ABSTRACT

Title of Thesis:	QUANTIFYING BARRIERS TO MEDITATION AS A HEALTH BEHAVIOR: EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS OF THE DETERMINANTS OF MEDITATION PRACTICE INVENTORY
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Although the benefits of mindfulness meditation practices have been widely documented, research data suggest that there are barriers to regularly engaging in meditation behavior. In order to explore research questions pertaining to meditation initiation and adherence, psychometrically valid scales to assess barriers to meditation practice are necessary. The aim of the present study was to explore the factor structure and construct validity of the *Determinants of Meditation Practice Inventory* (DMPI) (Williams et al., 2011), a perceived barriers to meditation scale. Exploratory and confirmatory factor analyses along with construct validity tests were performed on data obtained from two large, community samples. Results supported the DMPI as a valid scale assessing perceived barriers with four factors, *Lack of Interest, Knowledge Concerns, Pragmatic Concerns and Sociocultural Beliefs*. The present

study offers a DMPI-revised scale that may be reliably used to assess attitudes and

beliefs that might impede meditation behavior.

QUANTIFYING BARRIERS TO MEDITATION AS A HEALTH BEHAVIOR:
EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS OF THE
DETERMINANTS OF MEDITATION PRACTICE INVENTORY

by

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Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction to the Problem

Practicing mindfulness meditation regularly has been shown to benefit

psychological and physical health in a number of ways. Since its integration into Western

psychology and medicine in the 1970s, thousands of studies have collectively

demonstrated the efficacy of mindfulness meditation for a host of conditions. One of the

most frequently cited definitions of mindfulness meditation is the process of "paying

attention in a particular way: on purpose, in the present moment, and non-judgmentally"

(Kabat-Zinn, 1994, p.4) This practice of paying attention has been taught in a wide variety

of formats, ranging from very traditional formats (e.g., lengthy meditation retreats)

(Ostafin et al., 2006) to incorporation into group therapy and psychoeducation programs

(e.g., Mindfulness-Based Cognitive Therapy for Depression (Segal, Williams, &

Teasdale, 2012) Mindfulness-Based Stress Reduction (Kabat-Zinn, 1982; Kabat-Zinn,

2009) Dialectical-Behavior Therapy (Linehan, 2003) and Acceptance and Commitment

Therapy (Hayes, Strosahl, & Wilson, 1999)) as a core component. Mindfulness is also

frequently woven into psychotherapy practice as a "standalone concept" (Horst, Newsom,

& Stith, 2013). Illustrative examples of the benefits of practicing mindfulness meditation

include improvements in stress-related physical diseases such as fibromyalgia

(Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007) type II diabetes (Rosenzweig et

al., 2007) rheumatoid arthritis (Zautra et al., 2008) as well as psychological conditions

like anxiety, depression and ADHD (Hofmann, Sawyer, Witt, & Oh, 2010; Khoury et al.,

2013; Zylowska et al., 2008).

Although the benefits of regular mindfulness practice have been well established,

it appears that there may be barriers, difficulties and challenges associated with

maintaining a regular mindfulness practice. For example, only a small fraction of Americans report practicing meditation of any sort (i.e., 9.4 percent) (Barnes, Bloom, Nahin, & National Center for Health Statistics (US), 2008) and empirical studies on meditation interventions have suffered from problematic participant attrition rates. (see Ospina, 2008). For example, although some mindfulness-based intervention studies experienced dropout rates of fewer than twenty percent (Kabat-Zinn, 1982; Shapiro, Schwartz, & Bonner, 1998), others have reported participant dropout rates as high as forty four percent (Shapiro, Astin, Bishop, & Cordova, 2005). Empirical research on barriers to meditation is sparse; however, participant reports of difficulties, challenges and doubts related to mindfulness meditation have been reported in qualitative work with college students (Sears, Kraus, Carlough, & Treat, 2011) psychotherapists and therapy clients (Horst et al., 2013), and mindfulness-based group therapy participants (Malpass et al., 2012). Moreover, prominent mindfulness meditation teachers have long known and addressed the difficulties inherent in meditation in their instructions (Brach, 2013) while the centuries-old Buddhist texts from which the mindfulness meditation tradition emerged include discussions of barriers, or "hindrances" that all meditators inevitably encounter (B. Bodhi, 2005). Thus, although engaging in a regular mindfulness meditation practice confers many benefits, there are it appears that there also barriers to regular practice. Despite this, barriers to meditation have been discussed in a mere handful of clinical studies. It is essential to increase the amount of studies that empirically explore barriers in order to understand what prevents people from engaging in mindfulness meditation and deriving the positive benefits from the practice that have been so extensively documented in recent decades. Knowing what the barriers are is the first step in helping clinicians in

