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Living in the Moment: Daily Life Assessments of Mindfulness Meditation on Stress, Coping
Flexibility, and Well-Being

Dusti R. Jones

Accepted in Partial Completion
Of the Requirements for the Degree
Master of Science

Kathleen L. Kitto, Dean of the Graduate School

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MASTER'S THESIS

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Dusti Jones

05/27/2015

Living in the Moment: Daily Life Assessments of Mindfulness Meditation on Stress, Coping
Flexibility, and Well-Being

A Thesis Presented to the Faculty of
Western Washington University

In Partial Fulfillment of the Requirements for the Degree
Master of Science

By

Dusti R. Jones

May, 2015

Abstract

The broaden-and-build theory proposes that positive emotions build over time to promote well-being (Fredrickson, 2001). Mindfulness meditation (MM) promotes positive emotions and well-being (Garland et al., 2010). This study examined the influences of a short-term MM intervention on trait mindfulness, stress, coping flexibility, and well-being (defined as flourishing and positive emotions) at longitudinal, daily, and momentary levels. Further, this study examined whether coping flexibility mediated the link between stress and well-being, and whether MM moderated each of the previous links. Results indicate that MM increased mindfulness, coping flexibility, and well-being, and decreased stress over time. Coping flexibility mediated the link between stress and flourishing at the longitudinal level. Overall, MM did not moderate mediated links. Results support the broaden-and-build theory and indicate that MM builds positive resources over time. Future studies should continue to examine the mechanisms by which MM promotes well-being.

Key words: Mindfulness, stress, coping flexibility, well-being, flourishing, positive emotions, mindfulness meditation

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Living in the Moment: Daily Life Assessments of Mindfulness Meditation on Stress, Coping Flexibility, and Well-Being

Stress is an unavoidable aspect of the human experience. Stressful situations tax our physical and psychological capacity on momentary, daily, and chronic basis (DeLongis, Folkman, & Lazarus, 1998; McEwen, 2012). Stress negatively influences health outcomes, from greater frequency of acute illness and inflammation to increasing risk for cardiovascular disease (Cohen et al., 1998; DeLongis et al., 1998; Slavish, Graham-Engeland, Smyth, & Engeland, 2015). Although the negative consequences of stress are well documented (Cohen & Williamson, 1991), the influence of stress on positive outcomes, including positive emotions and flourishing needs further elaboration (Folkman & Moskowitz, 2000). The goal of the present study is to examine the processes by which stress influences positive outcomes, namely coping flexibility and flourishing, and to determine whether short-term mindfulness meditation (MM), a health promoting intervention to reduce stress, will promote a more resilient response to stress.

Stress occurs when a threat is perceived in the surrounding environment (Lazarus & Folkman, 1984). This threat need not be physical or immediate; looming financial pressures of education expenses, impending deadlines, and even being stuck in traffic are all examples of situations that can stimulate the stress response (McEwen, 2012). These stressful experiences can last for a moment or may become chronic occurrences. Momentary stress is associated with greater negative emotion that can last hours after the stressor has dissipated (Jones, Hoff, Kirsch, & Lehman, 2013). Chronic stress predicts increased depression and anxiety, and seems to erode a person's sense of well-being (Billings & Moos, 1982; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013). Studies indicate that both momentary

and chronic stress narrow attention and interfere with problem solving abilities, both of which are necessary tools for effectively coping with stress (Fredrickson & Branigan, 2005).

Factors such as greater trait mindfulness, experience with MM, positive emotions, and coping may help to buffer the negative consequences of stress (Cheng, Hui, & Lam, 2000; Jain et al., 2007; Steptoe, Waddle, Marmot, & McEwen, 2005) and facilitate well-being (Garland, Gaylord, & Fredrickson, 2011). MM is especially effective in reducing overall levels of stress (Weinstein, Brown, & Ryan, 2009) and promoting positive health outcomes (Marchand, 2012; Shennan, Payne, & Fenlon, 2011). Likewise, coping flexibility, the ability to use multiple coping strategies depending on what is most appropriate for the situation, facilitates successful coping and well-being (Cheng & Cheung, 2005). The present study seeks to determine whether coping flexibility is one mechanism by which MM reduces stress and increases well-being, specifically flourishing and positive emotion.

The Broaden-and-build Theory

The broaden-and-build theory postulates that positive emotions, such as happiness, joy and contentment, self-perpetuate. This means that feelings of contentment or joy will lead to more feelings of contentment and joy. Further, the broaden-and-build theory suggests that positive emotions diversify, promoting the experience of more varied positive emotions similar to an upward spiral (Fredrickson, 2001). For example, the ability to revel in wonder and awe is more likely when one is experiencing a relaxed state rather than stress or negative emotion (Smith & Joyce, 2004). The theory also suggests that the experience of positive emotions prime individuals to experience more frequent positive emotions. Affective neuroscience supports this notion; due to the plasticity of the brain, dispositional emotions promote structural changes in the brain (Davidson, Jackson, & Kalin, 2000 for a review).

Davidson and colleagues have found that differences in the prefrontal cortex predicted positive dispositional mood. This research suggests that emotional experiences and dispositions pave neurological pathways for future positive emotion experiences (Garland et al., 2010).

Finally, the broaden-and-build theory proposes that regularly occurring positive emotions help to build positive resources (Fredrickson, 2001). Individual occurrences of positive emotion therefore have the propensity to aid in the development of personal assets that increase well-being and promote flourishing (Fredrickson & Kurtz, 2011). For example, a person who frequently feels happy may have an easier time building a social support network to rely on for companionship or aid in times of need. Many studies have supported the “build hypothesis,” finding that positive emotions facilitate greater optimism, resilience, social support, and social connection (Fredrickson et al., 2008; Kok & Fredrickson, 2010; Schiffrin, & Falkenstern, 2012; Tugade & Fredrickson, 2004). Thus, the broaden-and-build theory lays the groundwork for the importance of positive emotions in everyday experiences, by perpetuating positive emotion, by diversifying the types of emotion experienced, and by building positive resources. These positive emotions and experiences continue to build, resulting in increased flourishing (Fredrickson & Kurtz, 2011).

Flourishing incorporates several key components: the belief that one’s life has purpose and meaning, the experience of positive emotions, the presence of positive relationships, and the feeling of belonging and usefulness in one’s community (Keyes, 2007). Flourishing has also been defined as the presence of mental health, rather than the absence of mental illness (Catalino & Fredrickson, 2011). The concept of flourishing is an important aspect of the broaden-and-build theory as it is the culmination of the upward spiral of

positive emotions (Fredrickson & Kurtz, 2011). According to Fredrickson and Kurtz, humans strive to increase their experience of positive emotions to facilitate mental health and well-being, in essence, human flourishing.

There are a number of physical and psychological benefits to flourishing. Flourishers tend to be more emotionally intelligent (Schutte & Loi, 2014), exhibit greater self-compassion (Satici, Uysal, & Akin, 2013) and live longer (Kern, Della Porta, & Friedman, 2014). Furthermore, flourishers tend to experience more variety of positive emotions throughout the day and more positive emotional reactivity to positive experiences (Catalino & Fredrickson, 2011). This means that when flourishers either perform a positive task, such as expressing gratitude, or experience a positive event, such as receiving a gift, they tend to report more intense positive emotions. This supports the broaden-and-build theory and also suggests that the relationship between flourishing and positive emotions may be reciprocal.

Stress and Positive Emotions

One of the main goals of the present study is to further examine the relationship among positive emotions and flourishing in the context of everyday stress. Given the available evidence of the benefits of positive emotions, studies have begun to examine the relationship among positive emotions, flourishing, and stress, as well as any subsequent protections these two well-being constructs may offer. Although a positive relationship between stress, positive emotions, and flourishing may seem counterintuitive as stress is not generally associated with positive feelings or well-being but with negative emotions, these relationships are not only present but important for maintaining optimal well-being (Scott, Sliwinski, Mogle, & Almeida, 2014).

The association between stress and negative emotion is logical; stress primarily serves to allow the body to respond to a threat in the environment (Lazarus & Folkman, 1984). To enable the body to respond to an imminent threat, attention is narrowed to promote focus on the threat (Easterbrook, 1959; Zautra, Berkhof, & Nicolson, 2002). The initiation of the physical stress response taxes cognitive resources, limiting the number of behavioral responses available (Uvnäs-Moberg, 1998), hence the fight or flight process. An excellent example of this is weapon focus. Weapon focus is a phenomenon whereby attention is narrowed to focus on a threat, namely a weapon. Victims are usually able to describe the weapon in extreme detail, but often do not remember other details about the incident, such as what the assailant looked like or was wearing, or even events from the occurrence (Fawcett, Russell, Peace, & Christie, 2013). The body mobilizes the fight or flight mechanism to ensure survival, however, this response limits the ability to perceive other pertinent information. In the modern world, most stress is not life-threatening and cannot be effectively coped with by fighting or fleeing.

Although the fight or flight response coupled with negative emotions are tenants of stress (Bolger, DeLongis, Kessler, & Schilling, 1989; Jones et al., 2014), recent research has found that positive emotions also occur during stress and may be an evolutionarily adaptive counter-response to the attention narrowing consequences of stress (Larsen, Hemenover, Norris, & Cacioppo, 2003; Scott et al., 2014). For example, Scott et al. (2014) examined a large cohort of adults, aged 33-84, using both daily diary and momentary assessments to gather information on positive emotion, negative emotion, and stress. They found that positive emotion co-occurred with negative emotion during stressful experiences at both the daily and momentary levels. The broaden-and-build theory helps to provide an explanation

for why positive emotions may be adaptive during a stressful experience and how they may buffer against the attention narrowing of stress and associated negative emotions: (1) by broadening attention to facilitate greater problem solving and coping (Fredrickson & Branigan, 2005; Folkman & Moskowitz, 2000), and (2) by helping to “undo” the consequences of both negative emotions and stress (Fredrickson & Levenson; Ong, 2010).

A seminal article by Fredrickson and Branigan (2005) illustrates how positive emotions can be adaptive during stress. In Study 1, participants were shown films to elicit negative, positive, and neutral emotions. Those participants in the positive emotion condition exhibited greater attention in a visual processing task compared to the neutral and negative emotion conditions. Study 2 tested the hypothesis that positive emotions would broaden the scope of one’s potential behavioral responses, meaning that those in the positive emotion condition would select a greater variety of possible behaviors to engage in when compared with the neutral and negative group. Their hypothesis was supported, those in the positive emotion condition did choose significantly more potential actions than the neutral or negative condition, and those in the negative condition chose significantly less than the neutral condition, suggesting that negative emotions may narrow possible actions, supporting previous research (Easterbrook, 1959). This research suggests that positive emotions may offer the cognitive space and capability to creatively think of alternate ways to cope with stress, an assertion that has received empirical support (for review see: Folkman & Moskowitz, 2000).

As previously mentioned, positive emotions help “undo” the effects of negative emotions. This is an important argument for the adaptive nature of the co-occurrence of positive and negative emotions during stress, indicating that the consequences of negative

emotions during stress, such as narrowed attention, may be offset by the co-occurrence of positive emotions, allowing for a more flexible behavioral response that may be more adaptive for effective coping. Negative emotions can elicit biological responses similar to stress, including elevated cardiovascular reactivity and prolonged cardiovascular recovery (Blascovich & Katkin, 1993). Fredrickson and Levenson (1998) again used films to alter positive and negative emotions. However, in this study all participants watched a film designed to induce negative emotion, followed by another film designed to elicit positive, negative, or neutral emotions. Continuous cardiovascular measures of heart rate and pulse transmissions were taken throughout the study. The results indicated that the first negative film successfully induced cardiovascular reactivity. For the second film, those in the positive emotion condition returned to their normal cardiovascular baseline quickly, while those in the negative or neutral emotion conditions took longer to recover. Fredrickson and Levenson suggest that positive emotions served to aid in homeostasis, allowing for a speedy physiological recovery.

Other research suggests that positive emotions also have an undoing effect on the negative consequences of stress. Ong and Allaire's (2005) 60-day extensive study evaluated the effects of positive emotions on cardiovascular activity as assessed twice a day. Their results indicate positive emotions were associated with cardiovascular recovery, echoing results from Fredrickson and Levenson (1998). Ong and Allair note that cardiovascular recovery promotes healthier cardiovascular functioning in everyday life.

Together, these studies suggest that if a variety of positive emotions can be promoted and experienced during a stressful event, those positive emotions may help inoculate against the deleterious consequences of stress (Ong, Bergeman, Bisconti, & Wallace, 2006).

Furthermore, the co-occurrence of both positive and negative emotions during stress predicts more effective coping and greater resilience (Larsen et al., 2003) which may lead to greater flourishing. A main goal of the present study is to examine the relationship among stress, positive emotions, and flourishing at a variety of levels: at a trait, daily, and momentary level. Another goal is to examine the potential relationships these variables may have with a relatively new psychological construct: coping flexibility.

Coping Flexibility

Effectively coping with stress is paramount for optimal health and well-being. Those who cope more effectively with stress report fewer illnesses, enjoy greater longevity, and report better quality of life (Cheng, Lau, & Chan, 2014; Kato, 2012; Lester, Smart, & Baum, 1994). In general, research suggests that problem-focused coping, which involves a direct attempt to solve the cause of the stress, is associated with better health outcomes (Roth & Cohen, 1986). However, some studies report opposing results, namely that emotion-focused or emotion-approach coping, attempting to control or alter emotions associated with the stressor and work through those emotions, is sometimes associated with better adjustment and psychological outcomes (Stanton & Low, 2012). For example, when a stressor is controllable, problem-focused coping tends to be best, while emotion-focused coping yields results that are more successful when the stressor cannot be changed (Chan & Hui, 1995; Marx & Schulze, 1991). Previous coping research has largely focused on problem- and emotion-focused coping, however due to discrepancies among the results of research on these coping strategies a new construct, coping flexibility, has emerged.

Coping flexibility is the ability to apply the appropriate coping strategy to a given situation and modify that strategy as necessary. Because most stressful situations are

complex, requiring the use of multiple coping strategies to effectively deal with a single stressor, individuals who have the ability to incorporate a wide variety of strategies are at an advantage (Cheng, 2003; Sideridis, 2006). Those reporting greater coping flexibility tend to report fewer psychological and physiological illnesses (Cheng et al., 2014; Kato, 2001) and better recovery from illness (Roussi, Krikeli, Hatzidimitriou, & Koutri, 2007).

Coping flexibility also predicts psychological well-being (Lester et al., 1994). Galatzer-Levy, Burton, and Bonanno (2012) found that college students who coped more flexibly experienced better adjustment to college life and showed more resilience when faced with a potentially traumatic experience. In addition, research by Fan, Gan, Zheng, and Wang (2010) indicates a strong association between coping flexibility and optimism. Although research on coping flexibility is growing, it remains a relatively young and understudied concept.

To the author's knowledge, no studies have investigated the momentary utility of coping flexibility in attenuating the stress response, nor have any studies directly examined the possible links between positive emotion and flourishing with coping flexibility. However, the foundational research for links between coping flexibility, positive emotion, and flourishing exist. Coping flexibility correlates with other trait measures of well-being, including resilience, optimism, self-efficacy, and happiness among others (for meta-analysis, see Cheng et al., 2014). Many of these constructs are also correlated with flourishing (Gallagher & Lopez, 2009; Howell & Buro, 2015). Likewise, research on positive emotions suggests there may be strong ties to coping flexibility. Positive emotion predicts creativity, problem solving, and cognitive flexibility (Baumann & Kuhl, 2005; Hirt, Devers, & McCrea, 2008; Lin, Tsai, Lin, & Chen, 2014) and could therefore be expected to correlate with coping

flexibility. This study examined links among coping flexibility, flourishing, positive emotions, and stress at the trait, daily diary, and momentary levels. Moreover, this study will examine potential moderators to each of these associations, namely MM.

Mindfulness Meditation

Trait mindfulness can be understood as an overall measure of how attentive and nonjudgmental individuals tend to be toward everyday experiences (Brown & Ryan, 2003). It is the extent to which one attends to outside stimuli, such as noticing the architecture of buildings on the drive to work or school, as well as attending to internal thoughts and emotions, such as noticing when one feels happy, sad, or intrigued. Trait mindfulness tends to be relatively stable; however it can be altered through practice with MM (Brown & Ryan, 2003). MM is the act of “paying attention, in the present moment, on purpose, non-judgmentally” (Kabat-Zinn, 1994, p. 4). MM directs practitioners to bring consciousness awareness to their thoughts, but to do so in a non-judgmental way, accepting both positive and negative thoughts as a part of normal life experience (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). MM often instructs one to focus attention on a particular event or practice, to the breath or a particular part of the body, with the intent of simply noticing what is occurring in the body at that moment. Non-judgment is integral to the process of MM, meaning that labels of “good” or “bad” should not be associated with the sensations noticed. For example, in MM someone with chronic pain would be encouraged to sit and notice what was occurring in their body, noticing the pain, yet refraining from assigning a negative judgment to the experience of pain. This person would just accept that there is pain, notice how the pain feels, and move along to other sensations in the body. This reappraisal of pain has successfully helped many people with chronic pain conditions cope with their pain,

resulting in lower perception of pain and reduced use of pain medication (Morone, Greco, & Weiner, 2008).

MM has many other health benefits in addition to helping cope with chronic pain. MM is particularly beneficial for decreasing stress. Weinstein et al. (2009) found that regular practice with MM reduced the number of daily events perceived as stressful. Other research suggests that those who practice mindfulness have an attenuated stress response during laboratory stress tasks (Nykliček, Mommersteeg, Van Beugen, Ramakers, & Van Boxtel, 2013). In this study, individuals who participated in a MM program had lower systolic and diastolic blood pressure during a mental arithmetic task and a speech task when compared to a control group. These studies indicate that MM helps reduce the number of situations perceived as stress and helps lower activation of the stress response when stress is experienced.

MM also promotes better coping strategies. Weinstein et al. (2009) found that a MM intervention increased the use of adaptive coping strategies, while maladaptive coping strategies decreased. This change in coping strategy may indicate either more active coping or a better fit of coping strategy to the situation. Although there are no studies examining direct links between MM and coping flexibility, MM may promote coping flexibility. Previous research indicates that those with higher trait mindfulness have greater flexible cognitive control (Anicha, Ode, Moeller, & Robinson, 2012), which is the ability to refocus attention to pertinent information despite competing stimuli, and greater cognitive flexibility (Moore & Malinowski, 2009). Other research suggests individuals with greater cognitive flexibility also tend to report greater coping flexibility (Cheng, 2003). MM facilitates flexible cognition by encouraging focused attention and also by promoting positive emotions

(Hanley, Garland, & Black, 2014). Finally, MM enhances executive attention (Tang, Rothbart, & Posner, 2012). Executive attention is important for both self-regulation and focused attention (Tang & Posner, 2015). According to Tang and Posner, MM promotes regulation of the executive attention network, likely through efforts to control mind wandering. It may be that MM increases cognitive flexibility and cognitive control via the executive attention network, and broadens problem solving abilities and cognition with positive emotions, thereby increasing capacity for coping flexibility.

Finally, MM increases positive emotions (Garland et al., 2011) and overall well-being (Eberth & Sedlmeier, 2012). To test the broaden-and-build theory in the context of MM, Fredrickson et al. (2008) conducted a seven-week MM intervention using loving kindness meditation, a particular kind of MM designed to increase feelings love, care, and appreciation for others. Fredrickson and colleagues used the daily diaries method to examine whether MM increased positive emotions over time. They found that over the course of seven weeks, those in the MM condition increased in positive emotions but the control group did not. Although the author is unaware of studies examining MM and flourishing, a number of studies have examined MM and a variety of other well-being constructs. In a meta-analysis of 39 MM studies, Eberth and Sedlmeier (2012) examined a variety of well-being measures with MM, including life satisfaction, psychological well-being, optimism, vigor, and activity level. They found that MM significantly increased well-being ($d = .23$ to $d = .80$, depending on the type of MM used). The present study seeks to replicate the findings of these studies using a short-term intervention lasting one week, specifically examining the effects of MM on the links among stress, flourishing, positive emotions, and coping flexibility.

