

THE RELATIONSHIP OF TRAIT MINDFULNESS AND POSITIVE MENTAL
AND PHYSICAL HEALTH AMONG COLLEGE STUDENTS

by

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ABSTRACT

The Relationship of Trait Mindfulness and Positive Mental and Physical Health
Among College Students

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Mindfulness engagement has become increasingly popular in therapeutic settings and is promising in terms of possibly reducing physical and mental health symptoms among a wide variety of clients (including college students) presenting diverse diagnoses. While a number of studies suggest that mindfulness interventions increase mindfulness ability, this assertion has not been validated because many researchers utilizing a mindfulness intervention fail to include measures assessing change in trait mindfulness ability. The present study examined mindfulness engagement and trait mindfulness, as well as physical and mental health correlates of trait mindfulness, in 300 college students (74% female) via an online survey.

Mindfulness ability in this general college population was similar to the overall mindfulness ability in the general population. Seventy-nine percent of respondents reported mindfulness engagement. Fifty-nine percent of the sample reported previous mindfulness engagement and only 32% of these individuals stated continued engagement.

While no overall differences in trait mindfulness were found between respondents who had reported previous mindfulness and those who had not, individuals who spent more time in their mindfulness practice, also reported higher amounts of trait mindfulness ability. These data suggest that in order for these specific mindfulness engagements to impact trait mindfulness ability, a time engagement threshold must be met. A number of trait mindfulness variables were significantly related to a number of mental and physical health variables. However, relationships between trait mindfulness and health variables were not uniform. Multiple subscales from the Five Factor Mindfulness Scale (FFMQ) were significantly correlated with mental and physical health variables. There were few physical and mental health variables that were significantly correlated or suggested trends with the Mindful Attention Awareness Scale (MAAS). Increased cognitive symptoms of depression, yet nonclinically significant levels as measured by the Beck Depression Inventory (BDI), were significantly positively related to increased levels of trait mindfulness ability. More efforts are needed, including, measurement of mindfulness throughout intervention, increased focus regarding the construct of mindfulness ability and novel forms for measurement, and the relationship between mindfulness ability measurement of mindfulness ability and specific mental and physical health variables.

(122 pages)

PUBLIC ABSTRACT

The Relationship of Trait Mindfulness and Positive Mental and Physical Health
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Mindfulness interventions have become an increasingly popular psychological intervention for mental health providers, especially in Westernized countries. Mindfulness interventions are promising in terms of possibly reducing physical and mental health symptoms among a wide variety of clients (including college students) presenting diverse diagnoses. While a number of studies suggest that mindfulness interventions increase mindfulness ability, as demonstrated by an increase in awareness, attention to the present moment, or other components of mindfulness, this assertion has not been validated because many researchers utilizing a mindfulness intervention fail to include measures assessing change in trait mindfulness ability. The present study examined mindfulness engagement and trait mindfulness, as well as physical and mental health correlates of trait mindfulness, in 300 college students (74% female) via an online survey.

Mindfulness ability in this general college population was similar to the overall mindfulness ability in the general population. Seventy-nine percent of respondents reported mindfulness engagement, with yoga and meditation as the highest engaged

practices. Although the majority of the sample reported previous mindfulness engagement, only 32% of these individuals stated continued engagement.

While no overall differences in trait mindfulness were found among respondents who had reported previous mindfulness and those who had not, there was a significant relationship between time spent in mindfulness practices and increased trait mindfulness. Individuals who spent more time in their mindfulness practice also reported higher amounts of trait mindfulness ability. These data suggest that in order for mindfulness engagement to impact trait mindfulness ability, there must be a mindfulness time engagement threshold that is met. A number of trait mindfulness variables were significantly related to a number of mental and physical health variables. However, relationships between trait mindfulness and health variables were not uniform. Multiple subscales from the Five Factor Mindfulness Scale (FFMQ) were significantly correlated with mental and physical health variables. There were few physical and mental health variables that were significantly correlated or suggested trends with the Mindful Attention Awareness Scale (MAAS). Increased cognitive symptoms of depression, yet nonclinically significant levels as measured by the Beck Depression Inventory (BDI), were significantly positively related to increased levels of trait mindfulness ability. More efforts are needed, including, measurement of mindfulness throughout intervention, increased focus regarding the construct of mindfulness ability and novel forms for measurement, and the relationship between mindfulness ability measurement of mindfulness ability and specific mental and physical health variables.

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CHAPTER I

INTRODUCTION

Mindfulness interventions have become an increasingly popular psychological intervention for mental health providers, especially in Westernized countries (Chiesa & Serretti, 2009; Kabat-Zinn, 2003; Murphy, Mermelstein, Edwards, & Gidycz, 2012; S. L. Shapiro, Brown, Thoresen, & Plante, 2011). Although mindfulness interventions may be interpreted as innovative practice, the concept of mindfulness originates from Eastern spiritual practices, specifically Buddhism. Within the Buddhist traditional philosophy, mindfulness is considered to exist as “bare attention” and as an alternative behavior to suppression and distraction of thoughts (Thera, 1972, p. 5; see also Epstein, 2004). Within Western medicine, there is no consensus for defining mindfulness, but the most commonly accepted definition is “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p. 4; see also Bishop, 2002). Ludwig and Kabat-Zinn (2008) described the goal of mindfulness as maintaining “awareness moment by moment, disengaging oneself from strong attachment to beliefs, thoughts, or emotions, thereby developing a greater sense of emotional balance and well-being” (p. 1350).

In the clinical setting, mindfulness is often facilitated within a psychological treatment as an adjunctive therapy (e.g., mindfulness-based stress reduction, mindfulness-based cognitive therapy, acceptance and commitment therapy, dialectical behavior therapy, and cognitive-behavioral therapy) and can also be a central piece of a nonclinical practice like yoga, t'ai chi, qigong, or seated meditation. The main goal of mindfulness

training is not to develop better relaxation abilities, but to interact with one's self and environment in a different manner. Mindfulness training aims to increase awareness, foster a nonjudgmental attitude for one's self, and increase focus for the present moment through various experiential exercises and meditation practices (S. L. Shapiro, Oman, Thoresen, Plante, & Flinders, 2008).

Research suggests that mindfulness interventions are promising in terms of possibly reducing physical and mental health symptoms among a wide variety of clients (including college students), presenting diverse diagnoses. A meta-analysis with 10 controlled studies completed by Grossman, Niemann, Schmidt, and Walach (2004) indicated that a specific mindfulness intervention, mindfulness-based stress reduction, was a useful treatment for individuals with a broad range of chronic diagnoses and general stress. Individuals diagnosed with nonclinical anxiety and depression (Alosco et al., 2012; Miller, Fletcher, & Kabat-Zinn, 1995; S. L. Shapiro, Schwartz, & Bonner, 1998), chronic pain (Carmody & Baer, 2007; Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985; McCracken & Velleman, 2010), fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007), cancer (Carlson, Speca, Faris, & Patel, 2007; Ledesma & Kumano, 2009), arthritis (Zautra et al., 2008), chronic heart failure (Sullivan et al., 2009), asthma (Pbert et al., 2012), chronic medical diseases (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010), diabetes (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007), stress (Chiesa & Serretti, 2009), smoking addictions (Davis, Fleming, Bonus, & Baker, 2007), major depression (Segal, Williams, & Teasdale, 2012; Teasdale et al., 2000), and depression and anxiety symptoms (Murphy et al., 2012; Stathopoulou, Powers, Berry,

Smits, & Otto, 2006) have benefitted from the effects from mindfulness practices. After an 8-week mindfulness-based intervention for 44 college students, lower scores for perceived stress and higher scores for forgiveness were reported, although changes in trait mindfulness ability across the intervention were not examined (Oman, Shapiro, Thoresen, Plante, & Flinders, 2008). Similarly, although mindfulness ability was not measured, Deckro et al. (2002) found that a mind/body intervention with emphasis on yoga, mindfulness, and coping for college students had a significantly positive effect on self reported stress levels, anxiety, and health behaviors.

The results of these studies suggested that mindfulness interventions are potentially useful for a broad range of mental and physical problems. While a number of studies suggested that mindfulness interventions change one's mindfulness ability, as demonstrated by an increase in awareness, attention to the present moment, or other components of mindfulness (Piet, Hougaard, Hecksher, & Rosenberg, 2010; S. L. Shapiro et al., 2011), this assertion has not been validated since many researchers utilizing mindfulness interventions fail to include measures assessing mindfulness ability. This lack of clarity points to the clear need to more closely examine the construct of mindfulness in college students.

It is important to note that while assessing for mindfulness ability, there are two types of mindfulness that have been examined: state and trait mindfulness. State mindfulness is considered to be unique to a specific exercise or intervention and requires a certain level of attention in a particular moment (K. W. Brown & Ryan, 2003; Cahn & Polich, 2006). State mindfulness is typically assessed pre/postintervention or meditation

exercise to assess for specific levels of current mindfulness that may have changed due to the intervention. Trait mindfulness is more commonly measured and refers to one's disposition to be mindful in daily life activities, not specific to certain experiences.

Measuring trait mindfulness is a better choice for measuring one's overall mindfulness ability that is not related to a specific exercise or experience (Cahn & Polich, 2006; D. H. Shapiro & Walsh, 1984; West, 1987). Through mindfulness exercises, clinical interventions and nonclinical practices seek to increase both trait and state mindfulness; one cannot aim to increase trait mindfulness without impacting state mindfulness and vice versa. Few studies have specifically assessed the change in trait and state mindfulness postmindfulness intervention. Carmody, Reed, Kristeller, and Merriam (2008) examined the change in trait and state mindfulness after an 8-week MBSR intervention, finding that both trait and state mindfulness increased after treatment. They also found that greater mindfulness ability was significantly correlated with decreased medical and psychological symptoms and higher levels of spirituality. S. L. Shapiro et al. (2011) found that scores for individuals with no mindfulness experience varied prior to treatment which suggests a natural variation of mindfulness ability independent of experience. It is clear that individuals likely have a certain amount of mindfulness ability regardless of specific mindfulness experience. Due to the increasing popularity of mindfulness interventions, it appears important to better understand the relationship between trait mindfulness and mental and physical health, particularly among college students.

A simple way to understand trait mindfulness and its health correlates is through

an exploratory survey. Although trait mindfulness appears to be a valid construct, it has not been studied heavily in college populations and the implications of mindfulness ability in college students need further examination (Baer et al., 2008; K. W. Brown & Ryan, 2003). The health habits established between the ages of 19 and 28 are typically behaviors that individuals will continue to exhibit later in life (Hamer, Kivimaki, & Steptoe, 2012), making this developmental period an important opportunity for intervention. Approximately 6.35% of the U.S. population is comprised of college students and about 41% of individuals between the ages of 18 and 24 are enrolled as undergraduate or graduate students (U.S. Census Bureau, 2010). College students may lack awareness of many healthy physical and mental health habits and these individuals may have heightened risk for developing physical and mental health complications later in life (Penedo & Dahn, 2005). Physical inactivity, poor diet, and mental health problems are significant areas of concern with college populations (Brevard & Ricketts, 1996; Keating, Guan, Piñero, & Bridges, 2005).

In a survey of 554 college students, Murphy et al. (2012) found that higher amounts of trait mindfulness were significantly negatively related to poor sleep hygiene, higher reports of stress, and poor eating habits. A potential weakness of this study, and other similar studies (Bodenlos, Noonan, & Wells, 2013; Caldwell, Harrison, Adams, Quin, & Greeson, 2010; Christopher & Antick, 2013; Vernig & Orsillo, 2009), is that student history and current uses of mindfulness practices were not assessed. It is, therefore, unclear if trait mindfulness alone and mindful practices are both important correlates of health in college students. Gaining a better understanding of the associations

between trait mindfulness and mindfulness practices along with health status among college student may facilitate development of new health interventions.

The four main purposes to be achieved in this study included: (a) to assess the existence of trait mindfulness ability and mindfulness practices in a general college population; (b) to examine the relationship between mindfulness ability and mental health in a general college population; (c) to examine the relationship between mindfulness ability and physical health in a general college population; and (d) to examine the relationship between mindfulness ability and health behaviors, specifically exercise/physical activity, diet, substance use, and spirituality/religiosity.

CHAPTER II

REVIEW OF THE LITERATURE

The primary purposes of this review are to: (a) document current conceptualizations of trait and state mindfulness, (b) explain various methods of mindfulness measurement, (c) the use of mindfulness within the clinical realm, and (d) summarize health implications of mindfulness interventions and practices. Articles related to mindfulness practice, utilization, and implications were located using PsychINFO, PsychArticles, PubMed, and Medline Internet databases.

Construct of Mindfulness

Mindfulness as a concept originated within Buddhist philosophy and was intended to help individuals end suffering by learning to connect with the inevitability of suffering in a different way (Thera, 1972). Although mindfulness practices originate from the Buddhist religion, individuals who do not identify with Buddhism are able to participate and benefit. Mindfulness practices can be taught outside the scope of Buddhism and are currently being disseminated throughout clinical and mental health settings within Western society (Baer, 2003). In 1998, there were over 240 hospitals and mental health clinics within the U.S. and abroad offering mindfulness interventions (Salmon, Santorelli, & Kabat-Zinn, 1998). Vieten (2009) suggested that mindfulness is defined by being present in one's body and less by correct or incorrect nature of experiences.

The conceptualization of mindfulness in the clinical and mental health arena is widely accepted as the moment-to-moment awareness of one's experience (Kabat-Zinn,

1994). Marlatt and Kristeller (1999) also described mindfulness as “bringing one’s attention to the present experience on a moment-to-moment basis” (p. 6). Another conceptualization of mindfulness is that it exists as a means to foster one’s ability to “change in relation to perceived experience, or *reperceive*” (S. L. Shapiro et al., 2006, p. 374). Kabat-Zinn (1994) described the art of mindfulness in seven core attitudes: nonjudging, practice, patience, beginner’s mind, trust, nonstriving, acceptance, and letting go. The nonjudging piece referred to one’s ability to simply notice the daily occurrences of natural judgments. The goal is to notice the judgments but not to change them. Patience refers to allowing oneself to acknowledge that things occur in a time that often cannot be controlled. It also fosters the concept of present-moment thinking, where we must have serenity to let life unfold in the here-and-now. Beginner’s mind refers to instilling a desire to start fresh and allow the present-moment impact more than previous experiences or own personal thoughts. Kabat-Zinn (2003, p. 35) described the beginner’s mind as “a mind that is willing to see everything as if for the first time.”

An attitude of self-trust helps create a culture of self-wisdom and it also limits one’s tendency to rely on others for acceptance or guidance. Nonstriving introduces the idea that one can simply be without attempting to produce a specific outcome. Embracing an attitude of nonstriving points to the fact that people can actually experience more when striving to do less. An attitude of acceptance helps individuals experience willingness to see things how they truly exist. This is not synonymous to being satisfied with one’s non-functioning or giving up a desire to be different, but simply seeing how one currently exists. Sometimes one can become extremely focused on goals to achieve,

things to change, and interest to control situations. Expressing the attitude of letting go helps an individual untangle from the constant attention to what can be done and changed.

Applications of Mindfulness Training

Mindfulness-based interventions are becoming increasingly popular within clinical practice and were first promoted by Kabat-Zinn (2003). Although many psychological treatments can incorporate a mindfulness aspect, certain treatments specifically aim to increase mindfulness ability. Mindfulness-based stress reduction (MSBR) utilizes experiential exercises to increase mindfulness ability (Kabat-Zinn, 1994). Dialectical behavior therapy (DBT), which has predominantly been used for individuals with borderline personality disorder, aims to impact affect tolerance through mindfulness meditation exercises (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991). Mindfulness-based cognitive therapy (MBCT) is a form of cognitive therapy designed with mindfulness meditation as a focus (Segal, Williams, & Teasdale, 2012). Acceptance and commitment therapy (ACT) is a form of behavioral therapy that views psychological flexibility resulting from six core processes, including mindfulness: attention to the present moment and fostering awareness for one's own experience (S. C. Hayes & Wilson, 2003). Cognitive-behavioral therapy (CBT) is a widely used therapy that addresses maladaptive cognitions and dysfunctional emotions through various techniques, including mindfulness exercises (Butler, Chapman, Forman, & Beck, 2006)

Specific Mindfulness Practices

The clinical and medical fields are not the only areas experiencing a growth of mindfulness training and interventions. Mindfulness practices are also becoming more popular in the mainstream world, as evidenced by the increase in practice of yoga, t'ai chi, qigong, seated meditation, and other types of mindfulness-specific practices (Quilty, Saper, Goldstein, & Khalsa, 2013; Wayne & Kaptchuk, 2008). Individuals are engaging in mindfulness practices like yoga, which is the most common (Cramer, Lauche, Langhorst, & Dobos, 2013), with aspirations to become more connected with oneself, relieve stress, decrease depression, and heighten awareness, among other outcomes. Specifically yoga, or “yoke or “unity” in Sanskrit, was historically believed and is currently believed by those who practice yoga to bring harmony to the body and mind through physical poses, breathing, recognition of intentions, and meditation (J. A. Smith, Greer, Sheets, & Watson, 2010). Yoga is also believed to help individuals who experience anxiety, depression, and/or overall stress (Panesar & Valachova, 2011). Melton, Gross, and Hansen (2010) conducted a survey gathering 2,562 college students' opinions of preferred exercises and yoga was selected as one of the preferred physical activities, noting that yoga is a “physical activity that prepares individuals for healthy, active lifestyles” (p. 786). Little is known regarding the specific mindfulness practices engaged by college students, as no studies currently exist which examine the prevalence of mindfulness practices among college students in relation to trait mindfulness ability.

State and Trait Mindfulness

Mindfulness can be categorized into state and trait mindfulness (Black, Sussman, Johnson, & Milam, 2012; K. W. Brown, Ryan, & Creswell, 2007). State mindfulness is considered to be the facilitation of mindfulness during a specific time period, for a specific intervention or intention (K. W. Ryan & Brown, 2003). Trait mindfulness is considered to be an overall encompassing trait one demonstrates throughout different events and time points, or one's disposition (K. W. Ryan & Brown, 2003). The most common way for assessing mindfulness ability is through measures aimed at trait mindfulness. Trait mindfulness is the most appropriate measurement for mindfulness to assess general mindfulness ability not related to a specific event or experience. The current project is a survey design and will specifically assess trait mindfulness due to the interest in general mindfulness ability versus response to a specific mindfulness intervention.

