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The Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction is a conceptual model (Figure D1) developed by the present author after critically examining existing theoretical and empirical work. It theorizes that through two pathways (Buddhist pathway and psychological pathway), individuals may elect to use mindfulness and positive reappraisal for coping, and individuals who use mindfulness and positive reappraisal more frequently will have a higher quality of life and lower perceptions of stress. In Study 1, a community sample was recruited to see if, after engagement in a writing task meant to induce stress, those in a mediation condition ($n = 29$) experienced less reactivity than those in distraction ($n = 27$) and rumination conditions ($n = 24$). In Study 2, participants were recruited from spiritual (Buddhist/Zen) groups ($n = 21$) and from the community ($n = 27$) to test the conceptual model through the use of the same experimental manipulation (from Study 1), followed by only meditation. Participants were given various self-report measures and asked open-ended questions about mindfulness and positive reappraisal. I predicted that participants in the meditation condition in Study 1 and the spiritual group in Study 2 would have lower reactivity to the stressful writing task. This hypothesis was supported for Study 1 across the pleasant/unpleasant subscale and for Study 2 across the pleasant/unpleasant and negative/relaxed mood subscales. For Study 2, I also predicted that higher levels of dispositional mindfulness, positive reappraisal, and state mindfulness would be related to lower perceived stress and higher quality of life. Higher dispositional mindfulness was predictive of lower perceived stress, and lower positive reappraisal was predictive of higher quality of life. These findings, additional exploratory

hypotheses, similarities and differences between the two spiritual and community groups, and

how these relationships map onto the MPR Pathways Model for Stress Reduction are discussed.

THE ROLE OF MINDFULNESS AND POSITIVE REAPPRAISAL IN STRESS

AND QUALITY OF LIFE

by

Sudheera Ranaweera

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Approved by

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Dr. Rosemery Nelson-Gray
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DEDICATION

In loving memory of Curtis Collazo, whose vulnerability was his strength.

APPROVAL PAGE

This dissertation written by Sudheera Ranaweera has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I: INTRODUCTION

Mindfulness has been determined to have a variety of benefits for people who engage in its use. Although mindfulness arose from Eastern religious teachings and principles, it has morphed into a westernized psychological concept (labeled "psychological" in this dissertation). Researchers have diverged on which perspective (religious/spiritual vs. psychological) to which they adhere when investigating mindfulness questions. The current literature suggests that mindfulness has a relationship with positive reappraisal across a variety of distinct samples. It is theorized that mindfulness and the subsequent use of positive reappraisal could help individuals cope with stressors, thus leading to positive outcomes. My dissertation tested a model called the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction, which I conceptualized in my preliminary exam paper (see Figure D1) to investigate whether individuals cope with stressors through mindfulness and positive reappraisal, utilizing either or both perspectives.

While it is complicated to examine the coping process, research on coping holds the potential to explain why some individuals might thrive under stress while others do not (Folkman & Moskowitz, 2004). There are undoubtedly individual differences in stress responses, which can be a function of many things, including personality, temperament, and traumatic environmental experiences. While such individual differences will exist in coping behavior, there may be overarching competencies that individuals can develop to engage in more adaptive coping. Understanding the components that make up adaptive coping, in general, can be advantageous for researchers and clinicians to create interventions that target these areas to better aid individuals. While past research has indicated that mindfulness is salutary (Baer, 2007), the

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possible connection of mindfulness with positive reappraisal for coping with stressors has not been thoroughly investigated.

It is essential to distinguish that mindfulness and positive reappraisal are independent concepts that have been demonstrated in past work to be associated. While my research examined the relationship between the two, the temporal order (i.e., does mindfulness happen before or after positive reappraisal when coping with a stressor) was not tested in this dissertation. The broader processes this research endeavored to investigate (i.e., the relationship that mindfulness and positive reappraisal have with each other and with quality of life and perceptions of stress) must be understood more comprehensively before questions at that level of specificity could be addressed.

Examining adaptive coping strategies and understanding the amount of skill and effort necessary to utilize these strategies may impact the relationship between coping and mental health (Aldwin & Revenson, 1987). Specifically, based on this type of research, clinicians could provide information about mindfulness and positive reappraisal to clients who may be experiencing mental health challenges such as depression and anxiety and seeking means to improve their ability to cope with stressors. Mindfulness and positive reappraisal may be a portion of recommendations for clients who are cognitively able to engage in their use without a tremendous amount of difficulty.

Coping

Broadly, defining coping is essential in conceptualizing how mindfulness and positive reappraisal may be linked and relevant as coping resources. Lazarus and Folkman defined coping as a "person's constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands [stressors] that are appraised as taxing or exceeding the person's

resources" (Lazarus & Folkman, 1984, p. 141). They developed a transactional model of stress and coping in which they highlighted the importance of the resources an individual has when it comes to dealing with stressors.

Lazarus and Folkman discussed the notion that insufficient resources can lead to stress. These resources can be physical (i.e., health and energy), psychological (i.e., positive beliefs), environmental (i.e., social and material), and competencies (i.e., problem-solving and social skills; Lazarus & Folkman, 1984). Given that access to various resources, particularly environmental resources, are not equally available for every person, it may be useful to consider ways to facilitate the development of competencies.

There are likely individual differences at play when considering coping with stressors. For instance, a spiritual outlook would likely influence an individual's coping ability with a given stressor. Consequently, it would be informative to study coping with a stressor through mindfulness and positive reappraisal, especially in Buddhist/Zen groups, as these individuals may employ mindfulness and positive reappraisal to a greater extent than other people. My research considered these individual differences through the recruitment of participants from both Buddhist/Zen groups and from a community setting.

Conceptualization of Mindfulness

Mindfulness, which originates from the Buddhist religion, has become extensively popularized in Western culture in the past decade. Research seems to point to the idea that mindfulness is beneficial for people to practice and implement in some capacity. Specifically, mindfulness has been identified to offer many gains, including improved physical health, fewer symptoms of psychopathology (i.e., reductions in state and social anxiety), and better interpersonal relationships (Baer, 2007; Garland et al., 2014; Kocovski et al., 2015; Zeidan et al.,

2010). Additionally, mindfulness has been found to be positively associated with prosocial behavior and meaning in life (Chu & Mak, 2020; Donald et al., 2019). Conversely, limited use of mindfulness has been associated with poor outcomes with regard to depression, anxiety, stress, and adolescent psychological adjustment (Desrosiers et al., 2013; Pepping et al., 2016). Recent work through the use of latent profile analyses demonstrated the emergence of three profiles of mindfulness: "average mindfulness," "low to average mindfulness," and "high non-judgmentally aware" in a group of Dutch individuals. While a minority of the participants fell into the "high non-judgmentally aware" profile, these individuals were older, male, and less educated. They also reported the best psychological outcomes and coping strategies (Zhu et al., 2020). This research indicates that there may be a difference in levels of mindfulness as a function of age, gender, and education.

The investigation of mindfulness by the scientific community is not without imperfections. For example, recent work has noted that mindfulness research tends to have a positivity bias and a restriction of range due to the measures utilized and methods used (i.e., studying constructs such as mindfulness or meditation in experienced meditators; Britton, 2019). Additionally, because mindfulness research occurs in a larger social context, there are many factors that can influence its interpretation, such as the need for positive findings, which can limit the scope of research (Grossman, 2019).

The way that mindfulness is defined has differed amongst scholars, which stems from differences in how mindfulness is conceptualized and assessed (Bishop et al., 2004; Brown & Ryan, 2004; Gethin, 2011; Malinowski, 2008; Nilsson & Kazemi, 2016). This issue also arises because mindfulness has been categorized into two main types, which include state mindfulness and dispositional (also known as trait) mindfulness. State mindfulness refers to a transient state

achieved intentionally by meditation or other mindfulness exercises. Conversely, dispositional mindfulness refers to a persisting condition achieved through daily practice via conscious effort or could be part of one's general disposition. Many researchers tend to consider primarily one type or the other in their work. There has been encouragement by mindfulness researchers to consider the historical background of mindfulness and its origin in Buddhist traditions (Analayo, 2019). This dissertation acknowledged both state mindfulness and dispositional mindfulness as plausible predictors of greater quality of life and lower perceptions of stress, as well as incorporated the Buddhist origins of mindfulness in both participant recruitment and overall methodology.

It would be beneficial to assess mindfulness in its numerous conceptualizations to discern if there are limits to its relationship with positive reappraisal. This dissertation ventured to accomplish this task by evaluating mindfulness comprehensively by incorporating measures of state and dispositional measures of mindfulness, as well as presenting participants with a brief mindfulness exercise. Studying mindfulness in this meticulous way serves to add to the existing literature on mindfulness and positive reappraisal, which lacks this quality of research. Additionally, it can also differentiate whether overall dispositional mindfulness and/or aspects of state mindfulness such as decentering and curiosity (which are subscales on the Toronto Mindfulness scale used in this dissertation) are directly related to positive reappraisal. For this study, mindfulness was defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 2012, p. 1)

Conceptualization of Positive Reappraisal

In the past, mindfulness has been investigated in combination with positive reappraisal. Positive reappraisal refers to an adaptive process involving reframing events that occur in a way

that focuses on their value or benefits (Garland et al., 2009). Positive reappraisal can be viewed as a strategy that is utilized as a part of emotion-focused coping. There appear to be age-related differences in the benefits of positive reappraisal and its use. Specifically, past research has demonstrated that positive reappraisal is associated with fewer symptoms of anxiety and depression, with this relationship being more robust in adults than adolescents (Garnefski et al., 2002). For instance, in the face of significant stress, individuals who are living with HIV/AIDs have found positive reappraisal coping to be helpful when managing the life-changing implications of living with this diagnosis (Finkelstein-Fox et al., 2020). Additionally, researchers have found that older adults use positive reappraisal more than middle-aged and young adults (Shiota & Levenson, 2009) and that younger adults had some emotion regulation benefits when compared to older adults after being instructed to engage in positive reappraisal and mindful attention (Brady et al., 2020). Furthermore, positive reappraisal has been demonstrated to increase positive emotions after viewing a negative film and leaves individuals with more ability to self-regulate when working on a learning task when compared to emotional suppression (Stiller et al., 2019). For purposes of this research, positive reappraisal is defined as the "reconstruction of events as valuable, benign, or beneficial" (Garland et al., 2009, p. 2). Additionally, for this research, qualitative data was collected about mindfulness and positive reappraisal. These data separately asked participants where they learned about mindfulness and/or positive reappraisal if they use each to manage stressors, and how they use them to manage stressors.

Theoretical Models of Mindfulness and Positive Reappraisal

Several theoretical models in the literature attempt to describe the way by which mindfulness and positive reappraisal interconnect. Specifically, these various models propose

how mindfulness and positive reappraisal are crucial aspects of coping with stressors and lead to positive outcomes (Garland et al., 2009; Garland et al., 2015). While no model individually is comprehensive, each provides unique knowledge that contributes to its utility.

The mindful coping model (Garland et al., 2009) proposes that when a stressor occurs, individuals engage in primary and secondary reappraisal. Afterward, it is theorized that there is a "mindfulness mode" that occurs during which decentering, attentional flexibility, and broadening of awareness occur. Decentering refers to seeing one's thoughts and feelings as temporary and allows for attentional broadening to occur. As a result of this broadened perspective, positive reappraisal is theorized to transpire during which new attributes and positive meaning are given to an event. Positive reappraisal may be a conscious process based on reflection or an automated process. This reappraisal is then thought to produce positive emotions like compassion, trust, and confidence, which reduce stress and impacts future appraisal processes.

To support the Mindful Coping Model, researchers found that in five distinct samples— individuals without contemplative practice, individuals with contemplative practice, college students, individuals from a randomized control trial for chronic pain, and individuals with alcohol and substance use disorders—dispositional mindfulness had a positive relationship with positive reappraisal (Hanley & Garland, 2014). Specifically, aspects of dispositional mindfulness, such as non-reactivity to inner experience and describing/ differentiating emotions, were the most highly related to positive reappraisal. Furthermore, even when controlling for positive refocusing, psychological well-being, and positive affect, mindfulness still accounted for a significant portion of the variance in positive reappraisal.

The Mindfulness to Meaning theory (MMT; Garland et al., 2015) is a further development of the Mindful Coping Model (Garland et al., 2009) and the Upward Model of

Flourishing (Garland et al., 2010), which were derived from the process of integrating

mindfulness to Lazarus and Folkman's transactional model of stress and coping (Lazarus &

Folkman, 1984). This theory has two hypotheses. The first is that mindfulness generates meaning

through reappraisal. The second is that mindfulness generates meaning through savoring. The

first hypothesis is the most relevant for this discussion. During the first stage, the pre-appraisal

stage, individuals are thought to see both positive and negative aspects of a stressor. When

individuals have dysphoric schemas, there is a focus on the negative aspects of a stressor.

Mindfulness is believed to influence working memory by allowing new appraisals and schemas

to arise. This reconfiguration includes primary appraisals of stressors but also broadens one's

attention allowing for broader appraisals to occur. This broadening of attention gives individuals

the ability to have a balanced view of a stressor, which includes both the positive and negative

aspects. The authors suggest that mindfulness is a label assigned for "scholarly convenience" on

a set of interacting cognitive and affective processes. They also note that positive reappraisal is

only one of several cognitive developments that occur from the use of mindfulness.

Several studies have provided support for the Mindfulness to Meaning Theory. For

example, Garland, Thielking, et al. (2017) found that in 97 cancer patients, dispositional

mindfulness was found to be positively correlated with self-report measures for quality of life,

attention to positive information, positive reappraisal, and savoring, and negatively associated

with emotional distress. Garland, Kiken, et al. (2017) also explored the impact of an 8-week

mindfulness-based intervention on state mindfulness and positive reappraisal in 234

predominately female White participants. They discovered that state mindfulness experienced

during meditation increased and reinforced habitual positive reappraisal. Increased use of

positive reappraisal also bolstered state mindfulness. A final study by Garland, Hanley, et al.

(2017) examined the Mindfulness to Meaning Theory in 107 treatment-seeking individuals with a social anxiety disorder. They found that mindfulness-based interventions such as Mindfulness-Based Stress Reduction led to more significant increases in decentering and broadened awareness than treatments like Cognitive Behavioral Therapy. The researchers also found that the mechanisms of change identified in the Mindfulness to Meaning theory (attentional control, decentering, broadened awareness, and reappraisal) led to an increase in positive affect even up to one-year post-treatment.

Finally, there is the mindful, supportive communication work which posits that mindfulness meditates the relationship between perceived emotional supports and received emotional support (Jones & Hansen, 2015). This perspective is unique in that it describes the role that mental health providers can have in giving emotional support to other individuals. The authors suggest that providers have a role in mindful coping (Garland et al., 2009). Specifically, providers can supply emotional support that can help individuals during the decentering stage of mindfulness by allowing individuals to consider different "vantage points" (Jones & Hansen, 2015, p. 3).

There is some work that helps support this model. Jones and Hansen (2015) investigated the effect of two weeks of mindfulness exercises on 44 undergraduate students. They found that individuals who engaged in mindfulness exercise for 2 weeks after learning about them at an initial session experienced increases in positive reappraisals, less dysfunctional communication coping (i.e., blaming others, expressing anger, aggression, or avoiding talking about a particular issue), and were more attentive to thoughts, feelings, and activities in the present. These individuals were also more emotionally expressive, socially expressive, emotionally sensitive, and had more emotional control at the end of the two weeks than at the start. Another study done

by Jones and Hansen (2015) investigated the effects of two weeks of mindfulness exercises on 51 undergraduate students' communicative coping abilities. After a two-week mindfulness practice, participants in the mindfulness group had less dysfunctional communicative coping skills and more positive reappraisals.

The most relevant models for my research are detailed here. This research does not intend to compare or test any of these theoretical models. This theoretical work was the basis for the creation of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction (see Figure D1), which is discussed below.

Relationship Between Mindfulness and Positive Reappraisal

The small empirical literature examining the relationship between mindfulness and positive reappraisal suggests that there is an association that exists between them. Specifically, both mindfulness and positive reappraisal appear to be beneficial for individuals of different cultural backgrounds, individuals with and without clinical disorders, and individuals at different points of development (Curtiss et al., 2017; Desrosiers et al., 2013; Greeson, 2009; Hanley et al., 2017; Modinos et al., 2010; Rayan & Ahmad, 2016; Teasdale, 1999). Several studies suggest ways that mindfulness and positive reappraisal may play a role with regards to improving psychological symptoms and self-efficacy (Desrosiers et al., 2013; Hanley et al., 2017; Modinos et al., 2010). Additionally, mindfulness-based interventions can work to increase both mindfulness and positive reappraisal (Rayan & Ahmad, 2016). Recent research has shown that mindfulness and positive reappraisal were both separately associated with better life satisfaction, lower perceived stress, and fewer depressive symptoms in a group of older men who experienced an emotionally distressing event (Aliche & Onyishi, 2020). Mindfulness and, subsequently, positive reappraisal could be resources that individuals can use to cope with stressors. The

opportunity for mental health services to reach the broader population can be limited by factors such as economic status or stigma. The benefit of mindfulness and positive reappraisal is that once individuals are taught the general principles behind these strategies, they can immediately be used, thereby making these strategies very accessible for people. Additionally, these strategies can be taught on a group basis if desired, which also helps provide access to more individuals in less time.

Stress, Mindfulness, and Positive Reappraisal

There is existing literature that illustrates that mindfulness has a role in helping individuals manage stress (Bao et al., 2015; Gerzina & Porfeli, 2012; Grossman et al., 2004) Mindfulness-based stress reduction (MBSR) utilizes mindfulness meditation to alleviate symptoms of physical, psychosomatic, and psychiatric disorders. Past work suggests that MBSR has been helpful for a variety of individuals in coping with a range of clinical and nonclinical problems (pain, cancer, heart disease, depression, anxiety, stressed nonclinical groups; Grossman et al., 2004). Other work has found mindfulness to be associated with lower perceived stress (Bao et al., 2015). Additionally, mindfulness and positive reappraisal may be protective factors. For instance, some past work utilized actors who posed as standardized patients and portrayed intense emotional patient experiences to help healthcare professionals practice clinical skills; those actors who were higher in mindfulness and positive reappraisal experienced less burnout from the distressing aspects of their work (Gerzina & Porfeli, 2012). It appears that mindfulness and positive reappraisal may not only be ways that individuals choose to cope with stressors, but they may also impact individuals' general perceptions of stress in their day-to-day lives.