Present Study

The present study builds on previous literature by incorporating momentary and daily diary assessments as a novel way to assess the mechanisms of MM. Momentary assessments were completed hourly to obtain information regarding participants' experiences from one hour to the next. Daily diary assessments were obtained toward the end of the participants' day and provide information regarding experiences over the entire day. These assessments provide a number of benefits. First, they provide an opportunity for participants to report high negative or low positive events and emotions. As Schwarz (2012) suggests, individuals may be reluctant to describe their lives as difficult or undesirable, however admitting that a day or a few hours are difficult is more acceptable. Second, MM focuses on being present in the moment, yet few studies actually examine moment-to-moment variations in MM interventions. Finally, assessing trait, daily diary, and momentary levels of stress, coping flexibility, positive emotions, and flourishing will allow for the examination of different processes in how MM may build positive resources over time.

This study was designed to examine whether coping flexibility was one mechanism by which MM affects the link between stress and two aspects of well-being, positive emotions and flourishing. Previous research has already established that MM has a positive effect on health by lessening stress and facilitating well-being. As such, practice with MM should aid in the decrease of stress and increase of positive emotions and flourishing. However, the mechanisms as to why these links are related are less clear. Coping flexibility is an important concept to examine. Coping flexibility affects appraisal of stress by increasing the ability of an individual to effectively cope with the stressor (Cheng, 2001), and affects whether a situation is even seen as stressful or not (Skinner & Brewer, 2002). Further, coping flexibility is related to greater well-being and cognitive flexibility (Cheng, 2003;

Lester et al., 1994). As such, it is possible that coping flexibility mediates the link between stress and well-being (flourishing and positive emotions).

Hypotheses

The current study explores mechanisms by which MM decreases stress and promotes well-being, incorporating the possibility that coping flexibility is involved in this process. Six hypotheses will explore the effect of practice with MM on trait mindfulness, stress, coping flexibility, flourishing, and positive emotions. Trait mindfulness was included as a manipulation check for the short-term MM intervention. Because MM increases trait mindfulness, I expected that a short-term MM intervention would increase trait mindfulness. Likewise, I expected MM would increase levels of coping flexibility and flourishing, as well as decrease stress. In addition, two mediation models were proposed (see Hypotheses 5 and 6). First, I proposed a mediation model testing coping flexibility as a potential mediator of the link between stress and well-being (see Figure 1). For the second model, I proposed that practice with MM would moderate the mediated links of the first model (Figure 2). Each hypothesis is listed below.

Hypothesis 1: Trait mindfulness will show a linear increase with MM practice.

Hypothesis 2: Ratings of perceived stress will show a linear decrease with MM practice.

Hypothesis 3: Coping flexibility will show a linear increase with MM practice.

Hypothesis 4: Well-being constructs (flourishing and positive emotions) will show a linear increase with MM practice.

Hypothesis 5: Stress will predict lower well-being and coping flexibility. Coping flexibility will mediate the link between stress and well-being, such that those higher in coping flexibility will report more well-being during times of stress (Figure 1).

Hypothesis 6: Mindfulness will moderate the mediated links between stress, well-being, and coping flexibility, such that those with MM experience will exhibit stronger links between stress, well-being, and coping flexibility (Figure 2).

Method

Students from Western Washington University human subject pool were awarded 6 hours of research participation credit for this study. As an incentive to complete the entire study, participants providing complete data were entered into a raffle to win \$25, for a total of \$750 given away at the end of the study. Participation in this study required a three-week commitment. To be eligible for the study, participants could not have completed more than two hours of mindfulness meditation practice with a trained meditation instructor.

The 115 participants were predominantly female (female = 62.6%, male = 36.5%) and of European American descent (European American 70%, Asian American 12%, Latino/Latina 5%, Middle Eastern American 2%, African American 1%, mixed race 4%, missing 4%) with a mean age of 18.97 ($SD = 2.13$, range: 18 - 36).

Procedure

The entire study occurred over two academic quarters (see Figure 3). Three waves of data collection were required to obtain an acceptable number of participants. For each wave, participants were randomly assigned to either the control or MM condition. I allowed the MM condition to be somewhat larger, with a maximum of 25 participants per wave, while the control condition had a maximum of 20 participants per wave. The MM condition

therefore consisted of 64 participants, and the control group consisted of 51. Participation for each wave is described below and shown in Figure 3. The measures used in this study are outlined in Table 1, and described later in detail. The number of assessments for longitudinal, daily diary, and momentary data can be found in Table 2. Attrition by condition will be discussed below in the attrition section.

Overview of the study. Prior to beginning the study, participants were pre-screened. Those who reported having completed more than two hours of training in MM were not allowed to participate in the study. A few participants had familiarity and practice with MM, although no official training. Likewise, some participants regularly participated in yoga, which is a traditional component of MM. To ensure that those familiar with MM and yoga were not differentially placed into one group, I used stratified random assignment so that those familiar with MM or yoga were placed equally into the MM and control conditions.

Table 1 summarizes the assessments participants completed as a part of this study. Participants completed all preliminary measures on the first day of the study. These pre-test measures included demographics, a health history questionnaire, height, weight, as well as trait measurements of mindfulness, coping flexibility, stress, and flourishing. Participants randomly assigned to the MM condition began their MM training the following evening and continued to meditate each day for a total of six days. During this time, participants in both the control condition and the MM condition completed daily diary measures online. The daily diary questionnaires included information regarding participants' most stressful experience of the day, their levels of trait mindfulness throughout the day, how flexibly they coped with their stressors, their level of flourishing, and how many minutes, if any, they spent practicing MM. At the end of this week, all participants returned and completed post-

test assessments of trait mindfulness, stress, coping flexibility, and flourishing. Following the MM intervention, participants were split into groups (as discussed below in momentary assessment section) and given an iPod Touch to use for two days. During this time, participants completed momentary measures of mindfulness, stress, and positive emotions. If participants reported having a stressful experience, they also reported coping flexibility. Finally, two weeks after the MM intervention, participants returned and completed follow-up measures of mindfulness, stress, coping flexibility, and flourishing. All measures used in this study are described later in detail.

Mindfulness meditation intervention. Participants in the MM condition received two and a half hours of MM instruction from a local director of a MM center. This instructor had been certified Mindfulness Based Stress Reduction instructor for four years and led MM courses for other researchers, lay people, and health professionals. In addition, he has training in Buddhist and Zen meditations and provides instruction in both. Participants practiced in a class of 20-25. Ideally, MM occurs in class of no more than 12, however, budget constraints necessitated larger classes. The training began with an overview of MM, including its origins in Buddhism and how it had been implemented in the United States. Participants received information regarding the physiological and emotional benefits of MM training, particularly regarding the reduction of stress. Next, participants were instructed on breathing techniques and sitting positions for sitting meditation and practiced appropriate techniques. Following this, participants practiced guided sitting meditation for 30 minutes. This meditation instructed participants to focus their attention on their breath. As with most sitting meditations, participants were instructed to notice whether their attention had wandered and if it had, to notice where it had wandered to and gently bring back their

attention to their breath. After the meditation, participants engaged in a reflection of their experience during this practice and if comfortable, were encouraged to share their experience with the group. These discussions were focused on the emotional experience of MM as well as anything they found particularly beneficial or difficult. For example, participants reported frequent mind wandering and needing to bring their attention back to their breath. Following the sitting meditation practice, participants were given a short break. Participants then came back and received instructions regarding a body-scan meditation.

The body-scan meditation also lasted 30 minutes. During this meditation, participants were instructed to lie comfortably on a mat and begin attending to their breath. Participants were then instructed to attend to their feet and notice what sensations, if any, they notice in their feet. Over the course of 30 minutes participants attended to various portions of their bodies, moving up from their feet to the top of their head, noting what they felt. Special focus was given toward non-judgment. For example, if participants felt discomfort in a particular area, they were encouraged to notice the feeling but refrain from assigning a negative judgment toward that feeling. Following the meditation, participants engaged in similar debriefing session regarding their MM experience. Once both meditation practices were complete, participants were given a compact disc with two guided meditations, the body scan and sitting meditation. They were provided with instructions regarding at-home practice, such as alternating between the sitting and body-scan meditation and practicing for a minimum of 30 minutes per day.

Time meditation and daily reports. The training for this study therefore incorporated two MM practices, the body-scan and sitting meditation. Because each of these meditation practices was 30 minutes long, all participants completed 60 minutes of MM

practice the first night. Participants were asked to practice using one of the of the meditation recordings for a minimum of 30 minutes of MM per day for six days following the training, totaling seven days of MM. Not surprisingly, the mean minutes meditating were greater for those in the MM condition ($M = 170.52$, $SD = 83.42$) than for the control condition ($M = 1.98$, $SD = 6.98$). However, a few participants in the control condition did report meditating during the intervention. All participants in the control condition included in subsequent analyses reported less than 30 minutes meditating over the entire study. Two participants from the control condition were removed from all analyses (discussed lower in multivariate outliers section) and are not included in the mean for the control condition.

After the MM training session, participants in the MM condition were emailed a link to the daily diary assessment. They were asked to fill out this assessment each night for six nights. Those who were in the control condition were emailed the same link and were also asked to fill out the assessment each night before bed for six nights.

Momentary assessment. Following the MM intervention and post-test, all participants in the each wave were randomly divided into one of four groups of 10, with approximately equal numbers from control condition and the MM condition. The first group, group A, was issued an iPod Touch and asked to use it over the subsequent two days, while groups B, C, and D were asked to return to pick up their equipment three, six, or nine days later. A schedule with the days all measures taken each group used the iPod Touch can be found in Figure 3. On the day they were to pick up their equipment, participants were brought into the lab and given instructions on completing momentary assessments. Participants practiced using the iPod Touch in front of trained research assistants to ensure they could properly complete and save assessments.

The iPod Touch prompted participants approximately once per hour to complete momentary measures of mindfulness, stress, positive emotion, and, if they experienced a stressor, coping flexibility. It took 10 days for all groups to complete the momentary assessment portion of the study. Once data collection was complete, participants returned for a final follow-up measure of mindfulness, stress, coping flexibility and flourishing.

Compliance. To encourage participant compliance, those participants who completed the entire study were entered to win the raffle. The prize was \$25 and there were 30 winners. In addition, participants were contacted one to two times each week via emails reminding them of research appointments (text of emails is shown in Appendix A). Participants who failed to complete the entire study received credits for the number of hours they actually participated. All data were collected electronically.

Once data collection was complete, participants were thanked, awarded credit, and debriefed. At the conclusion of the study those participants in the control condition were offered a mindfulness session and access to all MM material used in the study.

Measures

A summary of all measures can be found in Table 1. Appendix B lists longitudinal measures, Appendix C lists daily diary measures, and Appendix D lists momentary measures.

Pre-test, Post-test, and Follow-up Measures. (Appendix B)

Mindfulness. The Five Facet Mindfulness Questionnaire (Baer et al., 2006) was used to assess trait levels of mindfulness. Baer et al.'s scale is a 39-item, Likert-type scale ranging from “never or very rarely true” (1) to “very often or always true” (5). Instructions directing participants to think about how true the statements were for them in the past month were altered to direct participants to think about how true the statements are for them in the last

week. There are five mindfulness subscales: nonreactivity, observing, acting with awareness, describing, and non-judgment. The seven-item nonreactivity subscale measures the ability to maintain calm and not be overtaken by thoughts or emotions. For example one item on this subscale is, “When I have distressing thoughts or images, I am able just to notice them without reacting.” The eight-item observing subscale assesses the extent to which individuals are observant of the sensations of their body or surroundings. An example is, “I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.” The eight-item acting with awareness subscale measures the level of attention one generally gives to activities. An example of this subscale is, “I do jobs or tasks automatically, without being aware of what I’m doing.” The eight-item describing subscale measures one’s ability to describe thoughts, feelings, opinions or beliefs. An example of the describing subscale is, “I’m good at finding the words to describe my feelings.” Finally, the eight-item non-judgment scale assesses the extent to which individuals place value judgments on their thoughts or actions. An example of this subscale includes, “I tell myself that I shouldn’t be feeling the way I’m feeling.”

Baer’s scale has been used extensively in mindfulness literature, particularly when attempting to examine the mechanisms of mindfulness (Sedlmeier et al., 2012).

For this study, all subscales were combined to as an overall measure of trait mindfulness. Although the subscales can be used to measure particular aspects of mindfulness, the measure was included in this study to provide a comprehensive, overall measure of mindfulness that includes its most important components (Baer et al., 2006). The objective was to determine whether a short-term MM intervention influenced mindfulness as a whole, rather than measuring its influence upon certain sub-components. In addition, examining the scale as a whole rather than five different subscales individually reduces

chances of obtaining a Type I error. In this study, the Five Facet Mindfulness Questionnaire exhibited good reliability at pre-test ($\alpha = .86$), post-test ($\alpha = .91$), and follow-up ($\alpha = .92$).

Stress. The Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) was used to measure stress. Cohen et al.'s perceived stress scale is a 10-item scale, ranging from "never" (0) to "very often" (4). This scale has been used extensively in previous MM research (Baer, Carmody, & Hunsinger, 2012; Brown & Ryan, 2003) and is a good indicator of how stressed a person feels their life is. For the purposes of this study, instructions directed participants to rate how much stress they have experienced in the previous week. Examples from the scale include, "In the last week, how often have you been upset because of something that happened unexpectedly?" and "In the last week, how often have you felt nervous and 'stressed'?" The Perceived Stress Scale exhibited good reliability at pre-test ($\alpha = .89$), post-test ($\alpha = .90$), and follow-up ($\alpha = .92$).

Coping flexibility. The Coping Flexibility Scale (Kato, 2012) was used to measure trait coping flexibility. Kato's coping flexibility scale is a 10-item, Likert-type scale ranging from "very applicable" (4) to "not applicable" (1) and has two subscales, an evaluation coping subscale and an adaptive coping subscale. The evaluation subscale measures whether an individual is aware of the potential success or failure of a coping strategy, while the adaptive subscale measures the ability of an individual to change their coping strategy. An example from the five-item evaluation coping subscale is, "I am aware of how successful or unsuccessful my attempts to cope with stress have been" and an example from the five-item adaptive coping subscale is, "When a stressful situation has not improved, I try to think of other ways to cope with it." This scale has demonstrated acceptable reliability and also convergent validity with the coping variability and well-being, and was negatively related to

measures of depression and anxiety. Because no specific theory suggested only one coping flexibility subscale would be affected, subscales were not examined at the longitudinal data level to reduce the number of analyses and avoid inflating the chance of obtaining statistical significance. The Coping Flexibility Scale exhibited acceptable reliability at pre-test ($\alpha = .83$), post-test ($\alpha = .83$), and follow-up ($\alpha = .87$).

A more commonly used coping flexibility scale by Cheng (2001) was incorporated in this study to validate the use of Kato's (2012) coping flexibility scale. Unfortunately, the instructions for the use coding and cluster analysis used in Cheng's scale were unclear in her articles. Attempts were made to contact Cheng directly to determine how she used cluster analysis with her scale, but no response was received. This prohibited the validation of Kato's scale with Cheng's scale. As such, we decided to move forward with data analysis on Kato's scale.

Flourishing. The Flourishing Scale was used to measure trait well-being. The flourishing scale is a relatively new scale designed to determine the extent to which individuals are flourishing or languishing (Diener et al., 2010). Diener et al.'s flourishing scale is an eight-item Likert scale ranging from strongly disagree (1) to strongly agree (7). Again, instructions were altered to inform participants to rate statements regarding the past week rather than the past month. The questions were designed to obtain information on five core components of flourishing, including meaning, engagement, positive emotions, positive relationships, and achievement. Examples of the scale include, "I felt that my life had purpose and was meaningful" and "I felt optimistic about my future." Although the flourishing scale is new, it has demonstrated good convergent validity with other well-being scales and also demonstrated good levels of reliability (Diener et al., 2010). In this study, the

Flourishing Scale exhibited good reliability at pre-test ($\alpha = .85$), post-test ($\alpha = .93$), and follow-up ($\alpha = .94$).

Daily diary measures. (Appendix C)

Reliability. Reliability of all daily diary and momentary measures was assessed in HLM using a 3-level model. Level one consisted of each item in a particular measure, while level two represented the particular measure occasion (one day or moment – for the momentary assessment) and level three represented the individual. The reliability of each variable was estimated by evaluating the consistency of the individual items at level one; values should be interpreted similarly to Cronbach's alpha.

Mindfulness. An adapted version of the Five Facet Mindfulness Questionnaire (Baer et al., 2006) was used to assess mindfulness at the daily diary level. The Five Facet Mindfulness Questionnaire described earlier was adapted by shortening the scale to two items per subscale for a total of 10 items. Existing items were chosen based on the following two criteria: the item must be in the top three for loadings on its factor, and must easily be altered to a more momentary tense without changing the integrity of the statement. For example the statement, "I perceive my feelings and emotions without having to react to them" was altered to "I perceived my feelings and emotions without having to react to them." In addition, instead of being instructed to think about the past week, participants were be instructed to limit their responses how they thought or felt throughout the day. The FFMQ reliability at the daily diary level was very poor; it was estimated at $< .01$. Because of this Hypothesis 1 was not tested at this level and the daily diary reports of mindfulness were not used in any subsequent analyses.

Stress. The Perceived Stress Scale was used to observe an individuals' level of stress for that day. The scale was adapted for use as a daily dairy measure by altering the instructions from the pre-, post-, follow-up scale. The instructions in the pre-, post-, follow-up directed participants to rate how much stress they had experienced in the previous week, however for the daily dairy scale participants were instructed to think about the most stressful situation of the day and to answer the Perceived Stress Scale based on that stressful situation. All other aspects of the scale remained the same as in the pre-, post-, follow-up measures. Reliability at the daily diary level was estimated at .72.

Coping flexibility. The Coping Flexibility Scale (Kato, 2012) was modified and shortened for use as daily diary measure of coping flexibility. Six of the highest loading items (three from each subscale) were taken from Kato's coping flexibility scale and reworded so that they could be answered regarding the most stressful situation of the day used in the Perceived Stress Scale. For example the statement, "If a stressful situation has not improved, I use other ways to cope with that situation" was modified to state, "If the stressful situation did not improve, I used other ways to cope with it." While overall coping flexibility scale did not exhibit acceptable reliability (estimated in HLM at .22) at the daily diary level, the adaptive subscale demonstrated adequate reliability (estimated at .78). Thus, all coping flexibility analyses for the daily diary level use only the adaptive subscale.

Flourishing. The Flourishing Scale (Diener et al., 2010) was similarly adapted to make it applicable for daily diary measurement. Instead of participants being instructed to think more broadly about their experiences, they were instructed to think about their day and respond to each item as to how they felt or thought on only that day. Minor changes were made to each statement. For example the statement, "I feel that my life has purpose and is

meaningful” was changed to “Today, I felt that my life had purpose and was meaningful.” Reliability at the daily diary level was estimated at .82.

Daily minutes meditating. Participants were asked if they participated in any form of MM, including body scan or sitting meditation, and if so, how many minutes they practiced that day.

Minutes meditating. An individual difference measure of minutes meditating was created that is the sum of the daily minutes meditating measure across all days of participation.

