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DISPOSITIONAL MINDFULNESS IN PEOPLE DIAGNOSED WITH CANCER: THE
RELATIONSHIP TO DEPRESSIVE SYMPTOMS AND WELL-BEING

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science at Virginia Commonwealth University

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Abstract

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of
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Coping with a cancer diagnosis is known to be a stressful experience that can be related to declines in personal well-being and increases in distress. Dispositional mindfulness is known to be related to depressive symptoms and well-being. The primary purpose of this study was to examine the relationship between mindfulness and experiences of depressive symptoms and well-being in people recently diagnosed with cancer. Seventy-four participants who were diagnosed with cancer in the last 12 months completed an initial self-report survey, and 43 of those completed another survey 3 months later. Cross-sectional regression analysis showed that higher levels of mindfulness were related to

fewer depressive symptoms, less use of avoidant coping, and more experiences of positive affect at baseline, but not related to positive reappraisal coping at baseline.

Longitudinal regression analyses showed no significant relationship between mindfulness at baseline and depressive symptoms, experiences of positive affect, positive reappraisal coping, or avoidant coping 3 months later, after controlling for the dependent variable at baseline. Additionally, cross-lagged analysis indicated no evidence of a causal relationship between mindfulness at baseline and the dependent variables 3 months later.

Dispositional Mindfulness in People Diagnosed with Cancer: The Relationship to Depressive Symptoms and Well-Being

With the advancement of effective treatments for cancer, more and more people are living long past their diagnoses and, therefore, living with the physical and emotional consequences of cancer and its treatment. Despite improved effectiveness, cancer treatments are still routinely highly stressful, frightening, and painful. The stress of these treatments, added to the existential stress of facing possible death when diagnosed with cancer, are likely to impact the psychological well-being of people living long after their cancer treatments. Stressful life events, such as cancer diagnosis, are known to be related to increased depressive symptoms and fewer positive life experiences (McDaniel, Musselman, Porter, Reed, & Nemeroff, 1995). With many more people living far beyond a cancer diagnosis, examination of the factors that lead to and protect people from psychological declines has become more important.

In the last 20 years, mindfulness, a state of being aware of what is happening in the moment without judgment, has emerged as an individual factor known to be related to psychological well-being—an idea backed up by an growing body of research. Long a goal of Buddhist meditative traditions, the experience of mindfulness is characterized by feeling a greater-than-usual sense of wakefulness and clarity (Langer & Moldoveanu, 2000a) and an especially vivid experience of perceiving phenomena happening both internally and externally in the present moment (Brown & Ryan, 2003). Mindfulness, which is theorized to be made up of both self-reflective attention and judgment-free experience of stimuli, is likely related to psychological well-being by improving an

individual's ability to choose what phenomena are paid attention to and control emotional reactions (Brown, Ryan, & Creswell, 2007b).

Mindfulness can be developed in a number of ways, including the contemplative traditions of many world religions. Its intentional cultivation was first used as a modern technique for the promotion of good mental health by Jon Kabat-Zinn who designed and popularized a training protocol called Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990). This 8-week mindfulness development program has been widely replicated and studied; empirical research has shown a consistent relationship between the training and reduced stress and improved well-being, including reduction of depressive symptoms (e.g., Carlson & Garland, 2005; Garland, Carlson, Cook, Lansdell, & Speca, 2007; Teasdale et al., 2000). In particular, programs like MBSR have been associated with decreased indicators of psychological disturbance among people diagnosed with cancer (Brown & Ryan, 2003).

However, researchers, including Brown and Ryan (2003), theorized that mindfulness is a useful theoretical concept related to psychological well-being even when it is not directly induced through training. To demonstrate this, Brown and Ryan developed a measure of "dispositional mindfulness" called the Mindful Attention Awareness Scale (MAAS). Further research has shown that scores on this measure went up through mindfulness training and that scores were negatively correlated with levels of depressive symptoms and positively correlated with measures of psychological well-being (Brown & Kasser, 2005; Brown & Ryan, 2003).

The present study aims to examine the relationship between dispositional mindfulness, as measured by the MAAS, and depressive symptoms, positive reappraisal

coping, and positive mind states among people recently diagnosed with cancer. To do so, people with a cancer diagnosis will be surveyed on these factors within 12 months of diagnosis and, again, 3 months later. It is hypothesized that scores on the MAAS will be negatively associated with depressive symptoms and positively associated with positive reappraisal coping and frequency of experiencing positive states of mind at the first measurement. Also, it is hypothesized that scores on the MAAS at the first survey will be negatively associated with depressive symptoms and positively associated with positive reappraisal coping and frequency of experiencing positive states of mind 3 months later.

Literature Review

According to estimates from the National Cancer Institute, 11.4 million Americans who had been diagnosed with cancer were alive in January of 2006 (American Cancer Society, 2010). Cancer takes the lives of about 1,500 people a day, more than half a million a year, and accounts for one out of every four deaths in the U.S. (American Cancer Society, 2009). Despite still being a prominent cause of death, 5-year survival rates for people diagnosed with cancer are improving; the 5-year survival rate was 66% between 1996 and 2003, up from 50% between 1975 and 1977 (American Cancer Society, 2009). With so many people surviving long past their diagnoses and cancer treatments, issues of quality of life during and after cancer treatment have become especially salient.

Within the general population of people living long beyond their cancer diagnosis, are a diverse group of survivors with different types and stages of cancer and, potentially, vastly different experiences of treatment and coping. For example, 200,000 women are

diagnosed with breast cancer annually, and the 5-year survival rate for all types of breast cancer is 90% (American Cancer Society, 2010). About 100,000 people are diagnosed with colon cancer annually and about 40,000 are diagnosed with rectal cancer annually, and the 5-year survival rate for all types of colorectal cancer is 65% (American Cancer Society, 2010). About 58,000 new cases of kidney cancer are diagnosed annually and the 5-year survival rate is 68% (American Cancer Society, 2010). About 24,000 people are diagnosed with liver cancer annually, and face a 5-year survival rate of 26% (American Cancer Society, 2010). And about 220,000 people are diagnosed with lung cancer annually, and the 5-year survival rate for all lung cancers is 16%, but those who are diagnosed early can expect a 53% 5-year survival rate (American Cancer Society, 2010). Similarly, demographic variables such as gender, age, and socioeconomic status further diversify the experiences of people diagnosed with cancer.

Almost everything associated with cancer diagnosis can be considered stressful, even traumatic, for individuals. First, people diagnosed with cancer are forced to consider the worst outcomes from the disease including significant physical impairment and possible mortality. Then, individuals are required to take in a great deal of sophisticated medical and health related information about their disease and treatment options, and subsequently make complicated decisions about potentially expensive, unreliable, painful, and frightening procedures and treatments. People diagnosed with cancer are likely to choose some form of treatment that may include any combination of surgery, radiation, chemotherapy, and hormone therapy. Treatment itself can be painful, strenuous, and chaotic, and can cause side effects including radiation burns, constipation, diarrhea, nausea, and vomiting, hair loss, bleeding, fatigue, and sexual problems. These

experiences of treatment vary based on type and stage of cancer, so there is a diverse range of treatment experiences. In addition to physical symptoms, the process of going through cancer treatment can be stressful in a number of other dimensions: it can cause conflicts and relationship stress among family members, financial problems, and occupational problems (American Cancer Society, 2009). Similarly, demographic factors including gender, ethnicity, family income, employment status, level of education, and relationship status have been shown to relate to stress experiences following cancer diagnosis (American Cancer Society). Finally, once diagnosed and treated for cancer, individuals are at a much greater risk for recurrence than the general public, and must deal with fears of becoming ill again.

All of these stressors have the potential to lead people diagnosed with cancer to a negative affect and lowered quality of life, as well as depressive symptoms. However, some people who have been diagnosed with cancer also have positive emotional experiences including increased frequency of positive mood states and positive reappraisal of difficult situations.

Depressive Symptoms and Cancer Diagnosis

Depressive symptoms are more common in populations of people with medical illnesses than in the general population, likely in relation to the stress associated with serious illness. In individuals with medical illnesses, several studies have found that about 25% demonstrate clinically significant depressive symptoms in any 6-month period (Massie, 2004), and 42% experienced depressive symptoms over a lifetime (Wells, Golding, & Burnam, 1988).

Among people diagnosed with cancer, it is estimated that 24% experience depressive symptoms (McDaniel et al., 1995). However, few studies have looked at depressive symptoms directly, rather than at rates of diagnosed Major Depression, or sufficiently isolated depressive symptoms from common symptoms of cancer treatment, such as fatigue.

Regardless of cause or treatment, the combination of depression and cancer diagnosis has been shown to have negative correlations with health outcomes, including survivorship rates. People diagnosed with cancer who are depressed tend to have lower quality of life, are less compliant with treatment, and experience longer hospital stays (Newport & Nemeroff, 1998). They also experience more pain than people diagnosed with cancer who are not depressed, and greater functional impairment (Mossey & Gallagher, 2004). To establish evidence that people diagnosed with cancer who also have depression experience an increased risk of death from all causes, Onitilo, Nietert, and Egede (2006) established baseline data in 1982 from more than 10,000 people, tracking their depression, with the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and cancer diagnosis. Eight or more years later, culminating in 1992, the researchers tracked the participants' mortality and compared groups defined by their depression and cancer statuses (depression but no cancer, cancer but not depression, neither cancer nor depression, and both cancer and depression). The people with both cancer and depression had a 19% increased risk of death from all causes compared with people with cancer only, a 24% increased risk compared with people with depression only, and a 70% increased risk of death compared with people with neither cancer nor depression.

Declines in Positive States Associated with Depressive Symptoms

Another way to conceptualize psychological distress in people diagnosed with cancer, other than looking at depressive symptoms, is through assessment of the presence or absence positive and negative affect. Negative affect has been found to be related to both anxiety and depression, and the absence of positive affect is strongly related to depression (Voogt et al., 2004). In particular, depressive symptoms in people diagnosed with cancer have been found to be more strongly related to lower levels of positive feelings, as compared to a healthy population, while the relationship between negative feelings and depressive symptoms was similar (Ritterband & Spielberger, 2001).

Positive Reappraisal Coping Associated with Less Distress

Positive reappraisal is an active coping mechanism in which an individual faces a negatively perceived situation and intentionally makes positive meaning of it (Garland, Gaylord, & Park, 2009). Evidence of positive reappraisal in people experiencing serious medical issues, including breast cancer and HIV, has been shown to be related to less psychological distress (eg., Manne et al., 2004; Moskowitz, Folkman, Collette, & Vittinghoff, 1996).

Avoidant Coping Fails to Support Long-Term Well-Being

Avoidant coping, which includes ignoring, escaping, and distorting stimuli, is conceptualized as a way of dealing with problems by pulling attention away from them (Weinstein, Brown, & Ryan, 2009). The relief of stress experienced through avoidant coping is short-lived in contrast with approach coping, in which problem-solving and reinterpretation feature prominently. Because stress relief from avoidant coping is not

long-term, it is thought to be ineffective in supporting future well-being (Davies & Clark, 1998).

Mindfulness Defined

For the purposes of this thesis, mindfulness is defined as “the state of being attentive to and aware of what is taking place in the present,” as established by Brown and Ryan in 2003 (p. 822). Mindfulness can be viewed in a variety of ways and has its roots in several spiritual traditions, most prominently, Buddhism (Brown et al., 2007b), but it is also, simply, the familiar experience of consciously experiencing being human.

The awareness component of mindfulness refers to conscious registration of stimuli, including the five senses, body awareness, cognitions, and emotions. Attention is paid to stimuli when they are notable (Brown et al., 2007b). Though conceptually simple, mindfulness is essential to positive experiences and behaviors. Mindfulness can be rare and challenging to attain because of the rapid, ongoing cognitive processes that distract from awareness of stimuli; inputs are quickly appraised using existing heuristics, associated with previous experiences, and assimilated into existing cognitive processes (Brown et al.). To be mindful, one must simply register facts observed through stimuli, rather than analyze them. In fact, the normal psychological reactions to stimuli are to be noticed as well, as part of the ongoing stream of consciousness. The absence of critical thoughts allows persons to be “present” to their experiences, and engage in objectively chosen thoughts and behaviors.

Brown, Ryan, and Creswell (2007a) identified several, overlapping characteristics of mindfulness useful for conceptual understanding as well as empirical study. *Clarity of awareness* describes the mirror-like reflection of reality that occurs in the mindful mind.

This unhindered state of attention is thought to allow access to all of an individual's psychological sources of knowledge and to create conditions favorable to clear-headed decision-making. Similarly, mindfulness is also characterized by *nonconceptual*, *nondiscriminatory awareness*, which separates experiences of stimuli from the routine cognitions about stimuli. A mindful state of thinking also allows for attention to be focused at different levels seamlessly. This *flexibility of awareness and attention* can include simultaneous focus on specific objects as well as sensing of all salient stimuli. An *empirical stance toward reality* allows judgments to be deferred until stimuli are fully experienced. Mindfulness includes *present-oriented consciousness*, with attention focused on in-the-moment experiences, rather than what has been or will be. All these characteristics are present and fundamental in all thinking beings, however, in its developed state, mindfulness also has a *stability or continuity of attention and awareness* that ensures that mindful states are frequent and continuous. This continuous noticing helps individuals move from narrow to broad focus and notice when they are not present, so that they may shift their awareness in a more mindful direction. Overall, mindfulness may be seen as an enhanced version of normative attention and awareness processes, with an emphasis on nonjudgment, present-moment orientation, and flexibility of scope.

The idea of mindfulness comes most clearly from a Buddhist tradition that argues for the elimination of human suffering through the cultivation of mental balance (Wallace & Shapiro, 2006). In Buddhism, experiences like anxiety, frustration, and depression are considered to be symptoms of an “unbalanced” mind, which can be remedied through skillful and sustained mental training to cultivate attention and awareness. Spiritual practices in Buddhism, including meditation, form this mental training with the goal of

achieving a state of continuous well-being that does not depend on pleasurable stimuli and that avoids a judgmental mind (Wallace & Shapiro). Similar conceptualizations of “mental balance” are found in a variety of diverse intellectual and spiritual traditions, including ancient Greek philosophy, Western European existentialism, and American transcendentalism, suggesting that the cultivation of attention and awareness is a goal common to most spiritual and religious practices and, more generally, human experience.

Research into Mindfulness

Starting in the 1980s, mindfulness has been a popular topic for scholarly research, clinical application, and popular media. In 1990, Kabat-Zinn described mindfulness as a process of bringing a certain quality of attention to moment-by-moment experience.

Langer (1989) described the dichotomy between mindfulness and mindlessness, describing the latter as a state of being open to surprise, oriented in the present moment, sensitive to context, and liberated from habitual mindsets. Her approach, which is significantly different from the general thread being examined in the present work, also described mindfulness as the process of drawing novel distinctions (rather than relying on distinctions and categories drawn in the past), and said that the “feel” of mindfulness is that of a “heightened state of involvement and wakefulness” (Langer & Moldoveanu, 2000b).

In keeping with the Buddhist idea that a balanced mind would result in elimination of suffering, it has been theorized that mindfulness is related to psychological health. The mechanisms for improvement in psychological health through mindfulness are not yet clear, but one theory argues for a direct connection; Brown and Ryan (2003) suggest mindfulness adds clarity and vividness to current experiences and encourages

closer, moment-to-moment sensory contact with life, without cognitive distortion.