Assessing Mindfulness

With multiple measures assessing mindfulness ability currently in the literature, it can be challenging to know the construct specifically assessed by each. There are currently eight paper-and-pencil mindfulness scales aiming to measure trait mindfulness ability, ranging from unidimensional, bidimensional, and multidimensional formats. The Mindfulness Attention and Awareness Scale is a unidimensional measure that assesses mindfulness ability through one's "present-centered attention and awareness" (MAAS; K. W. Brown & Ryan, 2003, p. 824). This measure is included in the data collection for this study because it has high internal consistency ($\alpha = 0.92$) and has been used successfully

in prior studies to assess mindfulness ability in individuals who do not have previous experience with mindfulness practice. This measure would be particularly appropriate for college students who may or may not have had prior mindfulness experience (K. W. Brown & Ryan, 2003; Mrazek, Smallwood, & Schooler, 2012; B. W. Smith et al., 2011).

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a multidimensional measure of trait mindfulness assessed through five separate factors: nonreactivity to inner experience, nonjudging of inner experience, observation, acting with awareness, and describing. This scale is appropriate for individuals who have not had previous experience with mindfulness practices (Bodenlos et al., 2013; Fernandez, Wood, Stein, & Rossi, 2010). This measure has been widely used in the literature and appears to capture some of the more important factors relative to trait mindfulness (Roberts & Danoff-Burg, 2010). Other scales not chosen for the current study include: Cognitive and Affective Mindfulness Scale—Revised (CAMS-R; A. M. Hayes & Feldman, 2004; see also Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004), Toronto Mindfulness Scale (TMS; Lau et al., 2006), Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), Southampton Mindfulness Questionnaire (SMQ; Chadwick, Hember, Symes, Peters, Kuipers, & Dagnan, 2008), and Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006).

Recognizing that the construct of mindfulness does not have a sole recognized conceptualization, one unidimensional measure and one multidimensional measure will

be included in the proposed study (Ritchie & Bryant, 2012). The included measures were appropriate for individuals with or without familiarity to mindfulness terminology or mindfulness practice. The MAAS (K. W. Brown & Ryan, 2003) was chosen as a unidimensional measure of trait mindfulness because of its high internal consistency and regular use in studies measuring mindfulness. The originators conceptualize mindfulness ability to be comprised of present-centered attention and awareness, likely making the final score more interpretable than other unidimensional measures containing more than two blended factors. The second mindfulness measure that was included was the FFMQ (Baer et al., 2006). In this measure, trait mindfulness is conceptualized differently than that in the MAAS, yielding a different perspective. Trait mindfulness is conceptualized in five separate subscales, enabling specific examination of the components in the mindfulness construct: nonreactivity to inner experience, nonjudging of inner experience, observation, acting with awareness, and describing. Within college populations, the FFMQ has currently only been used in four studies, two of which did not involve associated variables of interest in the present study—sexual body esteem in only female college students (Fink, Foran, Sweeney, & O’Hea, 2009) and executive attentional performance (Josefsson & Anders, 2011). The third study that used FFMQ found the measure to adequately assess trait mindfulness ability for students who were not familiar with mindfulness terminology and appeared sensitive in measuring changes in mindfulness ability (Caldwell et al., 2010). The fourth study completed by Roberts and Danoff-Burg (2010), which is similar in nature to the present study, confirmed the measure as having sufficient use within survey style research and among college students,

evidencing a strong rationale for use within the current study.

Potential Health Correlates of Trait Mindfulness in College Students

Trait mindfulness, specifically its relation to potential health variables among college students, has not been examined previously. Although there have been mindfulness interventions aimed at increasing health variables, trait mindfulness is not commonly measured (Bergen-Cico, Possemato, & Cheon, 2013; Caldwell et al., 2010; Chase, 2009; Roberts & Danoff-Burg, 2010). Three exploratory surveys included trait mindfulness in methods: Chase, who explored the association with overall adjustment to college, A. Palmer and Rodger (2009), who examined the association to stress and coping styles, and Roberts and Danoff-Burg (2010), who assessed the association to stress and health perceptions. It seems important to measure mindfulness when utilizing an intervention also aimed at increasing mindfulness ability. It is important to better understand the relationship between trait mindfulness and health correlates, including overall mental health, perceived stress, physical health, eating, sleeping, and spirituality.

Roberts and Danoff-Burg (2010) found that college students reporting lower reported stress were also more likely to score higher mindfulness ability, noting that mindfulness ability is likely associated with positive health perceptions and behaviors. However, previous mindfulness experience and an alternative measure of mindfulness were not included in this study. Masuda, Anderson, and Sheehan (2010) also found that mindfulness was significantly predictive of positive mental health in African American college students. These findings suggest that there is a relationship between trait

mindfulness and health. Chase (2009) made an opposing conclusion after completing his exploratory survey, noting that trait mindfulness was in fact not significantly related to increased mental health. Looking at the lack of research utilizing trait mindfulness measures and Chase's differing conclusions, it appears important to expand on current research to better understand the relationship trait mindfulness has with specific health variables and previous mindfulness practices, which specifically has yet to be examined.

Mental Health

Trait mindfulness is a consistent positive correlate of mental health and might also shield against negative decision-making (Black et al., 2012; K. W. Brown et al., 2007). The benefits of having higher trait mindfulness have been demonstrated in various populations, from individuals who suffer from chronic mental disorders to those who experience general life stress (Chiesa & Serretti, 2009; Godfrin & Van Heeringen, 2010; Greeson, 2009; Grossman et al., 2004; Irving, Dobkin, & Park, 2009; S. L. Shapiro et al., 2008). McCracken and Yang (2008) measured mindfulness and health variables for rehabilitation workers' health and found that mindfulness was significantly related to decreased stress ($\alpha = 0.23$), increased social functioning ($\alpha = 0.44$), emotional functioning ($\alpha = 0.40$), and vitality ($\alpha = 0.43$). Keng, Smoski, and Robins' (2011) recent empirical review reports that mindfulness practices can improve overall mental health and is significantly related to better overall physical and mental health. A study assessing stress in therapists-in-training revealed that MBSR was effective at increasing mindfulness ability, which was correlated with a decrease in subjective reports of stress after an 8-week treatment (S. L. Shapiro, Brown, & Biegel, 2007). Carmody and Baer

(2007) found mindfulness ability to be significantly correlated with an increase in perceived stress ($\alpha = 0.44, p = 0.001$), psychological well-being ($\alpha = 0.49, p = 0.001$), and psychological symptoms ($\alpha = 0.49, p = 0.001$) for a sample of 174 patients. In a survey with 4,307 respondents, mindfulness practice, specifically yoga, was found to be related to stronger social relationships (67%), subjective well-being (86.5%), and a belief that yoga improved mental health (55.2%; Ross, Friedmann, Bevens, & Thomas, 2013).

A study treating 30 patients with PTSD found that a classic 6-week MBSR program was an effective treatment in decreasing reported stress ($p = 0.002$) and depression ($p = 0.005$) and increasing quality of sleep ($p = 0.035$), although no significant improvements on the MAAS were found (Kluepfel et al., 2013). Twenty-eight patients with chronic pain participated in an 8-week Mindfulness-Based Pain Management (MBPM) program and experienced improvements in mental health and an increase in perceived control of pain (C. A. Brown & Jones, 2013). In a longitudinal study, Miller et al. (1995) examined patients' anxiety levels after 3 years post an MBSR treatment and found that individuals who received the MBSR treatment were experiencing fewer panic attacks and had maintained more goals overall than an anxiety comparison group who did not receive the MBSR treatment. A novel mindfulness intervention called mindfulness-based art therapy was used with 191 women recovering from breast cancer, revealing improvements in psychosocial stress and overall mental health, especially those who reported higher levels of stress at baseline (Monti et al., 2012). Interested in identifying the difference between trait mindfulness and self-control in their relationship to healthy psychological functioning, Bowlin and Baer (2012) found that having a mindful

disposition to one's experiences was significantly correlated with greater overall mental functioning. One hundred thirty-one individuals with a subclinical level of stress and anxiety received 10 weekly sessions of yoga and reported a significant improvement in stress and anxiety in comparison to control group (C. Smith, Hancock, Black-Mortimer, Eckert, 2007). Murphy et al. (2012) found a direct relationship between trait mindfulness and health behaviors for college students (i.e., sleep, eating, and exercise) showing that a higher level of trait mindfulness is associated with more positive health behaviors.

Physical Health

Mindfulness-based interventions have shown a direct relationship with specific physical health outcomes. Prostate cancer patients experienced a significant decrease in blood pressure and enhanced cortisol and immune levels, as well as an increase in quality of life as measured by stress symptoms and mood disturbance (Carlson et al., 2007). A significant reduction in medical and psychological symptomatology was found for patients who completed more amounts of mindfulness practice (e.g., meditation) throughout an 8-week MBSR intervention, suggesting that engagement in mindfulness practice was directly related to a positive shift in health (Carmody & Baer, 2007).

Although shown with a small sample size ($n = 18$), Davis et al. (2007) found that 56% of smokers in a study who had engaged in a 6-week mindfulness intervention were more likely to have successfully abstained from tobacco use, confirmed with a 7-day point prevalence abstinence. These data suggest mindfulness engagement is significantly correlated with smoking cessation behavior.

Individuals with severe psoriasis experienced significant decreases in

symptomatology after engaging in meditation as an additional part of UV or PUVA light treatment (Kabat-Zinn et al., 1998). In a comparison study examining the change in reported pain for patients with rheumatoid arthritis with and without recurrent depression, Zautra et al. (2008) found the mindfulness meditation and emotion regulation treatment to be the most effective treatment in comparison to CBT. Individuals who had arthritis and recurrent depression were found to have the largest change in pre and postsymptomatology, specifically higher physician determined joint-functioning ratings. Patients with fibromyalgia who participated in twelve-weeks of classic tai chi versus a wellness education intervention experienced significant improvements in physical and mental functioning, as shown by significant decreases in symptom scores in comparison to control group (Wang et al., 2010). A few studies examining the outcomes of yogic participation revealed a positive relationship between higher amounts of participation and psychological well-being (Harinath et al., 2004), a decrease in schizophrenic symptoms and more appropriate social and occupational functioning when yoga was used as an adjunctive treatment (Duraiswamy, Thirthalli, Nagendra, & Gangadhar, 2007), significant improvements in anxiety, depression, anger, fatigue, and confusion for individuals in a psychiatric inpatient setting post yogic participation (Lavey et al., 2005), and an increase in overall physical fitness (Tran, Holly, Lashbrook, & Amsterdam, 2001).

Health in College Students

The health habits that are established between the ages of 19 and 28 are typically the same behaviors that individuals will practice later in life (Hamer et al., 2012). It is important to establish healthy physical and mental health behaviors during this time.

Research suggests a significant proportion of college students struggle to engage in healthy physical and mental health habits and these individuals may have heightened risk for developing future physical and mental health complications (Penedo & Dahn, 2005; Stoppa & Lefkowitz, 2010). College students are also at the highest risk for weight gain, which is linked with many other physical and mental health complications (Anderson, Shapiro, & Ludgren, 2003).

Mental health. General stress is a common problem for college students and is significantly related with lower reports of health quality (Misra, McKean, West, & Russo, 2000; Townsend et al., 2013). Rates of major depression, anxiety, and suicide among college students are of particular concern (Hunt & Eisenberg, 2010). In the 2008 National College Health Assessment sponsored by the American College Health Association, with 26,000 respondents throughout 70 colleges and universities, 1 in 10 students reported having considered a suicide attempt (American College Health Association, 2008). In a more recent longitudinal study, the Healthy Minds Study (Hunt & Eisenberg, 2010), which included student participation from 26 colleges and universities between 2007 and 2009, 17% of students reported positive results for depression, 9% for major depression, and 10% for anxiety disorder. Due to escalating depression and suicide rates, it is sensible to examine trait variables associated with mental health in college students. A study conducted by Christopher and Brennan (2010) revealed trait mindfulness as a mediator in facilitating the relationship between life satisfaction and decreased depressive symptoms within college students. More examination between specific mental health variables and trait mindfulness may encourage better interventions for mental health among college

students.

Health behaviors. Alcohol and tobacco use are common among college students (Palmer, McMahon, Rounsaville, & Ball, 2010; Rigotti, Lee, & Wechsler, 2000). Although conventional cigarette use is declining, electronic cigarette use is increasing, especially among college students (Ayers, Ribisl, & Brownstein, 2011). A study by Bowen and Marlatt (2009) revealed that college students who engaged in a mindfulness technique called urge surfing were less likely to continue tobacco use. Bodenlos et al. (2013) surveyed 310 students, finding alcohol consumption to be negatively related to mindfulness ability. Vernig and Orsillo (2009) also found that students who experienced mindfulness instruction were less likely to experience alcohol dependency. There appears to be a relationship specifically between negative health behaviors (i.e., tobacco use and greater alcohol consumption) and lower mindfulness ability.

Sleep. Many college students experience difficulties sleeping, with reports ranging from 31.6% to 64% of students (Buboltz, Brown, & Soper, 2000; Pilcher, Ginter, & Sadowsky, 1997). A 9-year prospective longitudinal study examined the relationship between childhood sleep problems and later adult-diagnosed depression and anxiety, evidencing that not only sleep disturbances can continue throughout one's life, but also that sleep problems are often times affected by one's level of stress and/or anxiety (Gregory et al., 2005).

Exercise. Examining exercise within the college populations has not been a high priority (Keating et al., 2005). Some of the most commonly documented unhealthy behaviors of college populations are low physical activity and high sedentary behavior

(Buckworth & Nigg, 2004). Caldwell et al. (2010) examined total pre and postmindfulness scores for students engaging in physical mindfulness exercise classes on campus and found increased mindfulness ability. In general, the relationship between exercise and positive mental health has been demonstrated in many studies with a consistent finding of lower physical activity associated with higher depression and anxiety symptoms (Paffenbarger, Lee, & Leung, 1994; Penedo & Dahn, 2005; Taylor, Sallis, & Needle, 1985). Physical activity programs result in similar improvements in depression symptomatology and general well-being as compared to psychotherapy (Penedo & Dahn, 2005). Adherence to an active lifestyle is oftentimes problematic for college students who usually report minimal to low amounts of exercise (Haberman & Luffey, 1998; Kilpatrick et al., 2011). Because one's mindfulness ability may impact awareness toward daily actions, increased mindfulness ability may have a direct impact on one's decision making, possibly encouraging more sound decision making and a healthier lifestyle.

Spirituality/religiosity. A few studies have looked at the relationship between mindfulness and spirituality and/or religiosity, but none to date have assessed this relationship within college students. Few studies have examined the association between religiosity/spirituality and mindfulness (Carmody et al., 2008; Leigh, Bowen, & Marlatt, 2005), making this an important variable to consider. Carmody et al. (2008) found that increased mental health was associated with both mindfulness ability and spirituality and Leigh et al. (2005) found a significant relationship between mindfulness and spirituality ($\alpha = 0.45, p = < 0.01$) and mindfulness and religiosity ($\alpha = 0.52, p = < 0.01$). A meta-

analysis examining religiosity, spirituality, and physiology concluded that higher amounts of religiosity, spirituality, and mindfulness were associated with lower blood pressure, among other health-related variables (Seeman, Dubin, & Seeman, 2003). The data for this study are also being collected in a predominantly religious area and it may be helpful to know the role that religiosity/spirituality plays in the relationship between mindfulness and associated variables.

Conclusions from the Literature Review

Mindfulness interventions and engagement in mindfulness practices are increasing across the U.S. Mindfulness training exists as a foci or one of the main focuses in multiple psychological therapies (e.g., MBSR, DBT, MBCT, ACT, and CBT). There have been meta-analyses and numerous studies documenting the positive effects of mindfulness-based interventions, which aim to increase mindfulness ability; however, mindfulness ability and its relation to mental and physical health outcomes have not been examined extensively. This is also commonly the case with mindfulness intervention research among college students, and there is a lack of clarity regarding the association of trait mindfulness, mindfulness practices, and health variables among this population. Examining the relationships between trait mindfulness and health variables is important for better understanding the effects of having a higher trait or dispositional mindfulness in everyday life. The current study examined the relationships of mindfulness, mindfulness experience, and general mental and physical health. A better conceptualization of these variables may facilitate ways in which college students can be

better supported throughout their education and paint a more detailed picture of how one's trait mindfulness is associated with other important areas of his or her life.

Research Purpose and Study Objectives

The primary purpose of this study was to examine the relationship of trait mindfulness with physical and mental health-related quality of life among college students. The purpose of this study was realized through *four main objectives*. The *first objective* was to assess the existence of trait mindfulness ability and mindfulness practices in a general college population. The *second objective* was to examine the relationship between mindfulness ability and mental health in a general college population. The *third objective* was to examine the relationship between mindfulness ability and physical health in a general college population. The *fourth objective* was to examine the relationship between mindfulness ability and health behaviors, specifically exercise/physical activity, diet, substance use, and spirituality/religiosity.

Research Aims

This study addressed the following research aims related to objective 1.

1. Describe the existence of trait mindfulness ability in a general college population.
2. Describe the type of mindfulness practices, current time spent engaged, and previous time engaged in a mindfulness practice.
3. Describe the relationship between time spent in mindfulness practice and trait

mindfulness.

4. Describe the correlations among specific mindfulness practices with trait mindfulness.

This study addressed the following research aims related to objective 2.

5. Examine the relationship between trait mindfulness and specific mental health variables (i.e., perceived stress, mental health, vitality, social functioning, emotional, and depression).

This study addressed the following research aims related to objective 3.

6. Explore the relationship between trait mindfulness and physical health for the general college population.

This study addressed the following research aims related to objective 4.

7. Examine the relationship between trait mindfulness ability, mindfulness practices, and health-behaviors (diet, physical activity, substance). Locate variables that are more predictive of greater trait mindfulness ability.

8. Examine the relationship that exists between mindfulness ability, mindfulness practices and religiosity/spirituality in the general college population.

CHAPTER III

METHODS

This study used a web-based survey designed to assess trait mindfulness ability, physical and mental health, and health behaviors in a sample of Utah State University (USU) undergraduate students. By completing the survey, students had the choice to be awarded credit for a specific psychology course, by receiving three credits in Sona (psychology department research participation tracking system), and also to enter a raffle to win one of four Visa gift cards.

Population and Sample

Undergraduate students at USU who were either part time or full time (i.e., enrolled in at least 6 credits, or 12 credits, respectively) were eligible to participate in this study. Using methods utilized by Murphy et al. (2012), students were recruited for participation through introductory psychology courses and also through printed posters hung around campus. Examples of a newspaper ad, flyer, and announcement are located in Appendix A. The informed consent that was used is located in Appendix B. An a priori power analysis was completed using G*Power. A minimum sample size of 175 was determined as necessary in order to obtain a hypothesized effect size of 0.15 and power of 80% (Baguley, 2004). The undergraduate student body at USU consisted of 14,759 students, thus a 0.01% response was necessary.