Momentary measures. (Appendix D)

Mindfulness. The same adapted version of the Five Factor Mindfulness Questionnaire (Baer et al., 2006) used in the daily diary questionnaire was used to assess momentary levels of mindfulness. Instead of being instructed to think about how they responded throughout the day, participants were instructed to limit their responses to the previous 10 minutes. Because mindfulness at the momentary level did not exhibit adequate reliability (estimated at $< .01$). Hypothesis 1 was not tested at this level. This measure of mindfulness was not used in any subsequent analyses.

Stress. A single-item question was used to observe an individuals’ level of stress on an hourly basis. This is the same instruction used in the daily diary assessment, however to adapt this to a momentary measure participants were instructed to think about what they were doing in the previous 10 minutes rather than to think about their entire day and then were instructed to rate the phrase, “The situation was stressful” from 0 to 100 on a slider scale on the iPod Touch.

Coping flexibility. The Coping Flexibility Scale (Kato, 2012) was modified and shortened for use as a momentary measure of coping flexibility. Again, this is the same scale that was used for the daily diary coping flexibility questionnaire. Only the instructions were altered from the daily diary measure. Participants were instructed to answer questions regarding stressors experienced in the previous 10 minutes rather than to fixate on one stressful experience from their day. Both subscales were used because the reliability of both subscales was greater than the reliability of either subscale alone. Reliability was estimated at .52.

Positive emotions. The Circumplex Model of Mood (Feldman, 1995) was used to assess positive emotions on a momentary level. The Circumplex Model of Mood incorporates 16 positive and negative moods or emotions that are found on the PANAS. Participants were asked hourly to indicate the extent to which they have experienced each of the 16 emotions in the previous 10 minutes on a slider scale from 1-10 with a neutral midpoint at five. This format has been used in previous studies (Lehman & Conley, 2010) and has demonstrated acceptable reliability. A preliminary factor analysis indicated two positive emotion factors, low activation positive emotions (LAPE) and high activation positive emotions (HAPE); LAPE consisted of two positive emotions: calm and relaxed, while HAPE consisted of four positive emotions: peppy, enthusiastic, happy, and satisfied. Within person reliability of HAPE was estimated at .59 and LAPE at .56.

Data Analysis

Dosage. A challenge with the data collected for this study was compliance with at-home meditation instructions. Minutes meditating are an important ingredient of the benefits of MM (Baer et al., 2012). Although all participants in the MM condition were asked to

practice for 210 minutes total, practice times varied greatly from participant to participant ($M = 170.52$, $SD = 83.42$, range: 60, 450). Likewise, although those in the control condition were not supposed to meditate, five reported meditating ($M = 1.98$, $SD = 6.98$, range: 0, 30). Major analyses were conducted both by condition (MM/control) and by minutes meditating.

All data were entered into SPSS and, when appropriate, HLM for analyses. Missing data and violations of statistical assumptions were assessed and altered on a case-by-case basis depending on compliance and overall patterns of results. Please see the section on compliance and dosage.

Multivariate outliers. Prior to data analysis, I examined the data for multivariate outliers using Mahalanobis distance using mindfulness, coping flexibility, and stress from the post-test data. I tested each group (MM and control) separately. Two multivariate outliers emerged, both from the control group. These two individuals reported no previous experience with MM or yoga practice, however, further examination of their data revealed that throughout the course of the study these two individuals reported practicing MM for 95 and 110 minutes, respectively. Because these two individuals began practicing MM despite being in the control group and emerged as multivariate outliers, I removed all their data from subsequent analyses. Although some other control group participants reported engaging in MM (not exceeding 30 minutes for the duration of the study), these participants did not emerge as multivariate outliers and thus were not deleted. Likewise, no participants in the MM condition emerged as multivariate outliers.

Attrition. To assess differential attrition by condition (mindfulness vs. control), I performed a chi-square analyses examining missing data (dummy coded 0 = present for pre-, post-, and follow-up data, 1 = missing one or more of pre-, post-, or follow-up) by condition.

The results were not statistically significant ($N = 113,1) = 2.56, p = .172$, indicating that attrition from the MM condition was not significantly different from the control condition.

To determine whether there were differences in attrition by sex, age, or pre-test variables (including mindfulness, stress, coping flexibility, or flourishing), I conducted multiple independent samples t-tests. None of these variables were statistically significant, indicating that those who dropped out of the study did not differ from those who remained in sex, age, nor by pre-test levels of mindfulness, stress, coping flexibility, or flourishing. See Table 3 for t-statistics.

Condition, wave, and group differences.

Longitudinal data. I conducted four one-way analyses of variance (ANOVA) to determine whether there were differences in mindfulness, stress, coping flexibility, and flourishing at pre-test by wave (Wave 1, Wave 2, and Wave 3). There were no statistically significant differences indicating that the waves did not differ in the primary variables of interest. See Table 4 for t-statistics.

Next, I conducted independent samples t-tests predicting mindfulness, stress, coping flexibility, and flourishing at pre-test from control (mindfulness vs. control). Scores on coping flexibility and flourishing did not differ by control; however, stress was statistically significant, indicating that those in the control group reported more stress at pre-test when compared to the mindfulness group ($M_{\text{Control}} = 2.89, M_{\text{MM}} = 2.59$). In addition, mindfulness was marginally significant such that those in the mindfulness condition reported more mindfulness at pretest ($M_{\text{Control}} = 3.15, M_{\text{MM}} = 3.30$). See Table 5 for t-statistics.

Daily diary data. In order to determine whether there were differences by wave (Wave 1, Wave 2, and Wave 3) in each outcome variable at the daily diary level, I used

multilevel modeling in HLM. Level 1 consisted of all outcome variables, including stress, adaptive coping, and flourishing. Wave was at Level 2. Wave was used to predict stress, adaptive coping, and flourishing. None of the results were significant, indicating that the outcome variables did not differ by wave. See Table 6 for results.

Momentary data. Multilevel modeling in HLM was also used to examine differences by wave and group in the momentary data. I only examined group (Groups A-D; representing the time between momentary assessments) differences in the momentary level because participants were not placed in groups during the longitudinal and daily diary phases; they were only put into groups for the momentary data collection. Level one variables included stress, coping flexibility, HAPE, and LAPE. Level two variables were wave and group. Wave and group were used to predict each of the momentary outcome variables. There were no differences in any of the outcome variables by wave. There were also no differences in stress, coping flexibility, or LAPE by group. However, there was a marginally significant difference in HAPE by group ($p = .060$) such that those in the latter groups reported more HAPE. See Table 7 for wave results and Table 8 for group results.

Data preparation.

Longitudinal analyses: pre-test, post-test, and follow-up data. Data were examined to ensure all assumptions for regression were met. All data appeared to be approximately normally distributed, with the exception of minutes meditating which was bi-modal, with most participants in the control condition reporting 0 minutes meditating. However, when examining minutes meditating for only the MM condition, the data were approximately normal, with two outliers. Those two outliers reported more than 350 minutes meditating but were not more than three standard deviations from the mean. I decided not to adjust the

outliers as they did not differ from others in the MM condition on outcome variables (see multivariate outliers section above). For ease of interpretation, I decided not to use any transformations on the minutes meditating variable. I used Hierarchical Linear Modeling (HLM) to analyze Hypothesis 1, 2, 3, and 4 for the pre-, post-, and follow-up data. Level 1 variables consisted of pre-, post-, and follow-up measures of mindfulness, stress, coping flexibility, and flourishing, and contrast coded variables that indicate linear change and quadratic change patterns. The contrast codes also controlled for differences by condition on levels of stress and mindfulness at pre-test. Level 2 variables consisted of minutes meditating and condition (mindfulness or control). Initial analyses determined whether the Level 1 effects were fixed or random. This analysis indicated whether the slope of each predicted variable differed significantly from person-to-person, or whether the slope was consistent across individuals. If slopes differed between people, that random variability was entered into multilevel models including the predicted variable. However, if the slope was consistent across people, then the slope was fixed and the effects of the predictor on the dependent variable was assumed to be equivalent across people. An alpha of .10 was used to determine whether variables were random (Lehman & Conley, 2010); all Level 1 effects that met this threshold were analyzed as random effects. All tests of random effects for the each level of data can be found in Table 9.

Daily diary data. All daily diary data appear to be normally distributed, however as previously mentioned, coping flexibility and mindfulness did not demonstrate adequate reliability. HLM was used to analyze daily diary data. Each day's measurements were nested within the individual, thus Level 1 variables were daily measurements, and the Level 2 variable was the individual. Data were checked to ensure that they did not violate

assumptions of nested regression models. Level 1 variables included stress, the adaptive subscale from coping flexibility, flourishing, daily minutes meditating, and daily linear time. Daily linear time was a contrast code designed to differentiate the outcome variable by day and allow for testing of linear trends of each of the outcome variables at the day level. The contrast codes were -3, -2, -1, 0, 1, 2, 3 to correspond to each of the seven days participants completed the daily diary analyses. All measures exhibited a random component, meaning that slopes varied from person-to-person at $p < .10$ (Lehman & Conley, 2010).

With the exception of the linear time variable, Level 1 variables were group mean centered, meaning that each person's daily value was subtracted from that individual's mean (across seven days of reporting). This allowed for variations in one persons' level of stress (for example) on a particular day to be compared to that person's average stress.

Momentary data. All momentary data appeared to be normally distributed and all but mindfulness exhibited acceptable reliability. Again, mindfulness was not used in any analyses. Momentary measures were used to replicate results found from the daily diary data. Level 1 variables included momentary reports stress, coping flexibility, flourishing, LAPE and HAPE (low and high activation positive emotions, respectively). Level 1 variables were nested in individuals. Minutes meditating and condition were Level 2 predictors.

Results

Hypothesis 1.

Longitudinal data. Mixed models were used to test Hypothesis 1 through 4. Example equations can be found in Table 10.

Hypothesis 1 examined whether trait mindfulness shows a linear increase with MM practice. Hierarchical linear modeling was used to examine whether mindfulness followed a

linear slope over time. The linear time variable (-1 for pre-test data, 0 for post-test data, and 1 for follow-up data) and was used to predict mindfulness. An initial analysis indicated that linear time was a statistically significant predictor of mindfulness ($p < .001$) indicating that over time mindfulness increased (Table 11). Consistent with Hypothesis 1, there was a main effect of minutes meditating such that those who reported more minutes meditating also reported greater mindfulness ($p = .021$) and minutes meditating interacted with linear time such that those who spent more time meditating reported greater increases in mindfulness over time ($p = .002$). Likewise, there was a main effect of condition such that those in the MM condition reported more trait mindfulness ($p = .003$) and condition interacted with linear time such that those in the MM condition reported greater mindfulness over time ($p = .006$).

To explore whether rates of increase in mindfulness leveled off after the MM intervention ended, I also tested for quadratic slope on mindfulness. To test for a quadratic slope of time, another variable, quadratic time, was created using contrast codes (-1 for pre-test data, 2 for post-test data, and -1 for follow-up data). Quadratic time was a statistically significant predictor of mindfulness ($p = .041$; Table 11). Next, I examined the interactions between quadratic time and minutes meditating. There were main effects of both minutes meditating and quadratic time on mindfulness ($p = .021$ and $p = .002$, respectively). The interaction between minutes meditating and quadratic time was also statistically significant ($p = .037$). I also examined the effects of condition on mindfulness. There was a main effect of condition ($p = .005$), but the main effect of quadratic time was not statistically significant ($p = .967$). The interaction between condition and quadratic time was not significant ($p = .065$) suggesting no difference in quadratic slope for those in the MM condition when

compared to the control. See Table 12 for results and Figure 4 for a graph of the effects of mindfulness over time by condition.

Summary. Because the reliability of the daily diary and momentary data was so poor, Hypothesis 1 was not tested at either of these levels. Together, these analyses indicate that the short-term MM intervention was successful at increasing trait mindfulness over time. Trait mindfulness does appear to “level off” once the MM intervention was over, possibly indicating that trait mindfulness may only continue to rise as long as MM is practiced, with leveling off between post-test and follow-up.

Hypothesis 2.

Longitudinal Data. The same analysis used to examine Hypothesis 1 was used to examine Hypotheses 2, 3, and 4. However, because quadratic time did not predict stress, coping flexibility, or flourishing, quadratic time was omitted from subsequent analyses (see Table 11). This suggests that stress, coping flexibility, and flourishing did not level off after the post-test.

Hypothesis 2 examined whether stress decreased in a linear trend over time. An initial analysis indicated that linear time was a statistically significant predictor of stress ($p = .003$) suggesting that stress decreased over time. However, when linear time was examined in the context of an interaction with minutes meditating, the main effect of linear time disappeared ($p = .596$). Likewise, there was no main effect of minutes meditating on stress ($p = .073$). However, there was a statistically significant interaction between minutes meditating and linear time, suggesting that those who reported more minutes meditating showed a stronger decrease in stress over time ($p = .010$). There was a main effect of condition such that those in the control condition reported more stress ($p = .001$), but no main effect of time ($p = .193$).

Condition did not interact with linear time ($p = .184$), suggesting that there was no difference in stress over time for those who were in the MM condition when compared with the control condition. See Table 12 for results.

Daily diary data. For Hypothesis 2, a model building multilevel regression approach was used to determine whether daily diary stress differed by daily minutes meditating or condition. To examine this hypothesis at the daily diary level, I first tested whether daily linear time predicted stress. Next, I tested whether minutes meditating and condition predicted stress. Finally, to examine whether there were differences by meditation experience, I examined whether condition moderated any link between daily linear time and stress. See Table 13 for example equations for daily diary data.

Daily linear time negatively predicted stress such that over seven days, participants reported less stress ($p = .003$; see Table 14). There was not a main effect of daily minutes meditating on stress ($p = .812$), suggesting that more time meditating each day did not lower stress that same day. There was a main effect of condition on stress such that those in the MM condition reported less stress ($p = .009$). However, condition did not moderate the link between stress and linear time ($p = .337$) suggesting that those in the MM condition did not differ from the control condition in their decrease in stress each day. See Table 15 for results.

Momentary data. For the momentary data, Hypothesis 2 examined whether stress is predicted by minutes meditating or by condition to determine whether stress is lower for those in the MM condition. Again, multilevel regression analyses were conducted (see Table 16 for example equations of momentary data). Minutes meditating (the summary variable of all minutes meditating over the course of the study) did not significantly predict stress ($p = .911$), indicating that stress did not differ for those who had spent more total time meditating.

Likewise, condition was also not predictive of stress ($p = .956$). See Table 17 for all momentary results.

Summary. The longitudinal data suggests that those who spent more time meditating reported less stress over time. This suggests that the amount of time spent meditating has a significant influence on the reduction of stress, with more time meditating leading to lower stress over time. There was also a main effect of condition suggesting that those in the MM condition reported less stress, but there was not an interaction between linear time and condition, so that those in the MM condition did not continue reporting decreasing stress over time. This pattern may suggest that continued practice effectively decreased stress over the three weeks. Those in the MM condition all meditated at least 60 minutes (during the instructor led session), but some meditated longer (as instructed), indicating that they were meditating on their own with the recordings.

The daily diary and momentary data suggest that the effects of MM on stress may not be immediate. Daily minutes meditating did not predict daily stress, nor did minutes meditating predict stress in the moment. Likewise, condition did not predict stress in the moment. However, condition did predict daily stress. This may again be the influence of the instructor led meditation rather than time spent practicing with the recordings. Together, the longitudinal, daily diary, and momentary data may suggest that MM does not take away the stress of the day or the moment, but over longer periods of time, MM decreases stress.

Hypothesis 3.

Longitudinal data. Hypothesis 3 examines whether coping flexibility increased over time. Linear time significantly predicted coping flexibility ($p = .049$), such that coping flexibility increased over time (Table 11). The main effect of minutes meditating was not

statistically significant ($p = .073$), however, there was a statistically significant interaction between minutes meditating and linear time on coping flexibility, indicating that those who spent more minutes meditating reported greater levels of coping flexibility over time ($p = .010$). There was also a main effect of condition on coping flexibility ($p = .039$), suggesting that those in the MM condition reported greater coping flexibility. Condition did not interact with linear time ($p = .060$), but was marginally significant such that those in the MM condition reported greater coping flexibility over time. See Table 12 for results.

Daily diary data. To examine Hypothesis 3, multilevel regression analyses were used to determine whether daily diary adaptive coping (a subscale of coping flexibility is being used due to problems with reliability in the overall scale) differed by daily minutes meditating or by condition. Daily linear time did not predict adaptive coping ($p = .288$; see Table 14). Likewise, neither daily minutes meditating nor condition were statistically significant predictors of adaptive coping ($p = .196$ and $p = .240$, respectively). Condition did not moderate the link between stress and linear time ($p = .954$). See Table 15 for results.

Momentary data. To test Hypothesis 3 with the momentary data, I examined whether coping flexibility in the moment differed between the MM condition and control conditions. Minutes meditating was a predictor of coping flexibility, indicating that those who spent more time meditating reported more coping flexibility in the moment ($p = .009$). Condition was not a predictor of coping flexibility ($p = .059$), but approached statistical significance with those in the MM condition reporting more coping flexibility. See Table 17 for results.

Summary. The longitudinal and momentary data suggest that coping flexibility can be increased with MM. The longitudinal data suggest that practice with MM increases coping flexibility over time, and also suggests that the more time spent practicing, the greater the

gains in coping flexibility. Further, the momentary data suggests that MM can influence how coping occurs in the moment; practice with MM allows for use of more flexible coping strategies from moment to moment.

The daily diary data does not suggest that MM influenced adaptive coping. It may be that both subscales of coping flexibility are necessary to see changes in coping flexibility.

Hypothesis 4.

Longitudinal data. Hypothesis 4 investigated whether MM increased well-being (via flourishing and positive emotions) over time. Linear time was a statistically significant predictor of flourishing ($p = .014$), indicating that flourishing increased over the three-week period (Table 11). A separate analysis indicated there was a main effect of minutes meditating ($p = .017$), with those who spent more time meditating reporting greater flourishing. There was a statically significant interaction between minutes meditating and linear time, suggesting that those who spent more time meditating reported greater flourishing over the three-week period ($p = .007$). The analysis of condition indicated that condition was a significant predictor of flourishing ($p = .003$) so that those in the MM condition reported more flourishing. There was a statically significant interaction between condition and linear time, suggesting that the effects of time on condition differed for those in the MM condition and those for the control condition ($p = .003$). Specifically, those in the mindfulness condition reported greater flourishing over time when compared to the control condition. See Table 12 for flourishing results and Figure 5 for graphs of flourishing over time by condition.

Daily diary data. Multilevel regression analyses were also used to examine whether flourishing differed by daily minutes meditating or by condition. Neither daily linear time nor

daily minutes meditating were significant predictors of flourishing ($p = .187$ and $p = .803$, respectively) indicating that flourishing did not increase by day nor by time spent meditating. However, condition did predict flourishing ($p = .024$), suggesting that those in the MM condition reported more flourishing. See Table 14 and Table 15 for results.

Momentary data. To test Hypothesis 4 with the momentary data, I examined positive emotions (both HAPE – high activation positive emotions and LAPE – low activation positive emotions) predicted by minutes meditating and condition. Minutes meditating was not a significant predictor of HAPE ($p = .161$) or LAPE ($p = .069$) suggesting that neither high nor low activation positive emotions differed by time spent meditating. However, condition predicted both HAPE ($p = .041$) and LAPE ($p = .026$), such that those in the MM condition reported greater levels of both high and low activation positive emotions. See Table 17 for results.

Summary. The longitudinal data indicates that MM is effective in increasing levels of flourishing over time, and that the more time spent meditating, the greater the increases in flourishing. The daily diary and momentary data suggest that minutes meditating was not effective in increasing well-being in the day and moment levels. However, being in the MM condition predicted well-being. This may indicate that it is the MM practice or training itself, and not the minutes spent practicing, that promotes well-being in the short-term, however, both MM and the amount of time invested were important for lasting changes in flourishing.