There are a number of possible mechanisms at play in establishing the link between mindful attention and psychological health. Mindfulness may operate indirectly by improving self-regulated functioning through enhanced attentional sensitivity to psychological, physical, and environmental cues, referred to as reflexive self-consciousness (Brown et al., 2007b). With greater awareness of both the internal and external worlds, persons are better able to make decisions about behavior in line with their personal goals and desires. For example, emotional regulation can improve through having a greater sense of reality combined with a better ability to change thoughts and behaviors (Coffey & Hartman, 2008). Rumination also decreases through this improved awareness, as do attachments to fleeting objects and outcomes (Coffey & Hartman). In addition to attentional sensitivity, the strength of attentional abilities may be important to well-being:

People need to be attentive to their inner states and behavior to pursue reflectively considered goals, and failing to bring sufficient attention to oneself tends to foster habitual, overlearned, or automatized reactions rather than responses that are self-endorsed and situationally appropriate. Effective functioning demands that attention be directed toward both inner and outer events, but there is also scholarly agreement that directing attention to subjective mental, emotional, and physical experience is key to healthy self-regulation. Indeed, the willingness to “look inside” is foundational to the development of self-knowledge from which regulated action proceeds. (Brown et al., p. 216)

The element of consciousness, when combined with attention, serves to protect the individual from spontaneous emotional reactions to stimuli, allowing a person to simply take in information without requiring judgment or future planning (Brown et al.). With this ability to choose simple awareness over automatic reactions in place, people are better able to choose related adaptive behaviors and maintain a high level of self-awareness, both factors related to ongoing psychological health.

Mindfulness Interventions

The majority of research on mindfulness has focused on interventions to enhance individual mindfulness which have been evaluated through outcome measures related to well-being (Brown & Ryan, 2003). Mindfulness-based stress reduction (MBSR), developed by Jon Kabat-Zinn, is the best-known of these interventions and features 8 weeks of training in voluntary deployment of attention, based on mindfulness meditation, and its integration into everyday life (Kabat-Zinn, 1990). Numerous studies have demonstrated positive attitudinal, health, and behavioral changes associated with MBSR, including improvements in psychological and physical well-being and reductions in anxiety and depression (Teasdale et al., 2000). Specifically in people diagnosed with cancer, MBSR has been associated with diminished medical and psychological symptoms, including fatigue, mood disturbance, depression, anxiety, fear of recurrence, pain, and symptoms of stress (eg., Carlson, Speca, Faris, & Patel, 2007; Garland et al., 2007), as well as enhanced sleep, posttraumatic growth, spirituality, energy, and quality of life (e.g., Garland et al., 2007; Lengacher et al., 2009).

Following the development of MBSR, Mindfulness-Based Cognitive Therapy (MBCT) was designed specifically to help persons avoid recurrence of major depression

(Teasdale et al., 2000). MBCT combines aspects of MBSR with elements of Cognitive Behavioral Therapy (CBT; Beck, Rush, Shaw, & Emery, 1979). The pieces of CBT working into MBCT are generally not those that focus on changing thoughts, but those intended to change thinking about thoughts (e.g., “I am not my thoughts”). Like MBSR, MBCT has also been associated with positive changes in outcome measures related to well-being (Teasdale et al.). Specifically, MBCT has been shown to prevent relapse of major depression in people who have experienced three or more major depressive episodes, bringing relapse rates down from 78% to 36% (Ma & Teasdale, 2004).

Though MBSR and MBCT are often lumped together in research of people diagnosed with cancer, stand-alone MBCT in an oncology setting has been associated with decreased depression and anxiety symptoms, decreased distress, and improved quality of life (e.g., Foley, Baillie, Huxter, Price, & Sinclair, 2010). As part of the initial validation of the Mindful Attention Awareness Scale (MAAS), Brown and Ryan (2003) assessed adults diagnosed with Stage 0, I, or II breast or prostate cancer for quality of life, mood states, responses to stressful situations, and mindful awareness both before and 2 weeks after a mindfulness training intervention modeled after MBSR. In this study, higher levels of mindfulness were related to lower levels of both mood disturbance and stress at both the pre-intervention measure and 2 weeks after, and increases in mindfulness during the intervention predicted decreases in the indicators of psychological disturbance (Brown & Ryan).

Toward an Empirical Definition of Mindfulness

With the successes of MBSR and MBCT demonstrated through empirical studies, researchers have moved toward establishing an empirical definition of mindfulness, one

that could be measured independently. To do so, it has become important to examine the relationships between mindfulness and other psychological constructs in the domains of cognitive abilities, personality traits, and cognitive styles (Sternberg, 2002).

In the area of cognitive abilities, Sternberg suggested that there is significant conceptual overlap between mindfulness and cognitive abilities and intelligence, but that mindfulness offers additional dimensions not spelled out in intelligence theory.

Additionally, Brown and Ryan (2003) point out that mindfulness and emotional intelligence – explained by Salovey, Mayer, Goldman, Turvey, and Palfai (1995) to include accurate perceptions about internal emotional states -- are similar in that they both involve awareness of one's emotions. Studies have shown that the two constructs appear to be correlated (Brown & Ryan; Baer, Smith, & Allen, 2004).

In the area of personality traits, comparisons to aspects of the big-five personality traits, as described by Costa and McCrae (1992), are apt. Both openness to experience and conscientiousness seem related to mindfulness, but, again, mindfulness seems to add an additional dimension (Sternberg, 2002).

In the area of cognitive styles, which Sternberg defined in 1997 as “preferred ways of using one's cognitive abilities,” none of the existing constructs, such as *constricted versus flexible control*, match mindfulness precisely. Sternberg argued that that mindfulness is likely a new, stand-alone cognitive style that deserves further exploration (Sternberg, 2002). Langer and Moldoveanu's (2000a) conception of mindfulness as sensitivity to novel distinctions could be seen as a cognitive style, but the authors prefer to see it as changeable, learnable skill, rather than a set pattern.

Finally, Brown and Ryan (2003) further distinguished mindfulness from self-awareness, or *reflexive consciousness*, with mindfulness offering a literal take on cognitive processes rather than a depiction of self.

Development of the MAAS

Brown and Ryan (2003) set out to define and measure mindfulness as a dispositional trait that can vary both between and within persons, and is characterized by the presence or absence of attention to and awareness of what is occurring in the present moment. This “dispositional” construct, which stands in contrast to other approaches to conceptualizing and measuring mindfulness, is the focus of the current study. To fully establish this construct, Brown and Ryan developed and validated the Mindful Attention Awareness Scale (MAAS), which assesses the single factor of individual difference in the frequency of mindful states over time (Brown & Ryan). The way this construct is measured, separates it from other conceptualizations of mindfulness including the intentional act of mindfulness, such as practice in meditation, and mindfulness as a cognitive style, defined by a tendency to notice thoughts as one has them. The researchers intentionally avoided measurement of qualities associated with a mindful state, such as acceptance and gratitude, instead focusing on the frequency of present-centered attention-awareness, which they consider foundational to any mindful experience and the best way to establish individual differences between individuals and over time without the complication of affect. The 15 items that make up the MAAS all inquire about the absence of particular mindful experiences; the researchers chose this indirect form of questioning because previous studies suggested that it is easier for individuals to identify the absence of mindfulness than to be aware of the presence of mindfulness. Examples of

items include “I could be experiencing some emotion and not be conscious of it until some time later” and “I forget a person’s name almost as soon as I’ve been told it for the first time,” and are rated on 6-point scale from 1 (*almost always*) to 6 (*almost never*) (Brown & Ryan, 2003, pp. 825-826).

The 15-item measure resulted in internal consistency (coefficient alpha) of .82 and the expected convergent and discriminant validity correlations. The MAAS was positively correlated with openness to experience, emotional intelligence, subjective well-being (lower negative affect, higher positive affect, and satisfaction with life); and negatively correlated with rumination, social anxiety, and indicators of psychopathology, including dissociation, alexithymia, and general psychological distress (Brown & Ryan; Brown et al., 2007b). MAAS scores were significantly higher in persons who practiced mindfulness regularly, than in matched controls. And, importantly, in people diagnosed with cancer who completed a MBSR course, higher MAAS scores were associated with decreases in mood disturbance and symptoms of stress (Brown & Ryan, 2003).

Other measures of mindfulness do exist. For example, the Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Büttenmüller, Kleinknecht, & Schmidt, 2006) uses 30 items to measure nonjudgmental present-moment observation and openness to negative experience and is designed for use with experienced meditators. Its authors argue that, like the MAAS, it has a single-factor structure, but the factor analyses suggested a somewhat unstable four-factor model (Baer, Smith, Hopkins, & Krietemeyer, 2006). The Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004) uses 39 items to measure four elements of mindfulness: observing, describing, acting with awareness, and accepting with judgment. The KIMS is related to conceptualizations of

mindfulness common in Dialectical Behavioral Therapy (DBT; Linehan, Armstrong, Suarez, Alimón, & Heard, 1991) and measures a tendency to be mindful in daily life. The Cognitive and Affective Mindfulness Scale (CAMS; Hayes & Feldman, 2004) uses 12 items to measure attention, awareness, present-focus, and acceptance/nonjudgment, but measures them together yielding a single total score. And finally, The Southampton Mindfulness Questionnaire (SMQ; Chadwick et al., 2008) uses sixteen 7-point Likert-type scale items to assess how frequently people use a mindful approach to dealing with distressing thoughts and images.

A factor analysis of these five self-report measures and others by Baer et al. (2006) indicated that a multifaceted construct with five factors would be preferable to a single-factor measure. This finding supported the development of the Five Facet Mindfulness Questionnaire (FFMQ) by Baer et al., which was assembled from the KIMS factor structure, as the best available measure. However, Brown, Ryan, and Creswell (2007a) argued that operational definitions of mindfulness are not yet settled and that the FFMQ fails to distinguish mindfulness from self-awareness, making the single-factor model more functionally stable.

Dispositional Mindfulness Associated with Mindfulness Training

Given the extensive research on mindfulness interventions such as MBSR, it is helpful to the field to know that what is being measured by self-report mindfulness assessments, specifically the MAAS, actually increases in the presence of mindfulness training. Chambers, Lo, and Allen (2007) tested a non-clinical group of 20 novice meditators and 20 control participants before and after an intensive, 10-day mindfulness meditation retreat. The meditators increased significantly in dispositional mindfulness

from before the training ($M = 54.35$, $SD = 14.27$) to after the training ($M = 64.50$, $SD = 12.37$) and the control group did not change. Similarly, Shapiro, Oman, Thoresen, Plante, and Flinders (2008) collected data for three groups of 15 participants, one treated with 8 weeks of MBSR, one a control, and another treated with a mediation program called Eight Point Program (EPP; Easwaran, 1991). They measured MAAS scores at pretest, posttest, and follow-up, and, using hierarchical linear models, found increases in mindful attention in both treatment groups. The main effect of group on MAAS scores averaged about two-thirds of a SD above the control group posttest, and even more in the 8 weeks following treatment. The findings of increased MAAS scores with training, form an important link between the measurement of dispositional mindfulness and the body of research showing MBSR and other training protocols are associated with improvements in psychological functioning. In other words, because it is known that training protocols improve both MAAS scores and psychological functioning, it is appropriate to hypothesize that high MAAS scores may correlate directly with any of the effects attributed to training.

Mindfulness' Relationship to Depressive Symptoms and Well-being

As previously established, mindfulness training improves scores on measures of psychological functioning and well-being, and mindfulness training is associated with higher MAAS scores. Because the dispositional assessment of mindfulness is still relatively new, there is a small -- but growing -- body of literature directly linking MAAS scores to scores on measures of well-being, without participant training in mindfulness.

Zvolensky et al. (2006) administered the MAAS, a measure of mood and anxiety symptoms, a measure of perceptions of personal health status, and a positive and negative

affect scale to 170 young adults. The MAAS was found to be positively associated with positive affectivity, perceived general health, and mental functioning, and negatively associated with negative affectivity, anxious arousal, and depressive symptoms. Through hierarchical linear regression, the researchers found the MAAS predicted a significant amount of variance in symptoms of depression, with higher scores on the MAAS predicting fewer depressive symptoms. However, higher scores on the MAAS did not significantly predict anxious arousal (Zvolensky et al., 2006). The researchers also found that greater levels of mindfulness were associated with improved perceptions of physical health status, lower perceived impact of health on physical functioning, and lower perceived impact of health status on the quality of mental functioning (Zvolensky et al., 2006). Importantly, this research is consistent with theories about depressive vulnerability being related to mindfulness.

In a 2007 study by Argus and Thompson, 141 clinically depressed inpatients were measured for mindfulness level (MAAS), problem-solving ability, adaptive and maladaptive perfectionism, and depression severity. The negative association between problem-solving ability and depression severity was mediated by mindfulness score, as was the positive relationship between maladaptive perfectionism and depression severity. Furthermore, among the measures, mindfulness contributed the greatest amount of variance to overall depressive symptom severity (Argus & Thompson, 2007).

In a 2010 study of 365 undergraduate students, Christopher and Gilbert measured mindfulness on the MAAS and KIMS scales, depressive symptoms, depressive cognitions, self-esteem, and satisfaction with life. The incremental validity of the KIMS and MAAS relative to self-esteem in the prediction of satisfaction with life and relative to

negative cognitions in the prediction of depressive symptoms was tested using hierarchical linear regression models (Christopher & Gilbert). Only the positive association between “observe” factor from the KIMS accounted for a significant amount of the variance relative to self-esteem in predicting increased satisfaction with life, and only the negative association with the “accept without judgment” factor from the KIMS accounted for a significant amount of variance relative to negative cognitions in predicting increased depressive symptoms (Christopher & Gilbert). Therefore, the MAAS and most of the KIMS factors did not appear in this study to contribute unique variance in satisfaction with life and depressive symptoms.

Similarly, a 2007 study of young adults showed negative associations between the “accept” factor on the KIMS and emotional vulnerabilities, such as negative affectivity and anxiety sensitivity (McKee, Zvolensky, Solomon, Bernstein, & Leen-Feldner, 2007). In another study concerning both anxiety sensitivity and mindfulness, Vujanovic, Zvolensky, Bernstein, Feldner, and McLeish (2007) found similar negative associations between the MAAS and anxiety sensitivity, anxious arousal, anhedonic depressive symptoms, and agoraphobic cognitions. Additionally, the researchers found that the combined effect of lowered anxiety sensitivity and high MAAS scores significantly predicted anxious arousal and agoraphobic cognitions (Vujanovic et al.).

In another study using both the MAAS and the KIMS, researchers looked at associations between mindfulness and responses to negative automatic thoughts in both a non-clinical student population and a treatment-seeking student sample (Frewen, Evans, Maraj, Dozois, & Partridge, 2008). In a the non-clinical sample of 64 undergraduates, both measures of dispositional mindfulness (MAAS and KIMS) were negatively

correlated with negative thought frequency and positively correlated with perceptions of the ability to let go of negative thoughts. In the treatment-seeking sample of 43 undergraduates who had enrolled in a mindfulness group modeled on MBSR and MBCT, the treatment was also shown to be associated with decreases in both frequency and perceptions of difficulty in letting go of negative automatic thoughts (Frewen et al., 2008).