Quality of Life, Mindfulness, and Positive Reappraisal

There are studies linking mindfulness as well as positive reappraisal with a higher quality of life (Da Silva & Pereira, 2017; Van De Ven et al., 2007; Zomorrodi et al., 2015). For instance, patients who had irritable bowel syndrome and went through mindfulness-based therapy consequently experienced improvements in their quality of life for up to a year post-therapy (Zomorrodi et al., 2015). Other researchers examined spirituality, mindfulness, and quality of life in psychiatric patients and found that a spiritual outlook is related to increased quality of life and the ability to cope through mindfulness (Da Silva & Pereira, 2017). Positive reappraisal also seems to be associated with quality of life from a developmental perspective. Specifically, in a youth sample with asthma, the coping strategy of positive reappraisal was found to be associated with increased scores on the positive quality of life domain (Van De Ven et al., 2007). Overall, this suggests that higher levels of mindfulness and higher levels of positive reappraisal have a positive impact on individuals' reported quality of life. Additionally, there may be something unique about being spiritual and having a spiritual outlook, which impacts individuals' quality of life and allows individuals to implement mindfulness as a coping strategy.

Short-Term Mindfulness Interventions and Improvements in Mood

Some existing literature supports the idea that short-term mindfulness interventions can lead to changes in mood (Tang et al., 2014; Zeidan et al., 2010). For instance, researchers found that participants who received 5 days of meditation practice had better attention, significant reduction of stress-related cortisol, and lower negative mood (less anger, depression, fatigue, and anxiety) than individuals in a control group given a relaxation training (Tang et al., 2014). Other work has demonstrated that a brief (one hour/day for 3 days) meditation intervention was more effective at lowering: depression, fatigue, confusion, and heart rate when compared to a Sham

meditation group (involving no guided instructions) and a control group (Zeidan et al., 2010). In my dissertation, the mindfulness intervention was a 10-minute seated meditation, which is briefer than the meditation practices done in past research. Nonetheless, this meditation may lead to state-based changes in mood, which may be a good temporary solution to protect against stressors.

Mindfulness, Rumination, and Distraction

Existing work has examined the effectiveness of meditation and mindfulness practices in improving an individual's mood after a negative mood induction, particularly when compared to other strategies such as distraction and rumination (Broderick, 2005; Kuehner et al., 2009). For example, Broderick (2005) found that after a sad mood induction that individuals who were in a mediation group experienced less negative mood than individuals who were in either a rumination or distraction group. Also, individuals who were in the distraction groups experienced less negative mood than those in the rumination groups. Similarly, other work has revealed that the induction of either a mindful self-focus or distraction positively impacted negative mood when compared to rumination (Kuehner et al., 2009).

Clinical treatments have also shown evidence that meditation and mindfulness have benefits for individuals (Hawley et al., 2014; Jain et al., 2007). A randomized control trial (RCT) compared one month of mindfulness meditation to somatic relaxation and a control group and found that those in the meditation group experienced less distracted and ruminative thoughts and behaviors than those in the control group (Jain et al., 2007). Additionally, in this RCT, the mindfulness meditation's effect on reducing distress seemed to be partially mediated by reducing rumination. Hawley et al. (2014) found that in outpatients receiving Mindfulness-based cognitive therapy (MBCT) and Mindfulness-based stress reduction (MBSR) for depression that those

engaging in formal (but not informal) mindfulness practice experienced less rumination and improved depressive symptoms.

Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction

The examination of the existing empirical evidence and theoretical frameworks regarding mindfulness and positive reappraisal lead to my creation of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction (see Figure D1). Broadly, this model is based on past research that suggests that positive reappraisal has a relationship with both state mindfulness (informal/formal mindfulness practices) and aspects of dispositional mindfulness (nonreactivity, differentiating emotional experiences, and describing emotional experiences; Hanley & Garland, 2014). Additionally, it is based on the idea that the relationship between mindfulness and positive reappraisal can lead to many theorized positive outcomes, including fewer psychological symptoms, less dysfunctional communication, less emotional distress, increased emotional control, and increased well-being (Curtiss et al., 2017; Jones & Hansen, 2015).

The Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction proposes that in the face of a stressor, an individual may choose to engage in mindfulness, which then leads to positive reappraisal with the final endpoint being positive outcomes (see Figure D1). An individual who experiences a stressor may go through the Buddhist pathway (color-coded blue) or the psychological pathway (color-coded red) to engage in coping that reduces the impact of the stressor. The Buddhist pathway represents those who have informal or formal practices of mindfulness and use mindfulness to cope with stressors. The psychological pathway represents those who have aspects of dispositional mindfulness, such as nonreactivity, differentiating emotional experiences, and describing an emotional experience, which helps them cope with stressors. These pathways are meant to be dimensional. Based on the existing

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literature, it is unclear which pathway contributes more to positive reappraisal and positive outcomes. Individuals may also have combined experience. Since no study to date has examined these two pathways in combination with positive reappraisal, it is difficult to explain or illustrate what this combined pathway might look like and how it would work. However, the possibility of a combined pathway is still important to mention.

This model has not yet been examined, and my research aimed to demonstrate whether pieces of this model are interrelated and if there are distinct paths by which it operates. In Study 1, participants were placed in three different groups (meditation, rumination, and distraction) after completing a stressful writing task. In Study 2, the same writing task was used to induce short-term stress in participants from both a spiritual group and a community group. In Study 2, participants were also asked about their perceptions of stress during the last month. Participants were asked if they use mindfulness and/or positive reappraisal to manage stressors, and if so, how. To confirm or refine the Buddhist and psychological pathways, all participants completed a dispositional mindfulness measure, completed a brief meditation (to induce state mindfulness), and then completed a state mindfulness measure. Participants were also asked open-ended questions to assess where they learned about mindfulness and/or positive reappraisal. To evaluate the theorized positive outcomes of using mindfulness and positive reappraisal to cope with stressors, participants completed a multicultural quality of life measure.

Goals and Hypotheses

The main goal of this dissertation was to understand the broader processes involved in the Mindfulness-Positive Reappraisal Pathways Model and how they are associated with one another before asking more specific questions. This exploratory research sought to answer these questions through two studies with different goals and hypotheses.

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In Study 1, a primary goal was to examine the effectiveness of meditation in the face of an immediate stressor (stressful writing task) when compared to rumination and distraction. Past work suggests that meditation would be more effective than rumination and distraction in positively impacting mood (Broderick, 2005; Jain et al., 2007; Kuehener et al., 2009). Based on this past literature, I hypothesized that individuals in the meditation group would have less reactivity across all mood subscales compared to the distraction group and compared to the rumination group.

In Study 2, a primary goal was to examine how the quality of life and perceptions of stress are related to state mindfulness, dispositional mindfulness, and positive reappraisal. Past literature has demonstrated that mindfulness and positive reappraisal are associated with improved quality of life and decreased perceptions of stress (Bao et al., 2015; Da Silva & Pereira, 2017; Grossman et al., 2004; Zomorrodi et al., 2015). Based on past work, I hypothesized that dispositional mindfulness, positive reappraisal, and state mindfulness would be predictive of lower perceived stress and higher quality of life across both the spiritual (Zen/Buddhist) group and the community group. Additionally, researchers have found that short-term mindfulness interventions can lead to changes in mood (Tang et al., 2014; Zeiden et al., 2014). Based on this empirical work, I hypothesized that participants from the Buddhist/Zen group, who frequently practice meditation, would have less reactivity after completing a stressful writing task than those from the community. Other goals included examining whether group membership (Buddhist/Zen group compared to a community group) impacts the quality of life and perceptions of stress, as well as examining whether differences exist in scores across all main study variables (state mindfulness, dispositional mindfulness, positive reappraisal, quality

of life, perceptions of stress) between the two participant groups. A final goal of Study 2 was to

replicate past work in demonstrating that mindfulness is related to positive reappraisal.

CHAPTER II: STUDY 1 METHODS

In Study 1, participants were randomly placed in a meditation group, rumination group, or distraction group after completing a stressful writing task. Past work has demonstrated that after a dysphoric mood induction, those instructed to meditate reported lower levels of negative mood than those in rumination groups or distraction groups (Broderick et al., 2005). Based on this past literature, I hypothesized that individuals in the meditation group will have less reactivity (lower $AUC_{I}s$; see below for an explanation of $AUC_{I}s$) across all mood subscales compared to the distraction group and compared to the rumination group.

Participants

The study received 172 responses from community members, ages 18 and older, recruited through Amazon Mechanical Turk (MTurk) in the summer of 2020. Participants were required to be 18 or older, English speaking (either native speakers of English or learned English as a second language), and located in the United States. Participants who completed all study measures received $4 for taking part in the study. Of the 173 individuals who participated, only 147 were paid for usable data. There were 26 participants who did not have usable data (on stressful writing tasks responded with one sentence, a few words, and nonsensical phrases; possibility of some responses produced by robots), so they were replaced and not paid during data collection. After data collection, it was noted that there were an additional 8 participants who did not complete more than 20% of the items on any of the mood measures and also did not pass the attention checks. There were an additional 59 participants, 17 participants in the rumination groups, 19 participants in the meditation groups, and 23 participants in the distraction groups who did not pass the attention checks (see Appendix A). The final sample included 80 participants (29 in the meditation group, 24 in the rumination group, and 27 in the distraction

group), whose demographics are summarized in Table C1. They ranged in age from 18 to 62 and were primarily White (66.3%) and Asian (16.3%). Additionally, they largely identified as heterosexual (83.5%), male (69.6%), having a 4-year degree or higher (75.1%), and being employed full-time (75.4%; Table C1).

Materials

Writing Task

A stressful writing task was used in this study to induce participant stress. There were no control groups for the stressful writing task; all participants were asked to engage in the stressful writing task. Past work reported that writing longhand compared to typing about a stressful experience is associated with greater negative affect, although typing still led to negative affect in participants (Brewin & Lennard, 1999). Additionally, past work has suggested that word count requirements may encourage more detail in some writing tasks (O'Brien & Hamm Baugh, 2013). For purposes of feasibility and later limitations due to COVID-19, a typing manipulation was used. Participants were given a writing task where they were asked to write at least a minimum of 150 characters (based on previous work about minimum character counts; O'Brien & Hamm Baugh, 2013) about the following: "Describe an experience you've had that was stressful for you to handle." Participants had 5 minutes to write a minimum of 150 characters, with no limit on the maximum number of characters they could use. This task was meant to get participants to feel stressed. Pilot work completed prior to this study by the current researcher allowed for stressor content categories to be created and used. Given the ongoing global pandemic, COVID-19 was added as one of the stressor content categories. After completing the writing task in the current study, participants were able to categorize their stressors using a drop-down list (for a detailed list of participants' self-categorizations across the three groups, see Table C2).

Brief Mood Introspection Scale

The Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988) is a mood scale with 16 mood adjectives (lively, sad, calm, jittery, etc.) to which participants responded. Participants were asked to indicate "how well each adjective describes [their] present mood." Each item is rated on a 4-point scale ranging from "definitely do not feel" to "definitely feel." The BMIS uses a four-point Meddis response scale. For scoring purposes, it can be coded so that XX is set equal to 1, X to 2, V to 3, and VV to 4. Additionally, XX to VV are anchored with "definitely do not feel" up to "definitely feel." The BMIS has been found by its creators to have good internal consistency ($\alpha = 0.58$ for the arousal-calm, $\alpha = 0.76$ negative-relaxed, $\alpha = 0.77$ positive-tired, and $\alpha = 0.83$, pleasant-unpleasant). Participants were given this mood assessment at four time points: Time 1 (before the stressful writing task), Time 2 (after the stressful writing task and before the experimental manipulation), Time 3 (5 minutes into the experimental manipulation), and Time 4 (after the experimental manipulation). Four subscale scores can be calculated from the BMIS: Pleasant-Unpleasant, Positive-Tired, Arousal-Calm, and Negative-Relaxed (see Figures D2-D5). Each subscale score is calculated using a different set and number of items. Specifically, Pleasant-Unpleasant uses all 16 items, Positive-Tired uses seven items, Arousal-Calm uses 12 items, and Negative-Relaxed uses six items. Negatively worded items are reverse scored. In Study 1, there was varying internal consistency for the BMIS subscales across four different time points. ($\alpha = 0.75$ to 0.84 for the arousal-calm; $\alpha = 0.38$ to 0.83, negative-relaxed; $\alpha = 0.60$ to 0.73, positive-tired; and $\alpha = 0.69$ to 0.85, pleasant-unpleasant). After data collection was complete, I calculated the area under the curve with respect to baseline BMIS scores to index emotional reactivity. This technique has been used in the past to index cortisol reactivity compared to baseline levels (AUC_I; Pruessner et al., 2003). AUC_I has the added benefit

of capturing reactivity across multiple time points. To calculate the area under the curve (with respect to increase and later with respect to ground), all subscales were scored in such a way that higher raw mood scores indicated more negative affect (unpleasant, negative, aroused, and tired mood). This is due to the fact that AUC_I scores are most interpretable when the direction of reactivity is positively scaled (Pruessner et al., 2003). Consequently, after initial BMIS subscale scores were calculated, two of the subscales (where higher scores were indicative of less negative affect), the positive/tired subscale and the pleasant/unpleasant subscale, were reverse coded.

Meditation Condition

In the meditation group, a 10-minute seated mindful awareness of the breath audio meditation was used. This meditation comes from the "mindfulness resources" provided by the University of California San Diego Center for Mindfulness (https://soundcloud.com/ucsdmindfulness/10-min-awareness-of-breath-by-christy-cassis). Participants were instructed to close their eyes when listening to this audio.

Meditation Attention Check

At the end of the meditation and for an attention check, participants were asked to select from a drop-down menu which word best completes a message that was shared in the meditation. The message that was used appeared at the very end of the meditation and stated, "When we are done with this practice, as long as we are breathing, there is more right with us than there is wrong." Participants were given the options of selecting from the following: breathing, moving, thinking, living, and learning. See Appendix A for meditation attention check criteria.

Rumination Condition

In the rumination groups, participants were provided with instructions to think about the stressor they wrote about in their minds for 10 minutes. This task and its instructions were adapted from a multifaceted past study involving the comparison of experimentally induced cognitive strategies such as rumination when adolescents were told to think about a stressful event (Rood et al., 2012). Specifically, participants were told to think about the stressor they wrote about in their head as a movie and to bring up all thoughts and feelings that this stressor elicited in them. Participants were given the written instructions: "You just wrote about a stressful experience. You are expected to think about that experience again, but now in a certain way. Now try to think about the causes of that stressful experience over and over again, about the consequences, and about how the experience moves you" (Rood et al., 2012, p. 83). Their computer program automatically advanced after 10 minutes had passed.

Rumination Attention Check

At the end of the rumination groups, participants were instructed to type out the words and images that went through their minds while doing the previous task and to be as complete as possible in their responses (Rood et al., 2012). See Appendix A for rumination attention check criteria.

Distraction Group

The materials used for this group have been repeatedly used by past researchers in studies with distraction groups (Kuehner et al., 2009; Vickers & Vogeltanz-Holm, 2003) and has been adapted in this study for use online. Participants were provided a set of 45 items. Instructions stated, "Read each item slowly and silently to yourself. As you read the items, use your imagination and concentration to focus your mind on each of the ideas. Spend a few moments

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visualizing and concentrating on each item" (Lyubomirsky et al., 2003, p.315). Examples of these items include "the layout of a classroom" and "the shape of the continent of Africa." Participants were presented with five items at a time (a total of 45 items) for about 66 seconds. This task lasted for a total duration of 10 minutes.

Distraction Attention Check

At the end of the distraction task, after participants proceeded to the next page, they were asked to select from a drop-down menu which word best completes a phrase. This phrase was one that they concentrated on in the exercise they had just completed. The phrase that was used is presented at the end of the distraction group and states, "A freshly painted door." Participants were given the option of selecting from the following: "A freshly painted … door, car, building, canvas, and stool." See Appendix A for distraction attention check criteria.

<div align="center">

Procedures

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Participants completed this study on an electronic device. They provided informed consent and completed demographic questions, which asked them about their age, race/ethnicity, gender, sexual orientation, the highest level of education, and employment status. Participants completed the BMIS (Time Point 1), the stressful writing task, the BMIS (Time Point 2), either the meditation task, rumination task, or distraction task, BMIS (Time Point 3 given 5 minutes into the experimental groups), and the BMIS (Time Point 4). Finally, participants were given a one-item attention check with content related to the group in which they were randomly placed.

Analytic Plan

Preliminary Analyses

Descriptive statistics for demographic information were generated. I examined the means for the outcome measures. The content of the stressors that participants wrote about was generated. I inspected Cook's distance to identify outliers across outcome measures.

One-Way ANOVA

A one-way ANOVA examining mood scores, across all mood subscales, between conditions at baseline (Time 1) was conducted to see if individuals significantly differed in baseline mood scores.

Primary Analyses

The area under the curve with respect to an increase (AUC_I) was calculated, and scores were used in primary analyses. This technique has been used in the past to index cortisol reactivity compared to a baseline level (Pruessner et al., 2003). Specifically, AUC_I provides a one-variable way to index reactivity across multiple time points with respect to baseline. In this study, this technique was used to index emotional reactivity compared to a baseline level since the effect of the group may be reflected through a change in mood levels from baseline. Higher AUC_Is are indicative of higher reactivity.