Hypothesis 5.

Longitudinal data. Hypothesis 5 is a mediation model examining whether stress predicts flourishing and to what extent coping flexibility mediates this link. To test Hypotheses 5, longitudinal data were entered into SPSS and PROCESS (Hayes, 2013) was

used to simultaneously test all mediated and moderated pathways. First, I used pre-test stress to predict follow-up flourishing. Post-test coping flexibility was entered as a mediator of the link between stress and flourishing (Model 4, Hayes, 2013). Results indicated that pre-test stress negatively predicted follow-up flourishing ($p < .001$), such that those higher in stress reported less flourishing three weeks later. Stress also negatively predicted coping flexibility ($p < .001$). Those reporting greater stress at pre-test also reported lower coping flexibility one week later. Coping flexibility also predicted flourishing ($p < .001$), indicating that those higher in coping flexibility at post-test also reported greater flourishing two weeks later. Tests of mediation were statistically significant ($p < .001$), suggesting that coping flexibility was a successful partial mediator between stress and flourishing, however, stress remained a statistically significant predictor of flourishing even when coping flexibility was accounted for ($p = .003$). See Figure 6 for the mediation model and Table 18 for statistics.

Daily diary data. Multilevel regression analyses were used to test Hypothesis 5 at the daily diary level using HLM. Preliminary tests were conducted to establish links between each of the variables: stress, adaptive coping, and flourishing with stress as the predictor, adaptive coping as the mediator, and flourishing as the outcome variable. Stress at the end of each day was used to predict flourishing. Results were statistically significant ($p < .001$), indicating that those reporting more stress at the end of each day also reported lower flourishing at the end of each day. Stress also significantly predicted adaptive coping ($p = .011$); those who reported more stress at the end of each day also reported more adaptive coping. Although this was statistically significant, it was in the opposite direction than anticipated. Adaptive coping did not predict flourishing ($p = .929$). See Figure 7 and Table 19

for statistics. Because the mediator did not predict the outcome variable, official tests of mediation were not conducted.

Daily minutes meditating was not used as a moderator for Hypotheses 5 at the daily diary level. Preliminary analyses showed no association between daily minutes meditating or any of the outcome variables indicating that minutes spent meditating each day did not influence stress, adaptive coping, or flourishing.

Momentary data. To test Hypothesis 5 at the momentary level, I used the same data analysis strategy as with the daily diary data. Preliminary analyses were conducted to establish links between stress and coping flexibility, stress and HAPE, and coping flexibility and HAPE. Another model was conducted replacing HAPE with LAPE. Preliminary analyses indicated that momentary stress did not predict coping flexibility ($p = .117$). Momentary stress did predict HAPE ($p < .001$) with those reporting greater stress reporting lower HAPE. Likewise, momentary stress predicted LAPE ($p < .001$) such that those reporting greater stress reported lower LAPE. Finally, coping flexibility did not predict HAPE ($p = .605$) or LAPE ($p = .956$). Because coping flexibility did not predict positive emotions, full tests of mediation were not conducted. See Figures 8 and 9 as well as Table 19 for analyses.

Summary. The longitudinal data support Hypothesis 5; coping flexibility successfully partially mediated the link between stress and flourishing. However, Hypothesis 5 was not supported at the daily diary or momentary level, as coping flexibility (and adaptive coping) did not predict well-being. This may suggest that it takes more time for coping flexibility to build necessary resources to positively influence well-being.

Hypothesis 6.

Longitudinal data. The same process used to test Hypothesis 5 was also used to test Hypothesis 6. Hypothesis 6 examined whether minutes meditating or condition moderated each of the mediation links in Hypothesis 5. Two separate tests of moderated mediation were conducted (Model 59, Hayes, 2013). First, pre-test stress was entered into the model as the predictor, with post-test coping flexibility as the mediator, and follow-up flourishing as the outcome. Next, minutes meditating was entered into the model as a moderator of the pathway between stress and flourishing, between stress and coping flexibility, and between coping flexibility and flourishing (see Figure 6). None of the moderation pathways were statistically significant, indicating that the strength of the links among the variables did not differ based on minutes meditating (see Table 18). For the second model, minutes meditating was replaced with condition. Again, none of the links among the variables were statistically significant, suggesting that the links among stress, coping flexibility and flourishing did not vary for those who were in the MM condition when compared to the control condition (see Table 18).

Daily diary data. Because not all the mediation pathways were statistically significant, a fully moderated mediation model was not possible for the daily diary data. However, I decided to test for moderation on both of the statistically significant pathways to determine whether condition moderated the link between stress and adaptive coping and the link between stress and flourishing. Level 1 variables cannot be entered into HLM as moderators, and as such daily minutes meditating was not used for moderation. Thus, only two tests of moderation were conducted. Condition was a significant moderator of the link between stress and adaptive coping ($p = .002$), indicating that for those in the MM condition the link between stress and adaptive coping was weaker (Table 20). However, condition was

not a significant moderator of the link between stress and flourishing ($p = .124$). See Figure 7 for results.

Momentary data. Again, I only conducted moderation tests on links that were statistically significant in Hypothesis 5. I conducted tests of moderation by minutes meditating and condition on the links between stress and HAPE as well as stress and LAPE. The link between stress and HAPE was not moderated by minutes meditating ($p = .366$). Likewise, the link between stress and HAPE was also not moderated by condition ($p = .637$). Regarding, LAPE, neither minutes mediating nor condition moderated the link between stress and LAPE ($p = .988$ and $p = .945$, respectively). See Figures 8 and 9 as well as Table 20 for results.

Summary. Experience with meditation was not a significant moderator of any of the links found in Hypothesis 5, suggesting that these links do not differ by condition or minutes meditating. However, condition did moderate the link between stress and adaptive coping at the daily diary level. This is interesting in that more stress predicted more adaptive coping, but for those in the MM intervention, this association was weaker.

Discussion

The present study examined the effects of a short-term MM intervention on trait mindfulness, stress, coping flexibility, and well-being (defined as flourishing and positive emotions) and examined whether the broaden-and-build theory can help to explain the potential mechanisms by which MM may lead to greater well-being. Overall, results supported the broaden-and-build theory. MM promoted positive emotions and flourishing, and broadened coping flexibility over time. The present study examined the effects of MM at three levels of time: longitudinal, daily, and momentary. In the following paragraphs, I

explain the effects of MM on each construct, as well as how MM operated at each level of analysis (longitudinal, daily, momentary).

Trait mindfulness served primarily as a manipulation check to ensure that our short-term MM intervention would alter mindfulness. These current results are in line with previous research that trait mindfulness can be changed with training in MM, and that this change can occur on a short-term, or weekly basis (Baer et al., 2012). Short-term interventions may be important for those who do not have the time or financial resources to participate in more time consuming, costly interventions. The present data suggest short-term interventions can successfully influence lasting changes in trait mindfulness, indicating that even a week long intervention can begin the process of building positive resources.

Short-term MM was also effective in reducing stress over a three-week period. The longitudinal data suggested that the more time spent meditating, the greater the reduction in stress over time. However, number of minutes meditating on a particular day did not reduce stress at the daily level, but being in the MM condition did reduce stress at the daily level. This pattern may indicate that the effects of MM on stress may not be immediately visible, but instead may build slowly over time and result in a lower perception of stress. Previous research supports this theory, as Garland, Gaylord, and Park (2009) found that positive reappraisal mediated the link between stress and trait mindfulness. It may be that MM promotes positive reappraisal, which helps to reduce stress. One hour or one day may not be long enough for positive reappraisal to make visible changes on the perception of stress, however a week or two may provide ample time to reappraise the stressful experience. This could explain why the longitudinal data suggested that stress decreased with MM. Further, the instructions for stress at the daily dairy level instructed participants to report their stress

level over the day, while the longitudinal data instructed them to rate their stress over the week. Examining stress over the week would give ample time for positive reappraisal to have occurred, whereas the daily diary level might not have allowed sufficient time.

This study provided support for the broaden-and-build theory. Positive interventions (MM) helped to build positive resources (coping flexibility). Further, the present study indicates that MM enhanced coping flexibility. Although other studies have examined links between various coping strategies and MM (Josefsson, Lindwall, & Broberg, 2014; Weinstein et al., 2009), to the author's knowledge no previous studies have examined coping flexibility in the context of MM. The present study suggests that MM can promote coping flexibility both over time and in the moment. Previous research has suggested that MM promotes positive emotions (Garland et al., 2011; Hanley et al., 2014) and that positive emotions broaden cognition (Fredrickson & Branigan, 2005). This may be part of the process by which MM builds coping flexibility. Future research should continue to examine these potential links and examine whether MM promotes coping flexibility via positive emotions.

Finally, short-term MM effectively promoted well-being. Results from each level of analysis suggested that MM increased flourishing and positive emotions, however, it may have been the experience of being in the initial group meditation training rather than overall time spent meditating that predicted flourishing and positive emotions in the daily and momentary data. There are two plausible explanations for the lack of change in flourishing at the daily level. First, it may be that flourishing does not change on a day-to-day basis. Flourishing is the presence of mental health (Catalino & Fredrickson, 2011). Mental health is a construct that simply may take time to exhibit positive change. Although MM can produce positive change in flourishing, it is likely that this change occurs over weeks rather than days,

as mental health may not be likely to change over the course of one day. MM also promoted positive emotions, supporting the broaden-and-build theory (Fredrickson et al., 2008; Garland et al., 2011). Interestingly, the MM condition predicted positive emotions while minutes meditating did not. This may suggest that it is being in a group practicing MM rather than meditating alone that promotes positive emotions. Other research suggests that these effects occur over time. Fredrickson and colleagues (2008) found that neither minutes meditating nor condition predicted changes in positive emotion from week-to-week, but rather those changes became apparent over many weeks. Fredrickson et al.'s research looked at change in positive emotions over eight weeks. Her MM intervention did not produce change in positive emotions from week-to-week, but rather positive emotions increased over the course of the study for those in the MM condition. The methodology in the present study differs from Fredrickson et al.'s in that measures of positive emotions were not aggregated over time as they were in Fredrickson et al.'s study. The current approach allowed momentary variability of positive emotions and the influence of the MM condition to become visible earlier than was apparent in Fredrickson et al.'s data.

The hypothesized mediation model examined the link between stress and well-being and evaluated the extent to which coping flexibility mediated this link. In the longitudinal data, coping flexibility was a significant partial mediator of the link between stress and flourishing. This suggests that the extent to which one copes flexibly with stress can facilitate mental health. Previous research has suggested that coping flexibility may be associated with greater well-being (Lester et al., 1994; Cheng et al., 2014), less depression, and fewer mental problems (Kato, 2001). Further, flourishing is associated with coping, and previous research found that adaptive coping (not the subscale adaptive coping used in the present study)

predicts flourishing (Faulk, Gloria, & Steinhardt, 2013). The longitudinal data in the present study supports these studies and suggests that coping flexibility is strongly related to flourishing and that MM can promote greater coping flexibility and flourishing.

The proposed moderated mediation model was not supported in any level of analysis. As outlined above, MM did not moderate any of the links among stress, coping flexibility or flourishing. This indicates that the strength of the associations of these links does not differ based on total time spent meditating or MM condition. This does not necessarily mean that MM does not influence each of the constructs but rather that MM does not alter the strength of the associations between each of these constructs. In hindsight, it seems more likely that MM may be part of the process of building well-being rather than augmenting the strength of the relationships among stress, coping flexibility, and well-being. For example, MM may mediate the relationships among stress, coping flexibility, and flourishing, perhaps via trait mindfulness and positive emotions. It is very likely that trait mindfulness predicts positive emotion (Garland et al., 2010) and that MM may mediate that link, thereby reducing stress, promoting coping flexibility and flourishing. This would be in line with the broaden-and-build theory upward spiral theory that over time, MM operates by increasing positive emotions during stressful events (Fredrickson et al., 2008; Garland et al., 2011), which would then facilitate greater coping flexibility (positive resources) and eventually build flourishing and overall well-being.

With the exception of moderated mediation model, the longitudinal data supported each of the proposed hypotheses, while not every hypothesis was supported at other levels of analysis. This may be partially due to the fact that the longitudinal data occurred over three weeks, while the daily and momentary data occurred over shorter periods of time. The

broaden-and-build theory suggests that positive emotions and positive resources develop over time, and some research has demonstrated that the development of positive resources is not immediately visible (Fredrickson et al., 2008; Fredrickson & Kurtz, 2011). It could be that the longitudinal portion of the study provided enough time for MM to build up enough positive emotions and resources to allow for visible changes in stress, coping flexibility, and flourishing. The positive emotion data supports this logic; those in the MM condition reported greater levels of positive emotion in the momentary portion of the study, which occurred after the MM intervention.

The daily diary data were less straightforward than the longitudinal data. Daily minutes meditating did not predict stress, adaptive coping or flourishing. However, condition did predict stress and flourishing. As with the pattern observed in Hypothesis 2, this may suggest that it is the experience of being in a MM intervention, rather than the actual time spent meditating, was most beneficial in increasing well-being. In the present intervention, during the initial MM training participants were encouraged to share their experiences with MM. It may be that this group process is optimal for obtaining the greatest benefits from a MM intervention, perhaps because of additional social support or finding encouragement and meaning from shared experience with others. Because there was no true baseline for the daily diary data (the first collection occurred same day of the first day of mindfulness, after the session with the instructor; see Figure 1) it is not possible to separate the effects of group MM from the effects of MM recordings.

The momentary portion of the study was designed to examine how previous MM would influence momentary processes. Importantly, these data suggested that more time spent meditating predicted greater momentary coping flexibility. This result is particularly

interesting because no previous studies have examined the extent to which coping flexibility varies in the moment. This result suggests not only that coping flexibility can vary from one time to the next, but also that the number of minutes spent meditating predicts the extent to which participants were able to cope flexibly. These results, coupled with the results from the longitudinal data, suggest that MM effectively promotes coping flexibility.

To date, two studies have examined whether coping flexibility can be altered with an intervention. Cheng, Krogan, and Chio (2012) created an intervention designed to modify coping flexibility in the workplace. This six-week intervention utilized cognitive-behavioral therapy focused on recognizing stress and becoming familiar with the concepts of matching a stressor with an appropriate coping strategy. In the final two weeks of the study, participants practiced implementing coping flexibility at work. Cheng et al.'s intervention, coupled with her previous psychotherapy intervention (Cheng, Yang, Jun, & Hutton, 2007), exhibited that coping flexibility can be increased with interventions. Although Cheng's interventions did not utilize MM, the present study suggests MM may build positive resources in the moment and over time to aid in more effective coping with stress. Future studies are necessary to corroborate the mechanisms of this association.

Overall, the mediation of stress and positive emotions by coping flexibility was not supported by the momentary data. Although stress did predict positive emotion, it did not predict coping flexibility. This association with positive emotion supports research by Scott et al. (2014) suggesting that positive emotion does occur during stressful events. Scott and colleagues, along with the broaden-and-build theory, suggest that positive emotions may be important for broadening cognition, which may influence coping flexibility.

Limitations and future directions. The current study examined a number of previously unresearched areas, and because of this, it is necessary that future research further examine the links presented here. In particular, the research between MM and its influence on coping flexibility are novel and need to be substantiated, especially at the daily and momentary level. The mindfulness scale at the daily and momentary levels, and the coping flexibility at the daily level, need to be adjusted, as reliability was low in this study. This is likely due to the shortening of both scales. Both of these scales were shortened to reduce response burden on participants. In hindsight, I believe this affected the integrity of these scales. Future research with the coping flexibility scale should consider using the entire scale. The mindfulness scale (FFMQ) has 39 items. If the integrity of the scale is not amenable to alterations, other trait mindfulness scales such as the Mindful Attention and Awareness Scale (Brown & Ryan, 2003) may be more effective at the daily and momentary levels.

Adaptive coping (the coping flexibility subscale) was predicted by daily stress in the mediation model. This association was significant, but again, was in the opposite direction as predicted those with greater stress reported more adaptive coping. However, adaptive coping did not predict flourishing. These two problems may be due to problems with the coping flexibility scale.

One strength of this study was that multiple methods were used to disseminate MM. A meditation instructor first trained participants in MM, then participants practiced on their own with recordings. Although this flexibility may be important for high stress or time pressed participants who cannot commit to attending a class each day, it was not possible to differentiate the effectiveness of each method. Future research should examine the

effectiveness of recordings and MM alone and MM with a trained instructor in a group, and then combinations of MM tools to determine what, and for whom, each method is most effective. Additionally, the present study had large classes of meditators, up to 25 at one time. This is may not be the optimal setting for MM.

Finally, future research should also examine how MM affects stress, coping flexibility, and well-being on a momentary basis during an intervention rather than just after the intervention is complete. Due to equipment limitations in the present study, momentary data was only collected after participants had completed the MM intervention. The ability to collect real-time data during and in the hours following MM would shed light on whether MM operates by building positive resources in the moment to influence lasting change in well-being.

Despite these limitations, the current research addresses previously unexplored questions in the influence of MM on stress, coping flexibility, and well-being on a longitudinal, daily, and momentary basis. It also provides some explanation of the processes of how stress relates to well-being, and offers hope of increasing well-being through the promotion of coping flexibility. The current research suggests that short-term MM interventions can reduce stress, improving coping flexibility, and increasing flourishing and positive emotions. Although long-term interventions may be ideal, they are not always feasible for researchers or some populations. For example, low-income populations often do not have the financial resources to take part in a costly eight-week program. Short-term interventions provide valuable, tangible benefits for those with limited time and resources. Short-term MM interventions can provide immediate boosts in positive emotions, and also build positive resources in as little as one week. These positive resources can continue to

build over time, resulting in improved well-being. Future studies should incorporate more short-term MM interventions to capitalize on these benefits, and further examine the wealth of possibilities MM offers.

References

- Anicha, C. L., Ode, S., Moeller, S. K., & Robinson, M. D. (2012). Toward a cognitive view of trait mindfulness: Distinct cognitive skills predict its observing and nonreactivity facets. *Journal of Personality, 80*, 255-285. doi:10.1111/j.1467-6494.2011.00722.x
- Baer, R. A., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 68*, 755-765. doi:10.1002/jclp.21865
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using Self-Report Assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45. doi:10.1177/1073191105283504
- Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods, 11*, 142-163. doi:10.1037/1082-989X.11.2.142
- Baumann, N., & Kuhl, J. (2005). Positive affect and flexibility: overcoming the precedence of global over local processing of visual information. *Motivation and Emotion, 29*, 123-134. doi:10.1007/s11031-005-7957-1
- Billings, A. G., & Moos, R. H. (1982). Stressful life events and symptoms: A longitudinal model. *Health Psychology, 1*, 99-117. doi:10.1037/0278-6133.1.2.99
- Blascovich, J., & Katkin, E. S. (1993). *Cardiovascular reactivity to psychological stress and disease*. Washington, DC, US: American Psychological Association.

- Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology*, *57*, 808 – 818.
doi:10.1037/0022-3514.57.5.808
- Brown, K., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*, 822-848. doi:10.1037/0022-3514.84.4.822
- Catalino, L. I., & Fredrickson, B. L. (2011). A Tuesday in the life of a flourisher: The role of positive emotional reactivity in optimal mental health. *Emotion*, *11*, 938-950.
doi:10.1037/a0024889
- Chan, D. W., & Hui, E. K. P. (1995). Burnout and coping among Chinese secondary school teachers in Hong Kong. *British Journal of Educational Psychology*, *65*, 15– 25.
doi:10.1111/j.2044-8279.1995.tb01128.x
- Cheng, C. (2001). Assessing coping flexibility in real-life and laboratory settings: A multimethod approach. *Journal of Personality and Social Psychology*, *80*, 814– 833.
- Cheng, C. (2003). Cognitive and motivational processes underlying coping flexibility: A dual-process model. *Journal of Personality and Social Psychology*, *84*, 425-438.
doi:10.1037/0022-3514.84.2.425
- Cheng, C., & Cheung, M. L. (2005). Cognitive processes underlying coping flexibility: Differentiation and integration. *Journal of Personality*, *73*, 859-886.
doi:10.1111/j.1467-6494.2005.00331.x
- Cheng, C., Hui, W., & Lam, S. (2000). Perceptual style and behavioral pattern of individuals with functional gastrointestinal disorders. *Health Psychology*, *19*, 146-154.
doi:10.1037/0278-6133.19.2.146

- Cheng, C., Kogan, A., & Chio, J. H. (2012). The effectiveness of a new, coping flexibility intervention as compared with a cognitive-behavioural intervention in managing work stress. *Work & Stress, 26*, 272-288. doi:10.1080/02678373.2012.710369
- Cheng, C., Lau, H. B., & Chan, M. S. (2014). Coping flexibility and psychological adjustment to stressful life changes: A meta-analytic review. *Psychological Bulletin, 140*, 1582-1607. doi:10.1037/a0037913
- Cheng, C., Yang, F., Jun, S., & Hutton, J. M. (2007). Flexible coping psychotherapy for functional dyspeptic patients: A randomized controlled trial. *Psychosomatic Medicine, 69*, 81-88.
- Cohen, S., Frank, E., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. J. (1998). Types of stressors that increase susceptibility to the common cold in healthy adults. *Health Psychology, 17*, 214-223. doi:10.1037/0278-6133.17.3.214
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396. doi:10.2307/2136404
- Cohen, S., & Williamson, G. M. (1991). Stress and infectious disease in humans. *Psychological Bulletin, 109*, 5-24. doi:10.1037/0033-2909.109.1.5
- Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context, and regulation: perspectives from affective neuroscience. *Psychological Bulletin, 126*, 890-909.
- DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal Of Personality And Social Psychology, 54*(3), 486-495. doi:10.1037/0022-3514.54.3.486

- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*, 143-156. doi:10.1007/s11205-009-9493-y
- Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review, 66*, 183-201. doi:10.1037/h0047707
- Eberth, J., & Sedlmeier, P. (2012). The effects of mindfulness meditation: A meta-analysis. *Mindfulness, 3*, 174-189. doi:10.1007/s12671-012-0101-x
- Fan, Y., Gan, Y., Zheng, W., & Wang, T. (2010). Relationship between optimism-pessimism and coping flexibility. *Chinese Journal of Clinical Psychology, 18*, 775-779.
- Faulk, K. E., Gloria, C. T., & Steinhardt, M. A. (2013). Coping profiles characterize individual flourishing, languishing, and depression. *Anxiety, Stress & Coping: An International Journal, 26*, 378-390. doi:10.1080/10615806.2012.708736
- Fawcett, J. M., Russell, E. J., Peace, K. A., & Christie, J. (2013). Of guns and geese: A meta-analytic review of the 'weapon focus' literature. *Psychology, Crime & Law, 19*, 35-66. doi:10.1080/1068316X.2011.599325
- Feldman, L. A. (1995). Variations in the circumplex structure of mood. *Personality and Social Psychology Bulletin, 21*, 806-817. doi:10.1177/0146167295218003
- Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist, 55*, 647-654. doi:10.1037/0003-066X.55.6.647
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218-226. doi:10.1037/0003-066X.56.3.218

- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion, 19*, 313-332.
doi:10.1080/02699930441000238
- Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). Open hearts build lives: Positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology, 95*, 1045-1062. doi:10.1037/a0013262
- Fredrickson, B. L., & Kurtz, L. E. (2011). Cultivating positive emotions to enhance human flourishing. In S. I. Donaldson, M. Csikszentmihalyi, J. Nakamura, S. I. Donaldson, M. Csikszentmihalyi, J. & Nakamura (Eds.), *Applied positive psychology: Improving everyday life, health, schools, work, and society* (pp. 35-47). New York, NY, US: Routledge/Taylor & Francis Group.
- Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion, 12*, 191-220.
doi:10.1080/026999398379718
- Galatzer-Levy, I. R., Burton, C. L., & Bonanno, G. A. (2012). Coping flexibility, potentially traumatic life events, and resilience: A prospective study of college student adjustment. *Journal of Social and Clinical Psychology, 31*, 542-567.
doi:10.1521/jscp.2012.31.6.542
- Gallagher, M. W., & Lopez, S. J. (2009). Positive expectancies and mental health: Identifying the unique contributions of hope and optimism. *The Journal of Positive Psychology, 4*, 548-556. doi:10.1080/17439760903157166

- Garland, E. L., Fredrickson, B. L., Kring, A. M., Johnson, D. P., Meyer, P. S., & Penn, D. L., (2010). Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotional dysfunctions and deficits psychopathology. *Clinical Psychology Review, 30*, 849-864. doi:10.1016/j.cpr.2010.03.002
- Garland, E. L., Gaylord, S. A., & Fredrickson, B. L. (2011). Positive appraisal mediates the stress-reductive effects of mindfulness: An upward spiral process. *Mindfulness, 2*, 59-67.
- Garland, E. Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore, 5*(1),: 37–44. doi:10.1016/j.explore.2008.10.001.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY, US: Guilford Press.
- Hirt, E. R., Devers, E. E., & McCrea, S. M. (2008). I want to be creative: Exploring the role of hedonic contingency theory in the positive mood-cognitive flexibility link. *Journal of Personality and Social Psychology, 94*, 214-230. doi:10.1037/0022-3514.94.2.94.2.214
- Howell, A. J., & Buro, K. (2015). Measuring and predicting student well-being: Further evidence in support of the Flourishing Scale and the Scale of Positive and Negative Experiences. *Social Indicators Research, 121*, 903-915. doi:10.1007/s11205-014-0663-1
- Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. R. (2007). A randomized controlled trial of mindfulness meditation versus relaxation

- training: Effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine*, 33, 11-21. doi:10.1207/s15324796abm3301_2
- Jones, D., Hoff, K., Kirsch, J., & Lehman, B. (2013, January). Pessimism moderates the mediated effects of rumination on micro-longitudinal associations between stress and negative affect. Poster session presented at the annual meeting of The Society for Personality and Social Psychology, New Orleans, LA.
- Josefsson, T., Lindwall, M., & Broberg, A. G. (2014). The effects of a short-term mindfulness based intervention on self-reported mindfulness, decentering, executive attention, psychological health, and coping style: Examining unique mindfulness effects and mediators. *Mindfulness*, 5, 18-35. doi:10.1007/s12671-012-0142-1
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York: Hyperion.
- Kato, T. (2001). The relationship between flexibility of coping to stress and depression. *Japanese Journal of Psychology*, 72, 57-63. doi:10.4992/jjpsy.72.57
- Kato, T. (2012). Development of the Coping Flexibility Scale: Evidence for the coping flexibility hypothesis. *Journal of Counseling Psychology*, 59, 262-273. doi:10.1037/a0027770
- Kern, M. L., Della Porta, S. S., & Friedman, H. S. (2014). Lifelong pathways to longevity: Personality, relationships, flourishing, and health. *Journal of Personality*, 82, 472-484. doi:10.1111/jopy.12062
- Keyes, C. L. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist*, 62, 95–108. doi:10.1037/0003-066X.62.2.95

- Kok, B. E., & Fredrickson, B. L. (2010). Upward spirals of the heart: Autonomic flexibility, as indexed by vagal tone, reciprocally and prospectively predicts positive emotions and social connectedness. *Biological Psychology*, *85*, 432-436.
doi:10.1016/j.biopsycho.2010.09.005
- Larsen, J. T., Hemenover, S. H., Norris, C. J., & Cacioppo, J. T. (2003). Turning adversity to advantage: On the virtues of the coactivation of positive and negative emotions. In L. G. Aspinwall, U. M. Staudinger, L. G. Aspinwall, & U. M. Staudinger (Eds.) *A psychology of human strengths: Fundamental questions and future directions for a positive psychology* (pp. 211-225). Washington, DC, US: American Psychological Association.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lehman, B. J., & Conley, K. C. (2010). Momentary reports of social-evaluative threat predict ambulatory blood pressure. *Social Psychological and Personality Science*, *1*, 51-56.
doi:10.1177/1948550609354924
- Lester, N., Smart, L., & Baum, A. (1994). Measuring coping flexibility. *Psychology & Health*, *9*, 409-424. doi:10.1080/08870449408407468
- Lin, W., Tsai, P., Lin, H., & Chen, H. (2014). How does emotion influence different creative performances? The mediating role of cognitive flexibility. *Cognition and Emotion*, *28*, 834-844. doi:10.1080/02699931.2013.854195
- Marchand, W. R. (2012). Mindfulness-based stress reduction, mindfulness-based cognitive therapy, and Zen mediation for depression, anxiety, pain, and psychological distress. *Journal of Psychiatric Practice*, *18*, 233-252. doi:10.1097/01.pra.0000416014.53215.86

- Marx, E. M., & Schulze, C. C. (1991). Interpersonal problem-solving in depressed students. *Journal of Clinical Psychology*, *47*, 361-367. doi:10.1002/1097-4679(199105)47:3<361::AID-JCLP2270470307>3.0.CO;2-L
- McEwen, B. S. (2012). Brain on stress: How the social environment gets under the skin. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, *109*, 17180-17185. doi:10.1073/pnas.1121254109
- Michl, L. C., McLaughlin, K. A., Shepherd, K., & Nolen-Hoeksema, S. (2013). Rumination as a mechanism linking stressful life events to symptoms of depression and anxiety: Longitudinal evidence in early adolescents and adults. *Journal of Abnormal Psychology*, *122*, 339-352. doi:10.1037/a0031994
- Moore, A., & Malinowski, P. (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness and Cognition: An International Journal*, *18*, 176-186. doi:10.1016/j.concog.2008.12.008
- Morone, N. E., Greco, C. M., & Weiner, D. K. (2008). Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study. *Pain*, *134*(3), 310-319. doi:10.1016/j.pain.2007.04.038
- Nyklíček, I., Mommersteeg, P. C., Van Beugen, S., Ramakers, C., & Van Boxtel, G. J. (2013). Mindfulness-based stress reduction and physiological activity during acute stress: A randomized controlled trial. *Health Psychology*, *32*(10), 1110-1113. doi:10.1037/a0032200
- Ong, A. D. (2010). Pathways linking positive emotion and health in later life. *Current Directions in Psychological Science*, *19*, 358-362. doi:10.1177/0963721410388805

- Ong, A. D., & Allaire, J. C. (2005). Cardiovascular intraindividual variability in later life: The influence of social connectedness and positive emotions. *Psychology and Aging, 20*, 476-485. doi:10.1037/0882-7974.20.3.476
- Ong, A. D., Bergeman, C. S., Bisconti, T. L., & Wallace, K. A. (2006). Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality and Social Psychology, 91*, 730-749. doi:10.1037/0022-3514.91.4.730
- Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist, 41*, 813-819. doi:10.1037/0003-066X.41.7.813
- Roussi, P., Krikeli, V., Hatzidimitriou, C., & Koutri, I. (2007). Patterns of coping, flexibility in coping and psychological distress in women diagnosed with breast cancer. *Cognitive Therapy and Research, 31*, 97-109. doi:10.1007/s10608-006-9110-1
- Satici, S. A., Uysal, R., & Akin, A. (2013). Investigating the relationship between flourishing and self-compassion: A structural equation modeling approach. *Psychologica Belgica, 53*(4), 85-99.
- Schiffrrin, H. H., & Falkenstern, M. (2012). The impact of affect on resource development: Support for the broaden-and-build model. *North American Journal of Psychology, 14*, 569-584.
- Schutte, N. S., & Loi, N. M. (2014). Connections between emotional intelligence and workplace flourishing. *Personality and Individual Differences, 66*, 134-139. doi:10.1016/j.paid.2014.03.031
- Schwarz, N. (2012). Why researchers should think 'real-time': A cognitive rationale. In M. R. Mehl, & T. S. Conner (Eds.) *Handbook of research methods for studying daily life* (pp. 22-42). New York, NY, US: Guilford Press.

- Scott, S. B., Sliwinski, M. J., Mogle, J. A., & Almeida, D. M. (2014). Age, stress, and emotional complexity: Results from two studies of daily experiences. *Psychology and Aging, 29*, 577-587. doi:10.1037/a0037282
- Sedlmeier, P., Eberth, J., Schwarz, M., Zimmermann, D., Haarig, F., Jaeger, S., & Kunze, S. (2012, May 14). The psychological effects of meditation: A meta-analysis. *Psychological Bulletin*. Advance online publication. doi: 10.1037/a0028168
- Shennan, C., Payne, S., & Fenlon, D. (2011). What is the evidence for the use of mindfulness-based interventions in cancer care? A review. *Psycho-Oncology, 20*, 681-697. doi:10.1002/pon.1819
- Sideridis, G. D. (2006). Coping is not an 'either' 'or': The interaction of coping strategies in regulating affect, arousal and performance. *Stress and Health: Journal of the International Society for the Investigation of Stress, 22*, 315-327. doi:10.1002/smi.1114
- Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of Personality and Social Psychology, 83*, 678-692. doi:10.1037/0022-3514.83.3.678
- Slavish, D. C., Graham-Engeland, J. E., Smyth, J. M., & Engeland, C. G. (2015). Salivary markers of inflammation in response to acute stress. *Brain, Behavior, and Immunity, 44*, 253-269. doi:10.1016/j.bbi.2014.08.008
- Smith, J. C., & Joyce, C. A. (2004). Mozart versus new age music: Relaxation states, stress, and ABC relaxation theory. *Journal of Music Therapy, 41*, 215-224.

- Stanton, A. L., & Low, C. A. (2012). Dispositional and stressor-related emotion regulation in the context of a chronic, life-limiting stressor. *Journal of Personality, 80*, 287-311. doi:10.1111/j.1467-6494.2011.00732.x
- Steptoe, A., Wardle, J., Marmot, M., & McEwen, B. S. (2005). Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 102*, 6508-6512. doi:10.1073/pnas.0409174102
- Tang, Y., & Posner, M. I. (2015). Mindfulness in the context of the attention system. In K. W. Brown, J. D. Creswell, R. M. Ryan, K. W. Brown, J. D. Creswell, R. M. Ryan (Eds.), *Handbook of mindfulness: Theory, research, and practice* (pp. 81-89). New York, NY, US: Guilford Press.
- Tang, Y., Rothbart, M. K., & Posner, M. I. (2012). Neural correlates of establishing, maintaining, and switching brain states. *Trends in Cognitive Sciences, 16*, 330-337. doi:10.1016/j.tics.2012.05.001
- Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology, 86*(2), 320-333. doi:10.1037/0022-3514.86.2.320
- Uvnäs-Moberg, K. (1998). Oxytocin may mediate the benefits of positive social interaction and emotions. *Psychoneuroendocrinology, 23*, 819-835. doi:10.1016/S0306-4530(98)00056-0
- Weinstein, N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional well-being. *Journal of Research in Personality, 43*, 374-385. doi:10.1016/j.jrp.2008.12.008

Zautra, A. J., Berkhof, J., & Nicolson, N. A. (2002). Changes in affect interrelations as a function of stressful events. *Cognition & Emotion, 16*, 309 –318.

doi:10.1080/02699930143000257

Table 1

Measures Used in this Study

| Type of Measure | Measure | Measure Name | Author and Year of Publication |
|-------------------------------|--------------------|--|---------------------------------------|
| Longitudinal (Level 2) | Mindfulness | Five Facet Mindfulness Questionnaire | Baer et al., 2006 |
| | Stress | Perceived Stress Scale | Cohen, Kamarck, & Mermelstein, 1983 |
| Daily Diary (Level 1) | Coping Flexibility | Coping Flexibility Scale | Kato, 2012 |
| | Well-Being | Flourishing Scale | Diener et al., 2010 |
| | Coping Flexibility | Coping Flexibility Questionnaire | Cheng, 2001 |
| | Mindfulness | Five Facet Mindfulness Questionnaire (Adapted) | Baer et al., 2006 |
| Momentary (Level 1) | Stress | Perceived Stress Scale | Cohen, Kamarck, & Mermelstein, 1983 |
| | Coping Flexibility | Coping Flexibility Scale (Adapted) | Kato, 2012 |
| | Well-Being | Flourishing Scale | Diener et al., 2010 |
| | Mindfulness | Five Facet Mindfulness Questionnaire (Adapted) | Baer et al., 2006 |
| | Stress | Single Item Stressor | Lehman & Conley, 2010 |
| | Coping Flexibility | Coping Flexibility Scale (Adapted) | Kato, 2012 |
| | Well-Being | Circumplex Model of Mood | Feldman, 1995 |

Table 2

Number of Assessments for Longitudinal, Daily Diary, and Momentary Data

| | Longitudinal | Daily Diary | Momentary |
|--------------------|--------------|-------------|-----------|
| Mindfulness | 312 | 491 | 1614 |
| Stress | 312 | 490 | 1542 |
| Coping flexibility | 311 | 475 | 113 |
| Flourishing | 312 | 491 | --- |
| Minutes meditating | 97 | 491 | 100 |
| HAPE | --- | --- | 1580 |
| LAPE | --- | --- | 1493 |

Table 3
Attrition by Gender, Age, Pre-test Mindfulness, Stress, Coping Flexibility, and Flourishing

| | <i>t</i> | <i>df</i> | <i>p</i> |
|--------------------|----------|-----------|----------|
| Mindfulness | .176 | 110 | .860 |
| Stress | .124 | 110 | .902 |
| Coping Flexibility | -.853 | 110 | .396 |
| Flourishing | .411 | 110 | .682 |
| Gender | .447 | 110 | .635 |
| Age | -.053 | 111 | .958 |

Note. This table reports whether there were differences in attrition by each of the outcome variables.

Table 4
Examining Differences in Longitudinal Pre-test Mindfulness, Stress, Coping Flexibility, and Flourishing by Wave

| | <i>df</i> | <i>F</i> | <i>p</i> |
|--------------------|-----------|----------|----------|
| Mindfulness | 2, 109 | .01 | .990 |
| Stress | 2, 109 | 1.38 | .256 |
| Coping Flexibility | 2, 108 | .82 | .446 |
| Flourishing | 2, 109 | 1.15 | .320 |

Table 5
Comparing Control and Mindfulness Meditation Conditions on Pre-test Longitudinal Data

| | <i>t</i> | <i>df</i> | <i>p</i> |
|--------------------|----------|-----------|----------|
| Mindfulness | -1.97 | 110 | .052 |
| Stress | 2.31 | 110 | .023 |
| Coping Flexibility | -1.14 | 110 | .256 |
| Flourishing | -1.61 | 110 | .110 |

Note. These analyses examined pre-test differences by condition. Results are t-tests comparing control and experimental groups on pre-test mindfulness, stress, coping flexibility, and flourishing.

Table 6

Examining Differences in Daily Diary Stress, Adaptive Coping, and Flourishing by Wave

| | Coefficient (SE) | <i>t</i> | <i>p</i> |
|-----------------|------------------|----------|----------|
| Stress | .04 (.08) | .54 | .589 |
| Adaptive coping | .04 (.04) | .91 | .365 |
| Flourishing | -.03 (.11) | -.24 | .809 |

Note. There were three waves of data collection. These analyses tested for differences among Wave 1, Wave 2, and Wave 3.