Gonzalez, Solomon, Zvolensky, and Miller (2009) measured disengagement coping, mindful attention, and anxiety and depressive symptoms in 98 adults who self-reported having an HIV or AIDS diagnosis. Disengagement coping is a way of dealing with stressful life events by withdrawing physically, emotionally, or cognitively from an unpleasant stressor; it may reduce affective discomfort in the short run, but can also yield longer-term negative emotional effects (Gonzalez et al.). The researchers found a significant interaction between mindful attention and disengagement coping in predicting anxiety symptoms, with higher levels of disengagement coping and lower levels of mindful attention associated with the highest rates of anxiety, and lower levels of disengagement and higher levels of mindful awareness associated with the lowest levels of anxiety symptoms (Gonzalez et al.).

Many of the features of mindfulness line up with aspects of positive reappraisal, which is an intentional switch away from focusing on a situation as negative and a construction of more adaptive way of viewing life events (Garland et al., 2009). The process of stepping away from experiencing the emotive content of thoughts, and rather examining them through a metacognitive stance – thinking about thinking -- is a hallmark of mindfulness, as well as a central feature of reappraisal. In their 2009 article on the

theoretical similarities between mindfulness and positive reappraisal, Garland et al. suggest that, in fact, “mindful decentering allows for the possibility of reappraisal” (p. 39). A pilot study by Garland et al. indicates that training in mindfulness is related to greater positive reappraisal.

Weinstein, Brown, and Ryan (2009) also examined the relationship between mindfulness, as measured by the MAAS, and coping, as well as both stress levels and well-being in college students. In four separate studies, the researchers found that more mindful individuals were less likely to use avoidant coping strategies. Additionally, in two of the four studies, higher levels of mindfulness were related to greater use of approach coping, which included positive reappraisal coping (Weinstein et al., 2009).

With this body of research substantially emerging, clear, empirical connections between dispositional mindfulness and well-being are forming. The developing body of literature further validates the MAAS and adds credence to arguments that the presence of a mindful disposition is related to fewer depressive symptoms, increased experiences of positive states of mind, and increased experiences of positive reappraisal coping upon the occasion of a stressful life event.

Summary and Statement of the Problem

It is widely accepted in cancer literature that the experience of diagnosis and treatment for a cancer is highly stressful and can result in negative psychological effects. Specifically, people recently diagnosed with cancer are at risk of experiencing less well-being and positive affect than those who do not have a cancer diagnosis.

Studies about dispositional mindfulness, as well as interventions to teach mindfulness, have shown that a high level of mindful attention and awareness is often

associated with better outcomes on measures of psychological distress. This is true in the general population and with clinical mental health populations, as well as for people who are facing serious medical diagnoses. However, few specifics are available in the literature about the effects of mindfulness on distress in people diagnosed with cancer.

It is hypothesized that individual differences in levels of mindful attention in people recently diagnosed with cancer will be related to individual differences in levels of depressive symptoms, positive states of mind, positive reappraisal coping, and avoidant coping. The present study has the potential to highlight the inverse relationship between mindfulness and negative mental health outcomes, and the positive relationship between mindfulness and positive outcomes. With mindfulness theorized to be related to greater ability to attend to stimuli in a manner consistent with well-being, there exists the possibility that people recently diagnosed with cancer are functionally protected from mental health deterioration by higher levels of dispositional mindfulness. Though this relationship has been previously examined through interventions that increase mindfulness, the present study adds a new element to the literature by relating dispositional mindfulness, uncoupled with an intervention, to the well-being of people diagnosed with cancer.

Method

Participants

Participants were a convenience sample of adults diagnosed with cancer in the 12-month period prior to study recruitment. All types of cancer diagnoses made individuals eligible to participate in the study, with the exception of non-melanoma skin cancer and

cancer which is likely to cause fatality within the study's follow-up period. Non-melanoma skin cancer rarely spreads to other parts of the body (American Cancer Society, 2009) and requires a less invasive treatment protocol than other cancers, which results in a significantly different emotional and physical experience for people with that specific diagnosis. Similarly, persons with cancer who would likely die within 6 months have significantly different experiences than those who hope to be cured through treatment. Participants were required to provide informed consent, read English text, and be at least 18 years old.

Demographic information is presented in Table 1 for the sample at Time 1 ($N = 74$). The mean age of participants was 52.8 years ($SD = 12$). The majority of participants were female ($n = 56, 75.7\%$). A total of 17 men participated in the study (23.9%). One participant (1.4%) did not answer the question about gender. There were 44 participants who identified themselves as Caucasian (59.5%), 23 who identified themselves as African American (31.1%), 1 who identified her or himself as Asian Pacific Islander (1.4%), and 1 who identified as bi-racial (1.4%). Five participants did not report their ethnicities. Of the participants, 27 (36.5%) reported their highest level of education as graduation from high school or attainment of a General Educational Development (GED) credential, 17 (23.0%) reported having had some college coursework, and 15 (20.3%) reported that they had graduated from college. The majority of the sample reported being married ($n = 39, 52.7\%$) or partnered ($n = 10, 13.5\%$). Thirty of the participants reported not being employed (42.3%), 18 (24.3%) were employed full-time, 11 (14.9%) were employed part-time, and 13 (17.6%) were retired. Twenty-eight participants reported their household income to be under \$20,000 a year (37.8%), 11 (14.9%) reported making

between \$20,001 and \$40,000 annually and 11 (14.9%) reported income between \$40,001 and \$60,000.

Table 1

Demographic Characteristics of Participants at Time 1

Variable	Number of Participants	Percent
Racial/Ethnic Background		
Caucasian (White)	44	59.5
African American (Black)	23	31.1
Asian/Pacific Islander	1	1.4
Bi-racial	1	1.4
Missing	5	6.8
Age		
20 to 29	4	5.4
30 to 39	5	6.8
40 to 49	22	29.7
50 to 59	17	23.0
60 to 69	17	23.0
70 to 79	3	4.1
80 to 89	1	1.4
Missing	5	6.8
Sex		
Female	56	75.7
Male	17	23.0
Missing	1	1.4
Highest Level of Education		
Elementary or Middle	1	1.4
Some High School	6	8.1
High School Graduate or GED	27	36.5
Some College	17	23.0
College Graduate	15	20.3
Some Graduate School	2	2.7
Graduate/Professional Degree	4	5.4
Other	1	1.4
Missing	1	1.4

(table continues)

Table 1 (continued).

Demographic Characteristics of Participants at Time 1

Variable	Number of Participants	Percent
Relationship Status		
Married	39	52.7
Partnered	10	13.5
Separated	1	1.4
Divorced	9	12.2
Widowed	3	4.1
Single	11	14.9
Missing	1	1.4
Employment		
Not Employed	30	40.5
Full-time	18	24.3
Part-time	11	14.9
Retired	13	17.6
Missing	1	1.4
Annual Household Income		
Less than \$20,000	28	37.8
\$20,001-40,000	11	14.9
\$40,001-60,000	11	14.9
\$60,001-80,000	5	6.8
\$80,001-100,000	12	16.2
Greater than \$100,000	6	8.1
Missing	1	1.4

Information about the illness characteristics of participants at Time 1 is presented in Table 2. Of the types of cancer participants had been diagnosed with, breast cancer occurred most frequently ($n = 34$, 45.9%), followed by lung cancer ($n = 7$, 9.5%), and colon/rectal cancer ($n = 5$, 6.8%). Nine participants reported having a diagnosis of a Stage I cancer (12.2%), 18 reported Stage II (24.3%), 17 reported Stage III (23.0%), 7

reported Stage IV (9.5%), 17 reported that they did not know their stage (23.0%), and 6 did not report their stage (8.1%). The majority of participants ($n = 57$, 77%) were actively in treatment when they completed the Time 1 survey. Most participants had some combination of three types of treatment, chemotherapy, radiation, and surgery; 27 had all three (36.5%), 13 had chemotherapy and radiation (17.6%), and 10 had surgery and radiation (13.5%). The average time passed since diagnosis, as measured at completion of the Time 1 survey packet, was 6.2 months ($SD = 4.7$).

Table 2

Illness Characteristics of Participants at Time 1

Variable	Number of Participants	Percentage
Cancer Types		
Breast	34	45.9
Lung	7	9.5
Colon/Rectal	5	6.8
Throat	4	5.4
Ovarian	4	5.4
Multiple Myeloma (Blood Cancer)	3	4.1
Cervical	2	2.7
Uterine	2	2.7
Oral	1	1.4
Peritoneal	1	1.4
Vulvar	1	1.4
Melanoma	1	1.4
Sarcoma	1	1.4
Missing	8	10.8
Stage of Disease		
Stage I	9	12.2
Stage II	18	24.3
Stage III	17	23.0
Stage IV	7	9.5
Uncertain	17	23.0
Missing	6	8.1
Treatment Status		
Finished	11	14.9
Unfinished	57	77.0
Uncertain	1	1.4
Missing	5	6.8

(table continues)

Table 2 (continued).

Illness Characteristics of Participants at Time 1

Variable	Number of Participants	Percentage
Treatment Type		
Surgery	3	4.1
Chemotherapy	6	8.1
Radiation	3	4.1
Surgery and Chemotherapy	5	6.8
Surgery and Radiation	10	13.5
Chemotherapy and Radiation	13	17.6
Surgery, Chemotherapy, and Radiation	27	36.5
Missing	7	9.5

Of the 74 participants who completed the survey at Time 1, 43 also returned the survey at Time 2, which was sent out about 3 months later. The attrition rate between Time 1 and Time 2 is 41.9%.

The group of participants that completed Time 2 surveys was compared with the group of participants who did not complete Time 2 surveys to identify any significant differences in demographic factors, illness factors, or scale scores. As described below, no significant differences were found between the groups.

T tests were conducted to determine if there was a significant difference between participants who completed Time 2 surveys and those who did not in age or time since diagnosis. There was no significant difference between Time 2 completers ($M = 53.12$, $SD = 12.56$) and those who did not complete Time 2 ($M = 52.45$, $SD = 13.04$) in age, $t(67) = .22$, $p = .83$, and there was no significant difference between Time 2 completers ($M = 6.00$, $SD = 4.44$) and those who did not complete Time 2 ($M = 6.58$, $SD = 5.23$) in

time since diagnosis, $t(64) = -.48, p = .63$. Chi-squared analysis was used to determine if there was a significant difference between participants who completed Time 2 surveys and those who did not in gender, ethnicity, or stage of cancer at diagnosis. There was no significant difference between Time 2 completers and those who did not complete Time 2 in gender, $\chi^2(1, N = 73) = .00, p = .99$; ethnicity (White or non-White), $\chi^2(1, N = 69) = .07, p = .80$; or stage of disease, $\chi^2(3, N = 68) = 5.79, p = .22$.

T tests were conducted to determine if there were significant differences between participants who completed Time 2 surveys and participants who did not complete Time 2 surveys on scale scores calculated from responses on Time 1 surveys. There was no significant difference between Time 2 completers ($M = 4.62, SD = 1.06$) and those who did not complete Time 2 ($M = 4.40, SD = 1.05$) on mindfulness at Time 1, $t(72) = .26, p = .80$; no significant difference between Time 2 completers ($M = 17.81, SD = 11.69$) and those who did not complete Time 2 ($M = 19.47, SD = 11.83$) on depressive symptoms at Time 1, $t(72) = -.60, p = .55$; no significant difference between Time 2 completers ($M = 12.88, SD = 4.36$) and those who did not complete Time 2 ($M = 13.94, SD = 3.36$) on positive states of mind at Time 1, $t(71) = -1.12, p = .27$; no significant difference between Time 2 completers ($M = 12.93, SD = 2.54$) and those who did not complete Time 2 ($M = 12.45, SD = 2.74$) on positive reappraisal coping at Time 1, $t(71) = .77, p = .45$; and no significant difference between Time 2 completers ($M = 12.00, SD = 3.46$) and those who did not complete Time 2 ($M = 11.77, SD = 4.39$) on avoidant coping at Time 1, $t(72) = .50, p = .62$.

Procedure

Recruitment was conducted at the Massey Cancer Center (MCC) located within Virginia Commonwealth University's Health System. MCC medical staff informed patients about their eligibility for the study and referred them to on-site study staff who provided additional information, obtained informed consent, and asked participants to complete the questionnaire packet and return it by mail. The MCC Protocol Review and Monitoring System and the Virginia Commonwealth University Institutional Review Board approved this method of recruitment of participants.

The questionnaire packet contained instructions, a postage-paid envelope, a form for information about where researchers should send a \$10 retail gift card as a "thank you" for participation, and 12 research measures including measures of depressive symptoms, positive affect, positive reappraisal, and mindfulness, and a demographic and illness variables questionnaire. Packets for Time 1 were given to participants at the time of recruitment and packets for Time 2 were sent to participant homes three months later.

Packet completion time was estimated to be about 45-60 minutes, based on a volunteer sample (mean age = 71.79 years, $SD = 1.24$). Participants were asked to complete the packet at three time points: Time 1, immediately following recruitment; Time 2, 3 months after first packet completion; and Time 3, 6 months after first packet completion – a measurement schedule previously used by Carver et al. (1993) in a study demonstrating that coping mediates the association between optimism and distress in women recently diagnosed with cancer. The present study examined only Time 1 and Time 2 data.

Measures

Mindful Attention Awareness Scale (Brown & Ryan, 2003; see Appendix A.)

The MAAS assesses individual differences in the frequency of mindful states over time, or the presence or absence of attention to what is occurring in the present moment (Brown & Ryan, 2003).

The scale consists of 15 items that ask participants to rate experiences of being mindful or mindless on a 6-point Likert scale from 1 (*almost always*) to 6 (*almost never*) and covers cognitive, emotional, physical, interpersonal, and general domains (Brown & Ryan, 2003). The sum of the 15 items is reported as the total score, ranging from 15 to 90, and higher scores indicate greater mindfulness. Although Brown and Ryan reported MAAS results using a mean score, other researchers have reported MAAS results using summed scores (e.g., Chambers, Lo, & Allen, 2007, Masuda, Price, & Latzman, 2011, Stanley et al., 2006).

The exploratory factor analysis conducted by Brown and Ryan (2003) revealed a single factor – mindfulness – is measured by the MAAS. The measure demonstrated good internal consistency for the scale in both a student sample (alphas > .80) and a sample of adults ages 18 to 77 years (alpha = .87). This analysis also demonstrated good temporal stability (alphas > .80) over a time interval of 4 weeks.

Brown and Ryan also established validity in the original study by demonstrating favorable comparisons between the MAAS and other scales that aimed to measure the likelihood of being aware of internal and external experiences. Additionally, the MAAS and scales correlated to measures of well-being, as hypothesized by the authors because of the known relationship between mindfulness and behavioral regulation, long associated with good mental health and well-being (Brown & Ryan, 2003).

After the initial scale development analysis, Carlson and Brown (2005) examined the reliability of the MAAS in a sample of people with a cancer diagnosis and again found good internal consistency ($\alpha = .87$). They also found that higher MAAS scores in this sample were associated with indicators of well-being.

In the current study, the MAAS also showed good internal consistency at both Time 1 ($\alpha = .93$) and Time 2 ($\alpha = .89$). Internal consistency reliability estimates for scales and subscales are presented in Table 3.