Study Design

This study utilized a cross-sectional descriptive survey design. Descriptive studies are typically utilized in new areas of research or when new populations are being examined and are helpful in collecting information without manipulating the participant's environment (Baer, 2003; Trochim, 2001). Descriptive studies involve more simple procedures of data collection, including survey and interview. The current study only utilized a descriptive study design. This method of data collection is also most appropriate given the size of participants needed.

Data and Instrumentation

The measures described below were chosen to assess information on specific variables, including current mental and physical health status, previous mindfulness experience, mindfulness ability, and common health-related behaviors like physical activity, smoking, binge drinking, and diet. Table 1 summarizes the study variables included in this study. The survey was administered through Qualtrics Survey Research Suite, a web-based tool available for use through USU. The survey in its entirety is located in Appendix C.

Demographics Information

A demographic questionnaire consisting of 16 questions was used to collect demographic information, including gender, age, ethnic identity, income, educational attainment, and religious/spiritual affiliation.

Table 1

Study Variables

Study variables	Measures
Demographic variables	Demographic questionnaire
Biological sex	Male/female
Age	Date of birth
Relationship status	Single, Married, Separated/Divorced/Widowed
Ethnicity	Ethnic Background
Educational attainment	Current level of education, years in college
Mindfulness experience	Previous mindfulness experience and current mindfulness practice (yes/no)
Mindfulness practice – type	Type of previous and current mindfulness practice
Mindfulness practice – time	Amount of previous and current mindfulness practice (time spent)
Reason for involvement	Type of reason for involvement in practice
Trait mindfulness ability	FFQ and MAAS total scores
Nonreactivity to inner experience	FFMQ factor “nonreactivity to inner experience”
Nonjudging of inner experience	FFMQ factor “nonjudging of inner experience”
Observation	FFMQ factor “observation”
Acting with awareness	FFMQ factor “acting with awareness”
Describing	FFMQ factor “describing”
Health-related behaviors	
BMI physical condition	BMI: Using reported height and weight
Physical activity	IPAQ-SF
Tobacco use	Tobacco use and amount during last month
Binge drinking	Binge drinking during last month
Stress	Perceived Stress Scale (PSS)
Health status/functioning	
Physical health	SF36v2 Physical Health Component Summary Scale <i>t</i> scores (PCS)
Physical functioning	SF36v2 Physical Functioning subscale score (PF)
Role-physical	SF36v2 Role-Physical subscale score (RP)
Bodily pain	SF36v2 Bodily Pain subscale score (BP)
General health	SF36v2 General Health subscale score (GH)
Mental health	SF36v2 Mental Health Component Summary Scale <i>t</i> scores (MCS)
Vitality	SF36v2 Vitality subscale score (VT)
Social functioning	SF36v2 Social Functioning subscale score (SF)
Role-emotional	SF36v2 Role-Emotional Functioning subscale score (RE)
Mental health (MH)	SF36v2 Mental Health subscale score (MH)
Depression	Beck Depression Inventory (BDI)

(table continues)

Study variables	Measures
Religious and spiritual beliefs	Ratings on the BMMRS 12 subscales
General religiosity/spirituality	Individual's perception of God (experience rather than cognitive)
Daily spiritual experiences	Search for meaning
Meaning	Value placed on religion itself
Values	Central beliefs
Beliefs	Forgiveness in relation to self, others, and God
Forgiveness	Private religious and spiritual practices
Private religious experiences	Religious and spiritual coping with stressful life events
Religious and spiritual coping	Relationships within place of worship
Religious support	Religious and spiritual history
Religious/spiritual history	Commitment to one's religious and spiritual beliefs
Commitment	Involvement within a public religious institution
Organizational religiousness	Identification of religious tradition or preference
Religious preference	

Mindfulness Experience

Mindfulness experience was assessed through seven main questions, with 16 possible subquestions, specifically developed for this survey. The questions appeared within the demographics questionnaire and will assess for previous mindfulness experiences, current mindfulness practice, type of previous and/or current mindfulness practices, amount of time previously and/or currently engaged in mindfulness practices, and reason for involvement.

Mindfulness Ability

The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item questionnaire that assesses trait mindfulness. Factors are: nonreactivity to inner experience, nonjudging of inner experience, observation, acting with awareness, and describing (Baer et al., 2006). Internal consistency ranges from $\alpha = .75$ to $\alpha = .91$ for the five separate constructs

(Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

This questionnaire is appropriate for individuals who do and do not report engaging in a meditation practice, making this questionnaire appropriate for individuals without previous formal mindfulness engagement (i.e., individuals who take this questionnaire do not need to be privy to mindfulness verbiage).

The Mindful Attention Awareness Scale (MAAS) is a 15-item measure that assesses trait mindfulness for individuals who have not had previous experience with mindfulness skills training through statements covering cognitive, emotional, physical, interpersonal and general domains. Internal consistency is $\alpha = 0.92$ and test-retest reliability is $\alpha = 0.81$ (Brown & Ryan, 2003).

Health Status and Current Functioning

The Short Form Health Survey (v2; Ware, Kosinski, Dewey, & Gandek, 2000) assesses the global quality of life through eight subscales, yielding an understanding of general health: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health (Ware & Sherbourne, 1992). Two summary scales are created from the eight subscales: the Physical Health Component Summary Scale (PCS), which yields a specific measure of general physical health and overall physical functioning, and the Mental Health Component Summary Scale (MCS), which yields a specific measure of psychological distress and overall psychological functioning. The SF-36v2 has strong test-retest reliability: the PCS $\alpha = 0.92$ and the MCS $\alpha = 0.91$ (Gandek, Sinclair, Kosinski, & Ware, 2004).

The Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) was used to

assess for clinical and subclinical levels of depression through symptoms and attitudes characteristic of depression disorder. The attitudes and symptoms covered in the measure include: mood, pessimism, sense of failure, lack of satisfaction, guilt feelings, sense of punishment, self-dislike, self-accusation, suicidal wishes, crying, irritability, social withdrawal, indecisiveness, distortion of body image, work inhibition, sleep disturbance, fatigability, loss of appetite, weight loss, somatic preoccupation, and loss of libido. The cut-off scores for the BDI help distinguish individuals as having an affective disorder: < 10 = no or minimal depression, 10-18 = mild to moderate depression, 19-29 = moderate to severe depression, and 30-63 = severe depression. The BDI contains high internal consistency and external validity shown by high correlations with other measures examining depression (Beck et al., 1988).

Health-Related Behaviors

The International Physical Activity Questionnaire—Short Form (IPAQ-sf) is designed as an adaptable measure for physical activity ranging from walking to vigorous activity through four generic items. The IPAQ-sf collects information on health-related physical activity throughout the respondent's last 7 days. It has been translated into over 20 languages and has also been used in many populations, including college students (Craig et al., 2003; Dinger, Behren, & Han, 2006). The instrument explains vigorous, moderate, walking, and sitting assesses activity through questions such as, "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?" The correlation between the IPAQ-sf and objective standards are of consideration, which range from $r = 0.09$ to $r = 0.39$ (Lee, Macfarlan,

Lam, & Stewart, 2011). Test-retest reliability within the U.S. is $\alpha = 0.80$ (Craig et al., 2003).

BMI was calculated via participants' reported weight and height. Although individuals may have tendencies to inaccurately self-report weight, this is more common in older adults and will not be of major concern in this study given the anonymity as well, which also helps yield more accurate responses (Brener, Billy, & Grady, 2003; Kuczmarski, Kuczmarski, & Najjar, 2001). The study assessed for binge drinking using the following question: Think back over the last month. How many times have you had five or more drinks* at one sitting? (*A drink is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, or a mixed drink.) Participants answered: 1. None, 2. Once, 3. Twice, 4. 3 to 5 times, 5. 6 to 9 times, or 6. 10 or more times. The study assessed for tobacco use using the following question: If you use tobacco (i.e., smoke or oral use), how many servings do you consume throughout one day? (One serving = one cigarette or that equivalent of oral tobacco product such as Snuff.) Participants answered 1 = None, 2 = One, 3 = Less than 6, 4 = Between 7 and 19, or 5 = 20 (1-pack) or more.

Stress was assessed in this study using the 10-item Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstien, 1983). This measure has high reliability ($\alpha = 0.85$ for 2-day retest and $\alpha = 0.55$ for 6-week retest). There does not appear to be male and female group differences and is significantly correlated with stressful life events and general psychopathology, especially for people between the ages of 22 to 35 ($p < .001$; Cohen et al., 1983).

Religious and Spiritual Beliefs

Participants recruited for this study lived in a predominantly religious area and had a greater chance of specific religious and/or spiritual practice involvement that might have been helpful in explaining possible differences in mindfulness ability. In order to better understand the participant pool, religious and spiritual beliefs were important data to collect in the current study. Religiosity and spirituality was assessed using the Brief Dimensional Measure of Religiosity and Spirituality (BMMRS; Fetzer Institute/National Institute on Aging Working Group, 1999). The BMMRS is a 28-item self-report measure that assesses religiosity and spirituality through twelve subscales: daily spiritual experiences, meaning, values, beliefs, forgiveness, private religious experiences, religious and spiritual coping, religious support, religious/spiritual history, commitment, organizational religiousness, and religious preference. The BMMRS has good test-retest reliability; $\alpha = 0.66$ and strong internal consistency, Cronbach's $\alpha = 0.90$ (Masters et al., 2009).

Data Analysis

Data were analyzed using the Statistical Package for Social Sciences version 22 (SPSS 22.0). Descriptive statistics were calculated, including percentages, means, and standard deviations, in order to describe the sample according to the study variables. Pearson r correlation coefficients were used to examine relationships among study variables.

CHAPTER IV

RESULTS

Introductory Statement

Survey data were collected during the fall 2014 semester and were analyzed using SPSS during the spring semester. Data were cleaned, screened for outliers, and assessed for missing data after completion of the survey. Results of the study are organized as follows: (a) existence of trait mindfulness ability, (b) description of mindfulness practices with current and previous time spent engaged, (c) relationship between time spent in mindfulness practice and trait mindfulness ability, (d) relationships found between specific types of mindfulness practices and trait mindfulness ability, (e) relationships between trait mindfulness ability and specific mental health variables, (f) evaluate the relationship between trait mindfulness ability and physical health, (g) health behaviors predictive of greater trait mindfulness ability, and (h) relationship between religiosity/spirituality and trait mindfulness ability.

Response Rates and Treatment of Missing Data

Three hundred sixteen participants (female $n = 228$, male $n = 88$) responded to the survey versus an estimated 800 students who were solicited to participate (overall response rate of 39.5%). This response rate appears quite adequate considering the national average college student response rate for paper and online surveys is 49.44% (Jans & Romans, 2007) and the mean response rate for web-based-only surveys of

college students is 32% (Sax, Gilmartin, Lee, & Hagedorn, 2008). Of the 316 participants who began the survey, 300 completed the survey (completion rate of 94.9%, female $n = 218$, male $n = 82$). Twenty-five respondents were labeled as poor responders due to missing at least 50% of data and were excluded from subsequent analyses. In sum, 275 participants were included in the final analyses. Given the correlational nature of this study, survey completion of less than 50% may limit generalizability (Rogelberg & Stanton, 2007). No statistically significant differences among demographics were found between participants who dropped out and those who completed the survey (see Table 2). These analyses suggest that response rates were not differentially related to participant demographic variables.

Relative to the survey, up to 50% of data were missing for the FFMQ for 26 respondents (9% of the sample). No statistically significant differences were found among demographic variables between poor FFMQ responders and complete responders (see Table 3).

Table 2

Analysis of Between Group Differences (Omnibus) on Demographic Variables

Outcome variable	Dropout ($n = 25$)		Completed ($n = 275$)		Mean difference	t	p	ES
	Mean	SE	Mean	SE				
Sex ^b	1.65	0.10	1.73	0.03	-0.08	-0.83	0.41	-0.17 ^d
Rx. status ^c	1.46	0.13	1.39	0.05	0.08	0.48	0.63	0.14 ^e
Year ^d	2.54	0.29	2.11	0.09	0.43	1.42	0.16	0.13 ^e

^aBiological sex (1 = male, 2 = female).

^bRelationship.

^cYear in school.

^dCohen's d refers to the difference between two means divided by standard deviation.

^ePhi coefficient (ϕ) refers to the measure of association between categorical variables.

Table 3

Analysis of Between Group Differences (FFMQ) on Demographic Variables

Outcome variable	Poor responders		Complete responders		Mean difference	<i>t</i>	<i>P</i>	<i>ES</i>
	Mean	<i>SE</i>	Mean	<i>SE</i>				
Sex ^a	1.41	0.05	1.37	0.10	0.04	0.34	0.73	.05 ^d
Rx. ^b status	2.11	0.10	2.07	0.20	0.03	0.16	0.88	.16 ^e
Year ^c	1.78	0.03	1.65	0.07	0.13	1.23	0.35	.14 ^e

^a Biological Sex (1 = male, 2 = female).

^d Relationship status.

^e Year in school.

^f Cohen's *d* refers to the difference between two means divided by standard deviation.

^g Phi coefficient (ϕ) refers to the measure of association between categorical variables.

These nonstatistically significant independent *t* tests suggest that FFMQ scores were not differentially biased in terms of measured demographic variables across poor and complete responders. Fortunately, no more than 9% of data were missing for any FFMQ subscale. Variables are not at risk for systematic bias when less than 10% is missing (Bennet, 2001) and 5% or less of missing data is likely to be inconsequential (Graham, 2009). Missing data were imputed with linear interpolation (LINT; Twisk & deVente, 2002), which uses the surrounding data points before and after a missing data point to predict the missing data. The procedure uses a least squares OLS regression to predict the missing values. Using the LINT method for data imputation did not significantly impact central tendency or variability (see Table 4).

No other formal imputation techniques were used to account for missing data. All other scales had complete data or were missing less than 5% of data, which is likely inconsequential given the sample size (Graham, 2009).

Table 4

Means and Standard Deviations for the FFMQ Subscales, Pre and Post LINT

FFMQ subscales	Original data (<i>n</i> = 249)		Amount missing (%)	New data (<i>n</i> = 275)	
	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>
Observe	27.12	5.34	9	26.87	5.31
Describing	25.67	6.62	5	25.68	6.58
Aware	26.07	5.70	6	26.20	5.70
Nonjudging of inner experience	25.62	7.30	6	25.57	7.19
Nonreactivity of inner experience	20.97	4.63	4	20.95	4.58

Construct of Trait Mindfulness Ability in College Students

The first research aim of this study was to describe the construct of trait mindfulness ability in a general college population. To address this objective, the participants were asked to complete two validated measures assessing trait mindfulness ability: the MAAS, a unidimensional measure, and the FFMQ, a multidimensional measure. Descriptive statistics and comparison norms for these measures are contained in Table 5. The present data corresponded with existing college student norms, with the exception of the FFMQ subscale Observe. On average, the current sample scored higher on this subscale than the population norms. Given largely, small effect sizes on these particular scales, it appears the present sample is reflective of general population norms for these measures.

Table 5

Mindfulness Ability in College Students as Measured by Self-Report

Scales	Total sample (<i>N</i> = 275)		College student norms ^a (MAAS <i>n</i> = 2,277) (FMMQ <i>n</i> = 259)		General population <i>ES</i> ^b
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
MAAS	3.63	0.76	3.83	0.70	-0.27
FMMQ-observe	26.86	5.31	24.32	4.84	0.50
FFMQ-describing	25.68	6.58	26.46	6.01	-0.12
FFMQ-acting with awareness	26.20	5.70	25.31	5.77	0.16
FFMQ-nonjudgement ^c	25.57	7.19	27.75	5.90	-0.33
FFMQ-nonreactivity ^d	20.95	4.58	20.50	3.82	0.11

^a Baer et al. (2008), MacKillop & Anderson (2007).

^b Effect size represents Cohen's *d*.

^c Nonjudgment to Inner Experience.

^d Nonreactivity to Inner Experience.

Description of Current and Previous Mindfulness Practice

The second research aim of this study was to describe participant mindfulness practice experience, both previous and current. To address this objective, study participants were asked if they had ever engaged in a mindfulness practice and if they answered yes, were asked to describe both previous and current engagement, if applicable. Participants were asked to identify the type(s) of the mindfulness practice as well as how often they had engaged the practice in an average week for both previous and current practice. A total time variable was created by combining the reported weekly times per practice type (i.e., yoga time + meditation time = total time). Descriptive statistics for these analyses are contained in Figure 1. This figure describes the amount of

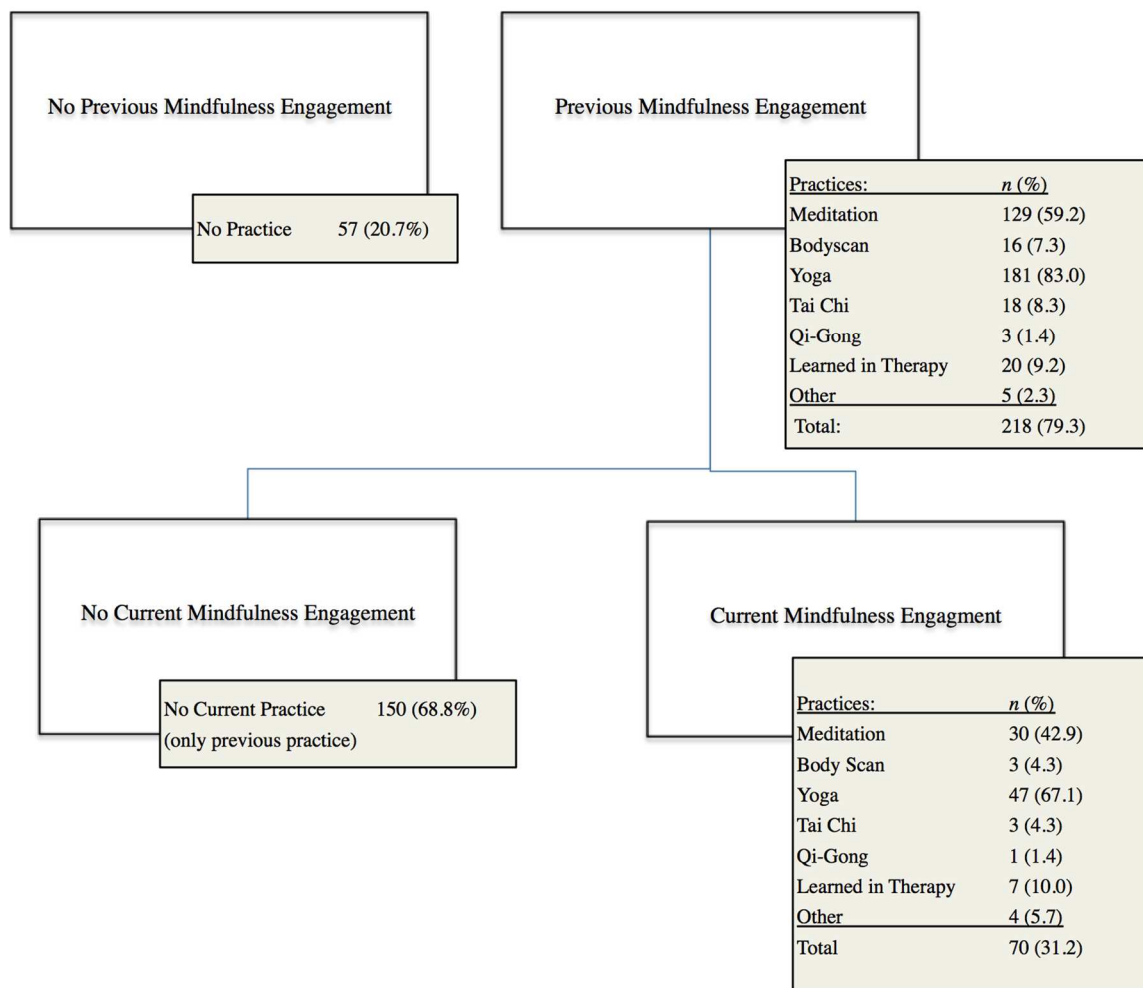


Figure 1. Description of previous and current mindfulness engagement ($n = 275$).

respondents who reported some previous mindfulness engagement and those who did not. It also shows how many people who had been previously engaged in mindfulness practice continued their practices on a weekly basis. Because respondents were able to identify multiple types of mindfulness practices, the total number of each specific engagement is greater than the total sample size.