Table 7
Examining Differences in Momentary Stress, Coping Flexibility, HAPE, and LAPE by Wave

| | Coefficient (<i>SE</i>) | <i>t</i> | <i>p</i> |
|--------------------|---------------------------|----------|----------|
| Stress | 1.02 (1.95) | .52 | .602 |
| Coping flexibility | .02 (.31) | .07 | .941 |
| HAPE | .13 (.21) | .60 | .552 |
| LAPE | -.11 (.18) | -.60 | .550 |

Note. There were three waves of data collection. These analyses tested for differences among Wave 1, Wave 2, and Wave 3.

Table 8

Examining Differences in Momentary Stress, Coping Flexibility, HAPE, and LAPE by Group

| | Coefficient (SE) | <i>t</i> | <i>p</i> |
|--------------------|------------------|----------|----------|
| Stress | .93 (1.43) | .65 | .518 |
| Coping flexibility | -.36 (.22) | -1.64 | .107 |
| HAPE | -.28 (.15) | -1.91 | .060 |
| LAPE | -.13 (.15) | -.87 | .385 |

Note. Participants were separated into four groups in each wave for momentary data collection. These analyses test for differences among groups on each variable of interest.

Table 9
Random Effects Table

| Longitudinal Data | | | | | |
|--------------------|-----------|--------------------|-----------|----------|----------|
| Outcome | <i>SD</i> | Variance Component | <i>df</i> | χ^2 | <i>p</i> |
| Mindfulness | .09 | .01 | 105 | 1993.112 | < .001 |
| Stress | .62 | .38 | 108 | 899.68 | < .001 |
| Coping flexibility | .39 | .16 | 108 | 612.10 | < .001 |
| Flourishing | .75 | .56 | 108 | 860.36 | < .001 |
| Daily Diary Data | | | | | |
| Outcome | <i>SD</i> | Variance Component | <i>df</i> | χ^2 | <i>p</i> |
| Stress | .61 | .37 | 102 | 815.78 | < .001 |
| Adaptive coping | .40 | .16 | 102 | 262.15 | < .001 |
| Flourishing | .81 | .67 | 102 | 747.41 | < .001 |
| Momentary Data | | | | | |
| Outcome | <i>SD</i> | Variance Component | <i>df</i> | χ^2 | <i>p</i> |
| Stress | 13.21 | 174.47 | 98 | 614.98 | < .001 |
| Coping flexibility | 1.27 | 1.61 | 50 | 104.66 | < .001 |
| HAPE | 1.63 | 2.66 | 99 | 1388.62 | < .001 |
| LAPE | 1.30 | 1.70 | 99 | 674.98 | < .001 |

Note. These analyses indicate whether the slope of each variable differed from person to person or if the slope is consistent across people. Each line in this table summarizes a different analysis. If significant the slope is random, if the slope is not significant it is fixed. Each slope is then entered into HLM according to whether it is fixed or random.

Table 10

Equations Used to Test Pre-, Post-, Follow-Up Hypotheses

| Hypothesis | Equations |
|--------------|---|
| Hypothesis 1 | $\mathbf{Mindfulness} = \gamma_{00} + \gamma_{01} * \mathbf{MinutesMeditating}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{MinutesMeditating}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ $\mathbf{Mindfulness} = \gamma_{00} + \gamma_{01} * \mathbf{MinutesMeditating}_j + \gamma_{10} * \mathbf{QuadraticTime}_{ij} + \gamma_{11} * \mathbf{MinutesMeditating}_j * \mathbf{QuadraticTime}_{ij} + u_{0j} + u_{1j} * \mathbf{QuadraticTime}_{ij} + r_{ij}$ $\mathbf{Mindfulness} = \gamma_{00} + \gamma_{01} * \mathbf{Control}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{Control}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ $\mathbf{Mindfulness} = \gamma_{00} + \gamma_{01} * \mathbf{Control}_j + \gamma_{10} * \mathbf{QuadraticTime}_{ij} + \gamma_{11} * \mathbf{Control}_j * \mathbf{QuadraticTime}_{ij} + u_{0j} + u_{1j} * \mathbf{QuadraticTime}_{ij} + r_{ij}$ |
| Hypothesis 2 | $\mathbf{Stress} = \gamma_{00} + \gamma_{01} * \mathbf{MinutesMeditating}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{MinutesMeditating}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ $\mathbf{Stress} = \gamma_{00} + \gamma_{01} * \mathbf{Control}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{Control}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ |
| Hypothesis 3 | $\mathbf{CopingFlexibility} = \gamma_{00} + \gamma_{01} * \mathbf{MinutesMeditating}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{MinutesMeditating}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ $\mathbf{CopingFlexibility} = \gamma_{00} + \gamma_{01} * \mathbf{Control}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{Control}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ |
| Hypothesis 4 | $\mathbf{Flourishing} = \gamma_{00} + \gamma_{01} * \mathbf{MinutesMeditating}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{MinutesMeditating}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ $\mathbf{Flourishing} = \gamma_{00} + \gamma_{01} * \mathbf{Control}_j + \gamma_{10} * \mathbf{LinearTime}_{ij} + \gamma_{11} * \mathbf{Control}_j * \mathbf{LinearTime}_{ij} + u_{0j} + u_{1j} * \mathbf{LinearTime}_{ij} + r_{ij}$ |

Note. Minutes meditating is a sum of how many minutes each participant spent meditating for the duration of the study. Linear time is a dummy coded variable designed to test whether the slope follows a linear trend. Quadratic time is a dummy coded variable to examine whether the slope follows a quadratic trend. Control is a dummy coded variable to differentiate between the experimental and control conditions.

Table 11
Linear and Quadratic Slopes Predicting Longitudinal Mindfulness, Stress, Coping Flexibility, and Flourishing

| Predictions of Mindfulness | | | |
|-----------------------------------|------------------|-------------------------|----------|
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Linear Time | 3.34 | .10 (.02) | < .001 |
| Quadratic Time | 3.34 | .01 (< .01) | .041 |
| Predictions of Stress | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Linear Time | 2.63 | -.09 (.03) | .003 |
| Quadratic Time | 2.63 | -.02 (.01) | .246 |
| Predictions of Coping Flexibility | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Linear Time | 2.66 | .05 (.02) | .049 |
| Quadratic Time | 2.66 | .01 (.01) | .303 |
| Predictions of Flourishing | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Linear Time | 5.55 | .08 (.03) | .014 |
| Quadratic Time | 5.55 | -.02 (.02) | .284 |

Note. Analyses are separate. Linear and quadratic time were not entered into the model simultaneously to predict slopes.

Table 12

Associations of Minutes Meditating, Condition, Linear Time, and Quadratic Time Predicting Longitudinal Mindfulness, Stress, Coping Flexibility, and Flourishing

| Mindfulness | | | | | | |
|---|--------------------|-------------------------|----------|-------------------------|-------------------------|----------|
| | Minutes Meditating | | | Condition (MM, control) | | |
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Meditation experience | 3.25 | < .01 (< .01) | .021 | 3.20 | .25 (.08) | .003 |
| Linear time | 3.25 | < .01 (< .01) | .020 | 3.20 | .05 (.02) | .008 |
| Meditation experience x linear time | .05 | < .01 (< .01) | .002 | .05 | .08 (.03) | .006 |
| Meditation experience | 3.25 | < .01 (< .01) | .021 | .05 | .08 (.03) | .005 |
| Quadratic time | .05 | < .01 (< .01) | .002 | < .01 | .01 (.04) | .967 |
| Meditation experience x quadratic time | <.01 | < .01 (< .01) | .037 | <.01 | .03 (.01) | .065 |
| Stress | | | | | | |
| | Minutes Meditating | | | Condition (MM, control) | | |
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Meditation experience | 2.75 | < -.01 (< .01) | .073 | 2.85 | -.05 (.12) | .001 |
| Linear time | 2.75 | -.02 (.04) | .596 | 2.85 | -.05 (.04) | .193 |
| Meditation experience x linear time | -.02 | < -.01 (< .01) | .010 | -.05 | -.07 (.05) | .184 |
| Coping Flexibility | | | | | | |
| | Minutes Meditating | | | Condition (MM, control) | | |
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Meditation experience | 2.58 | .17 (.08) | .057 | 2.57 | .17 (.08) | .039 |
| Linear time | 2.58 | < -.01 (.03) | .753 | 2.57 | < -.01 (.03) | .997 |
| Meditation experience x linear time | < -.01 | < .01 (< .01) | .010 | < -.01 | .09 (.05) | .060 |
| Flourishing | | | | | | |
| | Minutes Meditating | | | Condition (MM, control) | | |
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Meditation experience | 5.39 | < .01 (< .01) | .017 | 5.30 | .45 (.15) | .003 |
| Linear time | 5.39 | < .01 (.05) | .997 | 5.30 | -.03 (.05) | .570 |
| Meditation experience x linear time | < .01 | < .01 (< .01) | .007 | -.03 | .20 (.07) | .003 |

Note. Meditation experience is either minutes spent meditating or condition. Each set of lines (meditation experience, linear time, meditation experience x linear time) represents separate analyses.

Table 13

Example Equations for Daily Diary Data

| Hypothesis | Equations |
|--------------|--|
| Hypothesis 2 | $\text{Stress} = \beta_{00} + \beta_{01} * \text{CONTROL}_i + \beta_{10} * \text{LINEARTIME}_{ti} + \beta_{11} * \text{CONTROL}_i * \text{LINEARTIME}_{ti} + r_{0i} + e_{ti}$ |
| Hypothesis 4 | $\text{Flourishing} = \beta_{00} + \beta_{01} * \text{CONTROL}_i + \beta_{10} * \text{LINEARTIME}_{ti} + \beta_{11} * \text{CONTROL}_i * \text{LINEARTIME}_{ti} + r_{0i} + e_{ti}$ |
| Hypothesis 5 | $\text{AdaptiveCoping}_i = \beta_{00} + \beta_{10} * \text{STRESS}_i + r_{0i} + r_{1i} * \text{STRESS}_i + e_{ti}$ |

Note. Linear time is a dummy coded variable to test for a linear slope. Control is a dummy coded variable to differentiate between the experimental and control conditions. “r” indicates a random slope and “e” indicates the error term. Hypothesis 1 was not tested at this level.

Table 14

Main Effects of Linear Time on Daily Diary Stress, Adaptive Coping, and Flourishing

| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
|-----------------|------------------|-------------------------|----------|
| Stress | 2.50 | -.03 (.01) | .002 |
| Adaptive Coping | 2.09 | -.02 (.01) | .238 |
| Flourishing | 5.31 | .02 (.02) | .187 |

Note. This table examines whether the slopes of the outcome variables follow a linear trend.

Table 15
Main Effects of Minutes Meditating and Condition on Daily Diary Stress, Adaptive Coping, and Flourishing

| Predictions of Stress | | | |
|--------------------------------|------------------|-------------------------|----------|
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 2.49 | < .01 (< .01) | .812 |
| Condition | 2.68 | -.34 (.12) | .009 |
| Condition x linear time | -.02 | -.02 (.02) | .337 |
| Predictions of Adaptive Coping | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 2.11 | < -.01 (< .01) | .455 |
| Condition | 2.16 | -.12 (.10) | .234 |
| Condition x linear time | -.02 | <-.01 (.03) | .954 |
| Predictions of Flourishing | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 5.31 | < .01 (< .01) | .829 |
| Condition | 5.09 | .40 (.17) | .023 |
| Condition x linear time | < .01 | .03 (.04) | .324 |

Table 16

Example Equations for Momentary Data

| Hypothesis | Equations |
|--------------|---|
| Hypothesis 2 | $\text{Stress} = \beta_{00} + \beta_{01} * \text{MINUTESMEDITATING}_i + r_{0i} + e_i$ |
| Hypothesis 4 | $\text{LAPE}_{ii} = \beta_{00} + \beta_{01} * \text{CONDITION}_i + r_{0i} + e_i$ |
| Hypothesis 5 | $\text{CopingFlexibility}_{ii} = \beta_{00} + \beta_{10} * \text{STRESS}_{ii} + r_{0i} + r_{1i} * \text{STRESS}_{ii} + e_i$ |

Note. Minutes meditating is a summary variable of time spent meditating over the course of the study. Condition is a dummy coded variable to distinguish between the control and experimental conditions. “r” indicates a random slope of the outcome variable and “e” is the error term.

Table 17
Main Effects for Momentary Minutes Meditating and Condition on Stress, Coping Flexibility, HAPE, and LAPE

| Predictions of Stress | | | |
|-----------------------------------|------------------|-------------------------|----------|
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 21.40 | < .01 (.01) | .911 |
| Condition | 21.57 | -.08 (1.44) | .956 |
| Predictions of Coping Flexibility | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 4.95 | < -.01 (< .01) | .009 |
| Condition | 5.35 | .48 (.25) | .059 |
| Predictions of HAPE | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 5.29 | < .01 (< .01) | .161 |
| Condition | 5.53 | .34 (.16) | .041 |
| Predictions of LAPE | | | |
| Predictor | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Minutes meditating | 6.08 | < .01 (< .01) | .069 |
| Condition | 6.34 | .32 (.14) | .026 |

Table 18
Tests of Longitudinal Mediation and Moderated Mediation

| Mediation Models | Coefficient pathways | | | Tests of Mediated Effects | |
|--|---------------------------------|-------------------------------|--------------------------------|-------------------------------|-----------------------------|
| | a coefficient nt (SE) | b coefficient nt (SE) | c' coefficient nt (SE) | Indirect effect | Confid- ence Interval |
| Pre-test Stress → Post-test Coping Flexibility → Follow-up Flourishing | <u>-0.24</u> (.06)*** | <u>.64</u> (.17)*** | <u>-.45</u> (.12)*** | <u>-.16</u> (.05)** | <u>-.27, -.22</u> |

Notes: Mediation models are shown with the independent variable (X) on the left, the mediator (M) in the middle, and the outcome (Y) on the right. Model variables and pathways are labeled using the nomenclature of Bauer, Preacher, and Gil (2006); the a coefficient summarizes the effect of X on M, b summarizes M on Y, and c' is used to identify the remaining effect of X on Y, after M is considered. The a, b, and c coefficient columns show the estimated coefficient and its robust standard error and statistical significance. Pathway coefficients shown in bold were moderated by minutes meditating in model 1 and those shown underlined were moderated by condition in model 2 (at $p < .05$). The right part of the table summarizes estimates of random indirect and total effects. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 19
Daily Diary and Momentary Analyses for Hypothesis 5

| Daily Diary | | | |
|--|------------------|-------------------------|----------|
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Stress predicting Flourishing | 5.31 | -.77 (.06) | < .001 |
| Stress predicting Adaptive Coping | 2.08 | .22 (.08) | .011 |
| Adaptive Coping predicting Flourishing | 5.31 | < .01 (.07) | .929 |
| Momentary | | | |
| | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Stress predicting HAPE | 1.56 | -.02 (< .01) | < .001 |
| Stress predicting LAPE | 6.34 | -.02 (< .01) | < .001 |
| Stress predicting Coping Flexibility | 5.48 | .01 (.01) | .230 |
| Coping Flexibility predicting HAPE | 1.72 | .19 (.04) | .134 |
| Coping Flexibility predicting LAPE | 4.39 | -.01 (.18) | .956 |

Table 20

Moderation of Hypothesis 5 Links by Condition and Minutes Meditating

| Daily Diary Data | | | |
|---------------------------------|------------------|-------------------------|----------|
| Moderated by Condition | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Stress and Adaptive Coping | -.05 | .50 (.15) | .002 |
| Stress and Flourishing | -.86 | .16 (.11) | .124 |
| Momentary Data | | | |
| Moderated by Condition | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Stress and HAPE | -.02 | < -.01 (< .01) | .637 |
| Stress and LAPE | -.03 | < -.01 (< .01) | .945 |
| Moderated by Minutes Meditating | <i>Intercept</i> | <i>Coefficient (SE)</i> | <i>p</i> |
| Stress and HAPE | -.02 | < -.01 (< .01) | .336 |
| Stress and LAPE | -.03 | < -.01 (< .01) | .998 |

Note. Each line summarized a separate analysis to determine whether condition or minutes meditating moderate each of the links among stress, coping flexibility, and positive emotions (HAPE and LAPE).



Figure 1. Mediation model with coping flexibility mediating the link between stress and well-being.

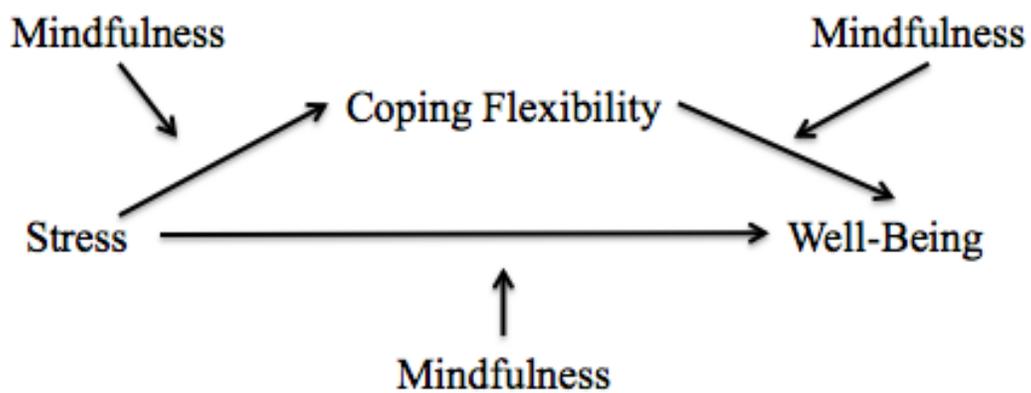


Figure 2. A moderated mediation model whereby mindfulness moderates the mediated links between stress, coping flexibility, and well-being.

| | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Day 1 | Pretest for all participants | | | |
| | Randomize (20 per group) | | | |
| | Mindfulness | | Control | |
| | Day 2 | 60 minutes of MM | | |
| | | Begin Daily Diary Measures | | Begin Daily Diary Measures |
| | Day 3-7 | 30 minutes of MM | | |
| | | Daily Diary Measures | | Daily Diary Measures |
| | Day 8 | Posttest | | Posttest |
| Randomize (10 per group; 5 from MM, 5 from control) | | | | |
| A | | B | C | D |
| Day 9-10 | Participate in momentary assessment | | | |
| Day 11 | | | | |
| Day 12-13 | | Participate in momentary assessment | | |
| Day 14 | | | | |
| Day 15-16 | | | Participate in momentary assessment | |
| Day 17 | | | | |
| Day 18-19 | | | | Participate in momentary assessment |
| Day 20 | | | | |
| Day 21 | Follow-up for all participants | | | |
| Replicate sequence for Waves 2 & 3 | | | | |

Figure 3. Schedule for MM study with experimental and control groups.