Table 3

Internal Consistency Reliability Estimates for Scales and Subscales

Instrument	Alpha
Mindful Attention Awareness Scale (MAAS)	
Time 1	.93
Time 2	.89
Center for Epidemiological Studies Depression Scale (CES-D)	
Time 1	.91
Time 2	.90
Positive States of Mind (PSOM)	
Time 1	.84
Time 2	.90
Positive Reappraisal Coping (PRC)	
Time 1	.68
Time 2	.75
Avoidant Coping	
Time 1	.64
Time 2	.80

Note. Due to missing data, N ranged from 71 to 74 at Time 1 and 40 to 43 at Time 2.

Center for Epidemiologic Studies Depression Scale (Radloff, 1977; see Appendix B). The CES-D assesses the presence or absence of depressive symptoms in a non-clinical population.

The scale consists of 20 items which are rated on a 4-point scale, with options 0 through 3 indicating the frequency of symptoms experienced over the preceding week. The ratings are summed for a total of up to 60 points and higher scores indicate a greater number of depressive symptom experiences.

Further analyses conducted by Radloff (1977) demonstrated good internal consistency for the scale in a sample of community adults ($\alpha = .85$) and in a clinical sample ($\alpha = .90$).

Studies of the reliability of the CES-D in persons with cancer have consistently shown high alphas ($> .85$) (Beeber, Shea, & McCorkle, 1998; Hann, Winter, & Jacobsen, 1999). Temporal stability of the CES-D in people diagnosed with cancer was shown to be moderate (between $r = .45$ and $r = .70$), in a time interval ranging from 3 to 12 months, by Hann et al. Construct validity for the CES-D in people diagnosed with cancer has been demonstrated in studies that consistently show greater experiences of depressive symptoms in people with cancer than in matched samples of healthy controls (Beeber et al., 1998; Hann et al., 1999) and in studies that show significant positive correlations with indicators of physical discomfort and poor psychological functioning (Beeber et al., 1998; Hann et al., 1999).

In the current study, the CES-D also showed good internal consistency at both Time 1 ($\alpha = .91$) and Time 2 ($\alpha = .90$).

Positive States of Mind (Horowitz et al., 1988; see Appendix C). The PSOM measures the ability of individuals to enter positive moods (focused attention, productivity, responsible caretaking, restful repose, sensuous pleasure, and sharing). The scale consists of 6 items rated on a 4-point scale, ranging from 0 (*unable to have it*) to 3 (*have it well*), and relates to moods experienced during the preceding week. Each item can represent a separate scale, but for the purposes of this study will be summed for a total indication of ability to enter positive states of mind, with higher scores indicating higher ability to enter positive states of mind.

The initial validation conducted by Horowitz et al. (1988) demonstrated good internal consistency for the scale in a sample of college students ($\alpha = .77$). Similar alphas have been reported in subsequent studies (e.g., Adler et al., 1998, Folkman, 1997). Convergent validity has been shown through an inverse relationship between the PSOM and the CES-D (Folkman), an inverse relationship between PSOM and the set of Profile of Mood States scales that measure negative symptomology (Tension-Anxiety, Anger-Hostility, Fatigue-Inertia, Depression-Dejection, Confusion-Bewilderment), and a positive relationship between PSOM and the Vigor-Activity scale of Profile of Mood States (Adler et al.).

In the current study, the PSOM also showed good internal consistency at both Time 1 ($\alpha = .84$) and Time 2 ($\alpha = .90$).

Positive Reappraisal Coping (Carver et al., 1989; see Appendix D). The positive reappraisal subscale of the COPE (Carver et al.) was conceived to measure coping that is focused on the management of negative emotions rather than on the primary stressor. However, it is also applicable to considering how an individual conceptualizes a negative

event and how he or she is able to problem-solve through the stress (Carver et al.). The positive reappraisal subscale is a 4-item self-report inventory that taps into one of 15 different coping strategies assessed by the overall, 60-item COPE. The 4 items are answered on a response scale of 1 (*I don't do this at all*) to 4 (*I do this a lot*), which in this case participants are asked to relate to their experiences with cancer. The sum of the items may range from 4 to 16, with higher scores indicating great use of positive reappraisal coping. Although Carver et al. calculated the score by summing the responses for each item, some researchers in subsequent studies have reported scores as the mean of the items (e.g., Sears, Stanton, & Danoff-Burg, 2003; Manne et al., 2004). For the purposes of the present study, the summed scores was used.

The initial validation conducted by Carver et al. (1989) demonstrated good internal consistency for the scale ($\alpha = .74$) with a general sample. In people with cancer, internal consistency has ranged from .77 (Sears et al., 2003) to .82 (Manne et al., 2004).

Construct validity has been shown through a positive correlations with positive affect and negative correlations with negative affect (Clark, Bormann, Cropanzano, & James, 1995).

In the current study, internal consistency for the positive reappraisal subscale of the COPE was .68 at Time 1 and .75 at Time 2.

Avoidant coping subscale of the Brief COPE (Carver, 1997; see Appendix D). The Brief COPE, like the full COPE (Carver et al., 1989), was designed to evaluate coping responses at times of stress. With mindfulness theoretically related to the frequency of attending to internal and external stimuli, we chose to assess the extent to

which participants used coping strategies which helped them to disengage from stressors. To do so, we used three subscales from the Brief COPE: Self-Distraction, which was called “mental disengagement” in the original COPE and entails choosing cognitive activities like work to avoid thinking about a stressor; Behavioral Disengagement, which entails “giving up” on attempts to cope; and Denial, which includes active attempts to tell oneself a stressor does not exist. Each subscale is made up of two items answered on a response scale of 0 (*I haven't been doing this at all*) to 3 (*I've been doing this a lot*) (Carver). The sum of these six items may range from 0 to 18, with higher scores indicating greater use of avoidant coping. In Carver's original validation of the full COPE, the three subscales loaded onto a single factor in the second-order factor analysis, producing an eigenvalue greater than 1.

In the initial validation of the Brief COPE by Carver (1997), conducted on a sample of 168 adults who had recently been affected by a hurricane, the alpha reliability for the subscale Self-Distraction was .71, for Denial it was .54, and for Behavioral Disengagement it was .65. Importantly, researchers in a number of studies of people diagnosed with cancer have combined items from multiple scales of the Brief COPE. For example, in a 2004 study of women coping with advanced breast cancer diagnoses (Kershaw, et al.), higher-order exploratory factor analysis showed that avoidant subscales including denial ($\alpha = .74$) and behavioral disengagement ($\alpha = .50$), tapped into the COPE's conceptualization of avoidant coping ($\alpha = .63$). Similarly, a 2002 study of breast cancer patients undergoing radiation therapy combined items from the original Denial and Behavioral Disengagement Brief COPE subscales and through factor analysis identified a factor called “Disengagement” with internal consistency of .80 (Fillion,

Kovacs, Gagnon, & Endler). And a 2002 study of men undergoing biopsies for prostate cancer combined scales from the Brief COPE including Denial and Behavioral Disengagement subscales, and through factor analysis found an “avoidant” factor with internal consistency of .55 (Perczek, Burke, Carver, Krongrad, & Terris).

In the current study, the avoidant subscale of the Brief COPE showed internal consistency of .64 at Time 1 and .80 at Time 2.

Demographic and disease questionnaire (See Appendix E). Survey packets included a request for information about gender, age, race/ethnicity, level of education, relationship status, employment status, annual household income, and living arrangements. Questions were also posed to participants regarding their type of cancer, stage of cancer, and of the kind of cancer treatment they have undergone thus far, if any.

Results

Preliminary Data Screening

Prior to analysis, the data were checked for errors, missing values, and univariate outliers.

Missing data. Missing data were evaluated, and if more than 20% of responses were missing from an individual’s responses to a scale, that individual was excluded from analysis of the scale (Tabachnick & Fidell, 2007). If a participant failed to answer one item on the scale, but did not miss more than 20% of the responses on the scale, a mean score from the items answered was calculated and was used to impute that individual’s full score for the scale.

Data entry errors. Data entry errors were evaluated through examination of descriptive statistics. Means, standard deviations, and ranges for all scales and variables were evaluated for appropriateness. One value, the range of scale scores for Mindfulness at Time 1, was found to be beyond expected parameters and a closer examination of the constituent data revealed an error in imputing a score. This error was fixed and no other parameters raised concern. Additionally, 10% of the survey packets for Time 1 ($N = 7$) and 10% of the survey packets for Time 2 ($N = 4$) were checked for data entry errors by personnel not involved in the original data entry process. No errors were found.

Outliers. Univariate outliers were tested for variables used in hypothesis testing. Each score was converted into a standard score and compared against a critical value two standard deviations away from the mean. No participants exhibited z scores over established critical values on any of the scale score variables. In order to detect the presence of multivariate outliers, Cook's distance was calculated for each regression performed (Tabachnick & Fidell, 2007). No multivariate outliers were detected.

Preliminary analyses were also conducted to ensure no violations of the assumptions of normality, linearity, and multicollinearity (Tabachnick & Fidell, 2007). Normality was checked through evaluation of skewness and kurtosis statistics; for all scale scores skewness and kurtosis values were between -1 and 1 indicating general normality (Tabachnick & Fidell, 2007). Linearity was checked through evaluation of boxplots for each pair combination of scale scores; no combinations of scores indicated a curvilinear relationship. Multicollinearity was checked through examination of tolerance statistics generated as part of collinearity diagnostics. In the analysis of both Hypothesis 5 and Hypothesis 6, which included four predictors (dependent variable at Time 1, two

covariates, and the independent variable at Time 1), the tolerance statistics for the dependent variable at Time 1 (CESD and PSOM respectively) and the independent variable at Time 1 (Mindfulness) were $< .64$, the cutoff that indicates a problem with multicollinearity (Tabachnick & Fidell, 2007). In both cases, the relationship between the dependent variable at Time 1 and the independent variable at Time 1 was relevant to the question featured in the hypothesis, so the variables were not combined. Further information about this decision is included in Chapter 5.

Preliminary Analyses

Normative data. Means, standard deviations, and ranges for all measures are presented in Table 4.

Table 4

Means, Standard Deviations, and Ranges of Scales and Subscales Used in Hypothesis Testing

Instrument	Mean	SD	Sample Range	Possible Range
Mindful Attention Awareness Scale (MAAS)				
Time 1	4.44	1.05	2.13-6	1-6
Time 2	4.30	.90	2.53-6	1-6
Center for Epidemiological Studies Depression Scale (CES-D)				
Time 1	18.51	11.70	0-49	0-60
Time 2	17.37	11.51	0-43	0-60
Positive States of Mind (PSOM)				
Time 1	13.33	3.97	3-18	0-18
Time 2	13.14	4.32	3-18	0-18
Positive Reappraisal Coping (PRC)				
Time 1	12.73 (3.18)	2.62 (.65)	4-16	4-16
Time 2	13.14 (3.29)	4.32 (1.08)	6-16	4-16
Avoidant Coping				
Time 1	11.84	3.30	6-20	0-18
Time 2	11.77	4.39	6-24	0-18

Note. Due to missing data, N ranged from 71 to 74 at Time 1 and 40 to 43 and Time 2. PRC scores presented in parentheses are means of scale scores; both summed scores and mean scores are reported for these measures to enable comparison to descriptive data from previous studies.

The means for participant mean scores on the MAAS at Time 1 ($M = 4.44$, $SD = 1.05$) and Time 2 ($M = 4.30$, $SD = .90$) were consistent with those found in previous studies, including Carlson and Brown's 2005 study which found a MAAS mean of 4.08 ($SD = .74$) in a population of people diagnosed with cancer. Mean scores on the CES-D at Time 1 ($M = 18.51$, $SD = 11.70$) and Time 2 ($M = 17.37$, $SD = 11.51$) were somewhat

higher than those found by Hann, Winter, and Jacobsen (1999), who were also studying a population of people diagnosed with cancer; they found CES-D scores that ranged from 10.9 ($SD = 8.9$) to 12.8 ($SD = 10.2$). Beeber, Shea, and McCorkle (1998) also found a lower CES-D mean ($M = 15.69$, $SD = 9.69$) among people diagnosed with cancer, but Lieberman et al. (2003) found slightly higher mean on a baseline CES-D survey ($M = 19.2$, $SD = 4.1$) in people diagnosed with cancer. Mean scores on the PSOM measure at Time 1 ($M = 13.33$, $SD = 3.97$) and Time 2 ($M = 13.14$, $SD = 4.32$) were similar to those found by Horowitz et al. (1998) in the initial validation of the measure which ranged from 11.3 ($SD = 3.6$) to 12.7 ($SD = 3.5$). The means of participant mean scores on the PRC measure at Time 1 ($M = 3.18$, $SD = .65$) and Time 2 ($M = 3.29$, $SD = 1.08$) were similar to those found by Manne et al. (2004) in a population of women diagnosed with breast cancer ($M = 2.9$, $SD = .76$). Finally, the mean scores for avoidant coping at Time 1 ($M = 11.84$, $SD = 3.30$) and Time 2 ($M = 11.77$, $SD = 4.39$) were similar to scores reported by Kershaw et al. (2004) from a study of women diagnosed with cancer. That article reported the Brief COPE subscales Self-Distraction ($M = 5.70$, $SD = 1.7$), Behavioral Disengagement ($M = 2.51$, $SD = 1.1$), and Denial ($M = 3.04$, $SD = 1.6$) separately, but the three sum for a mean of 11.25 which is comparable to our study.

Correlations. Pearson correlations were calculated to examine the linear relationships among the scales and subscales used in hypothesis testing in the present study (see Table 5). Among the variables used in the testing of Hypotheses 1 through 4, the Time 1 scale and subscale variables, Mindfulness (MAAS) was shown to have a significant negative correlation with depressive symptoms (CES-D, $r = -.54$, $p = <.001$) as well as with avoidant coping ($r = -.39$, $p = .001$). Additionally, Mindfulness was

shown to have a significant positive correlation with Positive States of Mind (PSOM, $r = .66, p = <.001$), but no significant correlation with positive reappraisal coping.

Table 5

Correlations Among Scale and Subscale Variables

	1	2	3	4	5	6	7	8	9	10
Mindfulness										
1. MAAS T1	---									
2. MAAS T2	.65**	---								
Depressive Symptoms										
3. CES-D T1	-.54**	-.55**	---							
4. CES-D T2	-.46**	-.60**	.39*	---						
Positive States Of Mind										
5. PSOM T1	.66**	.42**	-.63**	-.40**	---					
6. PSOM T2	.49**	.69**	-.47**	-.81**	.51**	---				
Positive Reappraisal Coping										
7. PRC T1	.12	.21	-.19	.05	.25*	.22	---			
8. PRC T2	.08	.00	-.15	-.14	.35*	.14	.40**	---		
Avoidant coping										
9. AC T1	-.39**	-.29	.41**	.53**	-.23	-.27	.18	.03	---	
10. AC T2	-.38**	-.50**	.29	.72**	-.25	-.60**	.10	.20	.67**	---

Note. MAAS = Mindful Attention Awareness Scale; CES-D = Center for Epidemiological Studies Depression Scale; PSOM = Positive States of Mind; PRC = Positive Reappraisal Coping; AC = Avoidant coping.

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

Among the Time 2 scale scores, Mindfulness (MAAS) correlated to the other variables in the same fashion it did with the Time 1 scores. Mindfulness was shown to have a significant negative correlation with depressive symptoms (CES-D, $r = -.60$, $p = <.001$) and with avoidant coping ($r = -.50$, $p = .001$). Mindfulness was also shown to have a significant positive correlation with positive states of mind (PSOM, $r = .69$, $p = <.001$), but no significant correlation with positive reappraisal coping.