addressing these barriers and assisting patients in integrating the practice into daily life. If people cannot successfully integrate the practice into daily life because of barriers that remain unaddressed, meditation, despite its benefits, becomes of little practical value.

Therefore, perhaps the "next wave" of meditation research in health psychology is to move beyond research establishing the efficacy of mindfulness training for mental health, and begin to examine questions related to adherence to meditation training interventions. Put simply, why do we resist doing what we already know is good for us? In this vein, Williams and her colleagues (2011) developed the Determinants to Meditation Practice Inventory (DMPI), a 17-item Likert-scale style questionnaire designed to document perceived barriers to meditation practice. The rationale for developing the scale was to address concerns of attrition plaguing meditation studies, for the ultimate goal of improving adherence to meditation interventions in clinical settings. The authors developed the scale through a systematic process involving a focused literature review, in-depth interviews with expert meditation teachers, and pilot-testing with a community-based sample to establish content domains and content validity of the items. Internal consistency, test-retest reliability and item response variability were also obtained through administration to a large community sample. Through this process, three content domains emerged to capture common barriers to meditation: Perceptions and Misperceptions, Pragmatic Concerns, and Sociocultural Beliefs. Detailed methodology of this process has been described elsewhere (e.g., Williams, Dixon, McCorkle, & Van Ness, 2011).

Although the DMPI items have undergone rigorous and systematic content validation, it is necessary to examine the construct validity of the measure by identifying

the factor structure through exploratory and confirmatory factor analyses. This process will not only identify quantifiable subscales, but it will also assist in conceptual refinement of the measure through interpretation of the emergent factor structure. Therefore, the purpose of the present study is to identify the latent factor structure of the DMPI through exploratory and confirmatory factor analyses, as well as perform additional tests of construct validity in a community sample. A psychometrically valid measure of barriers to meditation practice will be useful in understanding the practical challenges to meditation for the ultimate purpose of assisting patients and clients in overcoming such challenges. Ultimately, a quantitative measure of barriers to meditation practice will be useful in both research and practice by because it will assist in identifying the person-level and contextual-level variables that relate to perceiving barriers to meditation. For instance, what personality characteristics are related to perceiving barriers to meditation? What specific experiences occurring in meditation interventions (e.g., positive group dynamics) predict perceiving barriers to meditation? Developing psychometrically valid measurement tools of perceived barriers to meditation is the first step in answering such questions.

Chapter 2: Review of the Literature

This review will discuss meditation and mindfulness meditation as currently conceptualized in western psychology and public health. Next, a historical perspective on the introduction of mindfulness to the United States will be presented, followed by a discussion of the proliferation of mindfulness meditation as a health behavior in western medical and psychological contexts. Next, the benefits of mindfulness practice will be discussed, followed by a review of current literature on barriers or challenges to engaging in mindfulness training as a health behavior. Finally, a review of the development of the first quantitative measure of barriers to meditation will be presented, in conjunction with a discussion of its strengths, limitations, and potential utility in counseling and health psychology research.