Seventy-nine percent of the sample ($n = 218$) had previously engaged in some form of mindfulness and 32% ($n = 70$) of this subsample reported continuing mindfulness

practice. Meditation and yoga were the most popular types of previous and current mindfulness practices. Body scan and mindfulness learned in therapy were the second most popular types of previous mindfulness practices. Respondents who previously engaged in yoga were more likely to continue yoga practice in comparison to other types of previous mindfulness practices. Out of 83% of individuals who engaged in yoga previously, 57% reported still engaging in the practice. Participants who reported current mindfulness engagement were also asked to report on reasons for continuing practice. This question was given to the 70 respondents who reported current mindfulness engagement (see Table 6). Over half of the individuals ($n = 39, 55.7\%$) reported that they engaged in their practice to improve physical and mental health.

Time Spent in Mindfulness Practice and Trait Mindfulness Ability

The third research aim of this study was to explore the relationship between time spent in mindfulness practice and trait mindfulness ability. Impact of mindfulness engagement was examined by comparing trait mindfulness ability, as measured by the

Table 6

Main Reason for Engaging in Current Mindfulness Practice

Reasons for engaging in practice	<i>n</i>	%
Engaging in current practice	70	100.0
To improve my physical health	6	8.6
To improve my mental health	11	15.7
To improve my physical and mental health	39	55.7
For spiritual reasons	8	11.4
To earn course credit	1	1.4
Other	3	4.3

MAAS and FFMQ subscales, for respondents who reported mindfulness experiences versus those who did not. There were no significant differences regarding trait mindfulness ability for individuals who reported previous mindfulness engagement and those who did not (see Table 7).

An overall mindfulness engagement time variable was correlated with mindfulness ability as measured by the MAAS and FFMQ subscales. On average, participants who reported previous mindfulness experiences ($n = 218$) identified that they previously spent 2.02 hours ($SD = 1.80$) on average per week in mindfulness activities. Seventy of the 218 participants (31.2%) who reported previous mindfulness engagement stated they continued to engage in mindfulness practice for about 2.84 hours ($SD = 2.43$) on average per week. Differences between mindfulness engagement types are found in Table 8. Yoga was the most commonly engaged practice, as measured by weekly hour engagement.

Table 7

Trait Mindfulness Ability In Relation To Mindfulness Experience

Scales	No mindfulness experience ($n = 57$)		Mindfulness experience ($n = 218$)		ES^a
	M	SD	M	SD	
MAAS	3.60	0.74	3.64	0.77	-0.05
FMMQ-observe	25.24	6.37	27.59	4.96	-0.41
FFMQ-describing	25.54	6.94	25.70	6.55	-0.02
FFMQ-acting with awareness	26.57	5.87	25.93	5.67	0.11
FFMQ-nonjudgement ^b	26.17	7.38	25.48	7.29	0.09
FFMQ-nonreactivity ^c	21.25	5.31	20.89	4.44	0.07

^a Effect size represents Cohen's d .

^b Nonjudgment to Inner Experience.

^c Nonreactivity to Inner Experience.

Table 8

Previous and Current Types of Mindfulness Engagement with Time Spent

Types of mindfulness engagement	< 1 hour		1-2 hours		3-5 hours		5+ hours	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Previous mindfulness engagement (<i>n</i> = 218)								
Meditation	94	43.1	29	13.3	5	2.3	-	-
Body scan	11	5.0	4	1.8	1	0.5	-	-
Yoga	74	33.9	87	39.9	18	8.3	2	0.9
Tai-Chi	9	4.1	8	3.7	1	0.5	-	-
Qi-Gong	2	0.9	1	0.5	0	0	-	-
Learned in therapy	10	4.6	6	2.8	4	9.2	-	-
Other	3	1.4	1	.5	1	0.5	-	-
Current mindfulness engagement (<i>n</i> = 70)								
Meditation	13	18.6	10	14.3	5	7.1	2	2.9
Body Scan	0	0	3	4.3	0	0	0	0
Yoga	13	18.6	26	37.1	8	11.4	-	-
Tai-Chi	2	2.9	1	1.4	-	-	-	-
Qi-Gong	1	1.4	-	-	-	-	-	-
Learned in Therapy	3	4.3	3	4.3	1	1.4	-	-
Other	1	1.4	2	2.9	1	1.4	-	-

Correlations were calculated for trait mindfulness and previous time spent in mindfulness practices for all respondents who reported either previous and/or current mindfulness engagement (see Table 9). Statistically significant relationships of time spent in mindfulness with two of the FFMQ subscales were observed for previous mindfulness engagement: observe ($r = 0.26, p < .01$); describing ($r = 0.19, p = .006$), and nonjudging of inner experience ($r = -0.16, p = .022$).

Correlations were calculated for trait mindfulness and previous time spent in mindfulness practices for those who reported current mindfulness engagement. Contrary to what was found in the larger group analysis, there were not statistically significant

Table 9

Correlations for Past Mindfulness Time Engagement and Trait Mindfulness Ability

Time variable	1	2	3	4	5	6
Previous time in mindfulness engagement ^a	0.04	0.26**	0.19*	0.06	-0.16*	0.03
Current time in mindfulness engagement ^b	0.01	0.20	-0.12	-0.03	-0.02	-0.01

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

^a $n = 218$.

^b $n = 70$.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

correlations between time spent in mindfulness and mindfulness ability as measured by FFMQ subscales Observe, Describing, and Nonjudging of Inner Experience for the current mindfulness engagers (see Table 9).

Specific Mindfulness Practices and Trait Mindfulness Ability

The fourth research aim of this study was to examine the relationship between specific mindfulness practices and trait mindfulness ability. Responses regarding past and current mindfulness practices were used. Data were first analyzed including all participants who reported previous mindfulness engagement, either only previously or previously and currently (see Figure 1 for subsample totals). All correlations are provided in Table 10. Previous time spent in meditation was significantly correlated with the FFMQ Observe subscale for individuals who had reported previous mindfulness experience ($n = 128$, $r = .213$, $p = .016$). Previous time spent engaged in yoga was significantly correlated with the FFMQ subscale Observe ($n = 181$, $r = .195$, $p = .009$) and the FFMQ subscale Describe ($n = 181$, $r = .169$, $p = .023$).

Table 10

Correlations for Past Mindfulness Engagement and Trait Mindfulness Ability (n = 218)

Time variable	1	2	3	4	5	6
Meditation	0.06	0.21*	0.07	0.17	0.05	-0.04
Body scan	-0.07	-0.33	0.12	0.22	0.09	0.16
Yoga	0.07	0.20**	0.17	0.02	-0.07	0.01
Tai-Chi	0.17	0.21	0.12	0.12	-0.09	0.32
Qi-Gong	-0.25	-0.12	0.64	0.28	-1.00	0.00
Learned in therapy	0.002	0.09	0.10	-0.003	-0.61	-0.39
Other	0.16	0.08	0.77	0.20	-0.43	0.54

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Data were then analyzed with all participants who reported that they had been currently engaged in a mindfulness practice (see Table 11). There were no other statistically significant relationships found. Analyses examining the relationship between mindfulness ability and time spent in specific practices included small subsamples (e.g., $n < 10$), thus contributing little power.

Trait Mindfulness Ability and Mental Health Variables

The fifth research aim was to describe the relationship of trait mindfulness and key mental health variables. Mental health subscales of the SF-36, the BDI, and the PSS were used. All means and standard deviations for the scales, including comparison groups, are available in Tables 12 and 13. Compared to the general college population, the study sample scored slightly lower for depression symptoms as measured by the BDI and PSS scores were commensurate.

Table 11

Correlations for Past Mindfulness Engagement and Trait Mindfulness Ability (n = 70)

Time variable	1	2	3	4	5	6
Meditation	0.23	-0.05	-0.16	0.17	0.08	-0.01
Body scan	-	-	-	-	-	-
Yoga	-0.07	0.09	-0.05	-0.22	-0.25	-0.07
Tai-Chi	-0.52	-0.90	-0.50	-0.68	-0.80	-0.82
Qi-Gong	-	-	-	-	-	-
Learned in therapy	0.46	0.52	-0.05	0.18	-0.65	0.54
Other	-0.60	0.22	-0.38	-0.44	-0.32	0.96

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 12

Beck Depression Inventory and Perceived Stress Scale Outcomes with Comparisons

Mental health variables	Total sample (N = 273)		College student norms		ES ^a
	M	SD	M	SD	
Beck Depression Inventory	8.56	8.43	10.27 ^b	1.98	-0.28
Perceived Stress Scale	16.37	1.66	15.83 ^c	7.90	0.09

^a Effect size represents Cohen's *d*.

^b General college population, N = 2,000 (Cohen & Janicki-Deverts, 2012).

^c General college population, N = 75 (Haztenbuehler, Parpal, & Matthews, 1983).

Respondents in the current study scored differently than the general population on a few subscales of the SF-36 (see Table 13). The current sample scored higher for the physical functioning subscale, suggesting that overall their behavioral activities are less likely to be adversely impacted by health problems. The current sample also scored lower for role-emotional functioning and social functioning, suggesting that emotional problems are commonly negatively impacting their ability to engage in work, other daily

Table 13

SF-36(v.2) Multidimensional Health Outcomes and Comparisons

SF-36 scale scores	Total sample (<i>n</i> = 275)		General population norms ^a		<i>ES</i> ^b
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Physical functioning ^c	54.05	5.84	50.00	10.00	0.49
Role-emotional functioning ^d	41.58	12.00	50.00	10.00	-0.76
Role-physical functioning ^c	51.46	7.66	50.00	10.00	0.16
Social functioning ^d	44.80	10.54	50.00	10.00	-0.51
Mental health ^d	49.10	10.35	50.00	10.00	-0.09
Bodily pain ^c	50.39	8.20	50.00	10.00	0.04
Vitality ^c	52.44	8.99	50.00	10.00	0.26
General health ^c	48.96	8.83	50.00	10.00	-0.11
Physical component summary	54.04	6.71	50.00	10.00	0.47
Mental component summary	44.13	12.36	50.00	10.00	-0.52

^a General population, *N* = 4,070 (Ware et al., 2000).

^b Effect size represents Cohen's *d*.

^c Signifies physical health variables.

^d Signifies mental health variables.

^e Role-Emotional scale: higher scores are indicative of less interference with daily functioning due to emotional problems.

^f Mental Health scale: higher scores are indicative of more nervousness and depression.

routines, and social functioning. Vitality was also higher for the current sample, indicating that the current sample feels more energetic and less fatigued than the general population. Overall, the current sample reports greater physical health and decreased mental health than the general population.

Correlations between trait mindfulness ability scales and the BDI and PSS were calculated (Table 14). The BDI was negatively significantly related to all FFMQ subscales and not related to the MAAS. Perceived stress was significantly negatively related to the MAAS and following FFMQ subscales: describing, acting with awareness, and nonjudging of inner experience.

Table 14

Correlations for Trait Mindfulness Ability and Perceived Stress and Depression (n = 275)

Mental health variables	1	2	3	4	5	6
Beck Depression Inventory	0.06	-0.25**	-0.40**	-0.51**	-0.26**	-0.36**
Perceived Stress Scale	-0.02	-0.14*	-0.23**	-0.24**	-0.11	-0.14*

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Significant correlations were found between SF-36(v2) subscales and trait mindfulness ability variables (see Table 15). Decreased emotional problems adversely impacting work and other related functioning, as measured by the SF-36 subscale role-emotional functioning, was significantly related to increased trait mindfulness as measured by the MAAS and the following FMMQ subscales: observe, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. Greater feelings of nervousness and depression, as measured by the SF-36 subscale mental health, was significantly related to increased trait mindfulness as measured by the MAAS and the following FFMQ subscales: observe, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience.

Social functioning was also significantly related to the MAAS and the following FFMQ subscales: observe, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience.

Trait Mindfulness Ability and General Physical Health

The sixth aim of the study was to evaluate the relationship between trait

Table 15

Correlations for Trait Mindfulness Ability and SF-36(v2) (n = 275)

SF-36 subscales	1	2	3	4	5	6
Physical functioning ^a	0.12	0.01	0.08	0.10	0.02	0.07
Role-emotional functioning ^{bc}	0.40**	-0.08	0.19**	0.39**	0.37**	0.27**
Role-physical functioning ^a	0.22	0.01	0.11	0.09	0.11	0.09
Social functioning ^b	0.32**	-0.05	0.21**	0.34**	0.38**	0.23**
Mental health ^{bd}	0.40**	0.10	0.28**	0.49**	0.46**	0.39**
Bodily pain ^a	0.08	-0.16**	0.10	0.10	0.15*	0.04
Vitality ^a	0.35**	0.08	0.28**	0.37**	0.28**	0.27**
General health ^a	0.27**	0.04	0.13*	0.26**	0.16**	0.19**
Physical component summary	-0.003	-0.05	0.01	-0.09	-0.12*	-0.07
Mental component summary	0.41**	0.01	0.26**	0.47**	0.46**	0.36**

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

^a Signifies physical health variables.

^b Signifies mental health variables

^c Role-Emotional scale: higher scores are indicative of less interference with daily functioning due to emotional problems.

^d Mental Health scale: higher scores are indicative of more nervousness and depression.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

mindfulness ability and physical health. Physical health subscales of the SF-36(v2) and BMI were used in analyses. Descriptive statistics and normative comparisons for the SF-36(v2) are located in Table 13 and descriptive statistics with norms for BMI are located in Table 16. The participants in the current study were average compared to national averages and similar studies.

Correlations were calculated between trait mindfulness variables and the physical health subscales from the SF-36(v2) and BMI. There were multiple significant correlations between the physical health subscales of the SF-36(v2) and the MAAS and FFMQ subscales for the entire sample (Table 15). Bodily pain that interfered throughout

Table 16

Descriptive Statistics for BMI

Weight variables	Total sample ($N = 275$)				General population norms ^a				ES^b
	M	SD	n	%	M	SD	n	%	
BMI	23.77	4.23			25.09	5.16			-0.28
Underweight			8	2.9					
Healthy weight			190	69.1 ^c			2937 ^d	31.2	
Overweight			52	18.9			3115	33.1	
Obese			24	8.7			3953 ^e	42.0	

^a BMI from general college population, $N = 384$ (Holland & Graves, 2013), Categories from U.S. National Survey,

$N = 9412$ (National Health and Nutrition Examination Survey, NHANES, 2010).

^b Effect size represents Cohen's d .

^c 61.4% of college students are at healthy weight (American College Health Association, ACHA, 2008)

^d NHANES reported statistics combine underweight and healthy weight categories.

^e NHANES reported statistics combine obese and extreme obese categories ($BMI > 30$).

the previous month was negatively significantly related to the FFMQ subscale Observe. Feeling energetic, as measured by SF-36 subscale vitality, was significantly related to the MAAS and the following FFMQ subscales: observe, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. Increased perceived physical health, as measured by SF-36 subscale general health, was also significantly related to the MAAS and the following FFMQ subscales: observe, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. There were no significant correlations between trait mindfulness variables and BMI (see Table 17), suggesting no relationship between BMI and trait mindfulness ability.

Health Behaviors and Trait Mindfulness Ability

The seventh aim of the study was to identify health behaviors predictive of greater trait mindfulness ability. Health behaviors assessed in the current study, tobacco use,

Table 17

Correlations for Trait Mindfulness Ability and BMI (n = 275)

BMI	1	2	3	4	5	6
BMI	-0.01	0.04	-0.05	-0.01	-0.10	-0.02

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

alcohol use, and physical activity, were also compared to national averages for college students (see Table 18). Participants in the current study were generally more active in terms of moderate and vigorous activity than college student averages. Tobacco and alcohol use were significantly lower than what is seen in the general college student population.

Correlations were also calculated between trait mindfulness variables and health behaviors (see Table 19). For the total sample, two significant correlations were found between trait mindfulness variables and health behaviors. The FFMQ subscale Nonjudging of Inner Experience was positively related to increased drinking behavior ($n = 267, r = .167, p = .006$). Mild physical activity, as measured by the IPAQ subscale walking, was significantly related to the FFMQ subscale Nonreactivity to Inner Experience ($n = 275, r = .13, p = .033$). Also, increased moderate physical activity was significantly related to FFMQ subscales Nonjudgement to Inner Experience ($n = 275, r = .13, p = .037$) and Nonreactivity to Inner Experience ($n = 275, r = .13, p = .030$).