When looking at Time 1 and Time 2 scores together, Mindfulness at Time 1 correlates with Time 2 dependent variables in the same pattern seen above. Mindfulness at Time 1 is significantly negatively correlated with depressive symptoms at Time 2 (CES-D, $r = -.46$, $p = .002$) and with avoidant coping at Time 2 ($r = -.38$, $p = .01$). And Mindfulness at Time 1 is significantly positively correlated with positive states of mind (PSOM, $r = .49$, $p = .002$), but not significantly correlated with positive reappraisal coping.

Covariates. Tests were conducted to detect any associations between dependent variables (depressive symptoms, positive affect, positive reappraisal coping, and avoidant coping) and demographic and illness variables.

To determine whether there were differences in any of the dependent variables by gender or race/ethnicity, a series of t tests were conducted. At Time 1, there was no significant difference between females ($M = 17.79$, $SD = 11.31$) and males ($M = 20.41$, $SD = 13.23$) in depressive symptoms (CES-D), $t(71) = -.81$, $p = .42$; no significant difference between females ($M = 13.76$, $SD = 3.75$) and males ($M = 12.06$, $SD = 4.58$) in positive states of mind, $t(70) = 1.56$, $p = .12$; no significant difference between females ($M = 12.78$, $SD = 2.44$) and males ($M = 12.35$, $SD = 3.16$) in positive reappraisal coping,

$t(70) = .59, p = .56$; and no significant difference between females ($M = 11.55, SD = 3.28$) and males ($M = 12.53, SD = 3.28$) in avoidant coping, $t(71) = -1.07, p = .29$. At Time 2, there was a significant difference between females ($M = 15.13, SD = 10.24$) and males ($M = 24.80, SD = 12.86$) in depressive symptoms (CES-D), $t(41) = -2.47, p = .02$, a significant difference between females ($M = 14.24, SD = 3.61$) and males ($M = 9.50, SD = 4.65$) in positive states of mind, $t(41) = 3.40, p = .002$, and a significant difference between females ($M = 11.00, SD = 4.30$) and males ($M = 14.30, SD = 3.86$) in avoidant coping, $t(41) = -2.17, p = .04$; however, there was no significant difference between females ($M = 12.53, SD = 2.90$) and males ($M = 11.80, SD = 2.53$) in positive reappraisal coping, $t(40) = .72, p = .48$. Therefore, gender was retained as a covariate when analyses included depressive symptoms, positive states of mind, or avoidant coping.

For the purposes of this study, race/ethnicity was condensed into “White” and “non-White” categories because, among the “non-White” group, only two participants reported a race other than African American. At Time 1, there was no significant difference between non-Whites ($M = 17.64, SD = 11.91$) and Whites ($M = 18.75, SD = 12.27$) in depressive symptoms (CES-D), $t(67) = -.36, p = .72$; no significant difference between non-Whites ($M = 13.68, SD = 4.15$) and Whites ($M = 13.09, SD = 4.03$) in positive states of mind, $t(66) = .57, p = .57$; no significant difference between non-Whites ($M = 13.12, SD = 2.39$) and Whites ($M = 12.52, SD = 2.72$) in positive reappraisal coping, $t(67) = .91, p = .36$; and no significant difference between non-Whites ($M = 11.84, SD = 3.22$) and Whites ($M = 11.61, SD = 3.36$) in avoidant coping, $t(67) = .27, p = .79$. This was also the case at Time 2; there was no significant difference between non-Whites ($M = 16.87, SD = 9.90$) and Whites ($M = 17.04, SD = 12.83$) in depressive

symptoms (CES-D), $t(38) = -.05, p = .96$; no significant difference between non-Whites ($M = 14.00, SD = 3.76$) and Whites ($M = 12.88, SD = 4.76$) in positive states of mind, $t(38) = .78, p = .44$; no significant difference between non-Whites ($M = 12.50, SD = 3.16$) and Whites ($M = 12.24, SD = 2.76$) in positive reappraisal coping, $t(37) = .27, p = .79$; and no significant difference between non-Whites ($M = 10.20, SD = 2.81$) and Whites ($M = 12.28, SD = 4.82$) in avoidant coping, $t(38) = -1.52, p = .14$.

The one categorical variable of interest, stage of cancer at diagnosis, was analyzed in relation to each dependent variable using an ANOVA. At Time 1, no significant differences were found among groups with different cancer stage diagnoses in depressive symptoms (CES-D), $F(4, 63) = 1.41, p = .24$; positive states of mind, $F(4, 62) = .92, p = .46$; positive reappraisal coping, $F(4, 62) = .39, p = .82$; or avoidant coping, $F(4, 63) = .87, p = .49$. At Time 2, again, no significant differences were found among groups with different cancer stage diagnoses in depressive symptoms (CES-D), $F(4, 36) = 1.03, p = .41$; positive states of mind, $F(4, 36) = .91, p = .47$; positive reappraisal coping, $F(4, 35) = .39, p = .82$; or avoidant coping, $F(4, 36) = .55, p = .70$.

Pearson correlations were conducted to determine whether age and time since diagnosis were significantly associated with any of the dependent variables. Time since diagnosis was found to be significantly positively correlated with depressive symptoms (CES-D) at Time 1, $r = .26, p = .04$, and with positive states of mind at Time 1, $r = -.30, p = .02$. No significant correlations were found between time since diagnosis and Time 1 positive reappraisal coping, $r = -.09, p = .47$, or Time 1 avoidant coping, $r = .07, p = .58$. And no significant correlations were found between time since diagnosis and Time 2 depressive symptoms (CES-D), $r = .03, p = .84$; Time 2 positive states of mind, $r = -.17,$

$p = .30$; Time 2 positive reappraisal coping, $r = -.23$, $p = .16$; or Time 2 avoidant coping, $r = -.15$, $p = .37$. Additionally, no significant correlations were found between age and Time 1 dependent variables (depressive symptoms [CES-D], $r = -.01$, $p = .95$; positive states of mind, $r = -.06$, $p = .60$; positive reappraisal coping, $r = -.22$, $p = .08$; avoidant coping, $r = .08$, $p = .50$) or Time 2 dependent variables (depressive symptoms [CES-D], $r = .15$, $p = .34$; positive states of mind, $r = -.08$, $p = .62$; positive reappraisal coping, $r = -.31$, $p = .05$; avoidant coping, $r = .14$, $p = .38$).

Hypothesis Testing

Eight hypotheses were tested using hierarchical multiple linear regression. The first four were cross-sectional, using data collected in Time 1 alone, and the last four were longitudinal, using data collected at Time 1 and Time 2 of this study.

Previous literature on mindfulness in a population of people with cancer diagnoses showed that higher MAAS scores were related to lower scores on a measure of distressed moods ($r = -.39$) and that higher MAAS scores were related to lower scores on a measure of symptoms of stress ($r = -.41$; Carlson & Brown, 2005). The effect size for these correlations falls in the range offered by Cohen (1992) for a medium effect size ($r = 0.30 - 0.49$), so a medium effect size was also sought for this study. With that in mind, for the cross-sectional hypotheses, incorporating three independent variables (one predictor and two covariates), with $p = .05$ and $N = 74$, the power to detect a medium effect size was between .75 and .80. For the longitudinal hypotheses, incorporating four predictors (one predictor, the Time 1 measure of the dependent variable, and two covariates), with $p = .05$ and $N = 43$, the power to detect a medium effect size was between .40 and .45.

Hypothesis 1. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will account for a significant amount of the variance in participants' reports of depressive symptoms also at Time 1. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report fewer depressive symptoms at Time 1.

Analysis of Hypothesis 1. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in depressive symptoms at Time 1, while accounting for the covariates gender and time since diagnosis. In step one, the covariates were entered into the model. Reports of mindfulness at Time 1 were entered in the second step of the model. Results for Hypothesis 1 are reported in Table 6. The covariates were not found to be a significant predictor of depressive symptoms, $\Delta F(2, 63) = 2.62$ $p = .08$ ($\Delta R^2 = .08$) when entered in the first step of the regression. Mindfulness was found to be a significant predictor of depressive symptoms, $\Delta F(1, 62) = 30.39$, $p = .00$ ($\Delta R^2 = .30$), accounting for an additional 30% of variance in the dependent variable. The beta weight for mindfulness ($\beta = -.57$) indicates an inverse relationship with greater mindfulness predicting fewer depressive symptoms.

Table 6

Hierarchical Multiple Linear Regression Model for the Prediction of Depressive Symptoms (CES-D) at Time 1 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Covariates:	(2, 63)	.08	.08	2.62				
Time Since Diagnosis					.68	.31	.27	2.21*
Gender					3.15	3.64	.11	.87
2. Mindfulness (MAAS)	(1, 62)	.38	.30	30.39**	-.44	.08	-.57	-5.51**

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Hypothesis 2. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will account for a significant amount of the variance in participants’ reports of positive moods also at Time 1. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report more positive moods at Time 1.

Analysis of Hypothesis 2. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in positive moods at Time 1, while accounting for the covariates gender and time since diagnosis. In step one, the covariates were entered into the model. Reports of mindfulness at Time 1 were entered in the second step of the model. Results for Hypothesis 2 are reported in Table 7. The covariates were found to be a significant predictor of positive moods, $\Delta F(2, 62) = 4.67$, $p = .01$ ($\Delta R^2 = .13$) when entered in the first step of the regression. Examination of the beta weights indicates that time since diagnosis ($\beta = -.32$) was a significant predictor of positive states of mind at Time 2, indicating that a more

recent diagnosis was related to having more experiences of positive affect. Mindfulness was also found to be a significant predictor of positive moods, $\Delta F(1, 61) = 61.80, p = <.001$ ($\Delta R^2 = .44$), accounting for an additional 44% of variance in the dependent variable. The beta weight for mindfulness ($\beta = .68$) indicates a positive relationship, with greater mindfulness predicting greater positive states of mind.

Table 7

Hierarchical Multiple Linear Regression Model for the Prediction of Positive States of Mind (PSOM) at Time 1 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Covariates:	(2, 62)	.13	.13	4.67*				
Time Since Diagnosis					-.27	.10	-.32	-2.72**
Gender					-2.05	1.16	-.21	-1.76
2. Mindfulness (MAAS)	(1, 61)	.57	.44	61.80**	.17	.02	.68	7.86**

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Hypothesis 3. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will account for a significant amount of the variance in participants’ reports of positive reappraisal also at Time 1. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report more positive reappraisal at Time 1.

Analysis of Hypothesis 3. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in positive reappraisal at Time 1. Reports of mindfulness at Time 1 were entered into the model. Results for Hypothesis 3 are reported in Table 8. Mindfulness did not account for

a significant amount of the variance in positive reappraisal at Time 1, $\Delta F(1, 71) = 1.00, p = .32$ ($\Delta R^2 = .01$). Therefore, Hypothesis 3 was not supported by the data.

Table 8

Hierarchical Multiple Linear Regression Model for the Prediction of Positive Reappraisal Coping (PRC) at Time 1 from Mindfulness at Time 1

Step and variable	<i>df</i>	R^2	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Mindfulness (MAAS)	(1, 71)	.01	.01	1.00	.02	.02	.12	1.00

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

Hypothesis 4. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will account for a significant amount of the variance in participants' reports of avoidant coping also at Time 1. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report less avoidant coping at Time 1.

Analysis of Hypothesis 4. A linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in avoidant coping at Time 1, while accounting for the covariate gender. In step one, gender was entered into the model. Reports of mindfulness at Time 1 were entered in the second step of the model. Results for Hypothesis 4 are reported in Table 9. Gender was not found to be a significant predictor of avoidant coping, $\Delta F(1, 71) = 1.15, p = .29$ ($\Delta R^2 = .02$) when entered in the first step of the regression. Mindfulness was found to be a significant predictor of avoidant coping when entered in the second step of the model, $\Delta F(1, 70) = 11.63, p = .00$ ($\Delta R^2 = .14$), with mindfulness accounting for 14% of the variance in

avoidant coping. The beta weight for mindfulness ($\beta = -.37$) indicates an inverse relationship, with greater mindfulness predicting less avoidant coping.

Table 9

Hierarchical Multiple Linear Regression Model for the Prediction of Avoidant Coping at Time 1 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Covariate: Gender	(1, 71)	.02	.02	1.15	.98	.91	.13	1.07
2. Mindfulness (MAAS)	(1, 70)	.16	.14	11.63**	-.08	.02	-.37	-3.41**

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Hypothesis 5. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will predict a significant amount of the variance in participants’ reports of depressive symptoms at Time 2 (3 months later), when the variance from depressive symptoms at Time 1 is controlled for. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report fewer depressive symptoms at Time 2, after accounting for depressive symptoms at Time 1. Additionally, mindfulness at Time 1 will have a stronger relationship to depressive symptoms at Time 2 than mindfulness at Time 2 has to depression symptoms at Time 1, demonstrating the role mindfulness plays in causing variance in depression symptoms.

Analysis of Hypothesis 5. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in depressive symptoms at Time 2, while accounting for depressive symptoms at Time 1

and the covariates gender and time since diagnosis. In step one, depressive symptoms at Time 1 were entered into the model. In step two, gender and time since diagnosis were entered into the model. And reports of mindfulness at Time 1 were entered in the third step of the model. Results for Hypothesis 5 are reported in Table 10. Depressive symptoms at Time 1 was found to be a significant predictor of depressive symptoms at Time 2, $\Delta F(1, 38) = 11.08, p = .00 (\Delta R^2 = .23)$ when entered in the first step of the regression. The beta weight for depressive symptoms at Time 1 ($\beta = .48$) indicates a positive relationship with depressive symptoms at Time 2. The covariates were found to add significantly to the prediction of depressive symptoms at Time 2, $\Delta F(2, 36) = 3.60, p = .04 (\Delta R^2 = .13)$ when entered in the second step of the regression. Examination of the beta weights indicates gender ($\beta = .36$) was a significant predictor of depressive symptoms at Time 2, with the male participants demonstrating higher levels of depressive symptoms. Finally, in step three, Mindfulness at Time 1 did not account for a significant portion of additional variance in depressive symptoms at Time 2, $\Delta F(1, 35) = 2.01, p = .17 (\Delta R^2 = .04)$.

Table 10

Hierarchical Multiple Linear Regression Model for the Prediction of Depressive Symptoms (CES-D) at Time 2 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Control: (CES-D T1)	(1, 38)	.23	.23	11.08**	.48	.14	.48	3.33**
2. Covariates: Time Since Diagnosis	(2, 36)	.36	.13	3.60*	-.16	.38	-.06	-.41
Gender					10.42	4.15	.36	2.51*
3. Mindfulness (MAAS T1)	(1, 35)	.39	.04	2.01	-.17	.12	-.23	-1.42

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Additional examination of the set of 6 correlations formed among mindfulness at Time 1, mindfulness at Time 2, depressive symptoms at Time 1 and depressive symptoms at Time 2 was conducted using cross-lagged analysis. Among the uses for cross-lagged analysis cited by Rughunathan, Rosenthal, and Rubin (1996) is “comparing the correlation between a current measure and a different future measure with a correlation between a different current measure and a future measure.” The comparison of mindfulness and depressive symptoms across two time points matches this scenario, making cross-lagged analysis an appropriate addition to the regression analyses used in this study.