I examined meditation compared to distraction and rumination in impacting mood after a short-term stressor using planned contrasts (using AUC_I scores) to index the amount of change in an outcome measure repeated over time with respect to baseline. An explicit hierarchical hypothesis was used in Study 1 (see above) to increase power and statistical sensitivity. Consequently, to follow up on statistically significant planned contrasts (meditation was compared to both distraction and rumination separately), Scheffe's multiple-comparison post hoc

tests were used. Past work has shown that meditation is the most effective in improving mood, followed by distraction and rumination after negative mood inductions (Broderick, 2005; Kuehner et al., 2009). Subsequently, to test the hypothesis that individuals in the mediation group will have the lowest reactivity to a stressful writing task, a linear contrast testing meditation compared to distraction and meditation compared to rumination was conducted. I numerically coded the groups for the analyses from 0 to 2, from lowest hypothesized reactivity to highest hypothesized reactivity. Consequently, 0 is mediation, 1 is a distraction, and 2 is rumination. Exploratory post hoc Scheffe's multiple comparisons, while more conservative, were used to examine all possible contrasts when hypothesized linear contrast was not as expected.

Secondary Analyses

The area under the curve with respect to ground (AUC_G) was calculated, and scores were used in secondary analyses. This technique has been used with endocrinological data as a measure that is related to the "total hormonal output" (Pruessner et al., 2003). Specifically, AUC_G provides a single variable to index total exposure over time. In this study, this technique was used to examine changes in mood levels over time since the effect of the group might emerge as a difference in mood levels throughout all time points. Higher AUC_Gs are indicative of greater total exposure to a positively coded subscale (i.e., unpleasant or negative or tired or aroused subscale) over time across the repeated measures used in the manipulation (i.e., meditation, distraction, or rumination).

I examined the impact of meditation compared to distraction and rumination in impacting mood after a short-term stressor using planned contrasts (using AUC_G) to determine total exposure to unpleasant or negative or tired, or aroused subscales over time across the

repeated measures used in the manipulation (i.e., meditation, distraction, or rumination). The same contrasts done for AUC_I were conducted.

Power Analysis

G*Power 3.1 was used to run a power analysis to determine the sample size for Study 1. To estimate a small effect size of $f = 0.20$ for three groups and four repeated measures, power was set to 0.80, with $r = 0.43$ (based on repeated mood measure correlations in the pilot data), and the nonsphericity correction was set to 1. The output parameters indicated a total sample of $n = 51$ (17 per group) needed for a power of 0.80. However, once the four repeated measures were consolidated into the singular measures of AUC_I and AUC_G, this changed the power considerations. Specifically, to run a one-way ANOVA with an estimated small effect size of $f = 0.20$ for three groups and one measure (either AUC_I or AUC_G), power set to 0.80, requires a total sample size of 246, for which this study was underpowered.

CHAPTER III: STUDY 1 RESULTS

Preliminary Analyses

Demographic information and corresponding descriptive statistics are found in Table C1. The mean AUC_I and AUC_G by mood scale and group are depicted in Figure D6 and Figure D7. Of the stressors written about by participants across conditions, 26.3% of participants categorized their stressors under job pressure, 12.5 % of participants categorized their stressors under relationship stress, and 11.3% of participants categorized their stressors under uncertainty and lack of control. Importantly, 6.3% of participants endorsed writing about a stressor related to COVID-19. Table C2 includes more information about the stressor content written by participants within each condition.

Outliers Detection

Cook's distance was used to determine whether there were any AUC_I data points that were outliers. If Cook's distance for any data points was greater than 1, then these points were considered outliers (Dhakal, 2017). No AUC_I data points were considered outliers.

One-Way ANOVA on Baseline Mood Scores

Four one-way ANOVAs were performed to compare the effect of condition on Time 1 mood scores across the four subscales (pleasant/unpleasant, positive/tired, negative/relaxed, calm/arousal). Results revealed that there were not statistically significant differences in Time 1 mood scores between the conditions across the: pleasant/unpleasant subscale, $F (2,79) = 2.90$, $p = 0.06$, positive/tired subscale, $F (2,79) = 1.41$, $p = 0.25$. negative/relaxed subscale, $F (2,79) = 1.94$ $p = 0.15$, and the calm/arousal subscale, $F (2,79) = 2.41$, $p = 0.10$ (see Table C3 for means and standard deviations).

Planned Contrasts

Four planned contrasts were run with AUC_I as the outcome variable (see Table C4 for means and standard deviations), with follow-up Scheffe's multiple-comparison post hoc tests to test the hypothesis that those in the mediation group would have the lowest reactivity to a stressful writing task followed by distraction and rumination. Exploratory post hoc Scheffe's multiple comparisons post hoc analyses, while more conservative, were used to examine all possible contrasts when hypothesized linear contrast was not as expected. It is important to note that there are four subscales (pleasant/unpleasant, calm/arousal, positive/tired, and relaxed/negative) of the BMIS that were scored so that **higher AUC_Is** are indicative of higher reactivity (Figure D6).

The first planned contrast was conducted to examine if there was a significant linear trend indicating that pleasant/unpleasant subscale AUC_I scores increased as hypothesized with the group. Pleasant/unpleasant AUC_I scores did significantly fit a linear contrast, $F(1,79) = 5.76$, $p = 0.02$. As expected, post hoc analyses using Scheffe's post hoc criterion for significance (see Table C5) indicated that those in the meditation condition had the lowest reactivity in the pleasant/unpleasant scale, indicated by AUC_I ($M = -1.41$, $SD = 11.0$) followed by those in the distraction condition AUC_I ($M = 5.85$, $SD = 10.8$), and those in the rumination condition AUC_I ($M = 6.75$, $SD = 15.7$; see Table C4).

The second planned contrast was conducted to examine if there was a significant linear trend indicating that calm/arousal subscale AUC_I scores increased as hypothesized with the group. Calm/arousal AUC_I scores did not significantly fit a linear contrast, $F(1,79) = 0.10$, $p = 0.75$. Exploratory post hoc analyses using Scheffe's post hoc criterion for significance indicated that there were no significant differences between conditions (see Table C5). Unexpectedly,

those in the distraction condition descriptively had the lowest reactivity in the calm/arousal scale, indicated by AUC_I ($M = 0.94$, $SD = 4.89$), followed by those in the rumination condition ($M = 1.28$, $SD = 7.16$), and followed by those in the meditation condition ($M = 1.67$, $SD = 5.89$; see Table C4).

The third planned contrast was conducted to examine if there was a significant linear trend indicating that negative/relaxed AUC_I scores increased as hypothesized with the group. Negative/relaxed AUC_I scores did not significantly fit a linear contrast, $F(1,79) = 0.86$, $p = 0.36$. Exploratory post hoc analyses using Scheffe's post hoc criterion for significance indicated that there were no significant differences between conditions (see Table C7). Unexpectedly, those in the rumination group descriptively had the lowest reactivity in the negative/relaxed scale, indicated by AUC_I ($M = -3.13$, $SD = 7.01$) followed by those in the distraction group ($M = -1.73$, $SD = 6.76$), and those in the meditation group ($M = -1.43$, $SD = 6.83$; see Table C4).

The fourth planned contrast was conducted to examine if there was a significant linear trend indicating that positive/tired subscale AUC_I scores increased as hypothesized with the group. Positive/tired AUC_I scores did significantly fit a linear contrast, $F(1,79) = 4.04$, $p = 0.05$. Post hoc analyses using Scheffe's post hoc criterion for significance indicated that there were significant differences between groups (see Table C8). As expected, those in the meditation group descriptively had the lowest reactivity on the positive/tired scale, indicated by AUC_I ($M = -1.62$, $SD = 5.00$). Unexpectedly, those in the rumination group had the next lowest reactivity on the positive/tired scale, indicated by AUC_I ($M = 1.28$, $SD = 6.44$), followed by those in the distraction group ($M = 1.71$, $SD = 4.47$; see Table C4).

Secondary Analyses

To test for the possibility that the group effect might emerge as a difference in level throughout all time points, the area under the curve with respect to ground (AUC_G; Pruessner et al., 2003) was used in planned contrasts (meditation vs. distraction and meditation vs. rumination) with follow up Scheffe's multiple comparison post hoc tests (see Tables C10-C13). Exploratory Scheffe's multiple comparisons post hoc analyses, while more conservative, were used to examine all possible contrasts when linear contrast was not as expected. It is important to note that **higher AUC_G's** are indicative of greater total exposure to a positively coded subscale (i.e., unpleasant or negative or tired or aroused subscale) over time across the repeated measures used in the manipulation (i.e., meditation, distraction, or rumination; see Figure D7). Regarding outliers, Cook's distance was used to assess if any AUC_G data points were outliers. No Cook's distance for any AUC_G data point was greater than 1.

Of the planned contrasts, there were two significant planned contrasts whose results are reported here. Calm/arousal AUC_G scores did significantly fit a linear contrast, $F (1,79) = 4.60, p = 0.04$. Post hoc analyses using the Scheffé post hoc criterion for significance indicated that there were no significant differences between groups (see Table C11). Those in the meditation group descriptively had the greatest total exposure to the arousal subscale over time as indicated by AUC_G ($M = 89, SD = 14.9$), followed by those in the distraction group AUC_G ($M = 88.3, SD = 16.3$), and the rumination group AUC_G ($M = 80.1, SD = 15.2$; see Table C9). Negative/relaxed AUC_G scores did significantly fit a linear contrast, $F (1,79) = 7.02, p = 0.01$. Post hoc analyses using the Scheffé post hoc criterion for significance indicated that there were no significant differences between groups (see Table C13). Those in the meditation group descriptively had the greatest total exposure to the negative subscale over time as indicated by AUC_G ($M = 41.7, SD =$

11.3), followed by those in the distraction group AUC$_G$ ($M = 39.5$, $SD = 11.7$), and the

rumination group AUC$_G$ ($M = 34.1$, $SD = 9.13$; see Table C9).

CHAPTER IV: STUDY 1 DISCUSSION

The goal of Study 1 was to determine the effectiveness of a short-term mindfulness intervention in the face of an immediate stressor. It was hypothesized the meditation group would have the lowest reactivity compared to those in the distraction and rumination condition. Reactivity across affect subscales as operationalized by the AUC_I score did significantly vary, as hypothesized for only the pleasant/unpleasant subscale. Additionally, the positive/tired reactivity across affect subscales as operationalized by AUC_I score partially varied as hypothesized. Specifically, those in the meditation condition did have the lowest reactivity on the positive/tired scale. However, unexpectedly this was followed by the rumination condition and the distraction condition. Secondary analyses were used to assess if the conditions differed in terms of greatest total exposure to the subscales of unpleasant, negative, tired, and aroused over time. Results revealed that there were differences among the conditions with regard to total exposure over time. While these were not significant differences, descriptively, those in the mediation condition reported the greatest total exposure to the aroused subscale and the negative subscale, followed by those in the distraction condition and rumination condition. Additionally, analyses revealed that there were no significant differences in mood scores (across all subscales) between the meditation, distraction, and rumination conditions at baseline (Time 1).

There were some limitations of this research. First, this study was significantly underpowered, making it difficult to find significant effects. Also, this study was conducted during the summer of 2020, during which the ongoing pandemic (COVID-19) was impacting everyone's lives. Additionally, there were protests and riots occurring against the systematic racism toward Black people. It is not necessarily a question of whether individuals were impacted by these daily life stressors but the extent to which they were. It is possible that some

of the unexpected findings of this study were due to the context in which participants were completing this study. Specifically, the stressful writing task might not have impacted stress levels in the same way that this task may have during a different period of time in the world. Additionally, individuals completing this study may have been at an elevated and continued level of stress due to the uncertain nature of the course of the pandemic and civil unrest related to condemning long-standing systematic racism and police violence that Black people in the United States have faced. Finally, it may have been valuable to have a group of participants that didn't engage in any strategy after the stressful writing task. This would have allowed us to see if doing nothing was equally as effective or more effective as engaging in meditation, distraction, or rumination.

The goal of Study 2 was to understand the broader processes (state mindfulness, trait mindfulness, positive reappraisal, perceptions of stress, quality of life) involved in the conceptual Mindfulness-Positive Reappraisal Pathways Model and how they are associated with one another. Aspects of the design of Study 1 were retained, and open-ended questions and self-report measures related to mindfulness, positive reappraisal, and quality of life were included to examine these associations.

CHAPTER V: STUDY 2 METHODS

Study 2 was designed to test components of the author's theorized Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction. In Study 2, participants (recruited from both Buddhist/Zen centers and the community) completed the same basic procedure as in Study 1: writing about a stressful life event, BMIS measure (at four time points), and a 10-minute meditation audio. Additionally, they completed self-report measures on the quality of life, perceptions of stress, dispositional mindfulness, and positive reappraisal and answered Open-Ended Questions about positive reappraisal and formal/informal practices (meditation, yoga, reading of Buddhist texts) of mindfulness. Based on past research (Bao et al., 2015; Da Silva & Pereira, 2017; Grossman et al., 2004; Tang et al., 2014; Zeidan et al., 2010; Zomorrodi et al., 2015), the following was hypothesized: (a) Individuals in the spiritual group (who have previous experiences with mindfulness) will have lower AUCI's across all mood subscales than those in the community group, and (b) Dispositional mindfulness, positive reappraisal, and state mindfulness will be predictive of lower perceived stress across both groups, and higher quality of life across both groups. Additionally, an exploratory hypothesis included the variable of group membership to see if it was predictive of lower perceived stress (on the Perceived Stress Scale) and higher quality of life. Secondary variables of hours spent meditation, hours spent doing yoga, and hours spent reading Buddhist texts were added to see if they were predictive of a higher quality of life. A final exploratory hypothesis examined if there were discrepancies in stressor severity ratings (subjective perceived severity vs. objective rater severity) based on group membership.

Participants

The initial sample consisted of 45 community members (a different set of individuals than those in Study 1), ages 18 and older, recruited through an MTurk advertisement and compensated $5.50 for participation; and 46 individuals (hereafter referred to as the spiritual sample or spiritual group), ages 18 and older, recruited through various Buddhist/Zen Centers in the U.S. during the summer of 2020. Participants had to be English speaking and located in the United States for recruitment. Participants in the spiritual group were recruited by outreach to Buddhists or Zen via an IRB-approved email, which provided the Qualtrics link for individuals who wished to participate. They had the option of receiving an Amazon gift card for $5.50 after completing the study. Both the MTurk advertisement and IRB-approved email included this very general description: "We are conducting an academic survey about life's challenges. We need to understand the challenges that you may have faced." Participants were also given information on consent, length of study, and compensation. There were 32 total participants (11 participants from the community sample and 21 from the spiritual sample) excluded from data analyses as they had more than 20% of the items missing on any mood measures. Additionally, seven participants from the community sample and four participants from the spiritual sample did not pass the attention check (see Appendix A). The final sample included 48 participants (27 participants in the community sample, 21 participants in the spiritual sample) who ranged in age from 23 to 77 years old ($M = 45.4$, $SD = 15.5$) and was primarily White (81%). Additionally, they primarily identified as heterosexual (77%), female (56%), had 4-year degrees (46%) and were employed full time (67%; see Table C14). The participants in the spiritual sample were recruited from 14 different Zen centers in seven different states (for a complete list, see Table C15).

Materials

Mindful Attention Awareness Scale (MAAS)

The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) is a 15-item self-report measure of dispositional mindfulness. This measure further examined the two theorized pathways of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction. It assesses everyday experiences such as "I snack without being aware that I'm eating" or "I find myself preoccupied with the future or past." Each item is rated on a 6-point Likert scale from 1 (*almost always*) to 6 (*almost never*). Higher scores on this scale indicate greater mindfulness. Participants' scores on the MAAS were included as a predictor in regression analyses. The MAAS has been found to have good internal consistency ($\alpha = 0.78$ to 0.92 based on past research; Park et al., 2013).

Multicultural Quality of Life Index (MQLF)

The Multicultural Quality of Life Index (MQLF; Mezzich et al., 2011) is a culturally informed quality of life measure. This measure was used to assess the positive outcomes component of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction. It assesses the quality of life across ten domains. These domains include physical well-being, psychological/emotional well-being, self-care, and independent functioning, occupational functioning, interpersonal functioning, social-emotional support, community and services support, personal fulfillment, spiritual fulfillment, and global perception of the quality of life. Each item is rated on a 10-point scale ranging from 1 (*poor*) to 10 (*excellent*). Participants' scores on the MQLF were used as an outcome in regression analyses. The MQLF has been found to have good internal consistency ($\alpha = 0.92$) and test-retest reliability ($r = 0.67$ to 0.79 based on past research; Mezzich et al., 2011).

Cognitive Emotion Regulation Questionnaire (CERQ)

The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002) is a 36-item self-report measure that is used to identify which cognitive coping strategies individuals use after experiencing negative events or situations. Items include statements such as "I think I can learn something from the situation." Each item is rated on a 5-point Likert scale from 1 (*almost always*) to 5 (*almost never*). The CERQ distinguishes nine different cognitive coping strategies, which make up the nine different subscales. Since the primary focus of this study was to examine the relationship between mindfulness and positive reappraisal, only the four items in the positive reappraisal coping subscale of the CERQ were asked of participants and used in data analysis. Participants' scores on this subscale were used to see if there is a relationship between state mindfulness, dispositional mindfulness, and positive reappraisal. Participants' scores on the CERQ were also used as one of the predictors in regression analyses. The CERQ has been found to have good internal consistency reliability ($\alpha = 0.70$ to 0.80 based on past research; Garnefski et al., 2002).