Definition of Meditation

Mindfulness meditation is but one type of meditation known to health providers in the United States. The Centers for Disease Control and Prevention define meditation as "a group of techniques with origins in Eastern religious or spiritual traditions. In meditation, a person learns to focus his or her attention and suspend the stream of thoughts that normally occupy the mind. This practice is believed to result in a state of greater physical relaxation, mental calmness, and psychological balance" (Peregoy, Clarke, & Jones, 2014). The CDC recognizes several forms of meditation, and as of 2012, the CDC included in published reports that meditation as recognized by the CDC includes "mantra meditation (including Transcendental Meditation, relaxation response, and clinically standardized meditation), mindfulness meditation (including vipassana,

Zen Buddhist meditation, mindfulness-based stress reduction, and mindfulness-based cognitive therapy), and spiritual meditation (including centering prayer and contemplative meditation)" (Peregoy et al., 2014). In response to national surveys, 9.4% of adults reported practicing meditation according to this definition of meditation (Barnes et al., 2008).

Unique Relevance of Mindfulness Meditation for Counseling and Health Psychology

Although varied forms of meditation are recognized by the CDC, research and clinical interests in meditation as applied to psychotherapy and health psychology have emphasized mindfulness meditation above other types (Academic Mindfulness Interest Group, Melbourne, 2006). There has been an increasing enthusiasm among practicing clinicians to integrate mindfulness-based practices into psychotherapeutic work in recent years (Academic Mindfulness Interest Group, Melbourne, 2006; Horst et al., 2013), which may be due to the unprecedented availability of mindfulness meditation training resources in the United States, as well as the many similarities between the mindfulness meditation and psychotherapy traditions (see Germer, 2013). Furthermore, mindfulness-based approaches have been highly influential in the development of many "third wave" psychotherapy programs (e.g., Dialectical Behavioral Therapy, Acceptance and Commitment Therapy, Mindfulness-Based Cognitive Therapy) (Hayes et al., 1999; Linehan, 2003; Segal et al., 2012). For example, clients in Dialectical Behavior Therapy and Acceptance and Commitment Therapy learn mindfulness practices in conjunction with behavior techniques (Baer, 2003), whereas clients progressing through the Mindfulness-Based Cognitive Therapy engage in intensive formal mindfulness meditation practices (e.g., sitting practices) in addition to learning skills derived from

traditional cognitive-behavioral therapy (e.g., challenging cognitive distortions) (Baer, 2003; Crane & Williams, 2010).

There are several explanations for the widespread integration of mindfulness-based approaches into contemporary psychology, the most thorough of which was provided by Germer, Seigel & Fulton (2013) in an in-depth discussion of the similarities and differences between psychotherapy and the mindfulness meditation tradition. Although originating within distinct cultural contexts, psychotherapy and mindfulness practices share certain fundamental processes and goals. Broadly, both psychotherapy and mindfulness emphasize and promote acceptance of the full range of experiences, meanwhile without condoning self-destructive behaviors and promoting positive behavioral change (Germer, Seigel & Fulton, 2013). Self-acceptance, as with the compassionate and curious attitude encouraged in mindfulness practices, is central in psychotherapy and believed to support positive growth. As Carl Rogers famously stated, "the curious paradox of life is that when I accept myself just as I am, then I can change" (Rogers, 1961, p. 17; in Germer, Seigel & Fulton, 2013). Furthermore, psychotherapy encourages clients to challenge distorted cognitions (e.g., all-or-nothing thinking) and to supplant compulsive, automatic behaviors likely to undermine health (e.g., binge eating) with purposeful, health-promoting behavior patterns (e.g., relaxation techniques) (Burns, 1980). Similarly, mindfulness meditation teaches practitioners to observe and scrutinize thoughts and to react to thoughts and feelings with clarity and openness, thus promoting a reduction in compulsive reactions and an increase in deliberate, conscious action (Gunaratana & Gunaratana, 2011).