Table 18

Descriptive Statistics for Health Behaviors

	Total sample ($N = 275$)			College student norms ^a			ES^b
	M	SD	%	M	SD	%	
Physical activity ^c							
Walking	86.29	150.85		87.45	133.15		-0.01
Moderate	60.98	99.58		42.33	66.65		0.22
Vigorous	53.24	67.03		30.05	42.63		0.41
Other health behaviors							
Tobacco use ^d			5.5			29	
Alcohol use ^e			14.5			80	

^a College student populations: IPAQ, $N = 1,254$ (Rettinger, 2012); tobacco and alcohol national averages (Substance Abuse and Mental Health Services Administration [SAMHSA], 2013)

^b Effect size represents Cohen's d .

^c Time on average per week in minutes

^d Reported use of tobacco

^e Reported use of alcohol

Table 19

Correlations for Trait Mindfulness Ability and Health Behaviors ($n = 275$)

Health behaviors	1	2	3	4	5	6
Alcohol use	0.04	-0.05	0.05	-0.01	0.17**	0.03
Tobacco use	0.02	0.02	0.06	0.00	0.09	0.11
IPAQ-walking	-0.07	0.08	0.05	-0.05	-0.04	0.13*
IPAQ-moderate	0.07	0.04	0.10	0.09	0.13*	0.13*
IPAQ-vigorous	0.09	-0.03	0.004	0.09	0.09	0.03

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Religiosity/Spirituality and Trait Mindfulness Ability

The eighth aim of the study was to investigate the possible relationship between religiosity/spirituality and trait mindfulness ability. The Brief Multidimensional Measure

of Religiousness/Spirituality (BMMRS; Fetzer Institute/National Institute on Aging Working Group, 1999) was used to measure religiosity/spirituality. Table 20 shows participant scores in comparison to nation-wide norms for scale items. Norms are not available for any BMMRS subscales and items within the following subscales: religious/spiritual history, commitment, and religious preferences due to their dichotomous and/or open-ended nature. Lower values for subscales and items indicate greater alignment with the subscale or item. In general, this sample reported greater amounts of religiosity/spirituality than the general population. Correlations were also calculated between trait mindfulness subscales and religiosity/spirituality variables (see Table 21). There were a number of religiosity/spirituality variables that were significantly related to trait mindfulness variables.

In the total sample, forgiveness was significantly negatively related to the MAAS total score ($n = 275$, $r = -.16$, $p = .011$) and the following FFMQ subscales: describe ($n = 275$, $r = -.134$, $p = .027$), aware ($n = 275$, $r = -.191$, $p = .002$), nonjudging ($n = 275$, $r = -.231$, $p = < .001$), and nonreactivity ($n = 275$, $r = -.179$, $p = .003$). This suggests that greater perceived forgiveness is associated with increased trait mindfulness in this sample. The subscale “daily spiritual experiences” was also significantly negatively related to FFMQ subscales describe ($n = 275$, $r = -.15$, $p = .011$), aware ($n = 275$, $r = -.13$, $p = .036$), and nonreactivity ($n = 275$, $r = -.14$, $p = .025$). This suggests that greater frequencies of daily spiritual experiences are related with increased trait mindfulness.

Table 20

BBMRS Subscale and Item Outcomes and Comparisons

Religiousness/spirituality variables	Total sample (<i>N</i> = 273)		General population norms ^a		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>ES</i> ^b
Daily spiritual experiences	17.22	9.03			
Feel God's presence	2.93	1.78	3.8	1.7	-0.50
Find comfort in religion	2.90	1.87	3.8	1.7	-0.50
Feel inner peace	3.08	1.52	3.7	1.4	-0.42
Desire to be closer to god	2.72	1.69	3.9	1.6	-0.72
Feel god's love	2.95	1.76	3.9	1.6	-0.56
Touched by creation	2.65	1.59	4.3	1.5	-1.07
Values/Beliefs	3.24	1.15			
God watches over me	1.48	0.84	3.4	0.8	-2.34
Desire to reduce pain	1.76	0.68	2.7	0.8	-1.27
Forgiveness	5.31	2.16			
Forgiven self	2.00	0.88	3.2	0.9	-1.35
Forgiven others	1.67	0.77	3.3	0.8	-2.08
Know that god forgives	1.64	1.05	3.6	0.8	-2.10
Private religious practice	22.45	10.21			
Private prayer	3.27	5.54	5.5	2.5	-0.52
Meditation	5.54	2.64	3.4	2.7	0.80
Scripture reading	4.28	2.49	2.2	1.4	1.03
Religious and spiritual coping					
Life is part of a larger force	2.10	1.07	2.4	1.1	-0.28
Work with god	2.30	1.12	2.5	1.0	-0.19
Look to god for strength	1.92	1.14	2.9	1.1	-0.87
Feel god is punishing	3.61	0.74	3.7	0.6	-0.13
Wander if abandoned	3.73	0.67	3.8	0.5	-0.12
Make sense without god	2.95	1.04	3.0	1.0	-0.05
Religious support	9.97	3.10			
Help with illness	1.88	1.16	3.2	.9	-1.27
Help with problem	1.93	1.14	3.3	.9	-1.33
Make too many demands	3.17	.89	3.5	.7	-0.41
Critical of me	3.00	1.04	3.7	.7	-0.79
Religious/spiritual history	1.69	.47			
Commitment	1.99	1.02			
Organizational religiousness	90.03	191.19			
Service attendance	2.82	1.61	3.6	2.8	-0.34
Other activities	3.51	1.81	3.4	2.7	0.05
Self-rating of religiousness	6.33	3.15			
Religious strength	2.11	1.09	2.7	1.0	-0.56
Spiritual strength	1.89	.88	2.7	.9	-0.09

^aFetzer Institute/National Institute on Aging Working Group (1999). Norms only available for separate items.

^bEffect size represents Cohen's *d*.

Table 21

Correlations for Trait Mindfulness Ability and Religiosity/Spirituality (n = 275)

BBMRS subscales	1	2	3	4	5	6
Daily spiritual experiences	-0.10	-0.09	-0.11	-0.15*	-0.13*	-0.14*
Values and beliefs	-0.03	-0.04	-0.10	-0.10	-0.03	-0.10
Forgiveness	-0.16*	0.04	-0.13*	-0.19**	-0.23**	-0.18**
Private practices	-0.08	-0.03	-0.07	-0.06	-0.05	-0.06
Religious support	0.01	0.09	-0.02	0.05	0.00	0.06
Religious experiences	-0.04	-0.02	-0.10	-0.03	0.02	0.06
Significant gain	-0.03	-0.08	0.03	0.06	0.11	0.07
Significant loss	0.01	-0.01	0.05	0.02	-0.02	0.03
Commitment	-0.10	0.01	-0.07	-0.05	-0.03	-0.07
Organized religion	0.03	-0.23*	0.18	-0.01	-0.15	-0.10

Note. 1 = MAAS, 2 = FFMQ – Observe, 3 = FFMQ – Describing, 4 = FFMQ – Acting with Awareness, 5 = FFMQ – Nonjudging of Inner Experience, 6 = FFMQ – Nonreactivity to Inner Experience.

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

CHAPTER V

DISCUSSION

The main research objectives of this study were to: (a) assess the existence of trait mindfulness ability and mindfulness practices in a general college population, (b) to study the relationship between mindfulness ability and mental health in a general college population, (c) to examine the relationship between mindfulness ability and physical health in a general college population, and (d) to assess the relationship between mindfulness ability and health behaviors, specifically exercise/physical activity, diet, substance use, and spirituality/religiosity.

These objectives were successfully completed through the administration of a web-based survey for college students at a university in the western region of the U.S. The findings are compared to national college and total population averages. This discussion will focus on implications of the findings, limitations to the survey and data collection methods, and implications and recommendations for future research in this area.

Summary of Outcomes

Existence of Trait Mindfulness Ability and Mindfulness Practices

Mindfulness ability in this general college population was similar to the overall mindfulness ability in the general population (S. L. Shapiro et al., 2008). Although there are no measures from previous studies examining specific types of mindfulness practices,

students in this sample appeared to have been engaged in a significant amount of previous mindfulness practice. Seventy-nine percent of respondents reported mindfulness engagement, with yoga and meditation as the highest engaged practices.

Although 79% of respondents stated having participated in mindfulness practices, only 32% of these individuals reported continuing engagement. No comparisons are available to judge whether this previous and current mindfulness engagement is characteristic of college populations. Yoga and meditation were the two most popular types of mindfulness practice which is no surprise given the more recent rise of these practices (Salmon et al., 2009). Fifty-seven percent of individuals who stated previous experience with yoga continued their practices. Surprisingly, there was no overall relationship between trait mindfulness ability and reported mindfulness engagement. Given the literature in this area (e.g., Chiesa & Serretti, 2009), and the impression that mindfulness interventions increase mindfulness (Piet et al., 2010; S. L. Shapiro et al., 2011), this discrepancy was notable. A few questions arose regarding the literature on mindfulness interventions and the measurement of trait mindfulness. While no overall differences in trait mindfulness were found between respondents who had reported previous mindfulness and those who had not, there was a significant relationship between time spent in mindfulness practices and increased trait mindfulness as measured by the FFMQ and the MAAS.

These data suggest that in order for mindfulness engagement to impact trait mindfulness ability, there may be a mindfulness time engagement threshold that needs to be met. Individuals who spent more time in their mindfulness practice also reported

higher amounts of trait mindfulness ability. Much research has suggested that trait mindfulness ability is significantly greater for individuals with a long history of mindfulness practice (Ludwig & Kabat-Zinn, 2008; Moore & Malinoski, 2009; Sauer et al., 2010). These data suggest that trait mindfulness may not be impacted by more short-term or less concentrated “doses” of mindfulness. This also questions the utility of “small mindfulness doses.” Results from this survey and related studies suggest that mindfulness practices might be specifically beneficial in increasing trait mindfulness ability when they are practiced for an extended amount of time or concentration.

Trait Mindfulness Ability and Mental Health Variables

Trait mindfulness variables were significantly related to a number of mental health variables, including SF-36(v2) mental health subscales, the BDI, and the PSS. Results from the SF-36(v2) suggest that increased trait mindfulness is significantly related to greater social functioning, yet increased nervousness and depression. Results from the BDI suggest that increased trait mindfulness is significantly correlated with decreased depression scores, which is contrary to what is captured in the SF-36(v2).

Given the item differences between the BDI and SF-36(v2), it is possible that greater physical symptoms of depression are identified in the BDI, suggesting that fewer physical symptoms of depression are correlated with trait mindfulness ability. It is likely that cognitive symptoms of depression might be mildly linked to increased trait mindfulness ability, proposing that those who are “more mindful” may be more readily aware of the cognitions in general, including those involved in depression. The PSS was

also significantly negatively related to trait mindfulness ability, suggesting that increased trait mindfulness is related to decreased rates of perceived stress.

Trait Mindfulness Ability and Physical Health Variables

In general, this college student sample reported greater physical health than the general population (Hamer et al., 2012). Results from the correlations between SF-36(v2) and trait mindfulness variables suggest increased trait mindfulness is significantly related to less interference with daily functioning, less bodily pain, greater energy for life, and greater overall physical health. While greater trait mindfulness was significantly related to increased nervousness and depression, greater trait mindfulness was significantly related to increased physical health. This suggests the possibility of two relationships. One might suggest that individuals who have greater physical health are less likely to experience painful sensations and physical ailments, and therefore less likely to have increased focus on the pain and greater focus on ability to engage in life. Alternatively, this relation might also suggest that individuals who have greater amounts of trait mindfulness ability are less likely to experience decreased function due to physical problems, suggesting that they are able to relate to painful sensations with a more functional perspective.

Trait Mindfulness Ability and Health Behaviors

A number of health behavior variables were examined in this current study, including BMI, physical activity levels, and alcohol and tobacco consumption. Given that

the population was drawn from a predominantly religious area, religiosity/spirituality was also examined since it likely plays a crucial role in overall functioning (Carmody et al., 2008; Leigh, Bowen, & Marlatt, 2005). BMI in the current study was reflective of the BMI found in the general population, with the majority of respondents in current study falling in the average/healthy weight category. No relationship between BMI and trait mindfulness ability was found in this study.

The current study was also comprised of relatively active individuals, given that their reports of activity levels were generally greater than college student averages. Moderate exercise was significantly positively related to the Nonjudging of Inner Experience and Nonreactivity of Inner Experience subscales of the FFMQ. This suggests that individuals may engage in greater exercise when they also practice a more compassionate and less reactive stance regarding their internal experience. Given the relationship with moderate exercise, this perspective might aid in continued exercise.

The current study sample was also less likely to consume tobacco or alcohol in comparison to the general college student population. While no overall relationships were found between trait mindfulness ability and tobacco or alcohol behavior, the FFMQ-Nonjudging of Inner Experience was significantly related to increased use of alcohol. This suggests that individuals in this study who were less judgemental of their thoughts, emotions, and sensations also reported greater alcohol consumption.

Overall, the current sample reported greater religiosity and spirituality than the general population, which is expected given the setting and predominant religion in the city of the university. An interesting relationship between trait mindfulness ability and

forgiveness was found in the BMMRS, suggesting that greater trait mindfulness was significantly correlated with increased forgiveness. This was found for all trait mindfulness variables except the FFMQ subscale Observe. Since previous comparison of these two measures is unknown, the significance of the relationship should be examined carefully.

Limitations of the Current Study

The findings from this study include several limitations regarding the sample, data collection methods, and survey construction. The sample characteristics were relatively homogeneous in regards to religiosity/spirituality and health choices (e.g., alcohol and tobacco use). The entire study sample came from a predominantly religious area in the western U.S. region. Gaining a more representative sample of college students for this survey would have likely entailed collecting data from multiple sites. Respondents in this study also had little experience with practices other than yoga and meditation, which brought challenges for examining the effects of other practices (e.g., qi-gong, tai chi) on trait mindfulness ability. With small sub-sample sizes for other mindfulness practices, quantitative analyses could not be completed. However, a larger and more heterogeneous sample in regards to previous mindfulness experiences might allow for greater understanding for the “potency” of certain practices in relation to others. While a few significant relationships emerged between health behaviors and trait mindfulness ability, none were globally related to differences in trait mindfulness ability. This may have been due to a homogenous sample in terms of health behaviors.

The survey was administered using online survey software and no paper-and-pencil versions of the survey were administered. This may have prevented additional respondents from taking it, especially if they were not able to find access to the link. Also, the majority of students recruited for the study were in introductory psychology courses, which may have also added to the homogeneity of the sample.

This study did not assess reasons for original engagement in mindfulness practice. Understanding why individuals engaged in mindfulness experiences would have been an important variable to consider as this might help explain reasons for continuing practice that are not related to mental or physical health functioning. A challenge presented with this concern and also with the overall collection of mindfulness experiences was the lack of validated measures for collecting information on mindfulness experience. An instrument measuring previous and current mindfulness engagement was created for this survey and included several limitations. While the items were written in a particularly objective manner and included content from previous similar research, the measure construction phase did not include a pilot evaluation with reliability or validity analyses.

Implications and Recommendations

This survey revealed that trait mindfulness ability is positively related to a number of mental and physical health variables, which is consistent with existing literature (e.g., Bergen-Cico et al., 2013; Caldwell et al., 2010; Chase, 2009). Results from this survey also suggest that increased mindfulness engagement is related to increased trait mindfulness, which suggests important implications for both the use of mindfulness

interventions and also the measurement of trait mindfulness ability as a process measure. While this relationship between ability and time spent in mindfulness practice does not suggest that mindfulness interventions introduced directly result in greater mental and physical health, this does suggest that efforts impacting mindfulness may lead to an increase in trait mindfulness ability. This is an area that is in need of more focus, especially since significant amount of research incorporates mindfulness interventions yet fails to measure change in trait mindfulness ability (Bodenlos et al., 2013; Christopher & Antick, 2013; Murphy et al., 2012, Vernig & Orsillo, 2009).

Understanding the necessary factors that increase trait mindfulness ability (e.g., time in practice, interventions, practice) can be a significant impact on providing appropriate treatments and also understanding change through the lens of mindfulness. Another step in preparing for greater understanding in this area might include the construction of a validated mindfulness experience questionnaire. This type of tool might also measure individuals' reasons for mindfulness practice engagement. In summary, it appears challenging to conclude that mindfulness engagement increases trait mindfulness, although this is a statement often made. A number of reviews regarding mindfulness and health benefits have been completed, yet little focus has been placed upon the measurement of mindfulness (e.g., Greeson et al., 2009, Keng et al., 2011). Examining the changes in trait mindfulness ability for people in the general population (i.e., not long-term meditators) who engage in mindfulness practices will lead to important understanding regarding the use of interventions in therapeutic settings. In efforts to better understand the role of mindfulness and its relation to mindfulness practice and

health outcome, the construct must be measured. Additionally, the variance among conceptualizations and definitions of mindfulness are challenging in terms of measuring and comparing treatment effects. Developing a more accepted standard for measuring mindfulness, which might entail increasing agreement in defining mindfulness within psychology, might raise continuity in research.

REFERENCES

- Alosco, M. L., Spitznagel, M. B., Miller, L., Raz, N., Cohen, R., Sweet, L. H., ... Gunstad, J. (2012). Depression is associated with reduced physical activity in persons with heart failure. *Health Psychology, 31*, 754-762.
doi:10.1037/a0028711
- American College Health Association. (2008). American College Health Association: National College Health Assessment spring 2007 reference group data report (abridged). *Journal of American College Health, 56*(5), 469-479.
doi:10.3200/JACH.56.5.469-480
- Anderson, D. A., Shapiro, J. R., & Lundgren, J. D. (2003). The freshman year of college as a critical period for weight gain: An initial evaluation. *Eating Behaviors, 4*, 363-367. doi:10.1016/S1471-0153(03)00030-8
- Ayers, J. W., Ribisl, K. M., & Brownstein, J. S. (2011). Tracking the rise in popularity of electronic nicotine delivery systems (electronic cigarettes) using search query surveillance. *American Journal of Preventive Medicine, 40*, 448-453.
doi:10.1016/j.amepre.2010.12.007
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science & Practice, 10*, 125-143.
doi:10.1093/clipsy.bpg015
- Baer, R. A., Smith, A., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*(3), 191-126.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45. doi:10.1177/1073191105283504
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., ... Williams, J. M. G. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment 15*, 329-342.
- Baguley, T. (2004). Understanding statistical power in the context of applied research. *Applied Ergonomics, 35*(2), 73-80.
- Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77-100.
- Bennett, D. A. (2001). How can I deal with missing data in my study? *Australian & New Zealand Journal of Public Health, 25*, 464-469.