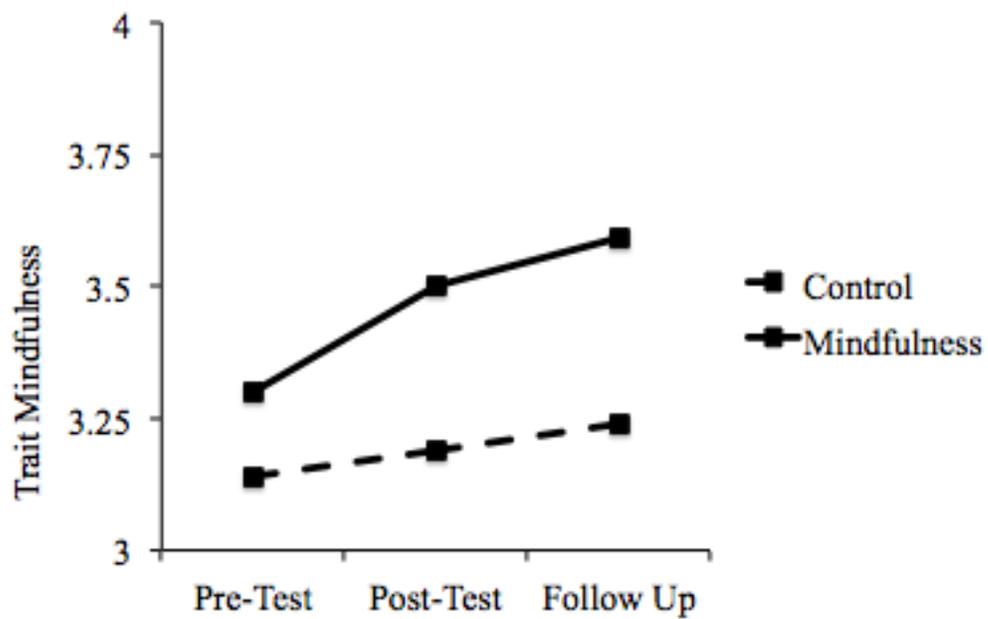


Figure 4. A comparison of the experimental condition with the control condition on longitudinal mindfulness.

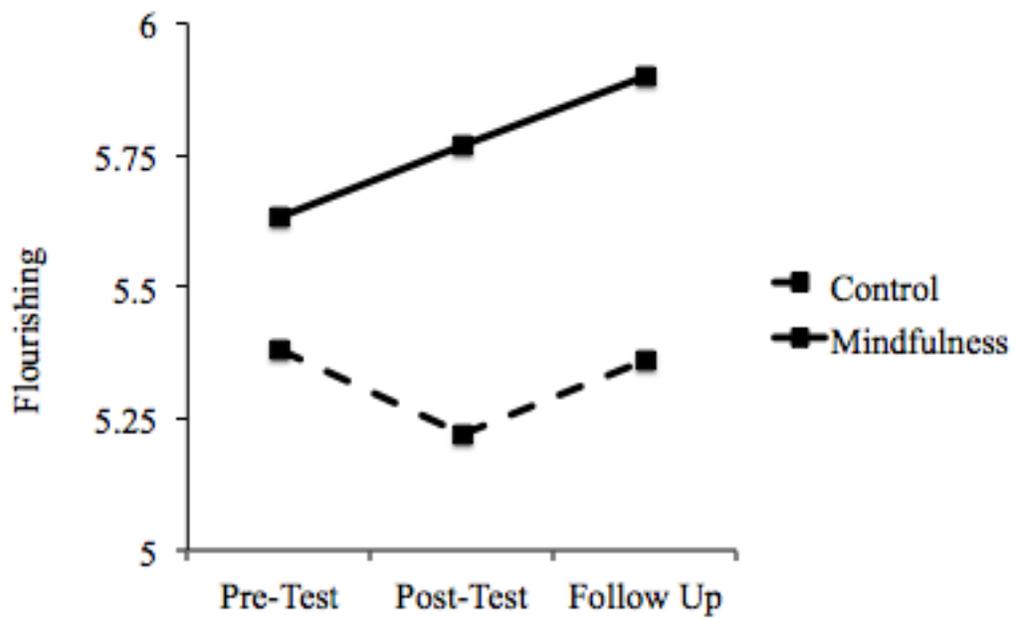


Figure 5. A comparison of the experimental condition with the control condition on longitudinal flourishing.

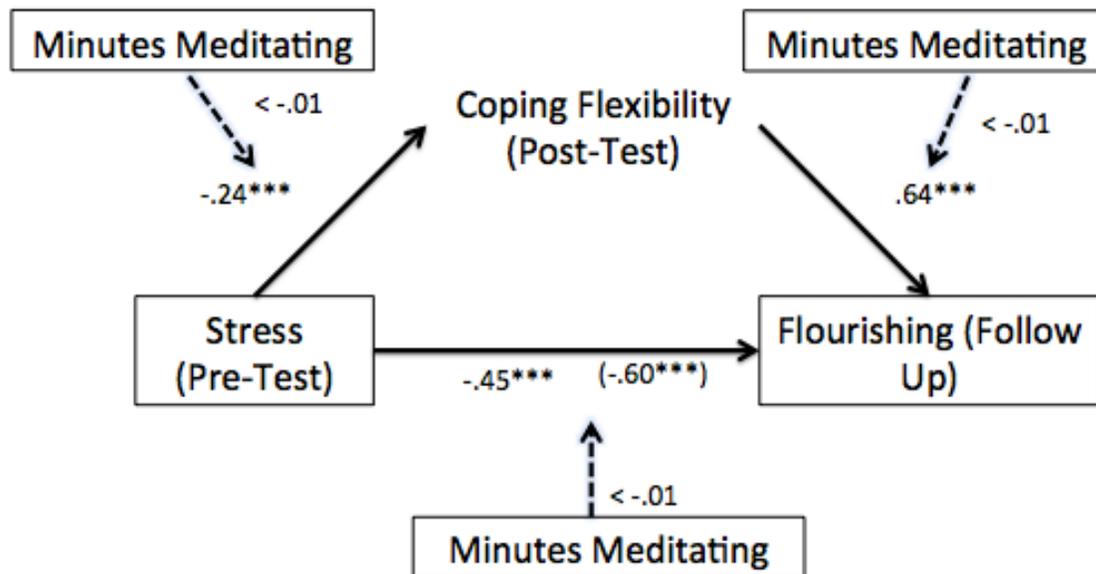


Figure 6. Moderated meditation whereby coping flexibility mediates the link between stress and flourishing and tests of moderation were conducted for each link in the longitudinal data.
 * $p < .05$, ** $p < .01$, *** $p < .001$

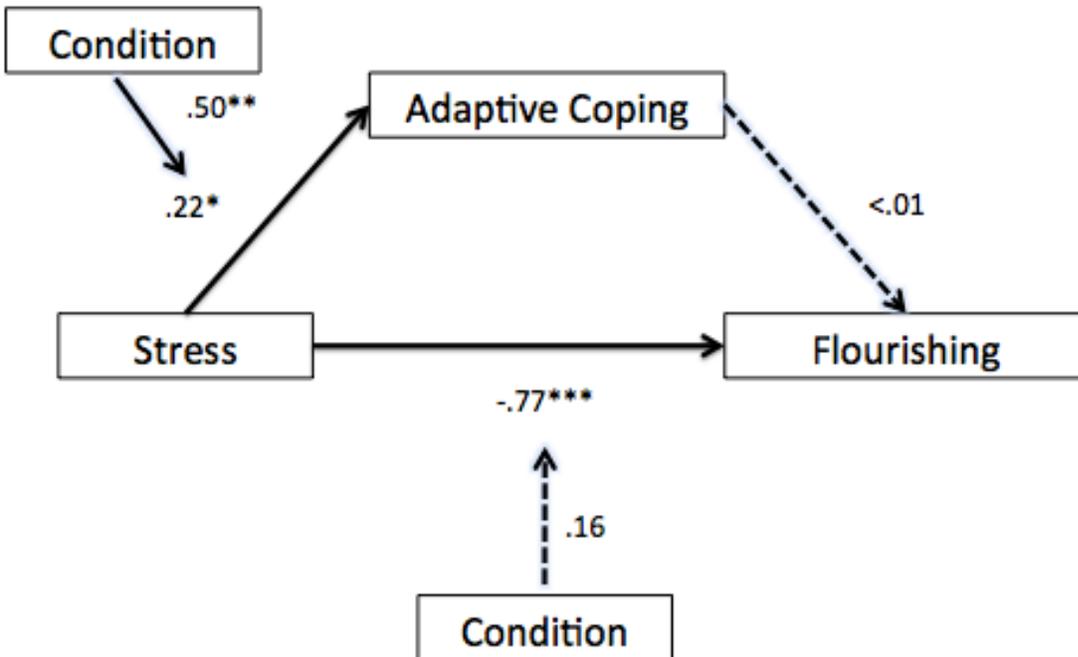


Figure 7. Moderated meditation whereby coping flexibility mediates the link between stress and flourishing and tests of moderation were conducted for each link in the daily diary data.

* $p < .05$, ** $p < .01$, *** $p < .001$

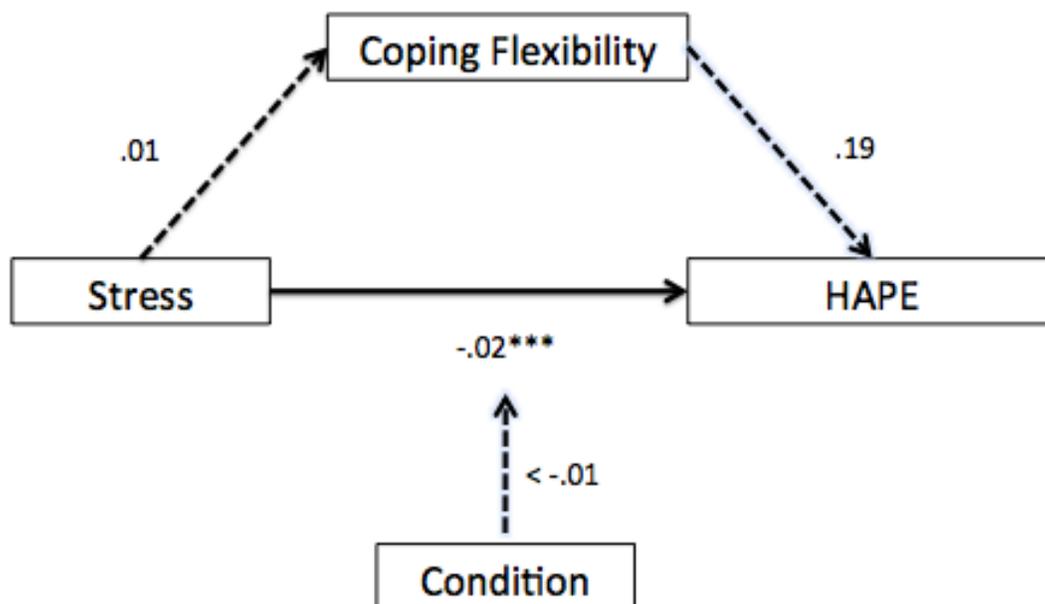


Figure 8. Moderated meditation whereby coping flexibility mediates the link between stress and HAPE and tests of moderation were conducted for each link in the momentary data. * $p < .05$, ** $p < .01$, *** $p < .001$

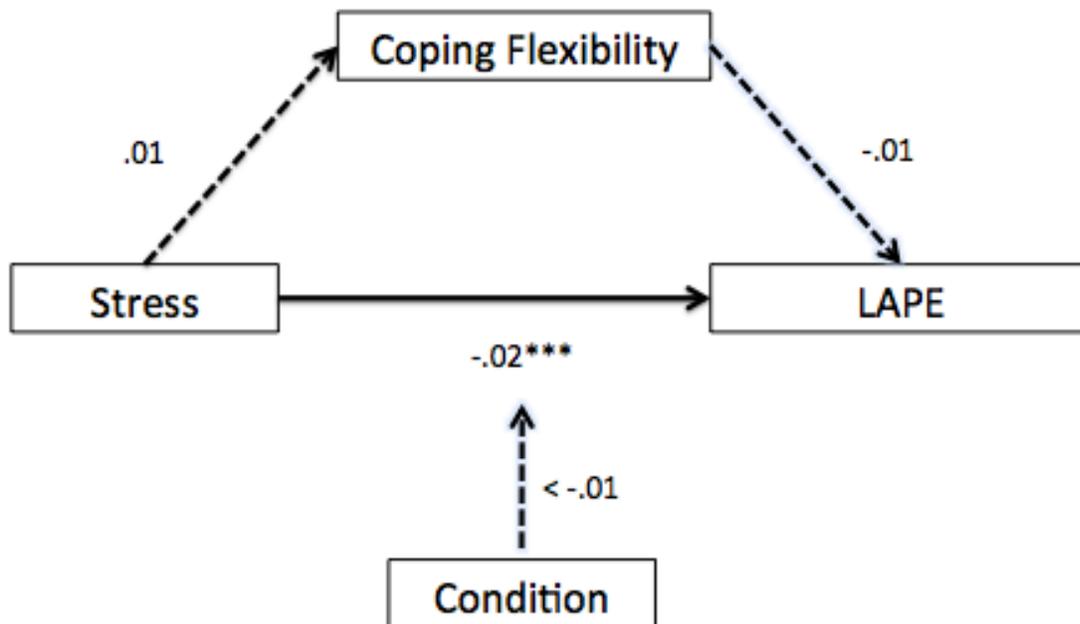


Figure 9. Moderated meditation whereby coping flexibility mediates the link between stress and LAPE and tests of moderation were conducted for each link in the momentary data. * $p < .05$, ** $p < .01$, *** $p < .001$

Appendix A

Reminder emails to participants.

Reminder email to participants for pretest, posttest, and follow-up.

Hello,

This email is to remind you that you have a research participation appointment on Monday, October XX, 2013 at 7 PM in AIC XXX to participate in the Mindfulness and Coping Study. If you have any questions, please contact us at dailybp@gmail.com.

Dr. Lehman's Research Lab

Reminder email to Mindfulness condition with Tim Burnett.

Hello,

This email is to remind you that you have a mindfulness meditation session scheduled with Tim Burnett, Director of Mindfulness Northwest. Your meditation session begins at 6:30 pm on October XX, 2013, in AIC XXX. Please arrive by 6:20 and check in with the research assistant by the door. If you have any questions, please contact us at dailybp@gmail.com.

Dr. Lehman's Research Lab

Reminder email to pick up equipment.

Hello,

This email is to remind you that you have an appointment to pick up equipment for your participation in the Mindfulness and Coping Study. Please come by AIC 165 on DAY OF WEEK, October XX, 2013 between the hours of 1:00 – 5:00 PM to pick up the equipment. If you have any questions, please contact us at dailybp@gmail.com.

Dr. Lehman's Research Lab

Reminder email to return equipment.

Hello,

This email is to remind you that you have an appointment to return equipment you used for participation in the Mindfulness and Coping Study. Please return equipment to AIC 165 on DAY OF WEEK, October XX, 2013 between the hours of 8:00 AM – 12:00 PM. **All equipment must be returned, including iPods, chargers, headphones, heart rate monitors and straps.** If you have any questions, please contact us at dailybp@gmail.com.

Dr. Lehman's Research Lab

Appendix B

Longitudinal Measures.

Mindfulness Experience

Please how frequently or infrequently you have had each experience **in the last week** by circling the appropriate number. Please answer according to what really reflects your experience rather than what you think your experience should be.

| | Never or Rarely True | Not Often True | Sometimes True | Often True | Very Often or Always True |
|--|----------------------------|-------------------|-------------------|---------------|---------------------------------------|
| 1. I perceive my feelings and emotions without having to react to them. | 1 | 2 | 3 | 4 | 5 |
| 2. When I'm walking, I deliberately notice the sensations of my body moving. | 1 | 2 | 3 | 4 | 5 |
| 3. I find it difficult to stay focused on what's happening in the present. | 1 | 2 | 3 | 4 | 5 |
| 4. I'm good at finding the words to describe my feelings. | 1 | 2 | 3 | 4 | 5 |
| 5. I criticize myself for having irrational or inappropriate emotions. | 1 | 2 | 3 | 4 | 5 |
| 6. I watch my feelings without getting lost in them. | 1 | 2 | 3 | 4 | 5 |
| 7. When I take a shower or a bath, I stay alert to the sensations of water on my body. | 1 | 2 | 3 | 4 | 5 |
| 8. It seems I am "running on automatic" without much awareness of what I'm doing. | 1 | 2 | 3 | 4 | 5 |
| 9. I can easily put my | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| beliefs, opinions, and expectations into words. | | | | | |
| 10. I tell myself that I shouldn't be feeling the way I'm feeling. | 1 | 2 | 3 | 4 | 5 |
| 11. In difficult situations, I can pause without immediately reacting. | 1 | 2 | 3 | 4 | 5 |
| 12. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. | 1 | 2 | 3 | 4 | 5 |
| 13. I rush through activities without being really attentive to them. | 1 | 2 | 3 | 4 | 5 |
| 14. It's hard for me to find the words to describe what I'm thinking. | 1 | 2 | 3 | 4 | 5 |
| 15. I believe some of my thoughts are abnormal or bad and I shouldn't think that way. | 1 | 2 | 3 | 4 | 5 |
| 16. When I have distressing thought or images, I am able to just notice them without reacting. | 1 | 2 | 3 | 4 | 5 |
| 17. I pay attention to sensations, such as the wind in my hair or sun on my face. | 1 | 2 | 3 | 4 | 5 |
| 18. I do jobs or tasks automatically, without being aware of what I'm doing. | 1 | 2 | 3 | 4 | 5 |
| 19. I have trouble thinking of the right words to express how I feel about things. | 1 | 2 | 3 | 4 | 5 |
| 20. I make judgments about whether my thoughts are good or bad. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 21. When I have distressing thoughts or images, I feel calm soon after. | 1 | 2 | 3 | 4 | 5 |
| 22. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. | 1 | 2 | 3 | 4 | 5 |
| 23. I find myself doing things without paying attention. | 1 | 2 | 3 | 4 | 5 |
| 24. When I have a sensation in my body, it's hard for me to describe it because I can't find the right words. | 1 | 2 | 3 | 4 | 5 |
| 25. I tell myself I shouldn't be thinking the way I'm thinking. | 1 | 2 | 3 | 4 | 5 |
| 26. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. | 1 | 2 | 3 | 4 | 5 |
| 27. I notice the smells and aromas of things. | 1 | 2 | 3 | 4 | 5 |
| 28. When I do things, my mind wanders off and I'm easily distracted. | 1 | 2 | 3 | 4 | 5 |
| 29. Even when I'm feeling terribly upset, I can find a way to put it into words. | 1 | 2 | 3 | 4 | 5 |
| 30. I think some of my emotions or bad or inappropriate and I shouldn't feel them. | 1 | 2 | 3 | 4 | 5 |
| 31. When I have distressing thoughts or images, I just notice them and let them go. | 1 | 2 | 3 | 4 | 5 |
| 32. I notice visual elements in art or nature, such | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|--|---|---|---|---|---|
| as colors, shapes, textures, or patterns of light and shadow. | | | | | |
| 33. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. | 1 | 2 | 3 | 4 | 5 |
| 34. My natural tendency is to put my experiences into words. | 1 | 2 | 3 | 4 | 5 |
| 35. I disapprove of myself when I have irrational ideas. | 1 | 2 | 3 | 4 | 5 |
| 36. I pay attention to how my emotions affect my thoughts and behavior. | 1 | 2 | 3 | 4 | 5 |
| 37. I am easily distracted. | 1 | 2 | 3 | 4 | 5 |
| 38. I can usually describe how I feel at the moment in considerable detail. | 1 | 2 | 3 | 4 | 5 |
| 39. When I have distressing thoughts or images, I judge myself as good or bad, depending on what the thought/image is about. | 1 | 2 | 3 | 4 | 5 |

Stress.