More specific parallels between both insight-oriented and behaviorist-oriented psychotherapy approaches and the mindfulness meditation tradition have been described; for example, the position that repeated *exposure* to fear-provoking and habitually avoided states (including both external and interoceptive sources of discomfort) promotes healing (see Germer et al, 2013, for a discussion). In behaviorist terms, repeated exposure to a fear-provoking stimulus (e.g., a public speaking event) will eventually cause the person to learn that the feared stimulus is in fact harmless, thereby leading to a reduction in avoidance behavior. In insight-oriented psychotherapy, the client repeatedly exposes him or herself to unwanted or threatening internal experiences (e.g., feelings, memories), and in doing so in the presence of an empathic therapist, begins to tolerate and accept such experiences, thereby leading to a reduction in the use of defensive strategies. During mindfulness meditation, the meditator will inevitably experience the arising and passing of unpleasant thoughts, feelings and physical sensations while attempting to repeatedly concentrate the mind on a single object of attention (e.g., the breath, sounds). Following the instruction to allow such events to occur (i.e., not to push them away), the practitioner becomes increasingly comfortable with such experiences, and learns that he/she can tolerate them and need not avoid them (Orsillo & Roemer, 2011). Of particular relevance to counseling psychology is the similarity between the mindfulness meditation tradition and the positive psychology movement (for discussion, see Germer et al., 2013). Illustrative examples of this similarity include a shared emphasis on the purposeful cultivation of positive emotions (e.g., compassion, gratitude), character strengths (e.g., virtues) and prosocial behavior (e.g., service) in service of the larger and shared human aspiration to be happy (Germer, 2013). Collectively, the various parallels between the

mindfulness meditation tradition and the psychotherapy tradition demonstrate the unique

relevance of mindfulness-based meditation practices for counseling psychology research

and practice, above other forms of meditation (e.g., centering prayer). As such, the

present review will emphasize mindfulness meditation training rather than other forms of

meditation as defined by the CDC.

Definition of Mindfulness Meditation

Within the western psychological mindset, mindfulness is generally understood as

a psychological construct characterized by the tendency to maintain undistracted, present-

moment sensory awareness (Germer, 2004). Mindfulness has also been described as the

ability to experience both pleasant and unpleasant experiences from an accepting, non-

reactive stance (Germer, 2004). Dr. Jon Kabat-Zinn, scientist and Zen practitioner

credited with bringing mindfulness practices to the medical setting, defines mindfulness

as "paying attention on purpose, in the present moment, and non-judgmentally to the

unfolding of experience moment-by-moment" (Kabat-Zinn, 2003). Thus, mindfulness

can be understood as a trait (i.e., the tendency to be mindful) and as a process (i.e., being

mindful). Mindfulness *meditation*, on the other hand, is a mental training technique that

can be employed to increase one's dispositional or trait-like mindfulness (Kabat-Zinn,

2003). It is important to note that mindfulness includes an affective quality of friendliness

and compassion towards one's experience (Brach, 2013). Given that the mind habitually

fixates on the illusory past and future, contributing to depression and anxiety, clinicians

recommend mindfulness meditation be practiced formally and informally on a daily basis

in order to cultivate a more mindful, and therefore happier, life (Kabat-Zinn, 2003).

Historical and Cultural Perspective

Although it has become possible to practice mindfulness meditation in the absence of any religious or philosophical orientation (Kabat-Zinn, 2000), the mindfulness meditation tradition has Buddhist origins (see e.g., Germer, 2004). Consideration of the cultural and religious origins of the mindfulness meditation tradition enriches our understanding of how the mindfulness tradition evolved as a practice currently employed in western healthcare settings to promote well-being. And, although barriers to meditation research is in its infancy, it is conceivable that westerners face unique, culturally-bound barriers to mindfulness meditation practice. Although it remains a question for future research, perhaps practicing mindfulness meditation in an individualistic society without any religious, spiritual, or ethical framework presents unique barriers to persisting in the practice.