- Bergen-Cico, D., Possemato, K., & Cheon, S. (2013). Examining the efficacy of a brief mindfulness-based stress reduction (brief MBSR) program on psychological health. *Journal of American College Health, 61*, 348-360. doi:10.1080/07448481.2013.813853
- Bishop, S. R. (2002). What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine, 64*(1), 71-83.
- Black, D. S., Sussman, S., Johnson, C. A., & Milam, J. (2012). Trait mindfulness helps shield decision-making from translating into health-risk behavior. *Journal of Adolescent Health, 51*, 588-592. doi:10.1016/j.jadohealth.2012.03.011
- Bodenlos, J. S., Noonan, M., & Wells, S. Y. (2013). Mindfulness and alcohol problems in college students: The mediating effects of stress. *Journal of American College Health, 61*, 371-378. doi:10.1080/07448481.2013.805714
- Bohlmeijer, E., Prenger, R., Taal, E., & Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: A meta-analysis. *Journal of Psychosomatic Research, 68*, 539-544. doi:10.1016/j.jpsychores.2009.10.005
- Bowen, S., & Marlatt, A. (2009). Surfing the urge: brief mindfulness-based intervention for college student smokers. *Psychology of Addictive Behaviors, 23*, 666.
- Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences, 52*, 411-415.
- Brener, N. D., Billy, J. O. G., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*, 436-457.
- Brevard, P. B., & Ricketts, C. D. (1996). Residence of college students affects dietary intake, physical activity, and serum lipid levels. *Journal of the American Dietetic Association, 96*(1), 35-38. doi:10.1016/S0002-8223(96)00011-9
- Brown, C. A., & Jones, A. K. P. (2013). Psychobiological correlates of improved mental health in patients with musculoskeletal pain after a mindfulness-based pain management program. *Clinical Journal of Pain, 29*, 233-244.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality & Social Psychology, 84*, 822-848. doi:10.1037/0022-3514.84.4.822

- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211-237. doi:10.1080/10478400701598298
- Buboltz, W. C. Jr., Brown, F., & Soper, B. (2001). Sleep habits and patterns of college students: a preliminary study. *Journal of American College Health, 50*, 131-135.
- Buckworth, J., & Nigg, C. (2004). Physical activity, exercise, and sedentary behavior in college students. *Journal of American College Health, 53*(1), 28-34. doi:10.3200/JACH.53.1.28-34
- Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review, 26*, 17-31.
- Cahn, B. R., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin, 132*, 180.
- Caldwell, K., Harrison, M., Adams, M., Quin, R. H., & Greeson, J. (2010). Developing mindfulness in college students through movement-based courses: Effects on self-regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health, 58*, 433-442. doi:10.1080/07448480903540481
- Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment, 15*, 204-223. doi:10.1177/1073191107311467
- 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, & Immunity, 21*, 1038-1049. doi:10.1016/j.bbi.2007.04.002
- Carmody, J., & Baer, R. A. (2007). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*(1), 23-33. doi:10.1007/s10865-007-9130-7
- Carmody, J., Reed, G., Kristeller, J., & Merriam, P. (2008). Mindfulness, spirituality, and health-related symptoms. *Journal of Psychosomatic Research, 64*, 393-403. doi:10.1016/j.jpsychores.2007.06.015
- 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 (SMQ). *British Journal of Clinical Psychology, 47*, 451-455. doi:10.1348/014466508X314891

- Chase, W. S. (2009). *Trait mindfulness, overall adjustment, and physical well-being perceptions of college students* (Doctoral dissertation.) Available from ProQuest Dissertations and Theses database. (UMI No. 3394772)
- Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *The Journal of Alternative & Complementary Medicine, 15*, 593-600.
- Christopher, M., & Antick, J. (2013). The role of dispositional mindfulness in mitigating the impact of stress and impulsivity on alcohol-related problems. *Addiction Research & Theory, 21*(5), 429-434. doi:10.3109/16066359.2012.737873
- Christopher, M., & Brennan, D. (2010). Incremental validity of components of mindfulness in the prediction of satisfaction with life and depression. *Current Psychology, 29*(1), 10-23. doi:10.1007/s12144-009-9067-9
- Cohen, S., & Janicki-Deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009. *Journal of Applied Social Psychology, 42*, 1320-1334.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health & Social Behavior, 24*, 385-396.
- Cramer, H., Lauche, R., Langhorst, J., & Dobos, G. (2013). Yoga for depression: A systematic review and meta-analysis. *Depression & Anxiety, 30*, 1068-1083. doi:10.1002/da.22166
- Craig, C. L., Marshall, A. L., Sjoström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise, 35*, 1381-1395.
- Davis, J. M., Fleming, M. F., Bonus, K. A., & Baker, T. B. (2007). A pilot study on mindfulness based stress reduction for smokers. *BMC Complementary & Alternative Medicine, 7*(1), 2.
- Deckro, G. R., Ballinger, K. M., Hoyt, M., Wilcher, M., Dusek, J., Myers, P., ... Benson, H. (2002). The evaluation of a mind/body intervention to reduce psychological distress and perceived stress in college students. *Journal of American College Health, 50*, 281-287. doi:10.1080/07448480209603446
- Dinger, M. K., Beherns, T. K., & Han, J. L. (2006). Validity and reliability of the International Physical Activity Questionnaire in college students. *American Journal of Health Education, 37*, 337-343.

- Duraiswamy, G., Thirhalli, J., Nagendra, H. R., & Gangadhar, B. N. (2007). Yoga therapy as an add-on treatment in the management of patients with schizophrenia: A randomized controlled trial. *Acta Psychiatrica Scandinavica*, *116*, 226-232.
- Epstein, M. (2004). *Thoughts without a thinker: Psychotherapy from a Buddhist perspective*. New York, NY: Basic.
- Fernandez, A. C., Wood, M. D., Stein, L. A. R., & Rossi, J. S. (2010). Measuring mindfulness and examining its relationship with alcohol use and negative consequences. *Psychology of Addictive Behaviors*, *24*, 608-616.
doi:<http://dx.doi.org/10.1037/a0021742>
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology & Behavioral Assessment*, *29*(3), 177-190.
- Fetzer Institute/National Institute on Aging Working Group. (1999). *Multidimensional measurement of religiousness/spirituality for use in health research: A report of the Fetzer Institute/National Institute on Aging working group*. Kalamazoo, MI: Author.
- Fink, S., Foran, K. A., Sweeney, A. C., & O'Hea, E. L. (2009). Sexual body esteem and mindfulness in college women. *Body Image*, *6*, 326-329.
doi:[10.1016/j.bodyim.2009.07.003](https://doi.org/10.1016/j.bodyim.2009.07.003)
- Gandek, B., Sinclair, S. J., Kosinski, M., & Ware, J. E. (2004). Psychometric evaluation of the SF-36 health survey. *Healthcare Finance Review*, *25*(4), 5-25.
- Godfrin, K. A., & Van Heeringen, C. (2010). The effects of mindfulness-based cognitive therapy on recurrence of depressive episodes, mental health and quality of life: A randomized controlled study. *Behaviour Research & Therapy*, *48*, 738-746.
doi:[10.1016/j.brat.2010.04.006](https://doi.org/10.1016/j.brat.2010.04.006)
- Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual Review of Psychology*, *60*, 549-576.
- Greeson, J. M. (2009). Mindfulness research update: 2008. *Journal of Evidence-Based Complementary & Alternative Medicine*, *14*(1), 10-18.
- Gregg, J. A., Callaghan, G. M., Hayes, S. C., & Glenn-Lawson, J. L. (2007). Improving diabetes self-management through acceptance, mindfulness, and values: A randomized controlled trial. *Journal of Consulting & Clinical Psychology*, *75*, 336-343. doi:[10.1037/0022-006X.75.2.336](https://doi.org/10.1037/0022-006X.75.2.336)

- Gregory, A. M., Caspi, A., Eley, T. C., Moffitt, T. E., O'Connor, T. G., & Poulton, R. (2005). Prospective longitudinal associations between persistent sleep problems in childhood and anxiety and depression disorders in adulthood. *Journal of Abnormal Child Psychology*, *33*, 157-163. doi:10.1007/s10802-005-1824-0
- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*, *57*(1), 35-43. doi:10.1016/S0022-3999(03)00573-7
- Grossman, P., Tiefenthaler-Gilmer, U., Raysz, A., & Kesper, U. (2007). Mindfulness training as an intervention for fibromyalgia: Evidence of postintervention and 3-year follow-up benefits in well-being. *Psychotherapy & Psychosomatics*, *76*, 226-233. doi:10.1159/000101501
- Haberman, S., & Luffey, D. (1998). Weighing in college students' diet and exercise behaviors. *Journal of American College Health*, *46*(4), 189-191. doi:10.1080/07448489809595610
- Hamer, M., Kivimaki, M., & Steptoe, A. (2012). Longitudinal patterns in physical activity and sedentary behaviour from mid-life to early old age: A substudy of the Whitehall II cohort. *Journal of Epidemiology & Community Health*, *66*, 1110-1115. doi:10.1136/jech-2011-200505
- Harinath, K., Malhotra, A. S., Pal, K., Prasad, R., Kumar, R., Kain, T. C., ... & Sawhney, R. C. (2004). Effects of Hatha yoga and Omkar meditation on cardiorespiratory performance, psychological profile, and melatonin secretion. *The Journal of Alternative & Complementary Medicine*, *10*(2), 261-268.
- Hatzenbuehler, L. C., Parpal, M., & Matthews, L. (1983). Classifying college students as depressed or nondepressed using the Beck Depression Inventory: An empirical analysis. *Journal of Consulting & Clinical Psychology*, *51*, 360.
- 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 & Practice*, *11*, 255-262. doi:10.1093/clipsy.bph080
- Hayes, S. C., & Wilson, K. G. (2003). Mindfulness: Method and process. *Clinical Psychology: Science & Practice*, *10*(2), 161-165.
- Hunt, J., & Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health*, *46*(1), 3-10. doi:10.1016/j.jadohealth.2009.08.008

- Holland, J. C., & Freeland-Graves, J. H. (2013). The influence of motivations to eat on weight status and diet quality. In V. R. Preedy, L-A. Hunter, & V. B. Patel (Eds.), *Diet quality: An evidence-based approach* (vol. 2, pp. 101-114). New York, NY: Springer.
- Irving, J. A., Dobkin, P. L., & Park, J. (2009). Cultivating mindfulness in health care professionals: A review of empirical studies of mindfulness-based stress reduction (MBSR). *Complementary Therapies in Clinical Practice, 15*(2), 61-66.
- Jans, M., & Roman, A. (2007). *National response rates for surveys of college students: Institutional, regional, and design factors*. Ann Arbor, MI: University of Michigan, Institute for Social Research.
- Josefsson, T., & Anders. M. (2011). Meditators and non-meditators on sustained and executive attentional performance. *Mental Health, Religion & Culture, 14*, 291-309. doi:10.1080/13674670903578621
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33-47. doi:10.1016/0163-8343(82)90026-3
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. New York, NY: Hyperion.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science & Practice, 10*(2), 144-156. doi:10.1093/clipsy.bpg016
- Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine, 8*(2), 163-190. doi:10.1007/BF00845519
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., ... Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (DVB) and photochemotherapy (PUVA). *Psychosomatic Medicine, 60*, 625-632.
- Keating, X. D., Guan, J., Piñero, J. C., & Bridges, D. M. (2005). A meta-analysis of college students' physical activity behaviors. *Journal of American College Health, 54*(2), 116-126. doi:10.3200/JACH.54.2.116-126
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31*, 1041-1056. doi:10.1016/j.cpr.2011.04.006

- Kilpatrick, L. A., Suyenobu, B. Y., Smith, S. R., Bueller, J. A., Goodman, T., Creswell, J. D., ... Naliboff, B. D. (2011). Impact of mindfulness-based stress reduction training on intrinsic brain connectivity. *NeuroImage*, *56*(1), 290-298. doi:10.1016/j.neuroimage.2011.02.034
- Kluepfel, L., Ward, T., Yehuda, R., Dimoulas, E., Smith, A., & Daly, K. (2013). The evaluation of mindfulness-based stress reduction for veterans with mental health conditions. *Journal of Holistic Nursing*, *1*, 1-8. doi:10.1177/0898010113495975
- Kuczmarski, M. F., Kuczmarski, R. J., & Najjar, M. (2001). Effects of age on validity of self-reported height, weight, and body mass index: Findings from the third National Health and Nutrition Examination Survey, 1988-1994. *Journal of the American Dietetic Association*, *101*(1), 28-34.
- Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., ... Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology*, *62*, 1445-1467. doi:10.1002/jclp.20326
- Lavey, R., Sherman, T., Mueser, K. T., Osborne, D., Currier, M., & Wolfe, R. (2005). The effects of yoga on mood in psychiatric inpatients. *Psychiatric Rehabilitation Journal*, *28*, 299-402.
- Ledesma, D., & Kumano, H. (2009). Mindfulness-based stress reduction and cancer: A meta-analysis. *Psycho-Oncology*, *18*, 571-579. doi:10.1002/pon.1400
- Lee, P. L., Macfarlane, D. J., Lam, T. H., & Stewart, S. M. (2011). Validity of the International Physical Activity Questionnaire Short Form (IPAQ-SF): A systematic review. *International Journal of Behavioral Nutrition & Physical Activity*, *2*(115), 1-11.
- Leigh, J., Bowen, S., & Marlatt, G. A. (2005). Spirituality, mindfulness and substance abuse. *Addictive Behaviors*, *30*, 1335-1341. doi:10.1016/j.addbeh.2005.01.010
- Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, H. L. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry*, *48*, 1060-1064.
- Ludwig, D. S., & Kabat-Zinn, J. (2008). Mindfulness in medicine. *Journal of the American Medical Association*, *300*, 1350-1352.
- MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the mindful attention awareness scale (MAAS). *Journal of Psychopathology & Behavioral Assessment*, *29*, 289-293.

- Marlatt, G. A. & Kristeller, J. L. (1999). Integrating spirituality into treatment: Resources for practitioners. In W. R. Miller (Ed.), *Mindfulness and meditation* (pp. 67-84). Washington, DC: American Psychological Association.
- Masters, K. S., Carey, K. B., Maisto, S. A., Caldwell, P. E., Wolfe, T. V., Hackney, H. L., ... & Himawan, L. (2009). Psychometric examination of the brief multidimensional measure of religiousness/spirituality among college students. *The International Journal for the Psychology of Religion, 19*(2), 106-120.
- Masuda, A., Anderson, P. L., & Sheehan, S. T. (2010). Mindfulness and mental health among African American college students. *Complementary Health Practice Review, 14*, 115-127.
- McCracken, L. M., & Yang, S. Y. (2008). A contextual cognitive-behavioral analysis of rehabilitation workers' health and well-being: Influences of acceptance, mindfulness, and values-based action. *Rehabilitation Psychology, 53*, 497-485.
- McCracken, L. M., & Velleman, S. C. (2010). Psychological flexibility in adults with chronic pain: A study of acceptance, mindfulness, and values-based action in primary care. *PAIN, 148*, 141-147. doi:10.1016/j.pain.2009.10.034
- Melton, B., Gross, A., & Hansen, J. (2010). Trends in physical activity interest in the college and university setting. *College Student Journal, 44*, 785-789.
- Miller, J. J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry, 17*, 192-200.
- Misra, R., McKean, M., West, S., & Russo, T. (2000). Academic stress of college students: Comparison of student and faculty perceptions. *College Student Journal, 34*, 236-245.
- Monti, D. A., Kash, K. M., Kunkel, E. J., Brainard, G., Wintering, N., Moss, A. S., ... & Newberg, A. B. (2012). Changes in cerebral blood flow and anxiety associated with an 8-week mindfulness programme in women with breast cancer. *Stress & Health, 28*, 397-407.
- Moore, A., & Malinowski, P. (2009). Meditation, mindfulness and cognitive flexibility. *Consciousness & Cognition, 18*(1), 176-186.
- Mrazek, M. D., Smallwood, J., & Schooler, J. W. (2012). Mindfulness and mind-wandering: Finding convergence through opposing constructs. *Emotion, 12*, 442-448. doi:http://dx.doi.org/10.1037/a0026678

- Murphy, M. J., Mermelstein, L. C., Edwards, K. M., & Gidycz, C. A. (2012). The benefits of dispositional mindfulness in physical health: A longitudinal study of female college students. *Journal of American College Health, 60*, 341-348. doi:10.1080/07448481.2011.629260
- National Health and Nutrition Examination Survey Data. (2010). *National health and nutrition examination survey (NHANES)*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Retrieved from http://www.cdc.gov/nchs/nhanes/search/nhanes09_10.aspx
- Oman, D., Shapiro, S. L., Thoresen, C. E., Plante, T. G., & Flinders, T. (2008). Meditation lowers stress and supports forgiveness among college students: A randomized controlled trial. *Journal of American College Health, 56*, 569-578. doi:10.3200/JACH.56.5.569-578
- Paffenbarger, R. S., Lee, I.-M., & Leung, R. (1994). Physical activity and personal characteristics associated with depression and suicide in American college men. *Acta Psychiatrica Scandinavica, 89*, 16-22. doi:10.1111/j.1600-0447.1994.tb05796.x
- Palmer, A., & Rodger, S. (2009). Mindfulness, stress, and coping among university students. *Canadian Journal of Counseling, 43*(2), 198-212.
- Palmer, R. S., McMahon, T. J., Rounsaville, B. J., & Ball, S. A. (2010). Coercive sexual experiences, protective behavioral strategies, alcohol expectancies and consumption among male and female college students. *Journal of Interpersonal Violence, 25*, 1563-1578. doi:10.1177/0886260509354581
- Panesar, N., & Valachova, I. (2011). Yoga and mental health. *Australian Psychiatry, 19*, 538-539.
- Pbert, L., Madison, J. M., Druker, S., Olendzki, N., Magner, R., Reed, G., ... Carmody, J. (2012). Effect of mindfulness training on asthma quality of life and lung function: A randomized controlled trial. *Thorax, 67*, 769-776. doi:10.1136/thoraxjnl-2011-200253
- Penedo, F. J., & Dahn, J. R., (2005). Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry, 18*(2), 189-193.
- Piet, J., Hougaard, E., Hecksher, M. S., & Rosenberg, N. K. (2010). A randomized pilot study of mindfulness-based cognitive therapy and group cognitive-behavioral therapy for young adults with social phobia. *Scandinavian Journal of Psychology, 51*, 403-410. doi:10.1111/j.1467-9450.2009.00801.x

- Pilcher, J. J., Ginter, D. R., & Sadowsky, B. (1997). Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well-being and sleepiness in college students. *Journal of Psychosomatic Research*, *42*, 583-596. doi:10.1016/S0022-3999(97)00004-4
- Quilty, M. T., Saper, R. B., Goldstein, R., & Khalsa, S. B. S. (2013). Yoga in the real world: Perceptions, motivators, barriers, and patterns of use. *Global Advances in Health & Medicine*, *2*, 44-49.
- Rettinger, V. W. (2011). The relationship between physical activity, stress, and academic performance (Unpublished doctoral dissertation). University of South Carolina, Columbia, SC.
- Rigotti, N. A., Lee, J., & Wechsler, H. (2000). U.S. college students' use of tobacco products: Results of a national survey. *Journal of the American Medical Association*, *284*, 699-705. doi:10.1001/jama.284.6.699
- Ritchie, T. D., & Bryant, F. B. (2012). Positive state mindfulness: A multidimensional model of mindfulness in relation to positive experience. *International Journal of Wellbeing*, *2*(3), 150-181. doi:10.5502/ijw.v2i3.126
- Roberts, K. C., & Danoff-Burg, S. (2010). Mindfulness and health behaviors: Is paying attention good for you? *Journal of American College Health*, *59*, 165-173. doi:10.1080/07448481.2010.484452
- Rogelberg, S. G., & Stanton, J. M. (2007). Introduction understanding and dealing with organizational survey nonresponse. *Organizational Research Methods*, *10*, 195-209.
- Ross, A., Friedmann, E., Bevens, M., & Thomas, S. (2013). National survey of yoga practitioners: Mental and physical health benefits. *Complementary Therapies in Medicine*, *21*, 313-323. doi:10.1016/j.ctim.2013.04.001
- Salmon, P., Lush, E., Jablonski, M., & Sephton, S. E. (2009). Yoga and mindfulness: Clinical aspects of an ancient mind/body practice. *Cognitive & Behavioral Practice*, *16*(1), 59-72.
- Salmon, P. G., Santorelli, S. F., & Kabat-Zinn, J. (1998). Intervention elements promoting adherence to mindfulness-based stress reduction programs in the clinical behavioral medicine setting. *The Handbook of Health Behavior Change*, *2*, 239-266.
- Sauer, S., Walach, H., Schmidt, S., Hinterberger, T., Lynch, S., Büssing, A., & Kohls, N. (2013). Assessment of mindfulness: Review on state of the art. *Mindfulness*, *4*(1), 3-17.