When a set of four variables is intercorrelated, as in the present study, six correlations are produced, and any two can be compared. Importantly, there are two types of correlation comparisons, overlapping and nonoverlapping. The overlapping type

occurs when the pair of correlations are generated by a common variable.

Nonoverlapping comparisons are made with correlations that have no common variables (Rughunathan et al., 1996). In this instance, an example of an overlapping correlation is the relationship between mindfulness and Time 1 and depressive symptoms at Time 1; they “overlap” due to a shared time point. Similarly, the relationship between mindfulness at Time 1 and mindfulness at Time 2 is an overlapping correlation because the measure is the same in both instances. The nonoverlapping correlations are the relationship between mindfulness at Time 1 and depressive symptoms at Time 2 as well as the relationship between mindfulness at Time 2 and depressive symptoms at Time 1 – neither of these combinations share the same time point or the same measure.

Cross-lagged analysis allows for the comparison of these two nonoverlapping correlations, by using any significant difference between the two to assess potential causal relationships (Rughunathan, Rosenthal, & Rubin, 1996.) The overlapping correlations can be examined directly for their difference in magnitude, if that difference is found to be significant through use of the Pearson-Filon test statistic (Pearson & Filon, 1989) or a variation preferred by Rughunathan et al., the *ZPF*, which incorporates the Fisher *Z* transformation of correlation coefficients.

$$ZPF = \left(\sqrt{\left(\frac{n-3}{2} \right)} \right) (Z_{14} - Z_{23}) A_{approx}$$

(1)

where

$$A_{approx} = \left(1 + \left(\frac{ave(r_{other}^2)}{(1 + ave(r_{test}^2) + 2(ave(r_{test})))} \right) \right)$$

(2)

In these equations, the set of six correlations are notated using r_{12} , r_{13} , r_{14} , r_{23} , r_{24} , r_{34} , where the nonoverlapping correlations are r_{14} and r_{23} . “ A_{approx} ” is an adjustment factor which helps us understand if the difference between the nonoverlapping correlations is significant, and it is calculated using all six correlations in the set. Z_{14} and Z_{23} are transformations of r_{14} and r_{23} , calculated using Fisher’s Z .

Examination of the correlations between mindfulness at Time 1, mindfulness at Time 2, depressive symptoms at Time 1, and depressive symptoms at Time 2 generated a test statistic (ZPF value) larger than any of the differences between correlations ($ZPF = .58$), indicating that there are no significant differences between correlations. In other words, the raw difference between the correlation between mindfulness at Time 1 and depressive symptoms at Time 2 and the correlation between mindfulness at Time 2 and depressive symptoms at Time 1 (our two nonoverlapping correlations), was not significant because it did not exceed the ZPF value. (See Appendix F.) Without a significant difference between these correlations we are not able to infer a causal relationship between mindfulness at Time 1 and depressive symptoms at Time 2, as was hypothesized.

Hypothesis 6. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will predict a significant amount of the variance in participants’ reports of positive states of mind at Time 2 (3 months later), when the variance from positive

states of mind at Time 1 is controlled for. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report higher positive states of mind at Time 2, after accounting for positive states of mind at Time 1. Additionally, mindfulness at Time 1 will have a stronger relationship to positive states of mind at Time 2 than mindfulness at Time 2 has to positive states of mind at Time 1, demonstrating the role mindfulness plays in causing variance in positive states of mind.

Analysis of Hypothesis 6. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in positive states of mind at Time 2, while accounting for positive states of mind at Time 1 and the covariates gender and time since diagnosis. In step one, positive states of mind at Time 1 were entered into the model. In step two, the covariates were entered into the model. And reports of mindfulness at Time 1 were entered in the third step of the model. Results for Hypothesis 6 are reported in Table 11. Positive states of mind at Time 1 was found be a significant predictor of depressive symptoms at Time 2, $\Delta F(1, 37) = 18.57, p = .00$ ($\Delta R^2 = .33$) when entered in the first step of the regression. Examination of the beta weight for positive states of mind at Time 1 ($\beta = .58$) indicates a positive relationship with positive states of mind at Time 2. The covariates were not found to add significantly to the prediction of positive states of mind at Time 2, $\Delta F(2, 35) = 2.57, p = .09$ ($\Delta R^2 = .09$) when entered in the second step of the regression. Finally, in step three, Mindfulness at Time 1 did not account for a significant portion of additional variance in positive states of mind at Time 2, $\Delta F(1, 34) = .72, p = .40$ ($\Delta R^2 = .01$).

Table 11

Hierarchical Multiple Linear Regression Model for the Prediction of Positive States of Mind (PSOM) at Time 2 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Control: (PSOM T1)	(1, 37)	.33	.33	18.57**	.59	.14	.58	4.31**
2. Covariates: Time Since Diagnosis	(2, 35)	.42	.09	2.57	-.05	.14	-.05	-.39
Gender					-3.48	1.54	-.33	-2.26*
3. Mindfulness (MAAS T1)	(1, 34)	.43	.01	.72	.04	.05	.15	.85

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Examination of the correlations between mindfulness at Time 1, mindfulness at Time 2, positive states of mind at Time 1, and positive states of mind at Time 2 generated a test statistic larger than any of the differences between correlations ($ZFP = .47$), indicating that there are no significant differences between correlations and causation cannot be inferred. (See Appendix F.)

Hypothesis 7. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will predict a significant amount of the variance in participants’ reports of positive reappraisal coping at Time 2 (3 months later), when the variance from positive reappraisal coping at Time 1 is controlled for. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will also report higher positive reappraisal coping at Time 2, after accounting for positive reappraisal coping at Time 1. Additionally, mindfulness at Time 1 will have a stronger relationship to positive

reappraisal coping at Time 2 than mindfulness at Time 2 has to positive reappraisal coping at Time 1, demonstrating the role mindfulness plays in causing variance in positive reappraisal coping.

Analysis of Hypothesis 7. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in positive reappraisal coping at Time 2, while accounting for positive reappraisal coping at Time 1. In step one, positive reappraisal coping at Time 1 was entered into the model. In step two, reports of mindfulness at Time 1 were entered into the model. Results for Hypothesis 7 are reported in Table 12. positive reappraisal coping at Time 1 was found be a significant predictor of positive reappraisal coping at Time 2, $\Delta F(1, 39) = 7.49, p = .01$ ($\Delta R^2 = .16$) when entered in the first step of the regression. Examination of the beta weight for positive reappraisal coping at Time 1 ($\beta = .40$) indicated a positive relationship with positive reappraisal coping at Time 2. Entered in Step 2, Mindfulness at Time 1 did not account for a significant portion of additional variance in positive reappraisal coping at Time 2, $\Delta F(1, 38) = .09, p = .76$ ($\Delta R^2 = .00$).

Table 12

Hierarchical Multiple Linear Regression Model for the Prediction of Positive Reappraisal Coping (PRC) at Time 2 from Mindfulness at Time 1

Step and variable	<i>df</i>	R^2	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Control: (PRC T1)	(1, 39)	.16	.16	7.49**	.44	.16	.40	2.74**
2. Mindfulness (MAAS T1)	(1, 38)	.16	.00	.09	.01	.03	.05	.31

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

Examination of the correlations between mindfulness at Time 1, mindfulness at Time 2, positive reappraisal coping at Time 1, and positive reappraisal coping at Time 2 generated a test statistic larger than any of the differences between correlations ($Z_{FP} = .65$), indicating that there are no significant differences between correlations and causation cannot be inferred. (See Appendix F.)

Hypothesis 8. Mindfulness demonstrated by individuals recently diagnosed with cancer at Time 1 will predict a significant amount of the variance in participants' reports of avoidant coping at Time 2 (3 months later), when the variance from avoidant coping at Time 1 is controlled for. Specifically, it is predicted that individuals with cancer who report having more mindfulness at Time 1 will report lower avoidant coping at Time 2, after accounting for avoidant coping at Time 1. Additionally, mindfulness at Time 1 will have a stronger relationship to avoidant coping at Time 2 than mindfulness at Time 2 has to avoidant coping at Time 1, demonstrating the role mindfulness plays in causing variance in avoidant coping.

Analysis of Hypothesis 8. A hierarchical multiple linear regression analysis was conducted to determine how much mindfulness at Time 1 predicts the amount of variance in avoidant coping at Time 2, while accounting for avoidant coping at Time 1 and the covariate gender. In step one, avoidant coping at Time 1 was entered into the model. In step two, gender was entered into the model. And reports of mindfulness at Time 1 were entered in the third step of the model. Results for Hypothesis 8 are reported in Table 13. Avoidant coping at Time 1 was found be a significant predictor of avoidant coping at Time 2, $\Delta F(1, 41) = 32.56, p = .00 (\Delta R^2 = .44)$ when entered in the first step of the regression. The beta weight for avoidant coping at Time 1 ($\beta = .67$) indicated a positive

relationship with avoidant coping at Time 2. Gender was also found to add significantly to the prediction of avoidant coping at Time 2, $\Delta F(1, 40) = 5.44, p = .03$ ($\Delta R^2 = .07$) when entered in the second step of the regression. Examination of the beta weights for gender ($\beta = .26$) indicated that male participants demonstrated higher levels of avoidant coping. Finally, in step three, mindfulness at Time 1 did not account for a significant portion of additional variance in avoidant coping at Time 2, $\Delta F(1, 39) = .34, p = .57$ ($\Delta R^2 = .00$).

Table 13

Hierarchical Multiple Linear Regression Model for the Prediction of Avoidant Coping (Avoid) at Time 2 from Mindfulness at Time 1

Step and variable	<i>df</i>	<i>R</i> ²	ΔR^2	ΔF	<i>B</i>	<i>SE B</i>	β	<i>t</i>
1. Control: (Avoid T1)	(1, 41)	.44	.44	32.56**	.84	.15	.67	5.71**
2. Covariate: Gender	(1, 40)	.51	.07	5.44*	2.67	1.14	.26	2.33*
2. Mindfulness (MAAS T1)	(1, 39)	.51	.00	.34	-.02	.04	-.07	-.58

Note. Gender is coded in data with 1 indicating “female” and 2 indicating “male.”

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

Examination of the correlations between mindfulness at Time 1, mindfulness at Time 2, avoidant coping at Time 1, and avoidant coping at Time 2 generated a test statistic larger than any of the differences between correlations ($ZFP = .56$), indicating that there are no significant differences between correlations and causation cannot be inferred. (See Appendix F.)

Discussion

The purpose of this study was to investigate the relationship between dispositional mindfulness and measures of depressive symptoms and well-being in people recently diagnosed with cancer. In this chapter, the results of the study will be summarized and compared to previous studies. The possible meanings of this study's findings will be explored along with limitations of the current study and suggestions for future research.

Summary of findings

Hypotheses 1 through 4 proposed that variance in a dependent variable, depressive symptoms, positive affect, positive reappraisal coping, or avoidant coping, at a single time point could be accounted for by levels of mindfulness, as measured by the MAAS, in a population of people recently diagnosed with cancer.

Mindfulness was found to predict depressive symptoms and avoidant coping, with greater mindfulness related to fewer depressive symptoms and less avoidant coping; and mindfulness was found to predict greater positive affect, with greater mindfulness related to more experiences of positive affect. This finding is convergent with the emerging body of literature on mindfulness which indicates that higher levels of mindfulness are related to better outcomes on measures that reflect well-being and, specifically, that more mindful individuals are likely to use more effective methods of coping with stress (e.g., Argus & Thompson, 2007; Weinstein, Brown, & Ryan, 2009; Zvolensky et al., 2006).

The findings in the current study are similar to those outlined in Weinstein, Brown, and Ryan's 2009 article, which included four separate studies of mindfulness, well-being, and coping methods in undergraduate students who experienced stress either in a controlled laboratory setting or in the naturalistic environment of a college course. In

that article, the authors reported that higher levels of mindfulness predicted better well-being outcomes and less use of avoidant coping styles, as is the case with the current study's participants, who were experiencing the stress of cancer diagnosis and treatment. Similarly, Zvolensky et al. (2009) found the mindfulness, as measured by the MAAS, was positively associated with positive affectivity and negatively associated with depressive symptoms. In this way, the current study extends previous findings on the relationship between mindfulness and measures of well-being to a naturalistic health stressor experienced by millions of people.

Weinstein, Brown, and Ryan (2009) also measured the participants' perceptions of day-to-day experiences as stressful, and found that more mindful individuals were less likely to report having stressful experiences. The authors also found that experiencing less stress was related to less use of avoidant coping strategies, greater use of adaptive coping methods, and experiences of higher well-being. Though the current study did not measure experiences of stress, the similar outcomes on measures of well-being and avoidant coping suggest that more mindful participants may experience less stress from cancer diagnosis and treatment leading to better day-to-day affect, less use of avoidant coping, and, in the end, fewer depressive symptoms.

The Weinstein, Brown, and Ryan (2009) study also showed greater use of positive coping strategies in people with higher levels of mindfulness, a finding that was not born out in the present study, as higher levels of positive reappraisal coping were not found to be predicted by higher levels of mindfulness. The 4-item measure of positive reappraisal coping, which is a subscale of Carver et al.'s (1989) COPE, may not have adequately evaluated positive coping strategies. Interestingly, while the other dependent variables in

the study showed a pattern of significant correlations to each other and to the MAAS, positive reappraisal coping did not have a consistent pattern of significant correlations. Additionally, of the scales used in this study, positive reappraisal coping had a relatively low level of internal consistency ($\alpha = .68$) at Time 1. With this in mind, it is likely that the positive reappraisal coping measure used in this study did not consistently measure what it was intended to. Future studies might consider using a different measure to investigate efforts at positive reappraisal coping, or positive coping generally.

Hypotheses 5 through 8 proposed that variance in a dependent variable at a second time point could be accounted for by levels of mindfulness at the first time point, after accounting for the dependent variable at Time 1 and any demographic or illness covariates. However, mindfulness at Time 1 was not found to predict any of the dependent variables at Time 2. Additionally, a cross-lagged analysis was conducted using the four scale variables in Hypotheses 5 through 8 to look for causal relationships between mindfulness at Time 1 and the dependent variables at Time 2. No causal relationships were found through cross-lagged analysis.

Despite the lack of significant hypothesized findings among the longitudinal analyses, exploratory analysis of the data did reveal that mindfulness at Time 1 correlated with depressive symptoms, positive affect, and avoidant coping variables measured at Time 2; mindfulness at Time 1 had a significant inverse correlation with depressive symptoms at Time 2 and avoidant coping at Time 2 and a significant positive correlation with positive affect at Time 2.

Study limitations that may be related to the lack of significant findings for Hypotheses 5 through 8 are explored below.

Limitations

The failure to obtain the expected results in the longitudinal hypothesis, as well as in the investigation of cross-lagged correlations, could be due to a number of methodological issues.

First, the size of the Time 2 sample ($N = 43$) was smaller than what would be desired for appropriate statistical power; the power for the longitudinal regression analyses was calculated to be between .40 and .45. The low power could have caused us to make a Type II error, failing to detect an association when there truly was one in the population, which would have made evidence of the role of mindfulness undetectable. The small Time 2 sample was caused in part by failure of participants to return Time 2 packets in the mail 3 months after being enrolled in the study, despite being contacted by phone with reminders. It may have been more efficient for participants to complete the surveys in an online format; however, this mechanism may have eliminated some of the socio-economic diversity from the study.