Perceived Stress Scale (PSS)

The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) is a 10-item self-report measure of globally perceived stress. This measure examined participants' perceptions (thoughts and feelings) of stress over the past month, which helped capture the first component (stressor) of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction. There are items worded more negatively (i.e., "How often have you felt nervous and 'stressed'?") while other items are worded more positively and reverse scored (i.e., "How often have you felt that things were going your way?"). Each item is rated on a 5-point Likert scale ranging from 0 (*Never)* to 4 (*Very Often*). Higher total scores on this measure are indicative of a greater

perception of stress. Participants' scores on the PSS were used for one of the outcomes in regression analyses. The PSS has been found to have good internal consistency reliability (α = 0.78 to 0.91) and good test-retest reliability (r = 0.73 to 0.85 based on past research; Lee, 2012).

Writing Task

A stressful writing task was used in this study to induce participant stress. There were no control groups for the stressful writing task; all participants were asked to engage in the stressful writing task. This is the same stressful writing task that was used in Study 1.

Brief Mood Introspection Scale

The Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988) is a mood scale with 16 mood adjectives (lively, sad, calm, jittery, etc.) to which participants responded. This is the same mood measure that was used in Study 1. In Study 2, there was varying internal consistency for the BMIS subscales across four different time points. (α = 0.35 to 0.63 for the arousal-calm; α = 0.51 to 0.63 negative-relaxed; α = 0.52 to 0.61 positive-tired; and α = 0.49 to 0.60, pleasant-unpleasant).

Meditation Group

All participants wrote about a stressful life event, followed by meditation. The variable of interest here was different reactions by the two groups of participants (community vs. spiritual). This is the same meditation that was used in Study 1.

Meditation Attention Check

At the end of the meditation and for an attention check, participants were asked to select from a drop-down menu which word best completes a message that was shared in the meditation. This is the same meditation attention check that was used in Study 1.

Toronto Mindfulness Scale (TMS)

The Toronto Mindfulness Scale (TMS; Lau et al., 2006) was used to assess state mindfulness. It was administered after the fourth and last mood assessment. It is a 13-item self-report measure of "state" like experiences during meditation. This measure was intended to examine further the two theorized pathways of the Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction. The instructions state, "We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement. 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?" Items include statements like "I experience myself as separated from my changing thoughts and feelings" or "I was curious about my reaction to things." Each item is rated on a 5-point Likert scale from 0 (*Not at all*) to 4 (*Very Much*). This scale corresponds to two subscales, which include the aspects of mindfulness of "Curiosity" and "De-Centering." Higher scores on specific items indicate an individual is higher on these aspects. The TMS can be used with individuals with and without meditation experiences and has been found to have satisfactory psychometric properties (Lau et al., 2006). Since scores on the TMS could differ based on meditation experience, participants were asked if they had previous experience with meditating.

Stressor Severity Scale

The Stressor Severity Scale was developed for this study based on pilot data and was given at the end of the study (Appendix B). This scale is meant to assess the severity of the stressor that participants write about during the writing task. It is intended to capture the nature of the circumstances (the stressor) that the participant experienced, as well as how upset the participant was by the stressor. This scale has two versions: the participant version and the rater

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version. The participant version had these instructions: "Please estimate how much the stressor you wrote about negatively impacted you." The rater version had these instructions "Please estimate how much the stressor negatively impacted [based on the written content provided] the participant." Both scales have the following range: (a) Hassle: negatively impacts 1-2 days but under a week "little"; (b) Minor: negatively impacts a week or more "somewhat"; (c) Moderate event: negatively impacts 2-3 weeks, "much"; and (d) Major event: negatively impacts more than 3 weeks, "great deal." The rater version also had examples at all different levels of severity (based on pilot data), which was provided to facilitate the raters' coding. Of the data collected, 20% was coded and scored for practice by two independent research assistants. Interrater agreement was calculated for these practice trials, with discussion allowed between assistants to achieve greater reliability. The two assistants coded the remainder of the data independently, and reliability was checked weekly during the coding process. The final interrater reliability, including the practice trails, was $\kappa = 0.70$ for the spiritual sample and $\kappa = 0.65$ for the community sample.

Open-Ended Questions

Participants were provided with a definition of mindfulness that states that it is "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 2012; p. 1). They were asked a couple of yes or no questions, which include: (a) Do you practice mindfulness? (b) Do you have any previous experience with meditating? (c) Do you practice yoga? (d) Do you read Buddhist texts and teachings? (e) Did you grow up (up to age 18) practicing mindfulness? Participants were asked to select from a drop-down menu their best estimate of the number of hours they have spent during a typical week in the past six months meditating, doing yoga, and reading Buddhist texts and teachings, respectively. Participants were

also asked: "Do you use mindfulness to manage stressors in your life? If so, how?" Participants were also provided with a definition of positive reappraisal that states that it is the "reconstruction of events as valuable, benign, or beneficial" (Garland et al., 2009, p. 2). Then they were asked yes or no: (a) Do you practice positive reappraisal? and (b) Did you grow up (up to age 18) practicing positive reappraisal? They were also asked, "Do you use positive reappraisal to manage stressors in your life? If so, how?" Finally, participants were asked, "Where did you first learn about mindfulness? And "where did you first learn about positive reappraisal?" Participants in the spiritual group were asked, "How many years have you been regularly attending a Zen center or sitting circle?" Importantly, participants were instructed to answer based on their experiences with mindfulness, meditation, and positive reappraisal prior to completing the current study. The answers to these questions were used to characterize the sample. The time-dependent questions (hours spent meditation, doing yoga, and reading Buddhist teachings/texts) were used as predictors in exploratory analyses.

Procedures

Participants completed this study on their electronic devices in a quiet place and responded to Qualtrics survey items. They provided informed consent and completed demographic measures, which asked questions about their age, race/ethnicity, gender, sexual orientation, the highest level of education, and employment status. Prior to the experimental manipulation, participants completed the Mindfulness Attention Awareness Scale (dispositional mindfulness) and the Multicultural Quality of Life Index, a subset of questions from the Cognitive Emotion Regulation Questionnaire (to measure positive reappraisal), and the Perceived Stress Scale. Then participants completed the BMIS (Time Point 1), the stressful writing task, the BMIS (Time Point 2), 5 minutes into the meditation, the BMIS (Time Point 3),

and after the meditation BMIS (Time Point 4), the one item attention check question, and the Toronto Mindfulness Scale (state mindfulness). Participants also responded using a drop-down box which category their stressor fell into based on a list of categories with "other (please specify)" as an option. Additionally, they rated the severity of the stressor they wrote about using the participant version of the Stressor Severity Scale and completed the Open-Ended Questions with which they were prompted.

Analytic Plan

Preliminary Analyses

Descriptive statistics for demographic information were generated (Table C14). Cronbach's α was calculated in order to examine internal consistency for all the main study variables (Table C16). The content of the stressors that participants wrote about was generated (Table C17). Participants' responses to questions related to meditation, practicing mindfulness, using mindfulness for stress management, using positive reappraisal, and using positive reappraisal for stress management were quantified.

Correlations

A zero-order correlation matrix was completed (see Table C19) using all main study variables. Quality of life scores, positive reappraisal scores, and state mindfulness (decentering) scores were not normally distributed, as assessed by Shapiro-Wilk's test ($p < .05$). Since the Pearson correlation test is somewhat robust to deviations from normality (Gel et al., 2007), correlations were still run. Visual inspection of box plots and scatterplots indicated that all main study variables were roughly linear.

T-Tests

      Independent samples *t*-tests were used to examine differences in scores on all main study variables (state mindfulness scores, dispositional mindfulness scores, positive reappraisal scores, quality of life scores, and perceived stress) for the spiritual group and the community sample. A paired-samples t-test was used to examine if there is a discrepancy in stressor severity ratings (subjective perceived severity vs. objective rater severity) that differs based on group membership.

Hierarchical Multiple Regressions

      Hierarchical multiple regressions were run to see which main study variables and secondary variables predicted perceived stress. The assumptions of regressions were tested. For the first regression, there was approximately linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was independence of residuals, with a Durbin-Watson statistic of 2.09, which is between 1.5 and 2.5, and therefore the data is not autocorrelated. The data was roughly normal, as assessed by a Q-Q Plot. There were no Cook's distances above a 1, one studentized residual greater than ±3 standard deviations, and four leverage values (two from the spiritual group and two from the community group above 0.2). Analyses were run with and without these leverage values.

      Hierarchical multiple regressions were run to see which main study variables and secondary variables predicted quality of life. The assumptions of regressions were tested. For this regression, there was approximately linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There appeared to be homoscedasticity,

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as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was independence of residuals, as assessed using the Durbin-Watson statistic, which had a value of 2.42, which is between 1.5 and 2.5; therefore, the data are likely not autocorrelated. The data were roughly normal, as assessed by a Q-Q plot. There was no Cook's distance above a 1, no studentized residuals greater than ± 3 standard deviations, and 16 leverage values (11 from the spiritual group and five from the community group) above 0.2. It is important to note that three of the predictors for the second regression included responses to open-ended questions related to hours spent meditating, hours spent doing yoga, and hours spent reading Buddhist texts during a typical week in the past 6 months. Relatedly, descriptive statistics showed that the participants with the high leverage values on average read more Buddhist texts, spent more hours doing yoga, and hours spent meditation than those in the rest of the sample. Analyses were run with and without these cases that had high leverages.

One-Way ANOVA

A one-way ANOVA examining mood scores, across all mood subscales, between groups at baseline (Time 1) was conducted to see if the spiritual group and community group significantly differed in baseline mood scores.

Primary Analyses

I examined the difference in mood scores between a community and spiritual sample using a linear contrast (using AUC_I scores) to determine if mood scores were linearly related to the group. An explicit hierarchical hypothesis was used in Study 2 (the spiritual group will have lower AUC_Is across all mood subscales than those in the community group) to increase power and statistical sensitivity. The area under the curve with respect to increasing (AUC_I) scores was

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calculated, and scores were used in primary analyses. Higher AUC_{IS} are indicative of higher reactivity.

Power Analysis

G*Power 3.1 was used to run a power analysis to determine the sample size for Study 2. To estimate a small effect size of $F = 0.20$ for two groups and four repeated measures, the power was set to 0.80, with $r = 0.43$ (based on repeated mood measure correlations in the pilot data), and the nonsphericity correction was set to 1. The output parameters indicated a total sample of $n = 42$ (21 per group) needed for a power of 0.80. However, once the four repeated measures were consolidated into the singular measure of AUC_I, this changed the power considerations. Specifically, to run a one-way ANOVA with an estimated small effect size of $F = 0.20$ for two groups and one measure (AUC_I), power set to 0.80, requires a total sample size of 200, for which this study was underpowered.

CHAPTER VI: STUDY 2 RESULTS

Preliminary Analyses

Descriptive statistics for all major study variables are found in Table C14. Cronbach's α was calculated in order to examine internal consistency for all main study variables; the α's were within the acceptable to excellent range (see Table C16). Of the stressors that participants indicated, those in the spiritual group tended to classify their stressors under relationship stress (28.6%) or uncertainty/lack of control (19%), whereas these in the community group tended to classify their stressors under job pressure (22.2%) or major life changes (14.8%). Table C17 includes more information about the stressor content written by participants. Participants were asked a variety of questions related to mindfulness and positive reappraisal. Those who were in the spiritual group compared to those in the community sample endorsed: meditating (100% vs. 29.6%), practicing mindfulness (87% vs. 33.3%), using mindfulness for stress management (87% vs. 40.7%), practicing positive reappraisal (52% vs. 37%), and using positive reappraisal for stress management (52% vs. 37%) more than their community group counterparts. Finally, Table C18 includes the mean and standard deviations of the BMIS subscales across each time point. Graphical representations of each BMIS subscale's raw mood scores by time are also depicted (Figures D8-D11).

Correlations Among Study Variables

Correlations were run amongst all main study variables; significant correlations are reported here (see Table C19). Dispositional mindfulness was negatively associated with both positive reappraisal ($r = -0.32$, $p<0.05$), and perceptions of stress ($r = -0.47$, $p<0.01$). Positive reappraisal was negatively associated with quality of life ($r = -0.42$, $p<0.01$) and positively associated with perceptions of stress ($r = 0.30$, $p<0.05$). State mindfulness decentering and state

mindfulness curiosity were positively associated ($r = 0.65$, $p<0.01$). Additionally, quality of life was positively associated with dispositional mindfulness ($r = 0.33$, $p<0.01$) and negatively associated with both perceptions of stress ($r = -0.71$, $p<0.01$).

T-Tests

Next, independent samples t-tests were used to examine differences in scores on all main study variables for the spiritual group and the community sample. There was a significant difference in state mindfulness (decentering) scores for the community sample ($M = 16.1$, $SD = -5.54$) as compared to the spiritual group ($M = 21.1$, $SD = 5.50$); $t(46) = 3.10$, $p < 0.01$. Specifically, participants in the spiritual group were higher in state mindfulness than participants in the community group. There was a significant difference in trait mindfulness scores for the community sample ($M = 4.84$, $SD = 0.94$) as compared to the spiritual group ($M = 4.32$, $SD = 0.76$) ; $t(46) = -2.07$, $p = 0.04$. Specifically, participants in the community sample were higher in trait mindfulness than participants in the spiritual group. There was no significant difference in perceived stress scores between the two groups; $t(46) = 0.39$, $p = 0.70$. There was no significant difference in the quality of life scores between the two groups; $t(46) = 0.60$, $p = 0.55$. There was no significant difference in state mindfulness (curiosity) scores between the two groups ($t(46) = 0.74$, $p = 0.46$). There was no significant difference in positive reappraisal scores between the two groups ($t(46) = -1.36$, $p = 0.18$).

Additionally, a paired samples t-test was used to examine if there is a discrepancy in stressor severity ratings that differs based on group membership. For the community sample, participants' subjective severity ratings and the raters' objective severity ratings were positively correlated ($r = 0.63$, $p < .001$). There was no significant difference between participants' subjective severity ratings and the raters' objective severity ratings ($t(26) = 0.50$, $p = .621$). On

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average, the raters' objective severity ratings were 0.11 points higher than participants'

subjective severity ratings (95% CI [-.35, .57]). Approximately 18.5% of the spiritual group rated

the stressor they wrote about a "1" (hassle; impacts 1-2 days of the week). Approximately 37%

of the community group rated the stressor they wrote about as "4" (major event; impacts more

than 3 weeks).

Similarly, for the spiritual group, participants' subjective severity ratings and the raters'

objective severity ratings were positively correlated ($r = 0.93$, $p = 0.02$). On average, the raters'

objective severity ratings were not different from participants' subjective severity ratings; $t(19) =$

0, p = 1. Approximately 42.9% of the spiritual group rated the stressor they wrote about as a "1"

(hassle; impacts 1-2 days of the week). Approximately 19% of the community group rated the

stressor they wrote about as "4" (major event; impacts more than 3 weeks).

Predicting Perceived Stress and Quality of Life

A multiple regression was run to predict perceived stress from state mindfulness,

dispositional mindfulness, positive reappraisal, and group membership $F(5,47) = 2.92$, $p = 0.02$,

$R^2 = 0.26$ (Table C20). Of all these variables, only dispositional mindfulness significantly

contributed to the model; t(47) = -2.83, p = 0.02. In the model predicting for perceived stress,

after excluding the four high leverage points, the overall model changed to $F(5,43) = 5.53$, p

<0.001, $R^2 = 0.42$ and dispositional mindfulness captured an even higher percentage of variance

in the model; $t(43) = -4.36$, $p<0.001$.

Multiple regression was run to predict the quality of life from state mindfulness, trait

mindfulness, positive reappraisal, group membership, hours spent mediation, hours spent doing

yoga, and hours spent reading Buddhist texts, $F(8,47) = 1.83$, $p = 0.10$, $R^2 = 0.27$ (Table C21).

Of all these variables, only positive reappraisal significantly contributed to the model (t (47) = -

2.08, $p = 0.04$). In the model predicting for quality of life, after excluding the 16 high leverage points, the overall model changed to $F(8,31) = 2.59$, $p = 0.04$, $R^2 = 0.47$ and positive reappraisal captured an even higher percentage of variance in the model; $t(31) = -3.05$, $p = 0.01$.

One-Way ANOVA

Four one-way ANOVAs were performed to compare the effect of group on Time 1 mood scores across the four subscales (pleasant/unpleasant, positive/tired, negative/relaxed, calm/arousal). Results revealed that there were not statistically significant differences in Time 1 mood scores between the groups across the: pleasant/unpleasant subscale, $F (1,47) = 0.06$, $p = 0.80$, positive/tired subscale, $F (1,47) = 0.12$, $p = 0.74$. negative/relaxed subscale $F (1,47) = 1.22$, $p = 0.28$, and the calm/arousal subscale, $F (1,47) = 4.02$, $p = 0.05$ (rounded down from $p = 0.051$).

Primary Analyses

Participants from both the community and spiritual samples engaged in the stressful writing task, followed by meditation. Four planned contrasts were run with AUC_I as the outcome variable to test the hypothesis that those in the spiritual group would have better mood across all subscales of the BMIS. As mentioned in Study 1, **higher AUC_Is** indicate higher reactivity (see Figure D12).

To assess for outliers, Cook's distance was used to detect any AUC_I data points that were outliers. If Cook's distance for any data points was greater than 1, then these points were considered outliers (Dhakal, 2017). No AUC_I data points were considered outliers.

The first planned contrast was conducted to examine if there was a significant linear trend indicating that pleasant/unpleasant subscale AUC_I scores increased as hypothesized with the group. Pleasant/unpleasant AUC_I scores did significantly fit a linear contrast, $F (1,47) = 11.9$,

p<0.01. As expected, those in the spiritual group had the lowest reactivity in the pleasant/

unpleasant scale, indicated by AUC_I (*M* = -3.55, *SD*=11.0), followed by the community group

AUC_I (*M* = 6.30, *SD*=8.77).

The second planned contrast was conducted to examine if there was a significant linear

trend indicating that calm/arousal subscale AUC_I scores increased as hypothesized with the

group. Calm/arousal AUC_I scores did not significantly fit a linear contrast, F (1,47) = 4.68, *p* =

0.77. Unexpectedly those in the community group descriptively had the lowest reactivity in the

calm/arousal scale, indicated by AUC_I (*M* = -2.96, *SD* = 6.67), followed by the spiritual group

AUC_I (*M* = -2.33, *SD* = 8.42).