- Sax, L. J., Gilmartin, S. K., Lee, J. J., & Hagedorn, L. S. (2008). Using web surveys to reach community college students: An analysis of response rates and response bias. *Community College Journal of Research & Practice*, *32*, 712-729.
- Seeman, T. E., Dubin, L. F., & Seeman, M. (2003). Religiosity/spirituality and health: A critical review of the evidence for biological pathways. *American Psychologist*, *58*(1), 53-63. doi:http://dx.doi.org/10.1037/0003-066X.58.1.53
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2012). *Mindfulness-based cognitive therapy for depression* (2nd ed.). New York, NY: Guilford.
- Shapiro, D. H., & Walsh, R. N. (1984). *Meditation: Classic and contemporary perspectives*. Hawthorne, NY: Aldine Transaction
- Shapiro, S. L., Brown, K. W., Thoresen, C., & Plante, T. G. (2011). The moderation of mindfulness-based stress reduction effects by trait mindfulness: Results from a randomized controlled trial. *Journal of Clinical Psychology*, *67*, 267-277. doi:10.1002/jclp.20761
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, *62*, 373-386.
- Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training & Education in Professional Psychology*, *1*(2), 105-115.
- 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
- Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine*, *21*, 581-599. doi:10.1023/A:1018700829825
- Smith, B. W., Ortiz, J. A., Steffen, L. E., Tooley, E. M., Wiggins, K. T., Yeater, E. A., ... Bernard, M. L. (2011). Mindfulness is associated with fewer PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems in urban firefighters. *Journal of Consulting & Clinical Psychology*, *79*, 613-617. doi:http://dx.doi.org/10.1037/a0025189
- Smith, C., Hancock, H., Blake-Mortimer, J., & Eckert, K. (2007). A randomized comparative trial of yoga and relaxation to reduce stress and anxiety. *Complementary Therapies in Medicine*, *15*(2), 77-83.
- Smith, J. A., Greer, T., Sheets, T., & Watson, S. (2010). Is there more to yoga than exercise? *Alternative Therapies in Health & Medicine*, *17*(3), 22-29.

- Stathopoulou, G., Powers, M. B., Berry, A. C., Smits, J. A., & Otto, M. W. (2006). Exercise interventions for mental health: A quantitative and qualitative review. *Clinical Psychology: Science & Practice, 13*(2), 179-193.
- Stoppa, T. M., & Lefkowitz, E. S. (2010). Longitudinal changes in religiosity among emerging adult college students. *Journal of Research on Adolescence, 20*(1), 23-38. doi:10.1111/j.1532-7795.2009.00630.x
- Substance Abuse and Mental Health Services Administration (SAMHSA). (2013). *National Survey on Drug Use and Health (NSDUH). Table 2.41B—Alcohol use in lifetime, past year, and past month among persons aged 18 or older, by demographic characteristics: Percentages, 2012 and 2013*. Retrieved from SAMHSA <http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabsPDFWHTML2013/Web/HTML/NSDUH-DetTabsSect2peTabs1to42-2013.htm#tab2.41b>
- Sullivan, M. J., Wood, L., Terry, J., Brantley, J., Charles, A., McGee, V., ... Cuffe, M. S. (2009). The support, education, and research in chronic heart failure study (SEARCH): A mindfulness-based psychoeducational intervention improves depression and clinical symptoms in patients with chronic heart failure. *American Heart Journal, 157*(1), 84-90. doi:10.1016/j.ahj.2008.08.033
- Taylor, C. B., Sallis, J. F., & Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public Health Reports, 100*, 195-202.
- Teasdale, J. D., Segal, Z. V., Mark, J., 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 & Clinical Psychology, 68*, 615-623. doi:10.1037/0022-006X.68.4.615
- Townsend, J., Hsieh, P. C., Van Puymbroeck, M., Johnston, J., Gassman, R., Agle, J., ... & YoussefAgha, A. (2013). Sense of coherence, perceived stress and health related quality of life in college students. *Illuminare: A Student Journal in Recreation, Parks, & Tourism Studies, 11*(1), 70-74.
- Tran, M. D., Holly, R. G., Lashbrook, J., & Amsterdam, E. A. (2001). Effects of hatha yoga practice on the health-related aspects of physical fitness. *Preventive Cardiology, 4*(4), 165-170. doi:10.1111/j.1520-037X.2001.00542.x
- Thera, N. (1972). *The power of mindfulness*. San Francisco, CA: Unity Press.
- Trochim, W. (2001). *Research methods knowledge base*. Cincinnati, OH: Atomic Dog.
- Twisk, J., & de Vente, W. (2002). Attrition in longitudinal studies: How to deal with missing data. *Journal of Clinical Epidemiology, 55*, 329-337.

- U.S. Census Bureau. (2010). *School enrollment: Social and economic characteristics of students*. Retrieved from <http://www.census.gov/hhes/school/>
- Vernig, P. M., & Orsillo, S. M. (2009). Psychophysiological and self-reported emotional responding in alcohol-dependent college students: The impact of brief acceptance/mindfulness instruction. *Cognitive Behaviour Therapy, 38*(3), 174-183. doi:10.1080/16506070902767563
- Vieten, C. (2009). *Mindful motherhood: Practical tools for staying sane during pregnancy and your child's first year*. Oakland, CA: New Harbinger.
- Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—the Freiburg Mindfulness Inventory (FMI). *Personality & Individual Differences, 40*, 1543-1555. doi:10.1016/j.paid.2005.11.025
- Wang, C., Schmid, C. H., Roness, R., Kalish, R., Yin, J., Goldenberg, D. L., ... McAlindon, T. (2010). A randomized trial of tai chi for fibromyalgia. *New England Journal of Medicine, 363*, 743-754.
- Ware, J. E., Kosinski, M., Dewey, J. E., & Gandek, B. (2000). *SF-36 health survey: Manual and interpretation guide*. Lincoln, RI: Quality Metric.
- Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-Item Short-Form Health Survey (SF-36): I. Conceptual framework and item selection. *Medical Care, 30*, 473-483.
- Wayne, P. M., & Kaptchuk, T. J. (2008). Challenges inherent to t'ai chi research: Part I—T'ai Chi as a complex multicomponent intervention. *The Journal of Alternative & Complementary Medicine, 14*(1), 95-102. doi:10.1089/acm.2007.7170A
- West, M. A. (1987). Traditional and psychological perspectives on meditation. In M. A. West (Ed.), *The psychology of meditation* (pp. 5-22). New York, NY: Oxford University Press.
- Zautra, A. J., Davis, M. C., Reich, J. W., Nicassario, P., Tennen, H., Finan, P., ... Irwin, M. R. (2008). Comparison of cognitive behavioral and mindfulness meditation interventions on adaptation to rheumatoid arthritis for patients with and without history of recurrent depression. *Journal of Consulting & Clinical Psychology, 76*, 408-421. doi:10.1037/0022-006X.76.3.408

APPENDICES

Appendix A
Recruitment Materials

Recruiting Materials
Newspaper Ad

Research Study

The Psychology Department at Utah State University is seeking individuals ages 18 and older attending college at least half time to participate in a study assessing their overall mental and physical health as it relates to mindfulness. The study will involve approximately 30 minutes of your time. You may receive psychology lab credit for your participation and will be entered into a raffle to win one of four \$50 Visa gift cards. If you are interested in participating or have questions please contact Sarah Potts at sarah.potts@aggiemail.usu.edu.

Flyer

Research Study

The Psychology Department at Utah State University is seeking individuals 18 years or older who are enrolled in a college or university at least half time to participate in a online survey assessing your overall mental and physical health as it relates to mindfulness

Mindfulness is originally an eastern practice, now becoming popular not only as a component of specific mind-body interventions such as yoga and meditation, but also psychological interventions. There is support that shows mindfulness has relationships with overall mental and physical health functioning. All individuals 18 years and older enrolled in a college or university at least half time are eligible to participate. The study will involve completing a survey that will take no more than half an hour to complete. You may receive psychology lab credit through Sona for your participation and will be entered into a raffle to win one of four \$50 Visa gift cards. If you are interested or have questions please contact Sarah Potts at sarah.potts@aggiemail.usu.edu.

Announcement

My name is _____. I am a graduate student in the Psychology Doctoral Program. I am assessing college students' mental and physical health in relation to mindfulness ability and current/previous mindfulness engagement. Mindfulness is originally an eastern practice, now becoming popular not only as a component of specific mind-body interventions such as yoga and meditation, but also psychological interventions. There is support that shows mindfulness has relationships with overall mental and physical health functioning.

The purpose of this study is to examine the prevalence and type of mindfulness experiences, trait mindfulness ability, and related health variables among college students. The study will involve the completion of self-report survey materials and requires a maximum of a half hour of your. Students enrolled in an undergraduate psychology course which requires lab credit may receive lab credit for their participation. Students leaving their Sona ID may also receive three Sona credits for participation. Everyone who participates will be entered into a drawing for a chance to win one of four \$50 Visa gift cards.

If you are interested in participating you will be asked to complete an anonymous survey assessing your everyday mindfulness and your thoughts related to your physical and mental health status, your physical activity and previous mindfulness experiences, and your religious and spiritual beliefs. After completing the survey materials you will be asked to provide your name and contact information to be used as your entry into the study raffle. This personal information will not be linked to your survey responses. Complete confidentiality will be respected in this study. All data that will be collected from you will be protected and stored in a locked file cabinet at the university. No personal information will appear in any reports or publications that may result from the study.

If you have questions please contact Sarah Potts at sarah.potts@aggiemail.usu.edu.

Appendix B
Informed Consent

Informed Consent

The Relationship of Trait Mindfulness and Positive Mental and Physical Health Among College Students

Introduction/ Purpose: Dr. M. Scott DeBerard, Ph.D. and Sarah A. Potts, B.A. in the Department of Psychology at Utah State University are running a study to better understand the prevalence and type of mindfulness experiences, trait mindfulness ability, and related health variables among college students. The goal of this study is to look at the relationship between mindfulness ability, previous mindfulness experiences, and associated health variables. The study will involve the completion of a 30-minute anonymous survey.

You have been asked to take part in this study you are at least 18 years of age and are enrolled in college at least part time. There will be up to 500 participants enrolled in this study.

Procedures: If you agree to participate, the following will happen:

- 1) You will be asked to complete an informed consent form with your name and contact information to be used in the study raffle.
- 2) You will be asked to complete a series of self-report survey materials requiring approximately 30 minutes of your time.
- 3) You may be contacted after data collection and the study raffle if you have won.

New Findings: You will be told of any important new findings (either good or bad), such as changes in the risks or benefits of being part of this study, or if there are different options to participating in this study that might cause you to change your mind about continuing in the study. If we learn new things about the study that are useful to you, or if the study changes at any time, you will be informed and we will ask you to complete a new consent form that will include the new information.

Risks: Every effort will be made to keep physical, medical, psychological, social, legal, or other risks as low as possible. You could possibly feel mild discomfort from answering some of the questions. You are welcome to stop being part of the study at any time or to not do any part of the study that you choose not to. There are no penalties for stopping or choosing to not do any part of the study. There is a possibility that data could be lost or revealed to others; however, every effort has been made to protect your privacy and maintain your confidentiality.

Benefits: It is possible that participation in this study may improve your knowledge of mindfulness terminology and health correlates. If you leave your Sona ID, you will receive three Sona credits for participation. Everyone who participates will be entered into a drawing for a chance to win one of four \$50 Visa gift cards.

Explanation & offer to answer questions: The research assistant has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may contact Sarah Potts at 816-383-1551 or Dr. M. Scott DeBerard at 435-797-1462.

Extra Cost(s): There are no extra costs to participating in this study.

Voluntary nature of participation and right to withdraw without consequence: Participation in research is completely up to you. You may stop at any time you want, or you may skip any part of the study that you don't want to do. Stopping early or not completing part of the study will not affect your ability to participate in the study. You may be taken out of the study if you repeatedly miss scheduled appointments/treatment sessions, or don't participate in the treatment.

Confidentiality: All information that we collect on you will be confidential. Only the investigator and the graduate research assistant will have access to the data. Any information that could be used to identify you will be kept separate from your survey material. To maintain your confidentiality all data will also be kept in a locked room in a locked file cabinet. Any personal identifiable information will be kept for three years after the study is completed and then destroyed.

IRB Approval Statement: The Institutional Review Board for the protection of human participants at USU has approved this research study. If you have any pertinent questions or concerns about your rights or a research-related injury, you may contact the IRB Administrator at (435) 797-0567. If you have a concern or complaint about the research and you would like to contact someone other than the research team, you may contact the IRB Administrator to obtain information or to offer input.

Copy of consent: You have been given two copies of this Informed Consent. Please sign both copies and keep one copy for your files.

Investigator Statement: "I certify that the research study has been explained to the individual, by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

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Sarah A. Potts, B.A.
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Signature of Participant: By signing below, I agree to participate.

Participant's signature

Date

Appendix C
Survey Instruments

Demographics Questionnaire

1. Relationship Status (Please circle one)
 - a. Single (not involved)
 - b. Married
 - c. Divorced
 - d. Separated
 - e. Involved in a significant relationship with a boyfriend/girlfriend

2. Ethnic background
 - a. African American
 - b. Asian American
 - c. Caucasian
 - d. Hispanic
 - e. Native American
 - f. Other: Please list: _____

3. Year in college
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior

4. Major: Please also indicate if you are undecided.

5. How often do you exercise
 - a. Never
 - b. Occasionally (less than once per week)
 - c. Sometimes (1-3 times per week)
 - d. Often (more than 3 times per week)

6. If you do exercise, use the following reasons to rate how important the following reasons are in your decision to exercise: (1-not at all important, 3-moderately important, 5-extremely important)
 - a. _____ to avoid weight gain
 - b. _____ to be healthy
 - c. _____ to look good
 - d. _____ to participate in social activities with others
 - e. _____ to relieve stress
 - f. _____ to meet people
 - g. _____ to help focus my attention
 - h. _____ other reasons: please list and rate: _____

7. What is your height in inches? _____
8. What is your weight in pounds? _____
9. Think back over the last month. How many times have you had five or more drinks* at one sitting? (*A drink is a bottle of beer, a glass of wine, a wine cooler, a shot glass of liquor, or a mixed drink.)
 - a. None
 - b. Once
 - c. Twice
 - d. 3-5 times
 - e. 6-9 times
 - f. 10 or more times
10. If you use tobacco, (i.e., smoke or oral use), how many servings* do you consume throughout one day? (*One serving = 1 cigarette or that equivalent of oral tobacco product such as Snuff).
 - a. None
 - b. One
 - c. Less than 6
 - d. 7-19 servings
 - e. 20 or more servings (one pack or more)
11. Have you ever engaged in a mindfulness practice*, even if it was just one time or for a short time?
*A mindfulness practice may include one or more of the following: meditation/ seated meditation/ guided meditation, body scan, yoga, tai chi, qi-gong, mindfulness intervention introduced in therapy (i.e., mindfulness-based stress reduction, mindfulness techniques taught by a therapist, etc).
 - a. Yes
 - b. No (**go next survey**)
12. Which types of mindfulness practices have you engaged in, not including current engagement? (check all that apply)
 - a. Meditation/Seated Meditation/Guided Meditation
 - b. Body scan
 - c. Yoga
 - d. Tai-Chi
 - e. Qi-Gong
 - f. Mindfulness intervention introduced in therapyOther: (list examples) _____

13. When you were engaged in meditation/seated meditation, how much time on average per week did you spend in meditation/seated meditation/guided meditation?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours

14. When you were engaged in a body scan, how much time on average per week did you spend using a body scan?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours
 - e.