Mindfulness and Buddhism. The word mindfulness has become a staple in the English language, yet it is a translation of the Pali word sati, which denotes awareness and remembering (Germer, 2004). Pali was the language of the historical Buddha, who exalted purposeful, present-moment awareness as fundamental to the end of human suffering. The historical Buddha, teaching 2,500 years ago in India, described mindfulness in two treatises, 1) the Anapasati Sutra (Rosenberg, 1999) and 2) the Satipathana Sutra (Thera, 1975). The Four Noble Truths, a treatise thought to include the essential teachings required to transcend unhappiness and suffering (Sumedho, 1992) also discusses mindfulness. Specifically, "right mindfulness," along with other ethical, moral and concentrative practices, aids the spiritual aspirant towards a peaceful mind, emotional

balance, and enlightenment (Sumedho, 1992). Therefore, mindfulness is not an end in itself, but a practice that supports equanimity and happiness.

Although mindfulness is a foundation of Buddhism, it is important to note that there is great variability with regard to specific mindfulness practices between and within Buddhist schools (Kabat-Zinn, 2003; Kang & Whittingham, 2010). Theravada Buddhism became the first organized Buddhist school in the 4th century BCE, basing its practices on the earliest surviving Buddhist scriptures known as the Tripitaka or Pali Canon (Harvey, 2012). In general, Theravada Buddhism historically flourished in Southeast Asia (i.e., Cambodia, Burma, Vietnam and Thailand) (Kabat-Zinn, 2003). Mahayana Buddhism, translated from Pali as the "Great Vehicle," was a Buddhist reform movement originating in 100 CE that took root in Vietnam, China, Korea and Japan. Later, Vajrayana Buddhism developed in the 5th century CE, adding a complex array of rituals and devotional practices (e.g., the use of mandalas and mantras) to traditional Mahayana practices. Vajrayana Buddhism spread throughout Tibet, Mongolia, Nepal, Bhutan and Ladakh, and is currently practiced by exiled Tibetan refugees throughout the globe (Harvey, 2012; Kabat-Zinn, 2003). Presently, Theravada, Mahayana and Vajrayana Buddhism are recognized as the primary branches of Buddhism (Cullen, 2011).

Western Buddhism. Although the migration of Buddhism to western cultures was complex and multifaceted, some authors emphasize the role of Asian immigrants in the nineteenth and twentieth centuries in bringing Buddhism to the United States (Coleman, 2002), as well as the 1983 World Congress of Religion in Chicago, where the organized schools of Buddhism were formally presented to a highly educated, elite American audience (Coleman, 2002). Following these events, the United States saw a

rise in so-called "cultural Buddhism" practiced by Asian Buddhist families settling in America, as well as a rise in the so-called "new Buddhism," a Buddhism practiced by American converts over the first half of the twentieth century (Coleman, 2002). Such American Buddhist converts were typically wealthy and highly educated (Coleman, 2002). By the 1950s, residential Zen centers had populated the American landscape (Coleman, 2002). Another primary factor contributing to the rise in American Buddhism was the Chinese persecution of Tibetan Buddhists in the 1950s. Tibetan refugees took residence in the United States and elsewhere in the West, contributing to western interest in and practice of Tibetan Buddhism throughout the second half of the 20th century (Coleman, 2002). Another primary influence on the emergence of a western Buddhism was Asian Buddhist leaders' active interest in holding dialogues with western scientists, the most well-known example of this being the enthusiasm from his Holiness the 14th Dalai Lama to explore common epistemological principles between the two traditions (McMahan, 2008).

Many of the practices originating in the three branches of Buddhism (Theravada, Mahayana and Vajrayana) have led to the present-day practices currently available in western culture. *Vipassana* meditation, or *insight* meditation, originated in the Theravada tradition and is typically considered synonymous with mindfulness in the contemporary United States. *Vipassana*, or the practice of sustained, present-moment sensory awareness, is the most common understanding of mindfulness practice in the west (Kang & Whittingham, 2010) which may be due in part to the widespread popularization of Dr. Jon Kabat Zinn's MBSR program (see Kang & Whittingham, 2010) that defines mindfulness meditation in this way. However, many other conceptualizations of