Second, the time at which participants were first surveyed, up to 12 months following diagnosis, paired with the interval between the Time 1 and Time 2 measures, may have resulted in measures that “missed” the hypothesized phenomenon. For example, if a person was diagnosed with cancer 6 months before completing the Time 1 survey, he or she may have already experienced the “change” in well-being that this study aimed to quantify. In that case, by accounting for dependent variables at Time 1 in the longitudinal regression analyses, evidence of the change over time would be lost. Evidence of the strong correlations between Time 1 and Time 2 dependent variables furthers this argument.

In addition to concern about the timing of the first survey, the timing of the Time 2 measure 3 months after the first may not have been appropriate for capturing change that took place after Time 1, especially in the longitudinal hypotheses where we were looking for change in well-being variables that could be attributed to variations in mindfulness at Time 1. Similar studies going forward should consider incorporating more time points at 6, 9, and 12 months after diagnosis which would improve the likelihood of finding any change in well-being indicators that exists in the population *and* the likelihood of pin-pointing when that change takes place.

In preliminary analyses of the data, we found that Time 1 dependent variables were highly correlated with Time 1 mindfulness, flagging a potential problem with multicollinearity, which can cause miscalculations in the role of individual predictors in regression analysis. For example, because depressive symptoms at Time 1 was highly correlated ($r = -.54, p = .00$) with mindfulness at Time 1, we may not have been accurately able to separate the predictive ability of these two variables (though the overall predictive ability of the model would not be affected). A traditional fix to a problem with multicollinearity is to combine highly correlated variables. However, for the purposes of this study, it was important to evaluate the dependent variables at Time 1 and mindfulness at Time 1 separately, so that we could examine the role of mindfulness in predicting a change in the dependent variable from Time 1 to Time 2. Therefore, the decision was made to leave unaddressed the potential multicollinearity problem.

Another source of concern in this study is the variability of illness factors, such as type of cancer diagnosis, stage of cancer diagnosis, type of treatment, and time since diagnosis, among participants. Because there were a variety of illness profiles among the

participants, but insufficient sample size to group participants by, for example, type of cancer or stage of cancer, experiences of being diagnosed with cancer may have varied in important ways without being accounted for. That said, all the participants faced a life threatening diagnosis, were asked to make challenging choices about their treatment, and were exposed to the stress of cancer treatment, so there was likely significant commonality to their experiences. And, by examining correlations between dependent variables and the covariates time since diagnosis and stage of cancer, we know there were either no significant differences between participants grouped by these variables or were able to account for them in the regression analyses.

Implications

Despite methodological challenges, this study produced fascinating significant results among the cross-sectional hypothesis. The role of mindfulness in accounting for variability in depressive symptoms, positive states of mind, and avoidant coping at a single time point is significant and supports the theory that people who have higher levels of mindfulness may be better able to cope with stressful life events like cancer. Additionally, knowing the demonstrated ability of training in mindfulness to improve dispositional mindfulness as measured by the MAAS, it may be highly beneficial for people diagnosed with cancer, or experiencing other stressful life events, to receive mindfulness training.

Future directions

As described above, similar studies being planned to examine the relationship between mindfulness and measures of well-being in people diagnosed with cancer should involve a larger sample of participants, should first measure participants at a standardized

time point closer to diagnosis than “up to 12 months,” and should measure participants at least three separate times at intervals of no more than 3 months. Additionally, logistical considerations should be explored to account for the tendency of participants to drop out of the study after the first time point. For example, it may be more efficient to conduct this type of research through internet surveys.

Researchers might also consider using different measures of well-being in future studies. Additional information about well-being could be provided through measures of anxiety symptoms and engagement in pleasurable activities, tracking of behaviors such as sleep, diet, substance use, and even reports of participant affect provided by friends and family members. Other methods of data collection, such as structured interview, might be considered to eliminate concerns about participant self-report of affective experiences. And health information, such as type of cancer and stage of cancer, might be better collected from participant medical records rather than by participant report.

As shown in the Weinstein, Brown, and Ryan 2009 article, participant experiences of stress seem to be an intermediate factor between mindfulness and well-being, with people high in mindfulness experiencing less stress and, in turn, maintaining higher levels of well-being. So, it would be prudent for future studies to examine the role of stress, in particular because it may be a better short-term indicator of the positive influence of being mindful and therefore more likely to be significantly predicted by variations in mindfulness.

Given the historical and theoretical associations between mindfulness and religious and spiritual practices, it would be interesting to collect information about the

type and quantity of participants' religious and spiritual practices both during their lifetimes and in the days and months following their diagnoses with cancer.

Finally, it would be ideal to have information about participants' levels of mindfulness and well-being prior to their diagnoses of cancer. Of course, it is impossible to know who will be diagnosed with cancer, so this type of measurement would need to be collected in the context of an extremely large longitudinal study, such as the Nurses' Health Study, which was started in 1976 and has 238,000 participants (Nurses' Health Study website, 2011). Having premorbid information about mindfulness and well-being would make measuring the effects of a stressful event, like diagnosis with cancer, much more efficient.

Conclusion

This study of the relationship between mindfulness, depressive symptoms, and well-being in people diagnosed with cancer showed that mindfulness predicts lower scores on measures of depressive symptoms and avoidant coping and higher scores on a measure of positive affect at a single time point. The study failed to show that mindfulness predicts well-being over time, but demonstrated significant correlations between mindfulness and subsequent measures of well-being. Methodological limitations, such as small sample size and survey timing, likely contributed to the lack of statistically significant results and could be eliminated in future studies.

Overall, this study supports previous findings that higher levels of mindfulness predict higher levels of well-being when individuals are under stress. The study contributes to evidence suggesting that intentional gains in mindfulness can be beneficial to the well-being of people experiencing stress.

List of References

List of References

- Adler, N. E., Horowitz, M., Garcia, A., & Moyer, A. (1998). Additional validation of a scale to assess positive states of mind. *Psychosomatic Medicine*, 60, 26-32.
Retrieved from <http://www.psychosomaticmedicine.org>
- American Cancer Society. (2009). *Cancer Facts & Figures 2009*. Atlanta, GA: American Cancer Society.
- Argus, G., & Thompson, M. (2007). Perceived social problem solving, perfectionism, and mindful awareness in clinical depression: An exploratory study. *Cognitive Therapy and Research*, 32, 745-757. doi:10.1007/s10608-006-9102-1
- Baer, R., Smith, G., & Allen, K. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, 11, 191-206.
doi:10.1177/1073191104268029
- Baer, R., Smith, G., Hopkins, J., & Krietemeyer, J. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13, 27-45.
doi:10.1177/1073191105283504
- Beck, A. T., Rush, A. J., Shaw, B. P., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.
- Beeber, L. S., Shea, J., & McCorkle, R. (1998). The Center for Epidemiologic Studies Depression Scale as a measure of depressive symptoms in newly diagnosed patients. *Journal of Psychosocial Oncology*, 16, 1-20.
doi:10.1300/J077V16N01_01
- Brown, K., & Kasser, T. (2005). Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Social Indicators Research*, 74, 349-368. doi:10.1007/s11205-004-8207-8
- Brown, K. W., & 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
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007a). Addressing fundamental questions about mindfulness. *Psychological Inquiry*, 18, 272-281.
doi:10.1080/10478400701703344

- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007b). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, 18, 211-237. doi:10.1080/10478400701598298
- Carlson, L., & Brown, K. W. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of Psychosomatic Research*, 242-248. doi:10.1016/j.jpsychores.2004.04.366
- Carlson, L., & Garland, S. (2005). Impact of mindfulness-based stress reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. *International Journal of Behavioral Medicine*, 12, 278-285. doi:10.1207/s15327558ijbm1204_9
- Carlson, L. E., Speca, M., Faris, P., & Patel, K. D. (2007). One year pre-post intervention follow-up of psychological, immune, endocrine and blood pressure outcomes of mindfulness-based stress reduction (MBSR) in breast and prostate cancer outpatients. *Brain, Behavior, and Immunity*, 21, 1038-1049. doi:10.1016/j.bbi.2007.04.002
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine*, 4, 92-100. doi:10.1207/s15327558ijbm0401
- Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., Ketcham, A. S., & Moffat, F. L. (1993). How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *Journal of Personality and Social Psychology*, 65, 375-390. doi:10.1037/0022-3514.65.2.375
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267-283. doi:10.1037/0022-3514.56.2.267
- Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton Mindfulness Questionnaire. *British Journal of Clinical Psychology*, 47, 451-455. doi:10.1348/014466508X314891
- Chambers, R., Lo, B. C. Y., & Allen, N. B. (2007). The impact of intensive mindfulness training on attentional control, cognitive style, and affect. *Cognitive Therapy and Research*, 32, 303-322. doi:10.1007/s10608-007-9119-0
- Clark, K. K., Bormann, C. A., Cropanzano, R. S., & James, K. (1995). Validation evidence for three coping measures. *Journal of Personality Assessment*, 65, 434-455. doi:10.1207/s15327752jpa6503_5

- Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, 13, 79-91. doi:10.1177/1533210108316307
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159. doi: 10.1037/0033-2909.112.1.155
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Davies, M. I., & Clark, D. M. (1998). Thought suppression produces rebound effect with analogue post-traumatic intrusions. *Behavioral Research and Therapy*, 36, 571–582. doi: 10.1016/S0005-7967(98)00051-5
- Easwaran, E. (1991). *Meditation: A simple eight-point program for translating spiritual ideals into daily life (2nd ed.)*. Tomales, CA: Nilgiri Press.
- Fillion, L., Kovacs, A., Gagnon, P., & Endler, N. S. (2002). Validation of the Shortened COPE for use with Breast Cancer Patients Undergoing Radiation Therapy. *Current Psychology*, 21, 17-34. doi:10.1007/BF02903157
- Foley, E., Baillie, A., Huxter, M., Price, M., & Sinclair, E. (2010). Mindfulness-Based Cognitive Therapy for individuals whose lives have been affected by cancer: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 72-79. doi:10.1037/a0017566
- Folkman, S. (1997). Positive psychological states and coping with severe stress. *Social Science & Medicine*, 45, 1207-1221. doi:10.1016/S0277-9536(97)00040-3
- Frewen, P. A., Evans, E. M., Maraj, N., Dozois, D. J. A., & Partridge, K. (2008). Letting go: Mindfulness and negative automatic thinking. *Cognitive Therapy and Research*, 32, 758-774. doi:10.1007/s10608-007-9142-1
- Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore*, 5, 37-44. doi:10.1016/j.explore.2008.10.001
- Garland, S. N., Carlson, L. E., Cook, S., Lansdell, L., & Speca, M. (2007). A non-randomized comparison of mindfulness-based stress reduction and healing arts programs for facilitating post-traumatic growth and spirituality in cancer outpatients. *Supportive Care in Cancer*, 15, 949-961. doi:10.1007/s00520-007-0280-5
- Gonzalez, A., Solomon, S. E., Zvolensky, M. J., & Miller, C. T. (2009). The interaction of mindful-based attention and awareness and disengagement coping with HIV/AIDS-related stigma in regard to concurrent anxiety and depressive

- symptoms among adults with HIV/AIDS. *Journal of Health Psychology*, 14, 403-413. doi:10.1177/1359105309102193
- Hann, D., Winter, K., & Jacobsen, P. (1999). Measurement of depressive symptoms in cancer patients: Evaluation of the Center for Epidemiological Studies Depression Scale (CES-D). *Journal of Psychosomatic Research*, 46, 437-443. doi:10.1016/S0022-3999(99)00004-5
- Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology Science and Practice*, 11, 255-262. doi:10.1093/clipsy/bph080
- Horowitz, M., Adler, N., & Kegeles, S. (1988). A scale for measuring the occurrence of positive states of mind: A preliminary report. *Psychosomatic Medicine*, 50, 477. Retrieved from <http://www.psychosomaticmedicine.org>
- Kabat-Zinn, J. (1990). *Full catastrophe living: The program of the Stress Reduction Clinic at the University of Massachusetts Medical Center*. New York, NY: Dell.
- Kershaw, T., Northouse, L., Kritpracha, C., Schafenacker, A., & Mood, D. (2004). Coping strategies and quality of life in women with advanced breast cancer and their family caregivers. *Psychology and Health*, 19, 139-155. doi:10.1080/08870440310001652687
- Langer, E. J. (1989). *Mindfulness*. Reading, MA: Addison-Wesley.
- Langer, E. J., & Moldoveanu, M. (2000a). The construct of mindfulness. *Journal of Social Issues*, 56, 1-9. doi:10.1111/0022-4537.00148
- Langer, E. J., & Moldoveanu, M. (2000b). Mindfulness research and the future. *Journal of Social Issues*, 56, 129-139. doi:10.1111/0022-4537.00155
- Lengacher, C. A., Johnson-Mallard, V., Post-White, J., Moscoso, M. S., Jacobsen, P. B., Klein, T. W., Widen, R. H., Fitzgerald, S. G., Shelton, M. M., & Barta, M. (2009). Randomized controlled trial of mindfulness-based stress reduction (MBSR) for survivors of breast cancer. *Psycho-Oncology*, 18, 1261-1272. doi:10.1002/pon.1529
- Lieberman, M. A., Golant, M., Giese-Davis, J., Winzlenberg, A., Benjamin, H., Humphreys, K.,... Spiegel, D. (2003). Electronic support groups for breast carcinoma: A clinical trial of effectiveness. *Cancer*, 97, 920-925. doi:10.1002/cncr/11145
- Linehan, M. M., Armstrong, H. E., Suarez, A., Alimón, D., & Heard, H. L. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients.