15. When you were engaged in yoga, much time on average per week did you spend doing yoga?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours

16. When you were engaged in tai chi, how much time on average per week did you spend doing tai-chi?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours

17. When you were engaged in qi-gong, how much time on average per week did you spend doing qi-gong?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours

18. When you were engaged in a mindfulness intervention within therapy, how much time on average per week did you spend using mindfulness interventions learned in therapy?
 - a. Less than 1 hour
 - b. 1-2 hours
 - c. 3-5 hours
 - d. More than 5 hours

19. When you were engaged in _____ (listed mindfulness practice), how much time on average per week did you spend engaged in _____ (listed mindfulness practice)?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
20. When you were engaged in _____ (other listed mindfulness practice), how much time on average per week did you spend engaged in _____ (other listed mindfulness practice)?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
21. Which types of mindfulness practices are you currently engaged with? (check all that apply)
- Meditation/Seated Meditation/Guided Meditation
 - Body scan
 - Yoga
 - Tai-Chi
 - Qi-Gong
 - Mindfulness intervention introduced in therapy
 - Other: (list examples) _____
22. How much time on average during this past week did you spend in meditation/seated meditation/guided meditation?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
23. How much time on average during this past week did you spend using a body scan?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours

24. How much time on average during this past week did you spend doing yoga?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
25. How much time on average during this past week did you spend doing tai-chi?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
26. How much time on average during this past week did you spend doing qi-gong?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
27. How much time on average during this past week did you spend using mindfulness interventions learned in therapy?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
28. How much time on average during this past week did you spend engaged in _____ (listed mindfulness practice)?
- Less than 1 hour
 - 1-2 hours
 - 3-5 hours
 - More than 5 hours
29. How much time on average per week did you spend engaged in _____ (other listed mindfulness practice)?
- Less than 1 hour
 - 1-2hours
 - 3-5 hours
 - More than 5 hours

30. What is your main reason for engaging in your mindfulness practice?
- a. To improve my physical health.
 - b. To improve my mental health.
 - c. To improve my physical and mental health.
 - d. For spiritual reasons.
 - e. To earn course credit.
 - f. Other (please list): _____

FFMQ

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

1. ____ When I am walking, I deliberately notice the sensations of my body moving.
2. ____ I'm good at finding words to describe my feelings.
3. ____ I criticize myself for having irrational or inappropriate emotions.
4. ____ I perceive my feelings and emotions without having to react to them.
5. ____ When I do things, my mind wanders off and I'm easily distracted.
6. ____ When I take a shower or bath, I stay alert to the sensations of water on my body.
7. ____ I can easily put my beliefs, opinions, and expectations into words.
8. ____ I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
9. ____ I watch my feelings without getting lost in them.
10. ____ I tell myself I shouldn't be feeling the way I'm feeling.
11. ____ I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
12. ____ It's hard for me to find the words to describe what I'm thinking.
13. ____ I am easily distracted.
14. ____ I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
15. ____ I pay attention to sensations, such as the wind in my hair or sun on my face.
16. ____ I have trouble thinking of the right words to express how I feel about things.
17. ____ I make judgments about whether my thoughts are good or bad.
18. ____ I find it difficult to stay focused on what's happening in the present.
19. ____ When I have distressing thoughts or images, I "step back" and am aware of the thought of image without getting taken over by it.
20. ____ I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

21. ____ In difficult situations, I can pause without immediately reacting.
22. ____ When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
23. ____ It seems I am "running on automatic" without much awareness of what I'm doing.
24. ____ When I have distressing thoughts or images, I feel calm soon after.
25. ____ I tell myself that I shouldn't be thinking the way I am thinking.
26. ____ I notice the smells and aromas of things.
27. ____ Even when I'm feeling terribly upset, I can find a way to put it into words.
28. ____ I rush through activities without being really attentive to them.
29. ____ When I have distressing thoughts or images, I am able just to notice them without reacting.
30. ____ I think some of my emotions are bad or inappropriate and I shouldn't feel them.
31. ____ I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. ____ My natural tendency is to put my experiences into words.
33. ____ When I have distressing thoughts or images, I just notice them and let them go.
34. ____ I do jobs or tasks automatically without being aware of what I'm doing.
35. ____ When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about.
36. ____ I pay attention to how my emotions affect my thoughts and behavior.
37. ____ I can usually describe how I feel at the moment in considerable detail.
38. ____ I find myself doing things without paying attention.
39. ____ I disapprove of myself when I have irrational ideas.

MAAS

Using the 1-6 scale, 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 experience *should be*. Please treat each item separately.

Almost always 1	Very frequently 2	Somewhat frequently 3	Somewhat infrequently 4	Very infrequently 5	Almost never 6
-----------------------	-------------------------	-----------------------------	-------------------------------	---------------------------	----------------------

1	I could be experiencing some emotion and not be conscious of it until some time later	
2	I break or spill things because of carelessness, not paying attention, or thinking of something else	
3	I find it difficult to stay focused on what's happening in the present	
4	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way	
5	I tend not to notice feelings of physical tension or discomfort until they really grab my attention	
6	I forget a person's name almost as soon as I've been told it for the first time	
7	It seems I am "running on automatic" without much awareness of what I'm doing	
8	I rush through activities without being really attentive to them	
9	I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there	
10	I do jobs or tasks automatically, without being aware of what I'm doing	
11	I find myself listening to someone with one ear, while doing something else at the same time	
12	I drive places on "automatic pilot" and then wonder why I went there	
13	I find myself preoccupied with the future or the past	
14	I find myself doing things without paying attention	
15	I snack without being aware that I'm eating	

IPAQ

The following questions have to do with the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

No vigorous physical activities **→** *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities **→** *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking → *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

PSS

INSTRUCTIONS: The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response by placing an “X” over the circle representing HOW OFTEN you felt or thought a certain way.

	Never	Almost Never	Sometimes	Fairly Often	Very Often
	0	1	2	3	4
1. In the last month, how often have you been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. In the last month, how often have you felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. In the last month, how often have you felt nervous and “stressed”?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. In the last month, how often have you felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. In the last month, how often have you been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. In the last month, how often have you felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. In the last month, how often have you been angered because of things that were outside your control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SF-36v2

The following questions address your physical and psychological well-being. If you are unsure how to answer a question, please give the best answer you can. Mark only one answer for each question.

1. In general, you would say your health is:
 - a. Excellent
 - b. Very good
 - c. Fair
 - d. Poor

2. Compared to one year ago, how would you rate your health in general now?
 - a. Much better
 - b. Somewhat better
 - c. About the same
 - d. Somewhat worse
 - e. Much worse

3. The following questions are about activities you might do during a typical day.

Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports			
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf			
Lifting or carrying groceries			

Climbing several flights of stairs			
Climbing one flight of stairs			
Bending, kneeling, or stooping			
Walking more than a mile			
Walking several hundred yards			
Walking one hundred yards			
Bathing or dressing yourself			

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the amount of time you spend on work or other activities					
Accomplished less than you would like					
Were limited in the kind of work or other activities (for example, it took extra effort)					

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the amount of time you spend on work or other activities					
Accomplished less than you would like					
Did work or activities less carefully than usual					

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with the family, friends, neighbors, or groups?
- Not at all
 - Slightly
 - Moderately
 - Quite a bit
 - Extremely
7. How much bodily pain have you had during the past 4 weeks?
- None
 - Very mild
 - Mild
 - Moderate
 - Severe
 - Very severe
8. During the past 4 weeks, how much did pain interfere with your normal week (including both work outside the home and housework)?
- Not at all
 - Slightly
 - Moderately
 - Quite a bit
 - Extremely
9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Did you feel full of life?					
Have you been very nervous?					
Have you felt so down in the dumps that nothing could cheer you up?					
Have you felt calm and peaceful?					
Did you have a lot of energy?					
Have you felt downhearted and depressed?					

Did you feel worn out?					
Have you been happy?					
Did you feel tired?					
During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc)?					

10. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
I seem to get sick a little easier than other people.					
I am as healthy as anybody I know.					
I expect my health to get worse.					
My health is excellent.					

Beck Depression Inventory

1.
 - 0 I do not feel sad.
 - 1 I feel sad
 - 2 I am sad all the time and I can't snap out of it.
 - 3 I am so sad and unhappy that I can't stand it.

2.
 - 0 I am not particularly discouraged about the future.
 - 1 I feel discouraged about the future.
 - 2 I feel I have nothing to look forward to.
 - 3 I feel the future is hopeless and that things cannot improve.

3.
 - 0 I do not feel like a failure.
 - 1 I feel I have failed more than the average person.
 - 2 As I look back on my life, all I can see is a lot of failures.
 - 3 I feel I am a complete failure as a person.

4.
 - 0 I get as much satisfaction out of things as I used to.
 - 1 I don't enjoy things the way I used to.
 - 2 I don't get real satisfaction out of anything anymore.
 - 3 I am dissatisfied or bored with everything.

5.
 - 0 I don't feel particularly guilty
 - 1 I feel guilty a good part of the time.
 - 2 I feel quite guilty most of the time.
 - 3 I feel guilty all of the time.

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

7.
 - 0 I don't feel disappointed in myself.
 - 1 I am disappointed in myself.
 - 2 I am disgusted with myself.
 - 3 I hate myself.

8.

- 0 I don't feel I am any worse than anybody else.
- 1 I am critical of myself for my weaknesses or mistakes.
- 2 I blame myself all the time for my faults.
- 3 I blame myself for everything bad that happens.

9.

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

10.

- 0 I don't cry any more than usual.
- 1 I cry more now than I used to.
- 2 I cry all the time now.
- 3 I used to be able to cry, but now I can't cry even though I want to.

11.

- 0 I am no more irritated by things than I ever was.
- 1 I am slightly more irritated now than usual.
- 2 I am quite annoyed or irritated a good deal of the time.
- 3 I feel irritated all the time.

12.

- 0 I have not lost interest in other people.
- 1 I am less interested in other people than I used to be.
- 2 I have lost most of my interest in other people.
- 3 I have lost all of my interest in other people.

13.

- 0 I make decisions about as well as I ever could.
- 1 I put off making decisions more than I used to.
- 2 I have greater difficulty in making decisions more than I used to.
- 3 I can't make decisions at all anymore.

14.

- 0 I don't feel that I look any worse than I used to.
- 1 I am worried that I am looking old or unattractive.
- 2 I feel there are permanent changes in my appearance that make me look unattractive.
- 3 I believe that I look ugly.

15.

0 I can work about as well as before.

1 It takes an extra effort to get started at doing something.

2 I have to push myself very hard to do anything.

3 I can't do any work at all.

16.

0 I can sleep as well as usual.

1 I don't sleep as well as I used to.

2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.

3 I wake up several hours earlier than I used to and cannot get back to sleep.

17.

0 I don't get more tired than usual.

1 I get tired more easily than I used to.

2 I get tired from doing almost anything.

3 I am too tired to do anything.

18.

0 My appetite is no worse than usual.

1 My appetite is not as good as it used to be.

2 My appetite is much worse now.

3 I have no appetite at all anymore.

19.

0 I haven't lost much weight, if any, lately.

1 I have lost more than five pounds.

2 I have lost more than ten pounds.

3 I have lost more than fifteen pounds.

20.

0 I am no more worried about my health than usual.

1 I am worried about physical problems like aches, pains, upset stomach, or constipation.

2 I am very worried about physical problems and it's hard to think of much else.

3 I am so worried about my physical problems that I cannot think of anything else.

21.

0 I have not noticed any recent change in my interest in sex.

1 I am less interested in sex than I used to be.

2 I have almost no interest in sex.

3 I have lost interest in sex completely.

Daily Spiritual Experiences

1. I feel God's presence.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

2. I find strength and comfort in my religion.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

3. I feel deep inner peace or harmony.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

4. I desire to be closer to or in union with God.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

**4 - Strongly disagree
Forgiveness**

Because of my religious or spiritual beliefs:

BMMRS

The following questions deal with possible

5. I feel God's love for me, directly or through others.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

6. I am spiritually touched by the beauty of creation.
 - 1 - Many times a day
 - 2 - Every day
 - 3 - Most days
 - 4 - Some days
 - 5 - Once in a while
 - 6 - Never or almost never

Values/Beliefs

7. I believe in a God who watches over me.
 - 1 - Strongly agree
 - 2 - Agree
 - 3 - Disagree
 - 4 - Strongly disagree

8. I feel a deep sense of responsibility for reducing pain and suffering in the world.
 - 1 - Strongly agree
 - 2 - Agree
 - 3 - Disagree

9. I have forgiven myself for things that I have done wrong.

- 1 - Always or almost always
- 2 - Often
- 3 - Seldom
- 4 - Never

10. I have forgiven those who hurt me.

- 1 - Always or almost always
- 2 - Often
- 3 - Seldom
- 4 - Never

11. I know that God forgives me.

- 1 - Always or almost always
- 2 - Often
- 3 - Seldom
- 4 - Never

Private Religious Practices

12. How often do you pray privately in places other than at church or synagogue?

- 1 - More than once a day
- 2 - Once a day
- 3 - A few times a week
- 4 - Once a week
- 5 - A few times a month
- 6 - Once a month
- 7 - Less than once a month
- 8 - Never

13. Within your religious or spiritual tradition, how often do you meditate?

- 1 - More than once a day
- 2 - Once a day
- 3 - A few times a week
- 4 - Once a week
- 5 - A few times a month
- 6 - Once a month
- 7 - Less than once a month
- 8 - Never

14. How often do you watch or listen to religious programs on TV or radio?

- 1 - More than once a day
- 2 - Once a day
- 3 - A few times a week
- 4 - Once a week
- 5 - A few times a month

6 - Once a month

7 - Less than once a month

8 - Never

15. How often do you read the Bible or other religious literature?

- 1 - More than once a day
- 2 - Once a day
- 3 - A few times a week
- 4 - Once a week
- 5 - A few times a month
- 6 - Once a month
- 7 - Less than once a month
- 8 - Never

16. How often are prayers or grace said before or after meals in your home?

- 1 - At all meals
- 2 - Once a day
- 3 - At least once a week
- 4 - Only on special occasions
- 5 - Never

Religious and Spiritual Coping

Think about how you try to understand and deal with major problems in your life. To what extent is each of the following involved in the way you cope?

17. I think about how my life is part of a larger spiritual force.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

18. I work together with God as partners.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

19. I look to God for strength, support, and guidance.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

20. I feel God is punishing me for my sins or lack of spirituality.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

21. I wonder whether God has abandoned me.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

22. I try to make sense of the situation and decide what to do without relying on God.

- 1 - A great deal
- 2 - Quite a bit
- 3 - Somewhat
- 4 - Not at all

23. To what extent is your religion involved in understanding or dealing with stressful situations in any way?

- 1 - Very involved
- 2 - Somewhat involved
- 3 - Not very involved
- 4 - Not involved at all

Religious Support

These questions are designed to find out how much help the people in your congregation would provide if you need it in the future.

24. If you were ill, how much would the people in your congregation help you out?

- 1 - A great deal
- 2 - Some
- 3 - A little
- 4 - None

25. If you had a problem or were faced with a difficult situation, how much comfort would the people in your congregation be willing to give you?

- 1 - A great deal
- 2 - Some
- 3 - A little
- 4 - None

Sometimes the contact we have with others is not always pleasant.

26. How often do the people in your congregation make too many demands on you?

- 1 - Very often
- 2 - Fairly often
- 3 - Once in a while
- 4 - Never

27. How often are the people in your congregation critical of you and the things you do?

- 1 - Very often
- 2 - Fairly often
- 3 - Once in a while
- 4 - Never

Religious/Spiritual History

28. Did you ever have a religious or spiritual experience that changed your life?

- No
- Yes

IF YES: How old were you when this experience occurred?

29. Have you ever had a significant gain in your faith?

- No
Yes

IF YES: How old were you when this occurred?

30. Have you ever had a significant loss in your faith?

- No
Yes

IF YES: How old were you when this occurred?

Commitment

31. I try hard to carry my religious beliefs over into all my other dealings in life.

- 1 - Strongly agree
2 - Agree
3 - Disagree
4 - Strongly disagree

32. During the last year about how much was the average monthly contribution of your household to your congregation or to religious causes?

\$ _____ OR

\$ _____

Contribution

Contribution per year per month

33. In an average week, how many hours do you spend in activities on behalf of your church or activities that you do for religious or spiritual reasons?

Organizational Religiousness

34. How often do you go to religious services?

- 1 - More than once a week
2 - Every week or more often
3 - Once or twice a month
4 - Every month or so
5 - Once or twice a year
6 - Never

35. Besides religious services, how often do you take part in other activities at a place of worship?

- 1 - More than once a week
2 - Every week or more often
3 - Once or twice a month
4 - Every month or so
5 - Once or twice a year
6 - Never

Religious Preference

36. What is your current religious preference?

IF PROTESTANT ASK:

Which specific denomination is that?

- Roman Catholic
Orthodox (Eastern, Greek, Russian, Serbian, Ukrainian)
Non-Chalcedonian Orthodox (Armenian, Syrian, Coptic, Ethiopian)
Jewish, Reform
Jewish, Conservative
Jewish, Reconstructionist
Jewish, Orthodox
Episcopal, Anglican
Lutheran, ELCA
Lutheran, Missouri Synod
Lutheran, other
Lutheran, don't know which

Methodist, United Methodist
 African Methodist Episcopal
 (AME, AME Zion)
 Methodist, other
 Methodist, don't know which
 Wesleyan Methodist
 Presbyterian, PCUSA
 Presbyterian, other
 Presbyterian, don't know which
 United Church of Christ
 (Congregational)
 Christian Church (includes
 Disciples of
 Christ, Christian-Disciples, any
 modifier
 such as First, Eastside,
 Community, etc.
 NOT including "just a Christian"
 or
 "Christian-no denomination")
 Reformed (Reformed Church in
 America,
 Christian Reformed)
 Baptist, Southern Baptist
 Convention
 Baptist, Independent
 Baptist, other fundamentalist
 (Primitive,
 Free Will, Missionary)
 Baptist, African American bodies
 (National
 Baptist Convention of America)
 Baptist, American
 Baptist, other
 Baptist, don't know which
 Christian and Missionary
 Alliance
 Churches of Christ (NOT
 including United
 Church of Christ [above], or
 International
 Churches of Christ)
 Evangelical Free Church
 Salvation Army

Full Gospel Fellowship
 Foursquare Gospel
 Nazarene
 Bible Church
 Churches of God (if possible,
 specify which)
 Other fundamentalist or
 evangelical
 Protestant (if possible, specify
 which)
 Mennonite
 Friends, Quaker
 Brethren
 Hutterites
 Amish
 Assemblies of God
 Church of God in Christ
 Pentecostal (includes anything
 with
 Pentecostal in the name)
 Holiness
 Apostolic
 Sanctified, Sanctification
 Other charismatic (if possible,
 specify which)
 Adventist
 Mormon (includes all Latter Day
 Saints
 groups)
 Jehovah's Witness
 Christian Scientist
 Metropolitan Community Church
 Spiritualist
 Unity
 Other community church
 Non-denominational church
 (other than
 charismatic)
 Protestant, no further information
 Christian, no further information

Overall Self-Ranking

37. To what extent do you consider yourself a religious person?

- 1 - Very religious
- 2 - Moderately religious
- 3 - Slightly religious
- 4 - Not religious at all

38. To what extent do you consider yourself a spiritual person?

- 1 - Very spiritual
- 2 - Moderately spiritual
- 3 - Slightly spiritual
- 4 - Not spiritual at all