mindfulness as developed throughout Buddhist history also exist (see Kang & Whittingham, 2010 for a review), as well as diverse meditation practices with a basis in mindfulness that include additional elements, such as cultivating "skillful" mindstates (e.g., compassion), and maintaining sustained attention on a "virtuous object" so as to progress towards happiness and enlightenment (see Kang & Whittingham, 2010). Furthermore, the Mahayana and Vajrayana traditions developed a vast array of rituals and ethical practices designed to support the meditator on the path towards spiritual realization (e.g., merit making). However, such practices are de-emphasized in the west. Notably, all Buddhist lineages posit that adherence to ethical principles is a mandatory activity for mindfulness meditation trainees, in part because such adherence promotes a tranquil mind and progression on the spiritual path (Kang & Whittingham, 2010; Saddhatissa, 1997). The role of ethics in mindfulness meditation has been de-emphasized in western health and medical settings; such settings have comparably emphasized alleviation of symptoms (see e.g., Grossman, 2004). It is important to consider how mindfulness meditation practice is presented in the west when conceptualizing potential barriers to meditation practice.

Initial encounters between Buddhism and western psychology.

A handful of western psychologists had contact with the Buddhist teachings during the early 21st century. Psychoanalyst Franz Alexander described the Buddhist notion of enlightenment as "a regression to intra-uterine life" in his article *Buddhistic training as an artificial catatonia,* published in *Psychoanalytic Review* (Alexander, 1931). Franz also indicated that the Buddha had "left an unresolved object transference in his followers" and that Buddhism differed from psychoanalysis because it denied reality.

Later, Freud wrote in *Civilization and its Discontents (1930/1961)* that the "oceanic feeling" brought on by meditation was a regressive experience (as discussed in Germer, 2004). Meanwhile, other psychoanalysts took a more favorable view of Buddhist philosophy and meditative practices. D.T. Suzuki, a Japanese Zen Buddhist teacher, communicated extensively with psychologists Karen Horney and Erich Fromm (Fromm, Suzuki, & De Martino, 1960; Morvay, 1999). Suzuki used language from English Romanticism and American Transcendentalism to bring Zen concepts to the west and explain Buddhist ideas of non-dualism (McMahan, 2008). By the time the United States reached the 1970s, Harvard psychologist and yogi Ram Dass had sold nearly 1 million copies of his book on Buddhist psychology for westerners, called *Be Here Now* (see Germer, 2004).

The *Journal of Counseling Psychology* published its first article on Zen and psychotherapy in 1962, wherein author Emanuel Berger drew several parallels between Zen and counseling psychology. Specifically, he noted that Zen philosophical concepts could be beneficial in several human psychological domains, including sport performance, creativity, and client-centered counseling (Berger, 1962). A review on meditation and psychotherapy appeared in *Psychological Bulletin* in the mid-1970s (J. C. Smith, 1975), wherein the author reviewed several studies on the benefits of meditation and suggested that it be researched as a potential adjunct to psychotherapy.

Meditation and physical medicine. As psychologists saw opportunities to treat mental health problems with meditation, physical medicine recognized the power of meditative practices to treat physical disease. Cardiologist Herbert Benson's research on the relaxation response for cardiovascular disease (Benson, Greenwood, & Klemchuk,

1975) was of paramount influence in this area. In one study (Benson, Alexander, & Feldman, 1975), Benson showed that training in a "non-cultic" relaxation technique (based on mindfulness meditation) for 20 minutes a day, twice a day, reduced premature ventricular contractions in at-risk cardiovascular disease patients. Published in *Lancet,* this groundbreaking study spearheaded movements in the medical field to consider mental training techniques as effective treatments for physical problems. Soon after the publication of Benson's groundbreaking studies on the relaxation response, scientist and Zen practitioner Jon Kabat-Zinn established the Center for Mindfulness at the University of Massachusetts Medical School to offer relief for chronic conditions that could not be cured through traditional medicine (see Germer, 2004). As part of this effort, Kabat-Zinn secularized mindfulness training practices from the Buddhist tradition and organized them into the Mindfulness Based Stress Reduction (MBSR) program. MBSR is an 8-week course emphasizing mindfulness meditation as well as mindfulness of daily activities (e.g., mindful eating and walking). Thousands of studies on the efficacy of MBSR for a variety of health problems were published in the succeeding three decades. A recent meta-analytic review quantified the magnitude of treatment effect across published MBSR studies and reported that the majority of uncontrolled and controlled studies showed treatment effect sizes of .5 ($p<.0001$) for a variety of health conditions, including heart disease and cancer (Grossman, Niemann, Schmidt, & Walach, 2004).