Please indicate how frequently you have thought or felt the following **in the past week**.

| | Never | Almost Never | Sometimes | Fairly Often | Very Often |
|---|-------|-----------------|-----------|-----------------|---------------|
| 1. In the last week, how often have you been upset that happened unexpectedly? | 0 | 1 | 2 | 3 | 4 |
| 2. In the last week, how often have you felt that you were unable to control the important things in your | 0 | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| life? | | | | | |
| 3. In the last week, how often have you felt nervous and “stressed”? | 0 | 1 | 2 | 3 | 4 |
| 4. In the last week, how often have you felt confident about your ability to handle problems? | 0 | 1 | 2 | 3 | 4 |
| 5. In the last week, how often have you felt that things were going your way? | 0 | 1 | 2 | 3 | 4 |
| 6. In the last week, how often have you found that you could not cope with things to do? | 0 | 1 | 2 | 3 | 4 |
| 7. In the last week, how often have you been able to handle your life? | 0 | 1 | 2 | 3 | 4 |
| 8. In the last week, how often have you felt that you were on top of things? | 0 | 1 | 2 | 3 | 4 |
| 9. In the last week, how often have you been angered by things that were outside of your control? | 0 | 1 | 2 | 3 | 4 |
| 10. In the last week, how often have you felt difficulties were too high that you could not overcome them? | 0 | 1 | 2 | 3 | 4 |

Coping Flexibility.

Please indicate how these situations apply to you by choosing one of the following for each situation: “very applicable,” “applicable,” “somewhat applicable,” and “not applicable.”

| | Not Applicable | Somewhat Applicable | Applicable | Very Applicable |
|---|---------------------------|--------------------------------|-------------------|----------------------------|
| 1. When a stressful situation has not improved, I try to think of other ways to cope with it. | 1 | 2 | 3 | 4 |
| 2. I only use certain ways to cope with stress. | 1 | 2 | 3 | 4 |
| 3. When stressed, I use several ways to cope and make the situation better. | 1 | 2 | 3 | 4 |
| 4. When I haven't coped with a stressful situation well, I use other ways to cope with that situation. | 1 | 2 | 3 | 4 |
| 5. If a stressful situation has not improved, I use other ways to cope with that situation. | 1 | 2 | 3 | 4 |
| 6. I am aware of how successful or unsuccessful my attempts to cope with stress has been. | 1 | 2 | 3 | 4 |
| 7. I fail to notice when I have been unable to cope with stress. | 1 | 2 | 3 | 4 |
| 8. If I feel that I have failed to cope with | 1 | 2 | 3 | 4 |

| | | | | | |
|--|---|---|---|---|--|
| stress, I change the way in which I deal with stress. | | | | | |
| 9. After coping with stress, I think about how well my ways of coping with stress worked or did not work. | 1 | 2 | 3 | 4 | |
| 10. If I have failed to cope with stress, I think of other ways to cope. | 1 | 2 | 3 | 4 | |

Flourishing

Please indicate your agreement with each item by placing the appropriate number on the line preceding that item.

| | Strongly Disagree | Dis-agree | Slightly Dis-agree | Neither Agree nor Dis-agree | Slightly Agree | Agree | Strongly Agree |
|---|-------------------|-----------|--------------------|-----------------------------|----------------|-------|----------------|
| 1. The conditions of my life are excellent. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. I am satisfied with my life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. So far I have gotten the important things I want in life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I felt that my life had purpose and | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|--|
| was meaningful. | | | | | | | | |
| 5. I felt that my social relationships were supportive and rewarding. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 6. I felt engaged and interested in my daily activities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 7. I actively contributed to the happiness and well- being of others. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 8. I felt competent and capable in the activities that were important to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

Health History

1. Do you have any known heart problems such as a stroke, cardiovascular disease, or heart palpitations?
 Yes No
2. Do you have heart arrhythmia?
 Yes No
3. Have you ever had any cardiac procedures?
 Yes No
4. Have you ever had rheumatic fever?
 Yes No

5. Do you have hypertension or diabetes?
 Yes No
6. Have you ever experienced chest pain, tightness, or discomfort?
 Yes No
How frequently?
(Open-ended)
When was the last time you experienced this?
(Open-ended)
7. Do you have asthma?
 Yes No
8. Have you ever experienced shortness of breath?
 Yes No
9. How frequently?
(Open-ended)
When was the last time you experienced this?
(Open-ended)
10. Have you ever experienced heart palpitations?
 Yes No
How frequently?
(Open-ended)
When was the last time you experienced this?
(Open-ended)
11. Have you ever experienced blackouts, fainting, or dizziness?
 Yes No
How frequently?
(Open-ended)
When was the last time you experienced this?
(Open-ended)
12. Have you ever smoked?
(Currently, previously, no)
If you currently smoke, how many cigarettes per day do you smoke?
(Open ended)
13. ID number (given to you by researcher): _____
14. Age: _____
15. Height: _____
16. Gender:
 Female
 Male
 Other (please specify): _____
17. Please select the ethnic identity you identify most with:
 African American
 American Indian/ Native American
 Asian American
 Caucasian
 Latino

- Pacific Islander
 Middle Eastern American
 Mixed Ethnic Identity
 Other (specify): _____
18. Class Standing:
 Freshman
 Sophomore
 Junior
 Senior
Is this your first year at WWU? Yes No
19. Current Marital Status:
 Single
 Married
 Divorced
 Other (please specify): _____
20. Cumulative Grade Point Average: _____

To be completed by researcher:

21. Weight: _____

Appendix C

Daily Diary Measures.

Daily Log

ID Number: _____

Think about your day today. Indicate your agreement with each item by circling that response for each statement.

| | Strongly Disagree | Disagree | Slightly Disagree | Mixed/ Neither Agree nor Disagree | Slightly Agree | Agree | Strongly Agree |
|---|----------------------|----------|----------------------|---|-------------------|-------|-------------------|
| 1. Today, I felt that my life had purpose and was meaningful. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. Today, I felt that my social relationships were supportive and rewarding. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. Today, I felt engaged and interested in my daily activities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. Today, I actively contributed to the happiness and well-being of others | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. Today, I felt competent and capable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| in the activities that were important to me. | | | | | | | |
|--|---|---|---|---|---|---|---|
| 6. Today, I felt as if I was a good person and lived a good life. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. Today, I felt optimistic about my future. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. Today, I felt that people respected me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Please think about your day today. How well does each statement describe what you experienced throughout your day?

1. I perceived my feelings and emotions without reacting to them.
“not at all” to “very much” (Slider bar)
2. When I had a distressing thought, I was able just to notice it without reacting.
“not at all” to “very much” (Slider bar)
3. I paid attention to sensations, such as the wind in my hair or sun on my face.
“not at all” to “very much” (Slider bar)
4. I paid attention to sounds, such as clocks ticking, birds chirping, or cars passing by.
“not at all” to “very much” (Slider bar)
5. I rushed through activities without being really attentive to them.
“not at all” to “very much” (Slider bar)
6. I found myself doing things without paying attention.
“not at all” to “very much” (Slider bar)
7. I had trouble thinking of the right words to express how I feel about something.
“not at all” to “very much” (Slider bar)
8. It was hard for me to find the words to describe what I was feeling.
“not at all” to “very much” (Slider bar)
9. Some of my emotions are bad or inappropriate and I shouldn’t feel them.
“not at all” to “very much” (Slider bar)

10. I made judgments about whether my thoughts are good or bad.
“not at all” to “very much” (Slider bar)

How frequently throughout the day did you feel:

11. Peppy - “not at all” to “extremely” (Slider bar)
12. Enthusiastic - “not at all” to “extremely” (Slider bar)
13. Happy - “not at all” to “extremely” (Slider bar)
14. Satisfied - “not at all” to “extremely” (Slider bar)
15. Calm - “not at all” to “extremely” (Slider bar)
16. Relaxed - “not at all” to “extremely” (Slider bar)
17. Quiet - “not at all” to “extremely” (Slider bar)
18. Still - “not at all” to “extremely” (Slider bar)
19. Sleepy - “not at all” to “extremely” (Slider bar)
20. Sluggish - “not at all” to “extremely” (Slider bar)
21. Sad - “not at all” to “extremely” (Slider bar)
22. Disappointed - “not at all” to “extremely” (Slider bar)
23. Afraid - “not at all” to “extremely” (Slider bar)
24. Nervous - “not at all” to “extremely” (Slider bar)
25. Aroused - “not at all” to “extremely” (Slider bar)
26. Surprised - “not at all” to “extremely” (Slider bar)

We are interested in understanding how people respond when they encounter stressful events in their lives. Please tell us what you have thought or done when you have experienced several stressful events within a specific period.

Please complete one of these logs every night, before bed, for six nights. If you are too busy or have forgotten to fill in the daily log on a particular night, please complete the daily log on the next morning regarding events of the previous day. Please report the stressful experience and how you handle it. Do not skip any questions because missing data can affect the findings of our study.

Before you complete the daily log, please note the following important points:

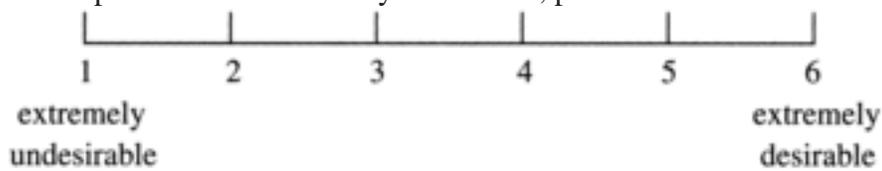
- You are asked to complete a total of six events, one per day. Please treat each event as an independent event unrelated to the other six events. **DO NOT** recall and use your previous answers as a guide to your answers in subsequent logs.
- We would like to know what you have actually thought or done during this stressful event. **DO NOT** report what you would like to think or do, what you should have thought or done, or what most people would think or do in that situation.

Section 1

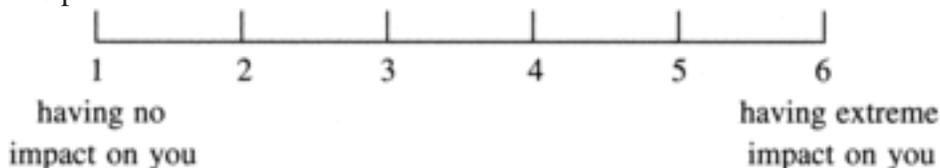
Describe in a sentence or two the most stressful or irritating event you experienced today. This event should (a) demand considerable effort from you to handle it, (b) influence your well-being and/or your relationship with others, or both (a) and (b).

Have you experienced this before? __Yes __No

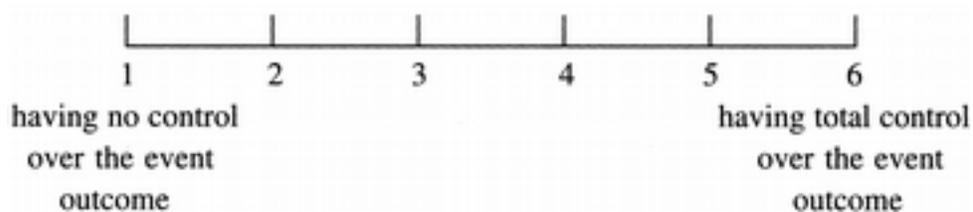
How desirable do you think this event has been to you? For example, if the event has elicited **a lot** of important outcomes that you wish for, please circle 6.



How much impact do you think the event has had on you? For example, if you considered the event had **no** impact on your physical or psychological well-being, or on your relationships with others please circle 1.



How much control do you think you have had over this event? For example, if you considered you had **total** control and could change the entire event, please circle 6. However, if you considered you had **a lot** of control and could change about **80%** of the aspects of the event, please circle 5.



Section 2

Describe in a few words your coping strategies that is, the thoughts or behaviors you have used to manage (e.g., master, tolerate, reduce, minimize) the stress associated with this event. We would like to know all your actual efforts made, and such thoughts or behaviors **NEED NOT** be completed or successful. Use at least 4-5 sentences to briefly describe each strategy.

1. What was your primary goal in using this strategy?

_____ to directly handle the demands/problems associated with the event to improve its effect on you

_____ to reduce or manage your distress or uncomfortable feelings associated with the event

2. How effective did you find this strategy was?

Rating guidelines: The extent of effectiveness depends on the extent to which the strategy is considered successful/unsuccessful in attaining or maintaining your goal. For example, if you considered the strategy was **extremely successful** in bringing about your primary goal, please circle the number 6.



Extremely
unsuccessful

Extremely
successful

Please think about the stressful situation you previously described and respond to the following questions.

27. The situation was stressful.
 “Strongly disagree” to “strongly agree” (Slide bar)
28. I could have done something else if I chose to.
 “Strongly disagree” to “strongly agree” (Slide bar)
29. The outcome of what I was doing was important to me.
 “Strongly disagree” to “strongly agree” (Slide bar)
30. I was capable of handling the situation.
 “Strongly disagree” to “strongly agree” (Slide bar)
31. I had control over the activity or outcome.
 “Strongly disagree” to “strongly agree” (Slide bar)
32. I was focused on my feelings.
 “Strongly disagree” to “strongly agree” (Slide bar)
33. I had the ability to succeed at what I was doing.
 “Strongly disagree” to “strongly agree” (Slide bar)
34. I was worried about others’ reactions to me.
 “Strongly disagree” to “strongly agree” (Slide bar)
35. I was focused on my problems.
 “Strongly disagree” to “strongly agree” (Slide bar)
36. I felt like I was losing control.
 “Strongly disagree” to “strongly agree” (Slide bar)
37. I considered multiple options before making a decision.
 “Strongly disagree” to “strongly agree” (Slide bar)
38. I tried to think of several different ways to resolve the stressor.
 “Strongly disagree” to “strongly agree” (Slide bar)
39. I was so stressed I could not think of a way to resolve the situation.
 “Strongly disagree” to “strongly agree” (Slide bar)
40. My initial approach to coping with the situation was successful: Yes No
41. Have you experienced a stressful event since your last report? Yes No
- If yes: Time of stressful event: _____
- How long did the stressful even last: _____
42. What type of stress was it?
- ___ Academic
- ___ Social
- ___ Other (please specify): _____

43. Please indicate how these situations apply to the stressful situation you described earlier.
44. During this stressful event, I used several ways to cope to make the situation better.
“not applicable” to “very applicable” (Slide bar)
45. If I didn’t cope well with the stressful situation, I used other ways to cope with it.
“not applicable” to “very applicable” (Slide bar)
46. If the stressful situation did not improve, I used other ways to cope with it.
“not applicable” to “very applicable” (Slide bar)
47. I am aware of how successful or unsuccessful I was in dealing with this stressful event.
“not applicable” to “very applicable” (Slide bar)
48. I didn’t notice if I was able to cope with the stressful situation or not.
“not applicable” to “very applicable” (Slide bar)
49. After I coped with the stressful event, I thought about how well the stressors worked or did not work.
“not applicable” to “very applicable” (Slide bar)
50. This final question is to ensure no responses were made accidentally or incorrectly. Did you answer all the questions intentionally and accurately? If not then please redo the questionnaire.
- Yes
No

Appendix D

Momentary Measures.

Within Day Questions (Administered via iPod)

Please enter your ID

Time/date

1. What is your posture?
 - Standing
 - Sitting
 - Lying Down
2. Were you talking?
 - Yes
 - No
3. Describe your physical movement right now:
 - None (sitting/napping)
 - Limited (standing)
 - Light (walking)
 - Moderate (jogging)
 - Heavy (running)
 - Extreme (sprinting)
4. How comfortable are you with the temperature?
 - Cold
 - Chilly
 - OK
 - Warm
 - Hot
5. Consumption right now?
 - Check all that apply**
 - Food
 - Alcohol
 - Caffeine
 - Drug/medicine
 - Cigarette
 - Other (please indicate)

Do you feel:

6. Peppy - “not at all” to “extremely” (Slider bar)
7. Enthusiastic - “not at all” to “extremely” (Slider bar)
8. Happy - “not at all” to “extremely” (Slider bar)
9. Satisfied - “not at all” to “extremely” (Slider bar)
10. Calm - “not at all” to “extremely” (Slider bar)
11. Relaxed - “not at all” to “extremely” (Slider bar)
12. Quiet - “not at all” to “extremely” (Slider bar)
13. Still - “not at all” to “extremely” (Slider bar)
14. Sleepy - “not at all” to “extremely” (Slider bar)
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18. Afraid - “not at all” to “extremely” (Slider bar)
19. Nervous - “not at all” to “extremely” (Slider bar)
20. Aroused - “not at all” to “extremely” (Slider bar)
21. Surprised - “not at all” to “extremely” (Slider bar)

How well does each statement describe what you just experienced?

22. I perceived my feelings and emotions without reacting to them.
“not at all” to “very much” (Slider bar)
23. When I had a distressing thought, I was able just to notice it without reacting.
“not at all” to “very much” (Slider bar)
24. I paid attention to sensations, such as the wind in my hair or sun on my face.
“not at all” to “very much” (Slider bar)
25. I paid attention to sounds, such as clocks ticking, birds chirping, or cars passing by.
“not at all” to “very much” (Slider bar)
26. I rushed through activities without being really attentive to them.
“not at all” to “very much” (Slider bar)
27. I found myself doing things without paying attention.
“not at all” to “very much” (Slider bar)
28. I had trouble thinking of the right words to express how I feel about something.
“not at all” to “very much” (Slider bar)
29. It was hard for me to find the words to describe what I was feeling.
“not at all” to “very much” (Slider bar)
30. Some of my emotions are bad or inappropriate and I shouldn’t feel them.
“not at all” to “very much” (Slider bar)
31. I made judgments about whether my thoughts are good or bad.
“not at all” to “very much” (Slider bar)

Please think about what you were just doing and indicate the extent to which each of the following statements describes your situation.

32. The situation was stressful.
“Strongly disagree” to “strongly agree” (Slide bar)

33. I could have done something else if I chose to.
 “Strongly disagree” to “strongly agree” (Slide bar)
34. The outcome of what I was doing was important to me.
 “Strongly disagree” to “strongly agree” (Slide bar)
35. I was capable of handling the situation.
 “Strongly disagree” to “strongly agree” (Slide bar)
36. I had control over the activity or outcome.
 “Strongly disagree” to “strongly agree” (Slide bar)
37. I was focused on my feelings.
 “Strongly disagree” to “strongly agree” (Slide bar)
38. I had the ability to succeed at what I was doing.
 “Strongly disagree” to “strongly agree” (Slide bar)
39. I was worried about others’ reactions to me.
 “Strongly disagree” to “strongly agree” (Slide bar)
40. I was focused on my problems.
 “Strongly disagree” to “strongly agree” (Slide bar)
41. I felt like I was losing control.
 “Strongly disagree” to “strongly agree” (Slide bar)
42. I considered multiple options before making a decision.
 “Strongly disagree” to “strongly agree” (Slide bar)
43. I tried to think of several different ways to resolve the stressor.
 “Strongly disagree” to “strongly agree” (Slide bar)
44. I was so stressed I could not think of a way to resolve the situation.
 “Strongly disagree” to “strongly agree” (Slide bar)
45. My initial approach to coping with the situation was successful: Yes No
46. Have you experienced a stressful event since your last report? Yes No

If yes: Time of stressful event: _____

How long did the stressful even last: _____

47. What type of stress was it?

___ Academic

___ Social

___ Other (please specify): _____

Please indicate how these situations apply to your most recent stressful situation.

48. During this stressful event, I used several ways to cope to make the situation better.
 “not applicable” to “very applicable” (Slide bar)

49. If I didn't cope well with the stressful situation, I used other ways to cope with it.
"not applicable" to "very applicable" (Slide bar)
50. If the stressful situation did not improve, I used other ways to cope with it.
"not applicable" to "very applicable" (Slide bar)
51. I am aware of how successful or unsuccessful I was in dealing with this stressful event.
"not applicable" to "very applicable" (Slide bar)
52. I didn't notice if I was able to cope with the stressful situation or not.
"not applicable" to "very applicable" (Slide bar)
53. After I coped with the stressful event, I thought about how well the stressors worked or did not work.
"not applicable" to "very applicable" (Slide bar)
54. This final question is to ensure no responses were made accidentally or incorrectly. Did you answer all the questions intentionally and accurately? If not then please redo the questionnaire.
- Yes
No