The third planned contrast was conducted to examine if there was a significant linear

trend indicating that positive/tired subscale AUC_I scores increased as hypothesized with the

group. Positive/AUC_I scores did not significantly fit a linear contrast, F (1,47) = 3.84, *p* = 0.06.

Those in the spiritual group descriptively had the lowest reactivity in the positive/tired scale,

indicated by AUC_I (*M* = -0.33, *SD* = 6.76), followed by the community group AUC_I (*M* = 2.94,

SD = 4.84).

The fourth planned contrast was conducted to examine if there was a significant linear

trend indicating that negative/relaxed subscale AUC_I scores increased as hypothesized with the

group. Negative/relaxed AUC_I scores did significantly fit a linear contrast, F (1,47) = 5.34, *p* =

0.03. As expected, those in the spiritual group had the lowest reactivity in the negative/relaxed

scale, indicated by AUC_I (*M* = -2.74, *SD* = 5.21), followed by the community group AUC_I (*M* =

0.48, *SD* = 4.43).

CHAPTER VII: STUDY 2 DISCUSSION

The goal of Study 2 was primarily to test the Mindfulness-Positive Reappraisal (MPR) Pathways, a model created by this author based on past theoretical and empirical research on the relationship between mindfulness and positive reappraisal as it relates to coping and stress. It was hypothesized that dispositional mindfulness, positive reappraisal, state mindfulness, and group membership would predict lower perceived stress. Only dispositional mindfulness was predictive of lower perceived stress. It was hypothesized that dispositional mindfulness, positive reappraisal, and state mindfulness would be related to higher quality of life ratings. Unexpectedly, only lower positive reappraisal was predictive of higher quality of life. Additionally, secondary variables (hours spent meditation, hours spent doing yoga, and hours spent reading Buddhist texts) were not predictive of lower perceived stress and higher quality of life. It was hypothesized that individuals in the spiritual group would have less reactivity after the stressful writing task than those in the community group. Unexpectedly, the spiritual group had less reactivity than the community group, only across only the pleasant/unpleasant and negative/relaxed scales. Additionally, analyses revealed that there were no significant differences in mood scores (across all subscales) between the spiritual group and community group at baseline (Time 1).

Finally, an exploratory hypothesis examined a discrepancy in stressor severity (participants' subjective rating vs. raters' objective rating) that differed based on group membership. Unexpectedly there were no significant differences found. However, those in the community sample reported the stressors they experienced as qualitatively different and perceived the stressors they wrote about as a more severe hassle than those in the spiritual sample. More than half the participants in the spiritual group had a professional or doctoral

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degree compared to the community group, less than one fifth of whom had a professional or doctoral degree. Additionally, almost the entire community group was employed full-time, while less than half of those in the spiritual group were employed full-time. These are likely additional factors to consider as to why those in the two groups differed both qualitatively and in terms of impact with regard to the stressors about which they wrote.

Past work with Dutch individuals found that those who had a "high-non judgmental aware" mindfulness profile tended to be male, less educated, and older (Zhu et al., 2020). In my study, those in the spiritual group were, on average, female, had professional or doctoral degrees, and were middle-aged, while those in the community group were predominantly male, had college degrees, and were middle-aged. This inconsistency suggests that different populations can benefit from mindfulness. Continued research is needed to understand how sociodemographic variables might contribute to distinct profiles of mindfulness.

There were other notable similarities and differences found between the two groups. Regarding how they differed, those in the spiritual group reported engaging in mindfulness (meditating, practicing mindfulness, using mindfulness for stress management) and positive reappraisal (practicing positive reappraisal, using positive reappraisal for stress management) practices at a greater rate than their community group counterparts. Those in the spiritual group also had higher state mindfulness decentering scores and lower trait mindfulness scores than those in the community group. This provides preliminary support that the Buddhist pathway (characterized by formal/informal practices of mindfulness) may align more with state mindfulness, and the psychological pathway (characterized by aspects of mindfulness such as nonreactivity, describing emotional experiences, and differentiating emotional experiences) of the MPR Pathways Model may align more with dispositional mindfulness.

Regarding similarities, across the main outcome measures, those in the spiritual group and those in the community group did not significantly differ in perceived stress scores, quality of life scores, state mindfulness curiosity scores, and positive reappraisal scores. These findings imply that despite the pathways of the MPR Pathways Model for how mindfulness connects to positive reappraisal and leads to positive outcomes, there is overlap between the theorized Buddhist and psychological pathways. Higher dispositional mindfulness was associated with a higher quality of life and lower: positive reappraisal and perceptions of stress. Aspects of state mindfulness such as decentering and curiosity were positively associated with one another. Higher positive reappraisal was associated with lower quality of life and higher perceptions of stress.

The implications of these associations provide support for existing research linking: aspects of mindfulness with each other and mindfulness with positive outcomes. The implications of the negative association between mindfulness and positive reappraisal may be related to the idea that conceptually, though related, mindfulness and positive reappraisal do also differ. Specifically, mindfulness encourages an awareness of and an acceptance of one's present moment, while positive reappraisal encourages those who engage in its use to reconstruct events that happen to them as valuable or beneficial. Additionally, these associations, in combination with findings that positive reappraisal was not predictive of higher quality of life or lower perceptions of stress, may suggest that positive reappraisal alone is not the driving force of the relationship between mindfulness and positive reappraisal.

CHAPTER VIII: GENERAL DISCUSSION

The present author developed the Mindfulness-Positive Reappraisal Pathways Model after critically examining past theoretical and empirical work on the relationship between mindfulness and positive reappraisal. The goal of Study 1 was to determine the effectiveness of a short-term mindfulness intervention (meditation vs. distraction and rumination) after writing about a stressful experience in a community sample. The purpose of Study 2 was to understand the broader processes (state mindfulness, trait mindfulness, positive reappraisal, perceptions of stress, quality of life) involved in the conceptual Mindfulness-Positive Reappraisal Pathways Model and how they are associated with one another in a spiritual and community sample.

Findings from Study 1 revealed that, as hypothesized, individuals in the meditation condition had the lowest reactivity in the pleasant/unpleasant subscale, followed by those in the distraction condition and rumination condition. Additionally, descriptively those in the mediation condition had the greatest total exposure to the arousal subscale and the negative subscale, followed by those in the distraction condition and rumination condition. In Study 2, findings showed that higher dispositional mindfulness was predictive of lower perceived stress, and lower positive reappraisal was predictive of higher quality of life. This adds to evidence that mindfulness benefits individuals in viewing stress and their enjoyment of life. The results of Study 2 also demonstrated that, as hypothesized, those in the spiritual group had less reactivity across the pleasant/unpleasant and negative/relaxed subscales than those in the community group. Since there was no significant difference in reactivity among the groups across the calm/arousal and positive/tired subscales, it may be that the affective component of meditation or mindfulness practice may not differentially impact these mood states. Alternatively, time may

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have contributed to the lack of change in these mood states. Perhaps a longer mindfulness intervention may more effectively target more considerable mood changes.

Notably, there was variability in the mood measure Cronbach's α scores between Study 1 and Study 2 and within each study. Due to a few factors, it is possible that the reliability of the mood measures across time points is being underestimated by the α's. Firstly α depends on the "Tau equivalent model," which assumes that each test item measures the "same latent trait" on the same scale (Tavakol & Dennick, 2011). The mood measure used in this study has multiple factors captured by the items on each subscale since they are bipolar subscales. Additionally, if the number of items on a scale is too small, it also violates the assumption of tau equivalence (Tavakol & Dennick, 2011). The mood measure used in this study varied in the number of items per subscale. For example, the pleasant/unpleasant scale used all sixteen items, whereas the negative/relaxed scale used six items. It may also be possible that the criteria used to exclude participants in Study 1 and the multiple different types of attention checks helped filter out inconsistent responders. Due to the length and depth of Study 2, individuals from Study 2 may have been responding less consistently over time despite completing the mood measures.

Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction

There appears to be some preliminary evidence for the Mindfulness -Positive Reappraisal (MPR) Pathways Model for Stress Reduction. Those from the spiritual group had higher state mindfulness (decentering) scores than the community group. In contrast, the community group had higher trait mindfulness scores. This maps the two pathways (the Buddhist and psychological) that were theorized as mechanistically different but leading to similar outcomes. Specifically, the Buddhist pathway aligns with state mindfulness (decentering), and the psychological pathway was conceptualized as being more associated with dispositional

mindfulness. Despite overlapping, this provides preliminary evidence that state mindfulness and dispositional mindfulness may be distinct ways that those in spiritual groups as compared to community groups engage in mindfulness practice.

Another essential component of the MPR Pathways Model for Stress Reduction is the relationship between mindfulness and positive reappraisal that previous literature has connected. Higher dispositional mindfulness was predictive of lower perceived stress, and lower positive reappraisal was predictive of higher quality of life. This may suggest that mindfulness and positive reappraisal have distinct roles in the theorized in the MPR Pathways Model for Stress Reduction. Conceptually, this provides preliminary evidence for the relationship between stressors and mindfulness practices via the psychological pathway in the earlier stages of the MPR Pathways Model for Stress Reduction. It also provides preliminary evidence for the relationship between positive reappraisal and positive outcomes in the later stages of the MPR Pathways Model for stress Reduction.

Strengths

There were various strengths of the present studies. Firstly, these studies examined mindfulness through the use of a state measure, trait measure, Open-Ended Questions, and through the use of mediation manipulation. In contrast, past work has studied mindfulness through the use of self-report or meditation manipulations. This study attempted to study mindfulness in its numerous conceptualizations through multiple measurement methods.

Secondly, Study 2 examined the broader processes of state mindfulness, trait mindfulness, positive reappraisal, perceptions of stress, and quality of life with both a spiritual (Buddhist/Zen) group and a community sample. While previous work had looked at some of these constructs together, this was the first study to ask these questions. Additionally,

participants were recruited from both the community and Buddhist/Zen centers. This allowed this research to incorporate both a psychological and spiritual conceptualization.

Thirdly, the MPR Pathways Model for Stress Reduction, a conceptual model, was created to look at previous literature on mindfulness and positive reappraisal and tested. No previous work has critically examined and consolidated the literature on mindfulness and positive reappraisal as they relate to coping with stressors. With this groundwork, future research could explore more specific questions related to whether mindfulness or positive reappraisal occurs first after a stressor or clarify if there is a combined pathway that includes both the Buddhist and psychological pathways.

Limitations

The present studies had several limitations, which may be attributable to various factors. The stressful writing task does not appear to have successfully made participants feel stressed, even though participants in conditions (Study 1) and groups (Study 2) did not significantly differ from each other in baseline (Time 1) mood scores. First and foremost, the ongoing pandemic and civil unrest occurring during data collection in June and July 2020 are likely to have impacted participants' baseline levels of stress, general functioning, and overall mood. Consequently, the writing task that was employed to create stress for participants may have, in reality, had a marginal impact on participants' overall mood due to this larger sociopolitical context. The period over which this data was collected is very distinct from what we consider "normal." Consequently, it may have been appropriate to ask participants to write about specifically the pandemic or current events. Alternatively, participants could have been asked if they felt that their current mood or stress levels were different from what they were used to due to the pandemic and the sociopolitical climate.

Secondly, participants may have chosen to write about stressors they have already dealt with or felt comfortable sharing. Due to individual differences in comfort in disclosing current stressors, disclosing the stressful manipulation may have been more or less valid or contemporary. The writing prompt did not specify how recent the stressor had to be and included language in the past tense, which may have led participants to write about something not actively stressful.

Thirdly, past research conducted by Broderick et al. (2005) assessed the effectiveness of mediation compared to rumination and distraction (similar to the methods in Study 1) using a lab-based mood induction. This induction involved participants listening to and reading a series of statements that started with slightly depressing content and built up to highly depressing content. Consequently, the written and online nature of the studies in this dissertation may have dampened the manipulation's effectiveness. Research has demonstrated that writing longhand (versus typing) induced greater negative affect and greater disclosure than typing. The typing writing manipulation in these studies may have made the writing task less stressful than intended. Other researchers found that having a minimum word count on writing tasks led participants to write more. However, they did not assess the quality of writing (O'Brien & Hamm Baugh, 2013). In my studies, while the minimum word count may have encouraged participants to increase the quantity of writing, it did not ensure that they provided more emotional detail. Consequently, the writing task may have varied in emotional intensity for participants based on how they chose to engage, leading to variability and ineffectiveness of this manipulation. Additionally, in Study 2, the two groups differed in what they wrote about stressors and how they perceived the impact of the stressors. Specifically, the spiritual and community group differed vastly in terms of the level of education and employment status.

Education can provide access to more resources to manage stressors, while being employed full-time can add additional stress.

Finally, it is unclear whether participants answered the mood checks accurately or randomly. It may have been more beneficial to include random checks throughout the study instead of at specific intervals (i.e., post manipulation). Additionally, the third mood measure was given halfway (5 minutes) into the meditation condition (in Studies 1 and 2) and the rumination and distraction conditions (in Study 1). It is possible that the timing of this mood check served as an interruption and proceeded to dampen the genuine emotion, enhancing or detracting from the impact of the manipulations. Additionally, it may have been valuable to have a condition in Study 1 where participants did not engage in any strategy after the stressful writing task. This would have allowed us to see if meditation was better than doing nothing. Regarding the attention checks in Study 2, which many participants did not successfully pass, this may have been related to the study being completed by robots (as many responses were nonsensical or fragments of sentences). Alternatively, the low payout of the study may have deterred those who participated from being as attentive as they might during a study that is higher paying.

Future research should focus on testing the research questions involved in these studies with a more prolonged meditation manipulation and perhaps a more specific stressful writing task prompt. It may also be helpful to recruit a larger and more diverse sample of spiritual and community groups to improve power and generalizability. The addition of a control condition where there was no stressful writing task would also strengthen this work. If mindfulness impacts negative emotional states after an immediate stressor, these changes in methodology would likely enhance these results.

Clinical Implications

The use of a community sample and spiritual (Buddhist/Zen) group allowed people of various ages, races, and cultural/religious backgrounds to participate in this study. This makes these data meaningful and informative for researchers and clinicians studying these constructs or implementing them in diverse clinical settings. In terms of accessibility, both mindfulness and positive reappraisal skills can be taught and made accessible rather quickly. However, both of these techniques can be cognitively demanding, take practice, and require consistency for individuals to gain the full benefits. As a result, the language used to deliver these skills to clinical and nonclinical populations and the willingness of individuals to engage in these practices, despite the effort it may require, are crucial to how successful these strategies might ultimately be on an individual level.

Conclusion

In summary, there is evidence to suggest that very brief mindfulness interventions may help impact specific aspects of mood over time. Individual differences in general mood, based on spirituality, may predict how immediate stressors may affect an individual and be impacted by informal/formal practices of mindfulness. There is also preliminary evidence to suggest that mindfulness (both state and trait) can lead to positive outcomes, even in the absence of positive reappraisal. This may be related to positive reappraisal being employed during times of adversity, while mindfulness can be enacted and used during times of stress but also times of happiness. Many evidence-based treatments such as Acceptance and Commitment Therapy and Dialectical Behavior Therapy are rooted in mindfulness practices, while positive reappraisal is less directly taught in clinical settings. Given these findings, it may be most beneficial for individuals to learn mindfulness and for positive reappraisal to be taught as an extra tool rather

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than a stand-alone tool. These findings can prompt continued conversation, education, and engagement around meditation, positive reappraisal, and mindfulness in everyday life in the face of stressors.

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APPENDIX A: ATTENTION CHECKS CRITERIA

Meditation Attention Check
- After the meditation condition, participants were prompted with the following: "Based on the meditation you just completed, please complete the following phrase: "When we are done with this practice, as long as we are _____, there is more right with us than it is wrong."
- This was the last statement in the guided audio meditation that participants heard beforehand
- Participants had to select from a drop-down list the correct response of "breathing."
- Participants were excluded for any other responses (moving, thinking, living, and learning) to this prompt

Distraction Attention Check
- After the distraction condition, participants were prompted with the following: " Please complete the statement based on the statements you just saw: A freshly painted _____."
- This is one of the last statements they saw in the distraction list beforehand.
- Participants had to correctly select from a drop-down list the correct response of "door."
- Participants were excluded for any other responses (car, building, canvas, stool) to this prompt

Rumination Attention Check
- Participants' written stressful task narratives were compared to what they wrote during the rumination attention check
- Participants were excluded for off-topic responses
- Examples of incorrect responses include the following: "all words are related to my life experience," "always good," and "in my life, previous situations are there, but I manage it. It's so difficult."
- Examples of correct responses include the following: "I was revisiting that time and how much I have changed since then. It was a tough moment for me, and I have not been the same since then. After that time, I feel that I could overcome any obstacle. Also, I thought about how I was so different back then and how everything was a struggle or at least felt like one" and "Thinking over and over about the stressful situation, I felt more and more frustrated. I was more and more annoyed by it as I thought about how it was caused by others. I kept thinking about what I could have done differently. I became critical of myself and that I could have done better and been more prepared and responsive. I also wanted to put this in my past, learn from it, and prepare for the possibility that it might arise again."

APPENDIX B: STRESSOR SEVERITY SCALE

1 - Hassle – participant or researcher estimates that it probably negatively impacts 1-2 days but under a week, "little."
2 - Minor event – participant or researcher estimates that it probably negatively impacts a week or more, "somewhat."
3 - Moderate event – participant or researcher estimates that it probably negatively impacts 2-3 weeks, "much."
4 - Major event – participant researcher estimates that it probably negatively impacts more than three weeks, "a great deal."