- Archives of General Psychiatry*, 48, 1060-1064. Retrieved from <http://archpsyc.ama-assn.org>
- Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-Based Cognitive Therapy for depression: Replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology*, 72, 31-40. doi:10.1037/0022-006X.72.1.31
- Manne, S., Ostroff, J., Winkel, G., Goldstein, L., Fox, K., & Grana, G. (2004). Posttraumatic growth after breast cancer: Patient, partner, and couple perspectives. *Psychosomatic Medicine*, 66, 442. doi:10.1097/01.psy.0000127689.38525.7d
- Masuda, A., Price, M., & Latzman, D. (2011). Mindfulness moderates the relationship between disordered eating cognitions and disordered eating behaviors in a non-clinical college sample. *Journal of Psychopathology and Behavioral Assessment*, 1-9. doi:10.1007/s10862-011-9256-3
- Massie, M. J. (2004). Prevalence of depression in patients with cancer. *JNCI Monographs*, 2004, 57. doi:10.1093/jncimonographs/lgh014
- McDaniel, J. S., Musselman, D. L., Porter, M. R., Reed, D. A., & Nemeroff, C. B. (1995). Depression in patients with cancer: diagnosis, biology, and treatment. *Archives of General Psychiatry*, 52, 89. Retrieved from <http://archpsyc.ama-assn.org>
- McKee, L., Zvolensky, M. J., Solomon, S. E., Bernstein, A., & Leen-Feldner, E. (2007). Emotional-vulnerability and mindfulness: A preliminary test of associations among negative affectivity, anxiety sensitivity, and mindfulness skills. *Cognitive Behaviour Therapy*, 36, 91-101. doi:10.1080/16506070601119314
- Moskowitz, J. T., Folkman, S., Collette, L., & Vittinghoff, E. (1996). Coping and mood during AIDS-related caregiving and bereavement. *Annals of Behavioral Medicine*, 18, 49-57. doi:10.1007/BF02903939
- Mossey, J. M., & Gallagher, R. M. (2004). The longitudinal occurrence and impact of comorbid chronic pain and chronic depression over two years in continuing care retirement community residents. *Pain Medicine*, 5, 335-348. doi:10.1111/j.1526-4637.2004.04041.x
- Newport, D., & Nemeroff, C. (1998). Assessment and treatment of depression in the cancer patient. *Journal of Psychosomatic Research*, 45, 215-237. doi:10.1016/S0022-3999(98)00011-7

- Onitilo, A. A., Nietert, P. J., & Egede, L. E. (2006). Effect of depression on all-cause mortality in adults with cancer and differential effects by cancer site. *General Hospital Psychiatry*, 28, 396-402. doi:10.1016/j.genhosppsych.2006.05.006
- Perczek, R. E., Burke, M. A., Carver, C. S., Krongrad, A., & Terris, M. K. (2002). Facing a prostate cancer diagnosis: Who is at risk for increased distress? *Cancer*, 94, 2924-2929. doi:10.1002/cncr.10564
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401. doi:10.1177/014662167700100306
- Ritterband, L. M., & Spielberger, C. D. (2001). Depression in a cancer patient population. *Journal of Clinical Psychology Medical Settings*, 8, 85-93. doi:10.1023/A:1009551809695
- Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. F. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. W. Pennebaker (Ed.), *Emotion, disclosure, and health* (pp. 125–154). Washington, DC: American Psychological Association.
- Sears, S. R., Stanton, A. L., & Danoff-Burg, S. (2003). The yellow brick road and the emerald city: Benefit finding, positive reappraisal coping, and posttraumatic growth in women with early-stage breast cancer. *Health Psychology*, 22, 487-497. doi:10.1037/0278-6133.22.5.48
- Shapiro, S. L., Oman, D., Thoresen, C. E., Plante, T. G., & Flinders, T. (2008). Cultivating mindfulness: Effects on well-being. *Journal of Clinical Psychology*, 64, 840-862. doi:10.1002/jclp.20491
- Stanley, S., Reitzel, L. R., Wingate, L. R., Cukrowicz, K. C., Lima, E. N., & Joiner, T. E. (2006). Mindfulness: A primrose path for therapists using manualized treatments? *Journal of Cognitive Psychotherapy*, 20, 327-335. doi:10.1891/088983906780643957
- Sternberg, R. J. (1997). *Thinking styles*. New York, NY: Cambridge University Press.
- Sternberg, R. J. (2002). Images of mindfulness. *Journal of Social Issues*, 56, 11-26. doi:10.1111/0022-4537.00149
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (5th ed.)*. Boston, MA: Pearson Education.
- Teasdale, J. D., Segal, Z. V., Mark, J., Williams, G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by

- mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology*, 68, 615-623. doi:10.1037/0022-006X.68.4.615
- Voogt, E., Van Der Heide, A., Van Leeuwen, A. F., Visser, A. P., Cleiren, M., Passchier, J., & Van Der Maas, P. J. (2004). Positive and negative affect after diagnosis of advanced cancer. *Psycho-Oncology*, 14, 262-273. doi:10.1002/pon.842
- Vujanovic, A. A., Zvolensky, M. J., Bernstein, A., Feldner, M. T., & McLeish, A. C. (2007). A test of the interactive effects of anxiety sensitivity and mindfulness in the prediction of anxious arousal, agoraphobic cognitions, and body vigilance. *Behaviour Research and Therapy*, 45, 1393-1400. doi:10.1016/j.brat.2006.06.002
- Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness--the Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences*, 40, 1543-1555. doi:10.1016/j.paid.2005.11.025
- Wallace, B. A., & Shapiro, S. L. (2006). Mental balance and well-being: Building bridges between Buddhism and Western psychology. *American Psychologist*, 61, 690-701. doi:10.1037/0003-066X.61.7.690
- Weinstein, N., Brown, K. W., & Ryan, R. M. (2009). A multi-method examination of the effect 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
- Wells, K. B., Golding, J. M., & Burnam, M. A. (1988). Psychiatric disorder in a sample of the general population with and without chronic medical conditions. *American Journal of Psychiatry*, 145, 976-981. Retrieved from <http://ajp.psychiatryonline.org>
- Zvolensky, M. J., Solomon, S. E., McLeish, A. C., Cassidy, D., Bernstein, A., Bowman, C. J., & Yartz, A. R. (2006). Incremental validity of mindfulness-based attention in relation to the concurrent prediction of anxiety and depressive symptomatology and perceptions of health. *Cognitive Behaviour Therapy*, 35, 148-158. doi:10.1080/16506070600674087

Appendix A

Mindful Attention Awareness Scale (MAAS)

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what **really reflects** your experience rather than what you think your experiences should be. Please treat each item separately from every other item.

1 Almost Always	2 Very Frequently	3 Somewhat Frequently	4 Somewhat Infrequently	5 Very Infrequently	6 Almost Never
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I could be experiencing some emotion and not be conscious of it until sometime later.....	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.....	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.....	1	2	3	4	5	6
I tend to walk quickly to get to where I'm going without paying attention to what I experience along the way.....	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.....	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it the first time.....	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.....	1	2	3	4	5	6
I rush through activities without being really attentive to them.....	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I am doing to get there.....	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.....	1	2	3	4	5	6

I find myself listening to someone with one ear, doing something else at the same time.....	1	2	3	4	5	6
I drive places on 'automatic pilot' and then wonder why I went there.....	1	2	3	4	5	6
I find myself preoccupied with past or future.....	1	2	3	4	5	6
I find myself doing things without paying attention....	1	2	3	4	5	6
I snack without being aware that I am eating.....	1	2	3	4	5	6

Appendix B

Center for Epidemiologic Studies Depression Scale (CES-D)

For each of the following statements, please circle the number that best describes how often you felt or behaved this way – DURING THE PAST WEEK.

	0 Rarely or None of the Time (Less than 1 Day)	1 Some or a Little of the Time (1-2 Days)	2 Occasionally or a Moderate Amount of Time (3-4 Days)	3 Most or All of the Time (5-7 Days)
DURING THE PAST WEEK:				
I was bothered by things that usually don't bother me.	0	1	2	3
I did not feel like eating; my appetite was poor.	0	1	2	3
I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
I felt that I was just as good as other people.	0	1	2	3
I had trouble keeping my mind on what I was doing. .	0	1	2	3
I felt depressed.	0	1	2	3
I felt that everything I did was an effort.	0	1	2	3
I felt hopeful about the future.	0	1	2	3
I thought my life had been a failure.	0	1	2	3
I felt fearful.	0	1	2	3
My sleep was restless.	0	1	2	3
I was happy.	0	1	2	3
I talked less than usual.	0	1	2	3

I felt lonely.	0	1	2	3
People were unfriendly.	0	1	2	3
I enjoyed life.	0	1	2	3
I had crying spells.	0	1	2	3
I felt sad.	0	1	2	3
I felt that people disliked me.	0	1	2	3
I could not get "going".	0	1	2	3

Appendix C

Positive States of Mind (PSOM)

This questionnaire is about the kinds of satisfying states of mind that you may have experienced **IN THE LAST 7 DAYS**. In the space to the left of each item please circle the number that coincides with the best description of your experience.

	0 Unable to have it	1 Trouble in having it	2 Limited in having it	3 Have it well
<u>Focused Attention</u> : Feeling able to attend to a task you want or need to do, without many distractions from within yourself.	0	1	2	3
<u>Productivity</u> : Feeling of being able to stay at work until a task is finished, do something new to solve problems, or express yourself creatively.	0	1	2	3
<u>Responsible Caretaking</u> : Feeling that you are doing what you should do to take care	0	1	2	3

of yourself or someone else.				
Restful Repose: Feeling relaxed, without distractions or excessive tension.	0	1	2	3
Sensuous Nonsexual Pleasure: Being able to enjoy bodily senses, enjoyable intellectual activity, doing things you ordinarily like, such as listening to music, enjoying the outdoors, lounging in a hot bath.	0	1	2	3
Sharing: Being able to commune with others in an empathetic, close way, as in talking, walking, going out, or just being together.	0	1	2	3

Appendix D

Cope Inventory (Modified)

These items deal with ways you've been coping with the stress in your life related to your experience with cancer. Each item asks what you've been doing to cope. Don't answer on the basis of whether a particular way of coping seems to be working or not—just whether or not you're doing it. Make your answers as true FOR YOU as you can.

For each statement, please circle the number that best describes how much or how frequently you have done what the item says, to deal with your experience with cancer.

	1 I don't do this at all	2 I do this a little bit	3 I do this a medium amount	4 I do this a lot
I try to grow as a person as a result of the experience.	1	2	3	4
I take the time to figure out what I'm really feeling.	1	2	3	4
I turn to work or other activities to take my mind off things.	1	2	3	4
I take time to express my emotions.	1	2	3	4
I say to myself "this isn't real."	1	2	3	4
I delve into my feelings to get a thorough understanding of them.	1	2	3	4
I give up trying to deal with it.	1	2	3	4
I let my feelings come out freely.	1	2	3	4
I refuse to believe that it has happened.	1	2	3	4
I realize that my feelings are valid and important.	1	2	3	4
I try to see it in a different light, to make it seem more positive.	1	2	3	4
I allow myself to express my emotions.	1	2	3	4
I give up the attempt to cope.	1	2	3	4

I acknowledge my emotions.	1	2	3	4
I look for something good in what is happening.	1	2	3	4
I feel free to express my emotions.	1	2	3	4
I do something to think about it less, such as going to movies, or watching TV, reading, daydreaming, sleeping, or shopping.	1	2	3	4
I learn something from the experience.	1	2	3	4

Appendix E

Demographic and Disease Questionnaire

In this last section, please answer these questions about your background. All responses are confidential.

1. What is your gender?

- ☐ Female
- ☐ Male

2. When were you born?

Month: _____ Year: _____

3. What is your racial/ethnic background? (Check all that apply)

- ☐ African American (Black)
- ☐ Caucasian (White)
- ☐ Asian/Pacific Islander
- ☐ Hispanic/Latino/Latina
- ☐ American Indian
- ☐ Other (specify) _____

4. How much school did you complete? (Check one only)

- ☐ Elementary or middle school
- ☐ Some high school
- ☐ High school graduate or GED
- ☐ Some college
- ☐ College graduate
- ☐ Some graduate school
- ☐ Graduate/professional degree
- ☐ Other: _____

5. What is your relationship status?

- ☐ Married
- ☐ Partnered or in a significant relationship
- ☐ Separated
- ☐ Divorced

- ☐ Widowed
- ☐ Single

6. Are you currently employed?

- ☐ Yes → If yes, do you work:
 - ☐ Full-time?
 - ☐ Part-time?
- ☐ No
- ☐ Retired

7. Which of the following categories best describes your annual household income from all sources before taxes?

- | | | |
|---|--|---|
| <input type="checkbox"/> Less than \$20,000 | <input type="checkbox"/> \$40,001-\$60,000 | <input type="checkbox"/> \$80,001-\$100,000 |
| <input type="checkbox"/> \$20,001-\$40,000 | <input type="checkbox"/> \$60,001-\$80,000 | <input type="checkbox"/> Greater than \$100,000 |

8. What are your current living arrangements? (Check all that apply)

- ☐ Live alone
- ☐ Live with spouse/partner
- ☐ Live with my children
- ☐ Live with other family members
- ☐ Live with non-family members

9. Do you currently have any pets living in your household? (Please check all that apply)

- ☐ No pets in household → **Please skip question 10.**
- ☐ Dog
- ☐ Cat
- ☐ Bird
- ☐ Fish
- ☐ Other pets

10. (If you have a pet in your household): Does having a pet help you to deal with your illness?

- ☐ Not at all helpful
- ☐ Slightly helpful
- ☐ Fairly helpful
- ☐ Very helpful

11. What was the date of your cancer diagnosis?

Month: _____ Year: _____

12. What type of cancer were you diagnosed with? (e.g., *breast cancer, colon cancer*)

13. When you were diagnosed with cancer, what was the stage of your disease?

- ☐ Stage I
- ☐ Stage II
- ☐ Stage III
- ☐ Stage IV
- ☐ Uncertain

14. What type of treatment have you received for your cancer? (Check all that apply)

- ☐ Surgery
- ☐ Chemotherapy
- ☐ Radiation
- ☐ Other (specify): _____
- ☐ No treatment → **Please skip question 15.**

15. (*If you have received cancer treatment*): Have you finished treatment?

- ☐ Yes
→ Date treatment was finished: Month: _____ Year: _____
- ☐ No, my treatment is not finished.
- ☐ Uncertain

Appendix F

Calculations for Cross-Lagged Analysis

Hypothesis 5: MAAS and CES-D

$$\begin{aligned}
 & \frac{(0.54^2 + 0.646^2 + 0.386^2 + 0.598^2)}{4} = 0.303879 \\
 & \frac{(0.461^2 + 0.546^2)}{2} = 0.255319 \\
 & \frac{(0.461 + 0.546)}{2} = 0.5035 \\
 & \left(1 + \left(\frac{0.303879}{(1 + 0.255319 + 2 (0.5035))} \right) \right) = 1.13432 \\
 & \left(\sqrt{\left(\frac{40}{2} \right)} \right) (0.4986 - 0.6127) 1.13432 = -0.57881
 \end{aligned}$$

Hypothesis 6: MAAS and PSOM

$$\frac{(0.664^2 + 0.646^2 + 0.507^2 + 0.691^2)}{4} = 0.398185$$

$$\frac{(0.487^2 + 0.417^2)}{2} = 0.205529$$

$$\frac{(0.487 + 0.417)}{2} = 0.452$$

$$\left(1 + \left(\frac{0.398185}{(1 + 0.205529 + 2(0.452))}\right)\right) = 1.18876$$

$$\left(\sqrt{\left(\frac{40}{2}\right)}\right) (0.5321 - 0.4441) 1.18876 = 0.467834$$

Hypothesis 7: MAAS and PRC

$$\begin{aligned}
 & \frac{(0.118^2 + 0.646^2 + 0.401^2 + 0.004^2)}{4} = 0.148014 \\
 & \frac{(0.079^2 + 0.206^2)}{2} = 0.0243385 \\
 & \frac{(0.079 + 0.206)}{2} = 0.1425 \\
 & \left(1 + \left(\frac{0.148014}{(1 + 0.0243385 + 2 (0.1425))} \right) \right) = 1.11304 \\
 & \left(\sqrt{\left(\frac{40}{2} \right)} \right) (0.0792 - 0.209) 1.11304 = -0.646101
 \end{aligned}$$

Hypothesis 8: MAAS and Avoidant Coping

$$\frac{(0.385^2 + 0.646^2 + 0.665^2 + 0.501^2)}{4} = 0.314692$$

$$\frac{(0.382^2 + 0.288^2)}{2} = 0.114434$$

$$\frac{(0.382 + 0.288)}{2} = 0.335$$

$$\left(1 + \left(\frac{0.314692}{(1 + 0.114434 + 2(0.335))}\right)\right) = 1.17635$$

$$\left(\sqrt{\left(\frac{40}{2}\right)}\right) (0.4024 - 0.2964) 1.17635 = 0.557644$$

Vita

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