .05$, **$p < .01$

Table 6. Mean Scores of Primary Measures by Condition from Pre-writing to Post-writing

Variable	Traditional Writing		Mindfulness-Enhanced Writing	
	Pre-Writing	Post-Writing	Pre Writing	Post Writing
Philadelphia Mindfulness Scale				
Mindfulness Total	M= 65.30(9.45)	-	M= 66.45 (8.75)	-
Acceptance	M= 28.30 (7.25)	-	M= 28.40 (7.08)	-
Awareness	M= 37.00 (4.75)	-	M= 38.05 (4.58)	-
Toronto Mindfulness Scale				
Mindfulness Total	M= 29.37 (7.83)	M= 32.20 (8.51)	M= 28.90 (7.69)	M= 30.15 (8.62)
TMS Curiosity	M= 16.20 (5.45)	M= 15.90 (4.87)	M= 14.75 (5.38)	M= 13.85 (5.43)
TMS Decentering	M= 13.65 (4.16)	M= 16.30 (5.91)**	M= 14.15 (4.16)	M= 16.30 (5.25)
Positive Affect Negative Affect Scales				
Positive Affect	M= 26.30 (7.58)	M= 26.65 (7.96)	M= 28.26 (6.45)	M= 25.70 (8.77)
Negative Affect	M= 16.15 (5.40)	M= 19.00 (8.43)*	M= 16.63 (8.79)	M= 21.50 (10.1)**

*$p < 0.10$, **$p < 0.05$
N= 20 in each cell

Appendix C. Demographic Form

Today's Date: _____

Sex: □ Male □ Female

Age: _____

Current term: □ Fall □ Winter □ Spring □ Summer

Year in school: □ Freshman □ Sophomore □ Pre-Junior □ Junior

□ Senior □ Other

Living Arrangement: □ Alone □ Housemate(s) ***(If yes, how many: ____)***

□ Roommate(s) ***(If yes, how many: ____)***

Ethnic Identity: □ Caucasian □ African American □ Hispanic

□ Native American □ Asian American □ Other

Have you ever participated in any type of meditation/yoga/relaxation training? □ Yes □ No

Are you currently involved in any type of meditation/yoga/relaxation training? □ Yes □ No

Appendix D. Writing Instructions

TRADITIONAL WRITING GROUP

1) Please identify an event that you experienced as stressful

You can think of a "stressor" as a stressful event. Some examples of stressors are: break-up, failure of an exam, car accident, starting college, illness of a loved one, death of a loved one…etc.

How long ago did this event occur? --------- days/months/years

2) Please rate how distressed **you were** about this event when it occurred?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

3) Now please rate how distressed **you are** about this event now:

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

Writing Instructions

Now, we would like for you to write about your very deepest thoughts and feelings about the **stressful event you identified above** and the ways it has affected you and your life.

For the next **20-30 minutes**, we'd like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others including parents, lovers, friends, or relatives, to your past, your present, or your future or to who you have been, who you would like to be or who you are now.

All of your writing will be completely confidential. Don't worry about spelling, sentence structure, or grammar. The only rule is that once you begin writing, continue to do so until your time is up.

Debriefing Activity: contemplate and answer the following questions.

A. What was this experience like for you?

_____

_____

B. Rate how distressed **you are now**:

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

C. How likely are you to participate in this activity again?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

1) Please identify an event that you experienced as stressful

   You can think of a "stressor" as a stressful event. Some examples of stressors are: break-up, failure of an exam, car accident, starting college, illness of a loved one, death of a loved one…etc.

   How long ago did this event occur? --------- days/months/years

2) Please rate how distressed **you were** about this event when it occurred?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

3) Now please rate how distressed **you are** about this event now:

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

Writing Instructions

Now, we would like for you to write about your very deepest thoughts and feelings about the **stressful event you identified above** and the ways it has affected you and your life.

For the next **20-30 minutes**, be willing to experience your thoughts and feelings, good and bad as they occur. In your writing, really let go and explore any and all **emotions, thoughts and feelings** that come to mind regarding the event. Describe where in your body you feel stress, tension or excitement (i.e. stomach, back, head). It is important that as you write, you **allow your words to just be words**, and nothing more, just write without judgment. Use this as a time to put any stress, upset, excitement or worry related to this experience into words in the space provided.

All of your writing will be completely confidential. Don't worry about spelling, sentence structure, or grammar. The only rule is that once you begin writing, continue to do so until your time is up.

Debriefing Activity: contemplate and answer the following questions.

A. What was this experience like for you?

_____

_____

B. Rate how distressed **you are now**:

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

C. How likely are you to participate in this activity again?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

Appendix E. Positive and Negative Affect Scale (PANAS)

Directions:

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

Use the following scale to record your answers.

1=Very slightly or not at all 2=A little 3=Moderately 4=Quite a Bit 5=Extremely

	Very slightly or not at all	A little	Moderately	Quite a Bit	Extremely
1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

Appendix F. The Toronto Mindfulness Scale

Instructions: We are interested in what you just experienced with the writing exercise. 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 not at all **1** a little **2** moderately **3** quite a bit **4** very much

1. I experienced myself as separate from my changing thoughts and feelings.	**0**	**1**	**2**	**3**	**4**
2. I was more concerned with being open to my experiences than controlling or changing them.	**0**	**1**	**2**	**3**	**4**
3. I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.	**0**	**1**	**2**	**3**	**4**
4. I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things “really” are.	**0**	**1**	**2**	**3**	**4**
5. I was curious to see what my mind was up to from moment to moment.	**0**	**1**	**2**	**3**	**4**
6. I was curious about each of the thoughts and feelings I was having	**0**	**1**	**2**	**3**	**4**
7. I was receptive to observing unpleasant thoughts and feelings without interfering with them	**0**	**1**	**2**	**3**	**4**
8. I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.	**0**	**1**	**2**	**3**	**4**
9. I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.	**0**	**1**	**2**	**3**	**4**
10. I remained curious about the nature of each experience as it arose	**0**	**1**	**2**	**3**	**4**
11. I was aware of my thoughts and feelings without overidentifying with them	**0**	**1**	**2**	**3**	**4**
12. I was curious about my reactions to things	**0**	**1**	**2**	**3**	**4**
13. I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.	**0**	**1**	**2**	**3**	**4**

Appendix G. The Philadelphia Mindfulness Scale (PHL-MS)

Instructions: Please circle how often you experienced each of the following statements *within the past week.*

1. I am aware of what thoughts are passing through my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

2. I try to distract myself when I feel unpleasant emotions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

3. When talking with other people, I am aware of their facial and body expressions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

4. There are aspects of myself I don't want to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

5. When I shower, I am aware of how the water is running over my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

6. I try to stay busy to keep thoughts or feelings from coming to mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

7. When I am startled, I notice what is going on inside my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

8. I wish I could control my emotions more easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

9. When I walk outside, I am aware of smells or how the air feels against my face.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

10. I tell myself that I shouldn't have certain thoughts.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

11. When someone asks how I am feeling, I can identify my emotions easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

12. There are things I try not to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

13. I am aware of thoughts I'm having when my mood changes.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

14. I tell myself that I shouldn't feel sad.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

15. I notice changes inside my body, like my heart beating faster or my muscles getting tense.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

16. If there is something I don't want to think about, I'll try many things to get it out of my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

17. Whenever my emotions change, I am conscious of them immediately.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

18. I try to put my problems out of mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

19. When talking with other people, I am aware of the emotions I am experiencing.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

20. When I have a bad memory, I try to distract myself to make it go away.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often