Domain	1 - Hassle	2 - Minor Event	3 - Moderate Event	4 - Major event
Work-Related	Preparing for a job interview	Starting a new job	Being teased by colleagues at work	Getting fired
Academics	Starting at a new school	Making friends at a new school	Midterms season	Trying to balance school, work, and social life.
Romance	Going on a first date	Arguing with significant other	Spending less quality time together with significant other	Going through a break-up
Family Stressors	Family member not texting back	Family disagreements	Being away from family	Parents divorcing

Study 1

Table C1. Participant Demographics (*n* = 80)

Demographic Information	Meditation		Distraction		Rumination		Full sample	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Gender								
Female	7	24.1	10	41.7	7	25.9	24	30.3
Male	21	72.4	14	58.3	20	74.1	55	69.6
Race								
White	15	57.7	18	75.0	20	74.1	53	66.3
Hispanic/Latinx	1	3.4	—	—	1	3.7	2	2.50
Black	4	13.8	1	4.2	—	—	5	6.25
Asian	7	24.1	3	12.5	3	14.8	13	16.3
Other	3	10.2	2	8.3	2	3.7	7	8.75
Sexual Orientation								
Heterosexual	22	75.9	22	91.7	22	81.5	66	83.5
Homosexual	1	3.4	—	—	2	7.4	3	3.80
Bisexual	5	17.2	2	8.3	3	11.1	10	12.7
Highest educational level								
High School	2	6.9	2	8.3	2	7.4	6	7.50
Some college	4	13.8	4	16.7	5	18.5	13	16.3
2-year degree	1	3.4	2	8.3	2	7.4	5	6.25
4-year degree	15	51.7	9	37.5	15	55.6	39	48.8
Professional degree	5	6.9	7	29.2	3	11.1	15	23.8
Doctoral	2	6.9	—	—	—	—	2	2.50
Employment								
Employed full time	19	75.9	19	79.2	18	66.7	56	75.4
Employed part time	3	10.3	3	12.5	4	14.8	10	13.2
Unemployed looking for work	2	6.9	1	4.2	2	7.4	5	6.58
Student	—	—	1	4.2	1	3.7	2	2.63
Retired	1	3.4	—	—	1	3.7	2	2.63
Disabled	—	—	—	—	1	3.7	1	1.32

Note. "—" indicates that no participants endorsed this response. All percentages for the full sample column were

rounded up to two decimal places. One participant in the meditation group did not complete demographic

information for gender, sexual orientation, and employment status.

Table C2. Stressor Content Categories

Stressor Content Category	Reported Frequency (%)		
	Meditation	Distraction	Rumination
Job Pressure	24.1	29.2	25.9
Uncertainty and lack of control	13.8	4.2	14.8
Major life changes(s)	3.4	4.2	7.4
Death of a close family member	3.4	8.3	14.8
Academics	3.4	4.2	3.7
Relationship stress	17.2	12.5	7.4
Family Emergency	13.8	8.3	3.7
Work Overload	6.9	12.5	3.7
Mental Health	—	4.2	—
COVID-19	3.4	8.3	7.4
Other	17.0	4.2	11.1

Table C3. Means and Standard Deviations of Raw Mood Scores at Time 1

Raw Mood	Meditation		Distraction		Rumination	
	M	*SD*	*M*	*SD*	*M*	*SD*
Pleasant-Unpleasant	37.9	7.75	34.0	7.83	33.2	7.73
Positive-Tired	17.3	3.77	16.7	4.23	15.4	3.93
Negative-Relaxed	14.4	3.58	12.4	3.46	13.8	4.39
Calm-Arousal	29.1	4.66	26.3	5.49	29.1	5.96

Table C4. Means and Standard Deviations of AUC$_I$ (Across Four Time Points) by Group

AUC$_I$	Meditation	Distraction	Rumination
Pleasant/Unpleasant	-1.41 (11.0)	5.85 (10.8)	6.76 (15.7)
Calm/Arousal	1.67 (5.89)	0.94 (4.89)	-1.15 (7.16)
Negative/Relaxed	-1.43 (6.83)	-1.73 (6.76)	-3.13 (7.01)
Positive/Tired	-1.62 (5.00)	1.71 (4.47)	1.28 (6.44)

Table C5. Post Hoc Scheffe's Test for AUC $_I$ Pleasant/Unpleasant

Group	Groups	Mean Difference	Significance
Meditation	Distraction	6.90	0.51
	Rumination	3.62	0.82
Distraction	Meditation	-6.90	0.51
	Rumination	-3.28	0.86
Rumination	Meditation	-3.62	0.82
	Distraction	3.28	0.86

Table C6. Post Hoc Scheffe's Test for AUC ɪ Calm/Arousal

Group	Groups	Mean Difference	Significance
Meditation	Distraction	0.68	0.99
	Rumination	8.83	0.11
Distraction	Meditation	-0.67	0.99
	Rumination	8.16	0.18
Rumination	Meditation	-8.83	0.11
	Distraction	-8.16	0.18

Table C7. Post Hoc Scheffe's Test for AUC I Negative/Relaxed

Group	Groups	Mean Difference	Significance
Meditation	Distraction	2.19	0.76
	Rumination	7.61	0.04
Distraction	Meditation	-2.19	0.76
	Rumination	5.43	0.20
Rumination	Meditation	-7.61	0.04
	Distraction	-5.43	0.20

Table C8. Post Hoc Scheffe's Test for AUC $_I$ Positive/Tired

Group	Groups	Mean Difference	Significance
Meditation	Distraction	2.12	0.81
	Rumination	-1.18	0.93
Distraction	Meditation	-2.12	0.81
	Rumination	-3.31	0.61
Rumination	Meditation	1.18	0.93
	Distraction	3.31	0.61

Table C9. Means and Standard Deviations of AUC$_G$ (Across Four Time Points) by Group

AUC$_I$	Meditation	Distraction	Rumination
Pleasant/Unpleasant	112 (7.17)	105 (20.5)	109 (21.1)
Calm/Arousal	90.0 (14.9)	88.3 (16.3)	80.2 (15.2)
Negative/Relaxed	41.7 (11.3)	39.5 (11.7)	34.1 (9.13)
Positive/Tired	50.2 (11.7)	48.1 (11.9)	51.4 (12.0)

Table C10. Post Hoc Scheffe's Test for AUC$_G$ Pleasant/Unpleasant

Group	Groups	Mean Difference	Significance
Meditation	Distraction	8.23	0.42
	Rumination	4.84	0.76
Distraction	Meditation	-8.23	0.42
	Rumination	-3.40	0.88
Rumination	Meditation	-4.84	0.76
	Distraction	3.40	0.88

Table C11. Post Hoc Scheffe's Test for AUC$_G$ Calm/Arousal

Group	Groups	Mean Difference	Significance
Meditation	Distraction	0.88	0.98
	Rumination	9.84	0.13
Distraction	Meditation	-0.88	0.98
	Rumination	8.96	0.19
Rumination	Meditation	-9.84	0.13
	Distraction	-8.96	0.19

Table C12. Post Hoc Scheffe's Test for AUC$_G$ Negative/Relaxed

Group	Groups	Mean Difference	Significance
Meditation	Distraction	2.67	0.70
	Rumination	8.14	0.06
Distraction	Meditation	-2.67	0.70
	Rumination	5.47	0.28
Rumination	Meditation	-8.14	0.06
	Distraction	-5.47	0.28

Table C13. Post Hoc Scheffe's Test for AUC$_G$ Positive/Tired

Group	Groups	Mean Difference	Significance
Meditation	Distraction	2.57	0.76
	Rumination	-1.52	0.92
Distraction	Meditation	-2.57	0.76
	Rumination	-4.09	0.55
Rumination	Meditation	1.52	0.92
	Distraction	4.09	0.55

Study 2

Table C14. Participant Demographics (*n* = 48)

Demographic Information	Community Sample		Spiritual Sample		Full Sample	
	n	*%*	*n*	*%*	*n*	*%*
Gender						
Female	12	44.4	15	71.4	27	56
Male	15	55.6	3	14.3	18	38
Non-Binary	—	—	2	9.5	2	4
Transgender	—	—	1	4.8	1	2
Race						
White	21	77.8	18	85.7	39	81
Hispanic/Latinx	—	—	—	—	—	—
Black	2	7.4	1	4.8	3	6
Asian	4	14.8	1	4.8	5	10
American Indian or Alaskan Native	—	—	—	—	—	—
Other	—	—	1	4.8	1	2
Sexual Orientation						
Heterosexual	24	88.9	13	61.9	37	77
Homosexual	—	—	3	14.3	3	6
Bisexual	3	11.1	5	23.8	8	17
Other	—	—	1	4.8	1	2
Highest educational level						
High School	2	7.4	—	—	2	4
Some college	2	7.4	1	4.8	3	6
2-year degree	3	11.1	1	4.8	4	8
4-year degree	16	59.3	6	28.6	22	46
Professional degree	4	14.8	8	38.1	12	25
Doctoral	—	—	5	23.8	5	10
Employment						
Employed full time	24	88.9	8	38.1	32	67
Employed part time	1	3.7	3	14.3	4	8
Unemployed, looking for work	—	—	1	4.8	1	2
Unemployed, not looking for work	—	—	1	4.8	1	2
Student	—	—	1	4.8	1	2
Retired	2	7.4	5	23.8	7	15
Disabled	—	—	2	9.5	2	4

Note. "—" indicates that no participants endorsed this response. All percentages for the full sample column were

rounded up to two decimal places.

Table C15. Zen Centers

Zen Center	Reported Frequency
Bellingham Insight Meditation	19%
Brooklyn Zen Center	14.3%
Buddhist Bookbag Sangha	9.6%
Neighborhood Zen Community	4.8%
Heart of Insight	4.8%
Lincoln Zen Center	4.8%
Live Oak Zen	4.8%
Ordinary Mind Zendo	4.8%
Pittsburg Zen Center	4.8%
Portland Mindfulness Community	4.8%
Silver Spring Zendo	4.8%
Stillworkers	9.5%
Other	9.5%

Table C16. Means and Standard Deviations of Key Measures

Measure	Community Sample				Spiritual Sample			
	n	*M*	*SD*	α	*n*	*M*	*SD*	α
MASS	27	4.84	0.94	0.94	21	4.32	0.76	0.88
PSS	27	12.8	8.97	0.92	21	13.7	7.36	0.90
CERQ	27	2.24	1.08	0.96	21	1.86	0.92	0.80
TMS-Decentering	27	16.1	5.54	0.84	21	21.1	5.50	0.70
TMS-Curiosity	27	12.7	6.42	0.94	21	14.0	6.38	0.91
MQL Index	27	7.20	2.11	0.93	21	7.52	1.47	0.88

Note. n = 48. MASS = Mindful Attention Awareness Scale; PSS = Perceived Stress Scale; CERQ = Cognitive

Emotion Regulation Questionnaire; TMS = Toronto Mindfulness Scale; MQL Index = Multicultural Quality of Life

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Table C17. Stressor Content Categories

Stressor Content Category	Community Sample Reported Frequency	Spiritual Sample Reported Frequency
Job Pressure	22.2	4.8
Uncertainty and lack of control	3.7	19.0
Major life change(s)	14.8	9.5
Death of a close family member	3.7	—
Academics	—	—
Relationship stress	14.8	28.6
Family Emergency	3.7	4.8
Work Overload	7.4	—
Mental Health	11.1	—
COVID-19	11.1	9.5
Other	7.4	23.8

Table C18. Means and Standard Deviations of BMIS Subscales (Across Four Time Points) by Group

BMIS Subscales	Community Sample	Spiritual Sample
	M (*SD*)	*M* (*SD*)
Time One		
Pleasant/Unpleasant	48.6 (10.9)	47.9 (6.91)
Calm/Arousal	26.9 (3.17)	29.0 (4.17)
Negative/Relaxed	10.6 (4.74)	12.0 (3.47)
Positive/Tired	18.4 (3.31)	18.7 (2.81)
Time Two		
Pleasant/Unpleasant	43.7 (12.2)	47.5 (8.67)
Calm/Arousal	27.6 (3.48)	29.0 (4.65)
Negative/Relaxed	12.6 (5.34)	12.0 (4.15)
Positive/Tired	17.6 (4.31)	18.6 (2.80)
Time Three		
Pleasant/Unpleasant	47.4 (10.3)	50.1 (6.84)
Calm/Arousal	24.8 (4.46)	27.5 (3.72)
Negative/Relaxed	9.85 (4.70)	10.2 (3.09)
Positive/Tired	17.1 (4.00)	18.8 (3.01)
Time Four		
Pleasant/Unpleasant	48.1 (9.65)	51.3 (6.92)
Calm/Arousal	24.0 (4.23)	27.7 (2.88)
Negative/Relaxed	9.03 (4.05)	9.90 (3.08)
Positive/Tired	16.7 (4.03)	19.4 (2.71)

Table C19. Correlation Matrix for Key Variables (*n* = 48)

Variable	1	2	3	4	5	6
1. PSS	—	-0.71**	-0.00	-0.10	-0.47**	0.30*
2. MQL Index	-0.71**	—	0.14	0.21	0.33*	-0.42**
3. TMS-Curiosity	-0.00	0.14	—	0.65**	-0.10	-0.22
4. TMS-Decentering	-0.10	0.21	0.65**	—	-0.04	-0.11
5. MASS	-0.47**	0.33	-0.10	-0.04	—	-0.32*
6. CERQ	0.30*	-0.42*	-0.22	-0.11	-0.32*	—

Note. n = 27. * *p* < .05 (two-tailed). ** *p* < .01 (two-tailed). PSS = Perceived Stress Scale; MQL Index =

Multicultural Quality of Life Index; TMS = Toronto Mindfulness Scale; MASS = Mindful Attention Awareness

Scale; CERQ = Cognitive Emotion Regulation Questionnaire;

Table C20. Predicting Perceived Stress from State Mindfulness, Dispositional Mindfulness, Positive Reappraisal, and Group Membership

Predictor	b	β	t
State Mindfulness-Curiosity	0.16	0.13	0.61
State Mindfulness-Decentering	-0.26	-0.22	-0.92
Dispositional Mindfulness	-3.52	-3.72	-2.83[*]
Positive Reappraisal	0.37	0.34	1.22
Group Membership	-0.83	-0.05	-0.29

Note. Fit for model $R^2 = 0.26$, Adjusted $R^2 = 0.17$, $F(5,47) = 2.92$, $p = 0.02$; [*]p < .05

Table C21. Predicting Quality of Life from State Mindfulness, Dispositional Mindfulness, Positive Reappraisal, Group Membership, and Secondary Variables

Predictor	b	β	t
State Mindfulness-Curiosity	-0.01	-0.04	-0.20
State Mindfulness-Decentering	0.04	0.14	0.60
Dispositional Mindfulness	0.40	0.20	1.17
Positive Reappraisal	-0.16	-0.36	-2.08[*]
Group Membership	-0.13	-0.04	-0.15
Hours spent meditating	-0.08	-0.11	-0.51
Hours spent doing yoga	0.08	0.06	0.38
Hours spent reading Buddhist texts	0.16	0.18	1.05

Note. Fit for model $R^2 = 0.27$, Adjusted $R^2 = .0.12$. $F(8,47) = 1.83$, $p = 0.10$; [*]p < .05

Table C22. Means and Standard Deviations of AUC$_I$ (Across Four Time Points) by Group

| AUC$_I$	Spiritual	Community
Pleasant/Unpleasant	-3.55 (11.0)	6.30 (8.77)
Calm/Arousal	-2.33 (8.41)	-2.96 (6.57)
Negative/Relaxed	-2.74 (5.21)	0.48 (4.44)
Positive/Tired	-0.33 (7.76)	2.94 (4.84)

**Figure D1. Proposed Mindfulness-Positive Reappraisal (MPR) Pathways Model for Stress Reduction**
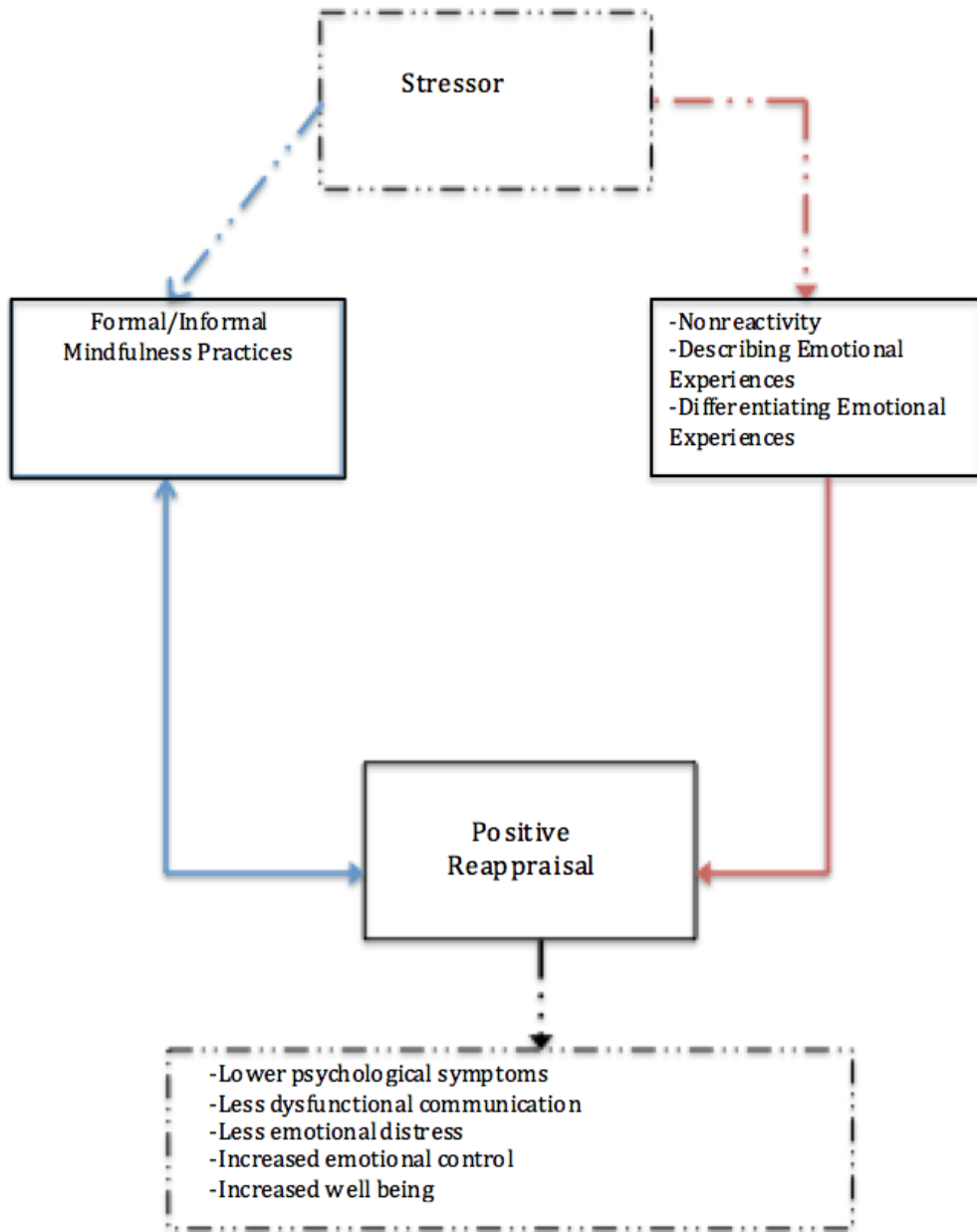
Note. The blue pathway is conceptualized as the Buddhist pathway, and the red pathway is conceptualized as the psychological pathway. Dashed boxes and arrows indicate that there is no causal link found between certain components of this model.

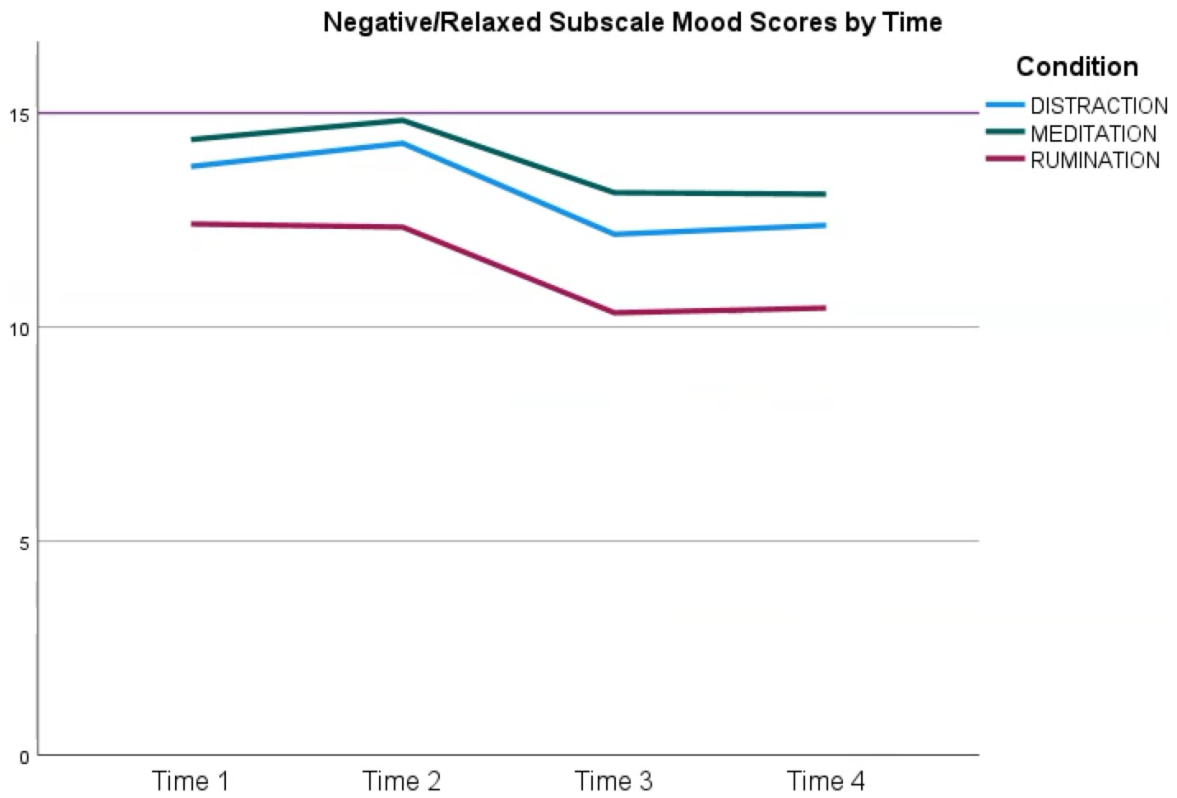**Figure** D**2. Graphical Representation of BMIS Pleasant/Unpleasant Mood Subscale Scores by Time for Study 1**
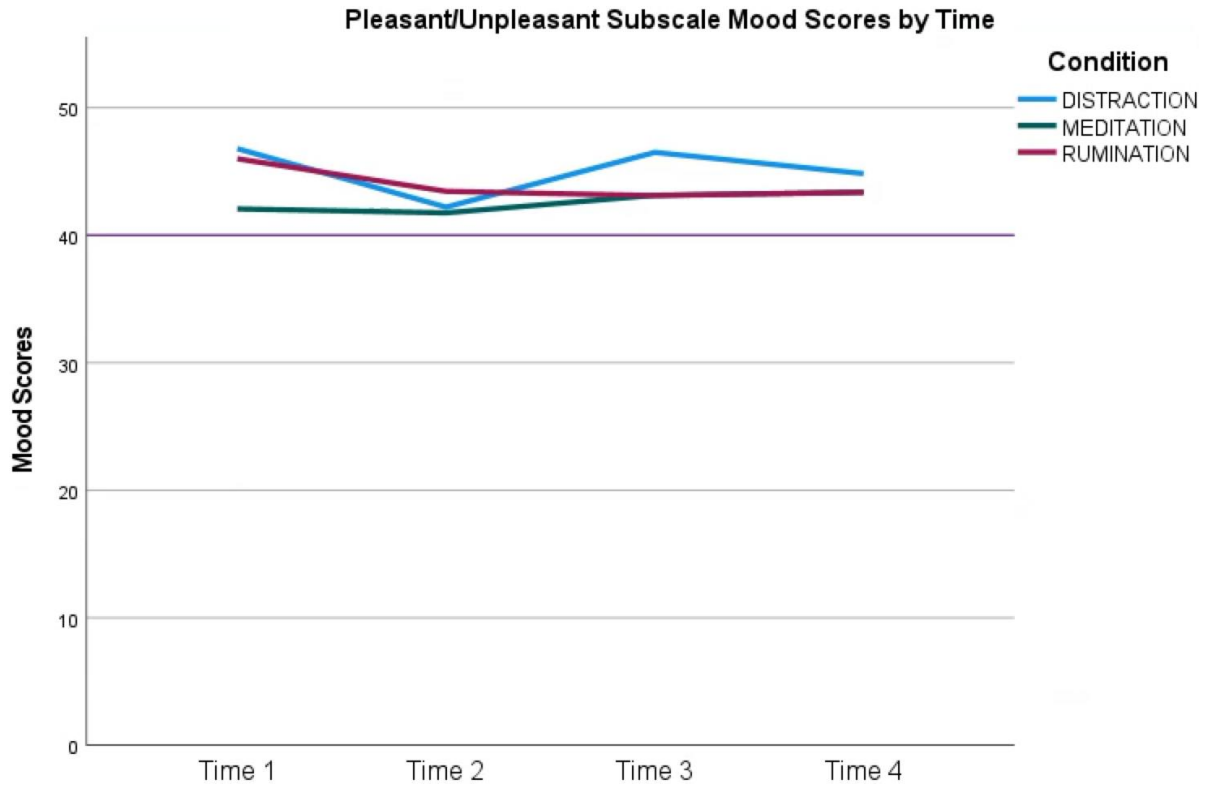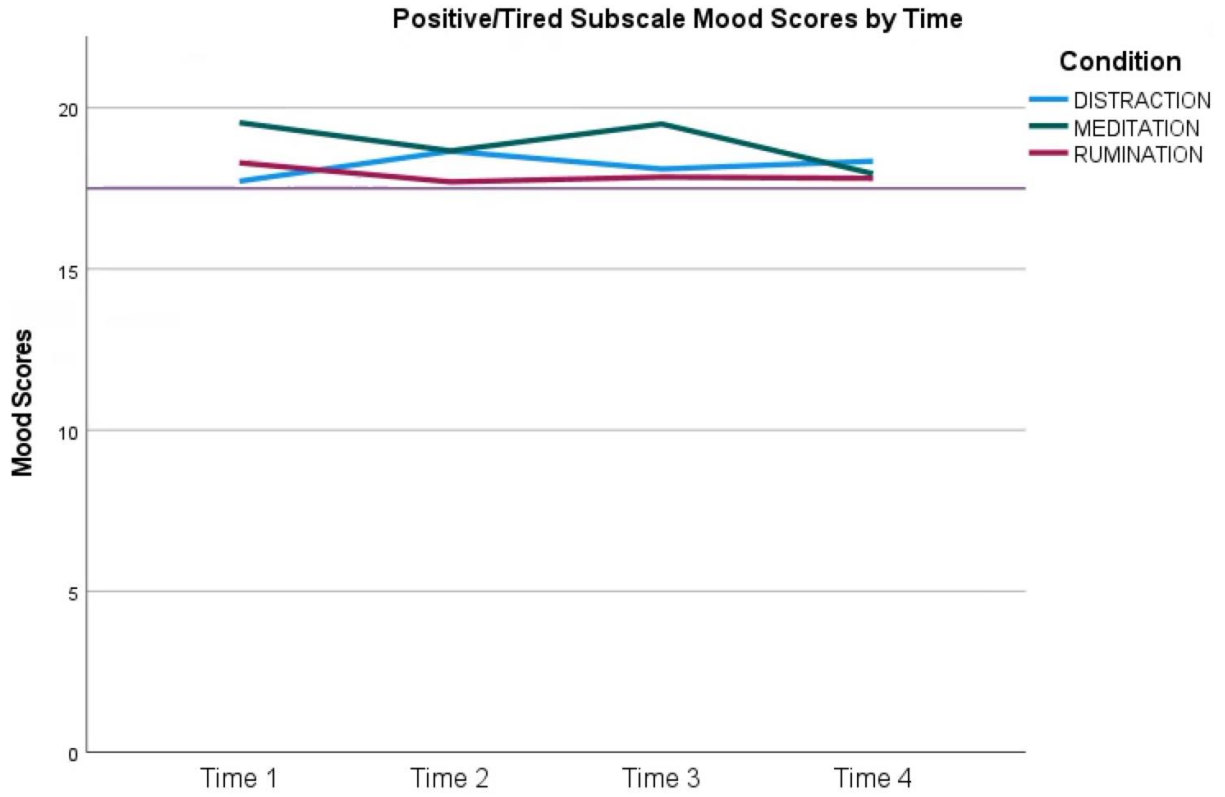

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A relatively neutral response is indicated at the score of 40 by the purple line.

Figure D3. Graphical Representation of BMIS Calm/Arousal Mood Subscale Scores by Time for Study 1
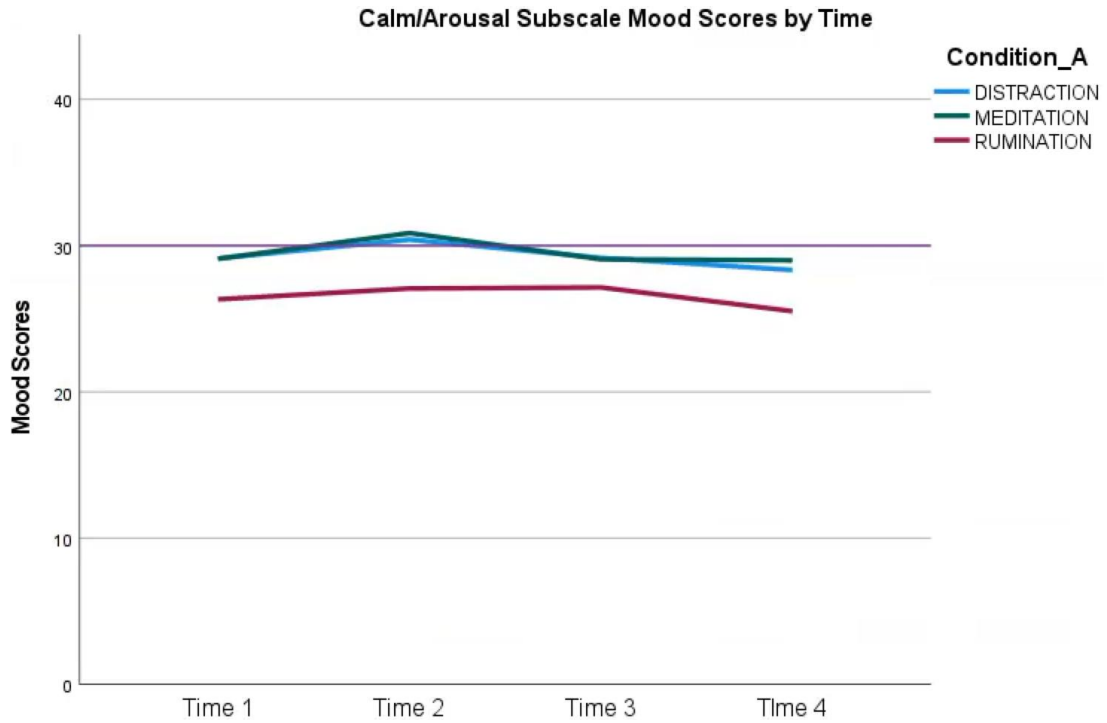
Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A

relatively neutral response is indicated at a score of 30 by the purple line.

Figure D4. Graphical representation of BMIS Negative/Relaxed Mood Subscale Scores by Time for Study 1

Negative/Relaxed Subscale Mood Scores by Time

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A relatively neutral response is indicated at a score of 15 by the purple line.
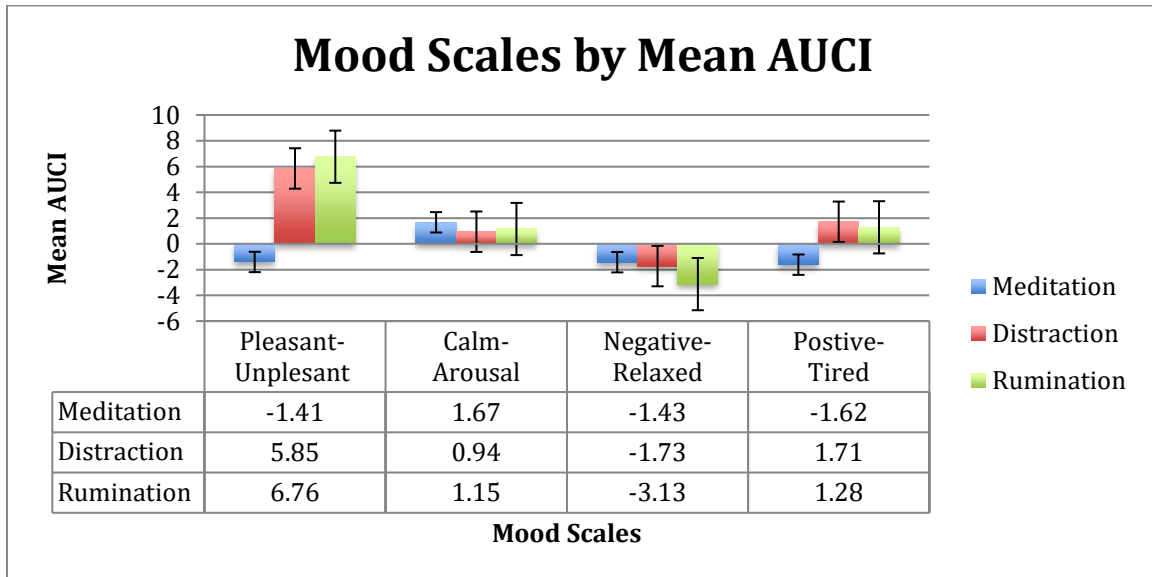
Figure D5. Graphical Representation of BMIS Positive/Tired Mood Subscale Scores by Time for Study 1

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A relatively neutral response is indicated at the score of 17.5 by the purple line.
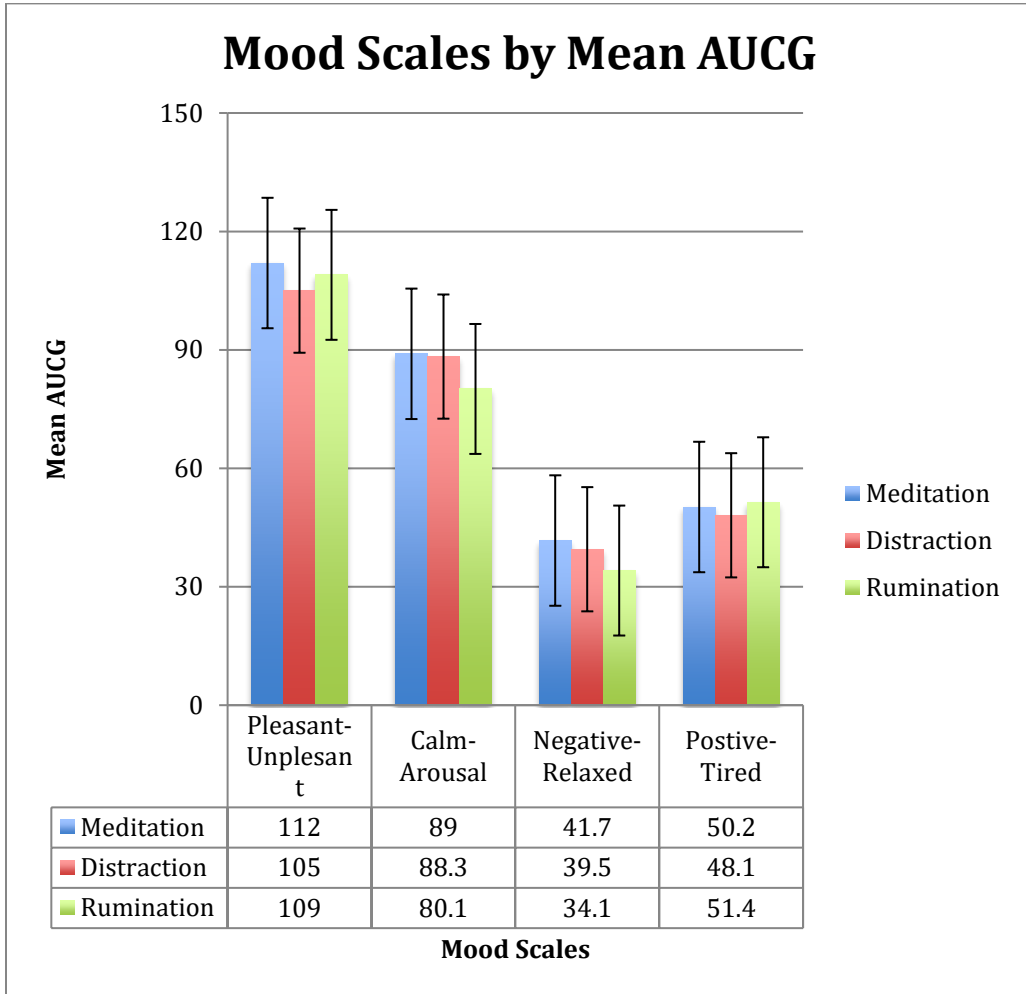
Figure D6. Graphical Representation of Mood Scales (With Data Table and Legend) by Mean AUC$_I$ Scores Across Groups for Study 1

Mood Scales by Mean AUCI

	Pleasant-Unplesant	Calm-Arousal	Negative-Relaxed	Postive-Tired
Meditation	-1.41	1.67	-1.43	-1.62
Distraction	5.85	0.94	-1.73	1.71
Rumination	6.76	1.15	-3.13	1.28

Mood Scales

Legend: Meditation, Distraction, Rumination

Note. Higher scores indicate higher reactivity.

Figure D7. Graphical Representation (With Data Table and Legend) of Mood Scales by Mean AUC_G Scores Across Groups for Study 1


Mood Scales by Mean AUCG

	Pleasant-Unplesant	Calm-Arousal	Negative-Relaxed	Postive-Tired
■ Meditation	112	89	41.7	50.2
■ Distraction	105	88.3	39.5	48.1
■ Rumination	109	80.1	34.1	51.4

Mood Scales

Note. Higher AUC_Gs are indicative of greater total exposure to a positively coded subscale (i.e., unpleasant or aroused or negative or tired subscale).

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Figure D8. Graphical Representation of BMIS Pleasant/Unpleasant Mood Subscale Scores by Time for Study 2
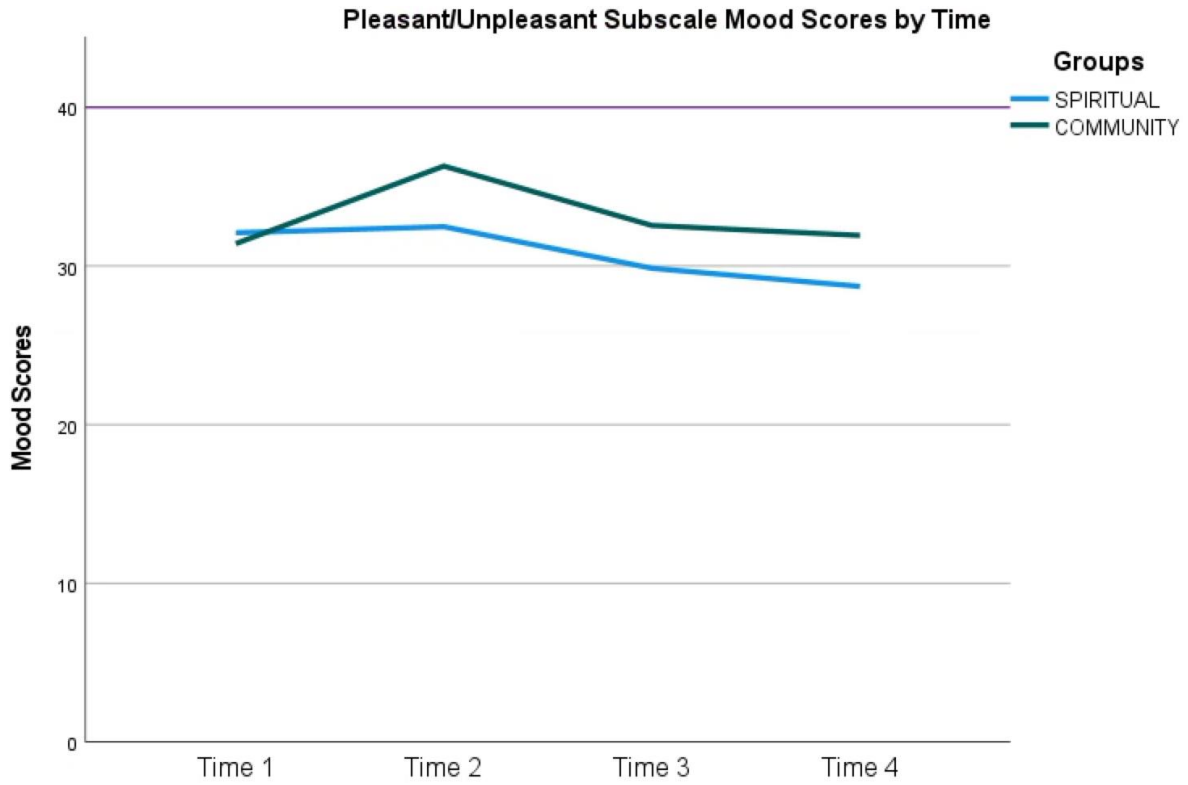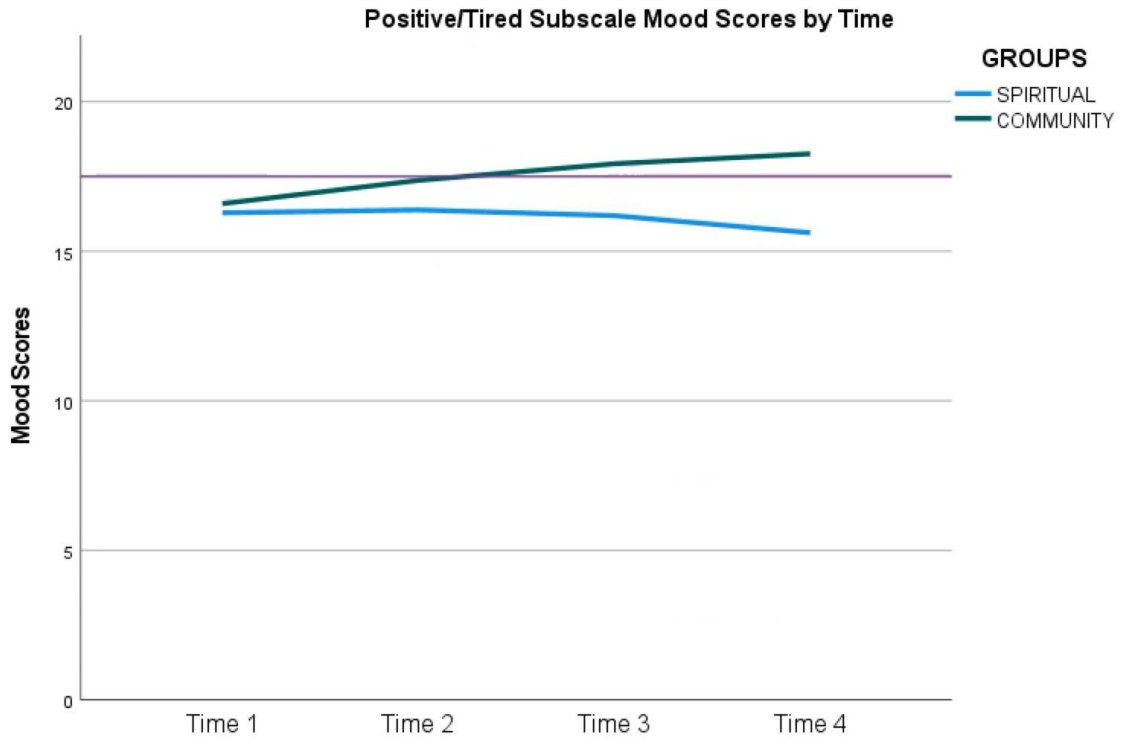

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A

relatively neutral response is indicated at a score of 40.

Figure D9. Graphical Representation of BMIS Calm/Arousal Mood Subscale Scores by Time for Study 2
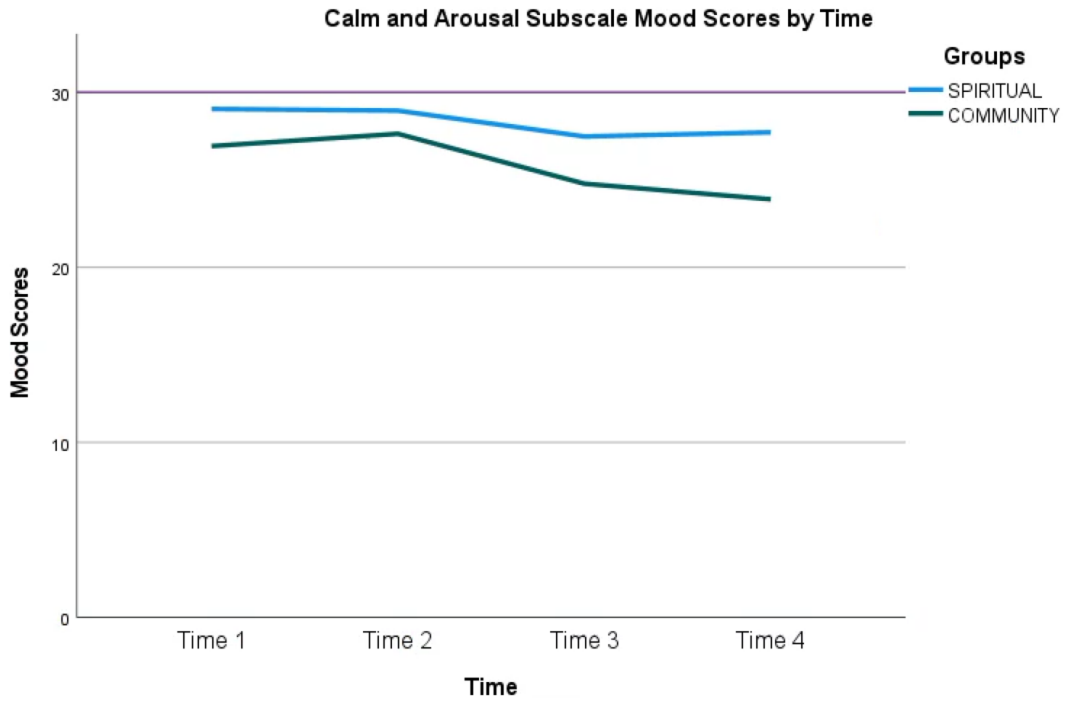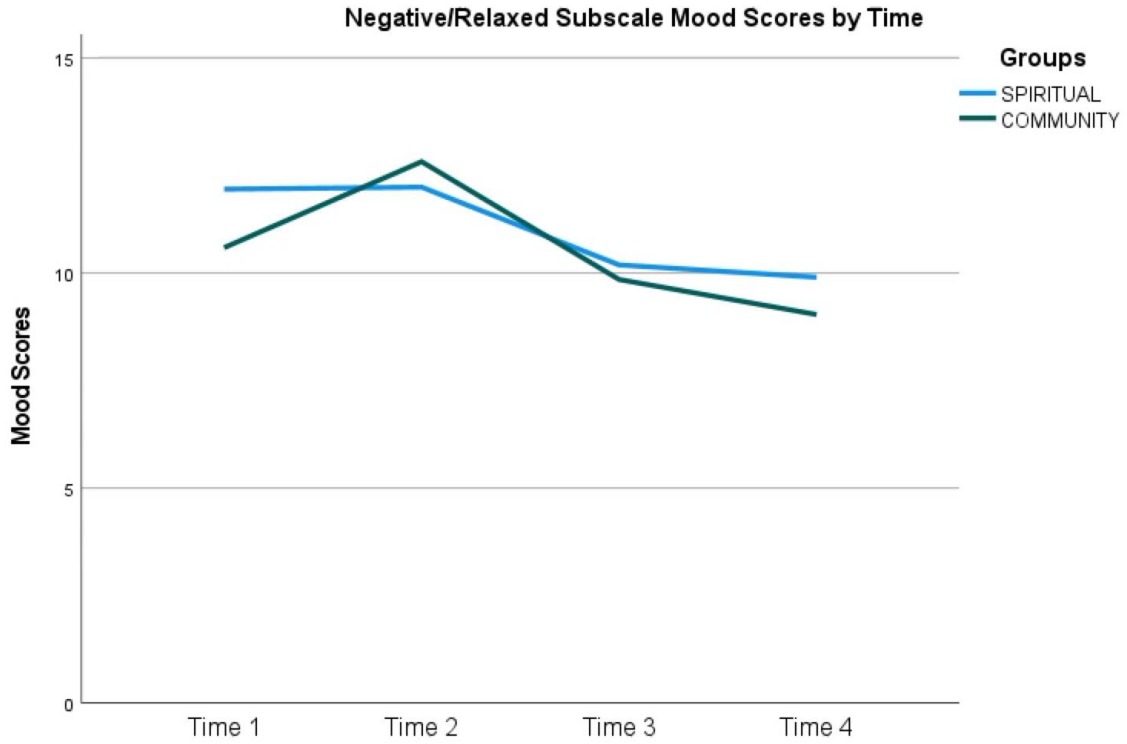

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A

relatively neutral response is indicated at a score of 30 by the purple line.

Figure D10. Graphical Representation of BMIS Positive/Tired Mood Subscale Scores by Time for Study 2

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A relatively neutral response is indicated at the score of 17.5 by the purple line.

Figure D11. Graphical Representation of BMIS Negative/Relaxed Mood Subscale Scores by Time for Study 2
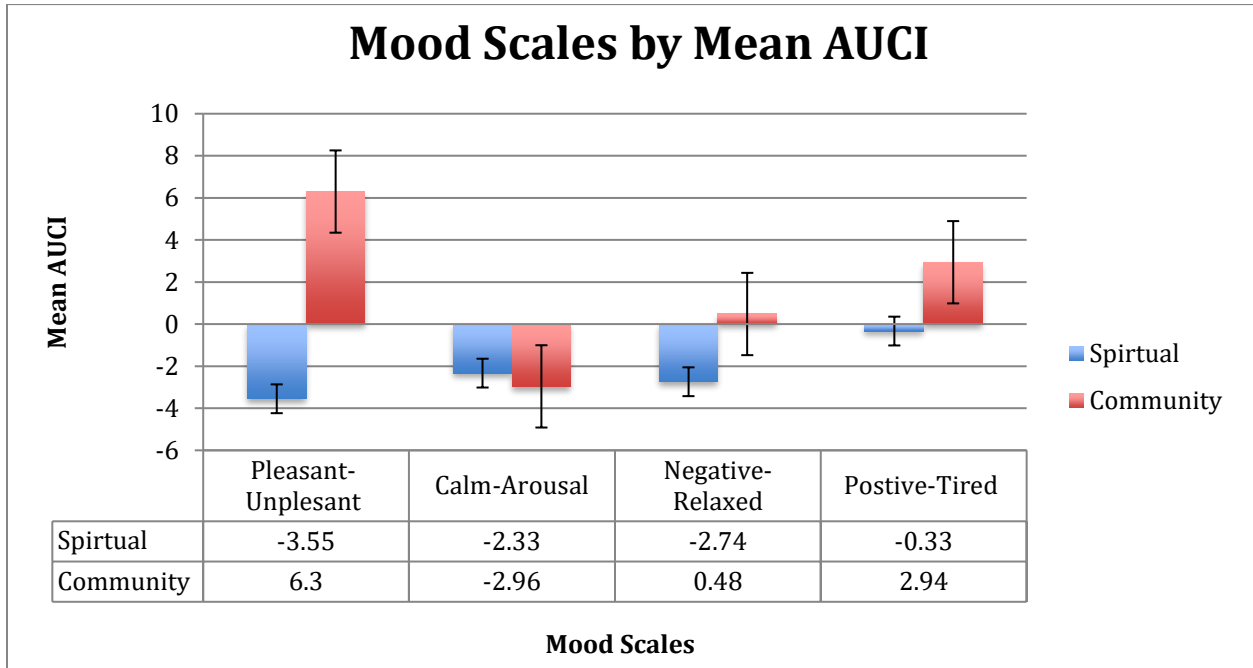

Negative/Relaxed Subscale Mood Scores by Time

Note. Negative affect is relatively higher mood scores, and positive affect is relatively lower mood scores. A relatively neutral response is indicated at a score of 15. The reference line could not be indicated at 15 since it was outside the range of responses.

Figure D12. Graphical Representation of Mood Scales (With Data Table and Legend) by Mean AUCI Scores Across Groups for Study 2

Mood Scales by Mean AUCI

	Pleasant-Unplesant	Calm-Arousal	Negative-Relaxed	Postive-Tired
Spirtual	-3.55	-2.33	-2.74	-0.33
Community	6.3	-2.96	0.48	2.94

Mood Scales

Legend: ■ Spirtual ■ Community

Note. Higher scores indicate higher reactivity.