Mindfulness-based manualized treatments. The success of MBSR in treating health problems contributed to a proliferation of mindfulness-based interventions in mental and physical health settings. Mindfulness-based philosophies and practices serve as primary elements of Dialectical Behavior Therapy (DBT) (Linehan, 2003), Acceptance

and Commitment Therapy (ACT) (Hayes et al., 1999), Mindfulness-Based Cognitive

Therapy (MBCT) (Segal et al., 2012) and others. To illustrate, the philosophical basis of

mindfulness is the notion that contentedness and happiness arise from full acceptance of

the reality of the present moment. As such, the MBCT protocol encourages clients to

change the way they *relate* to intrusive thoughts and disruptive emotions, rather than

change or replace the thoughts and emotions themselves as is sometimes taught in

traditional Cognitive Behavioral Therapy (Segal et al., 2012). Clients are encouraged to

relate to the full spectrum of experience with friendliness and non-judgment.

Mindfulness Efficacy Studies and Limitations

Mindfulness meditation training as a health intervention has proliferated within

psychological and medical treatment settings and has demonstrated efficacy. Given the

high volume of published studies examining mindfulness-based intervention efficacy, a

useful starting point to a discussion of the state of the research on this topic is with three

prominent and recent meta-analytic reviews (Grossman et al., 2004; Hofmann et al.,

2010; Khoury et al., 2013). Grossman and colleagues (2004) conducted a meta-analysis

on the impact of mindfulness-based stress reduction (MBSR) on physical and mental

health, while Hofmann and colleagues (2010) conducted a meta-analysis on mindfulness-

based therapies (i.e., both MBSR and mindfulness-based cognitive therapy (MBCT)) on

specific mental health outcomes. Finally, Khoury and colleagues (2013) examined

mindfulness-based therapies (i.e., MBSR and MBCT) on a range of physical and mental

health outcomes. Findings from these reviews and from studies reviewed therein point to

the efficacy of mindfulness-based interventions and also highlight several important

limitations in the mindfulness-based intervention literature.

Grossman and colleagues (2004) examined the efficacy of MBSR on physical and mental health outcomes. This meta-analysis examined 20 studies (N =1605 subjects) employing a variety of dependent measures, including measures of pain, depression, mood, physical health and others. Separate effect sizes were calculated for controlled and uncontrolled (i.e., observational) studies. For controlled studies (n = 13), medium and statistically significant effect sizes were reported for mental health (d = .54) and physical health (d = .53), which were similar in magnitude and not statistically different from effect sizes for the uncontrolled studies. The authors also reported a mean effect size for controlled studies employing active control groups (e.g., exercise combined with relaxation training, psychoeducation; n = 6 studies) which was also of medium magnitude (d = .49) and not statistically different from the mean effect size for studies employing waitlist control groups (d = .59; n = 4 studies) that failed to control for nonspecific aspects of the MBSR intervention. On the one hand this finding suggests that mindfulness-specific aspects of the MBSR interventions contributed to improved health outcomes; however, this inference must be made cautiously due to the small number of studies included in the review.

The findings from Grossman and colleagues (2004) suggest that MBSR is a promising intervention; however, several limitations of included studies and the meta-analysis invite cautious interpretation of findings. First, although the authors initially identified 64 empirical articles on MBSR and health, a very small number of studies (i.e., 20) were included in the review. The majority of excluded studies were excluded because the mindfulness-based meditation training intervention failed to approximate the structure of standardized MBSR or because of insufficient statistical reporting. Next, the authors

were only able to examine studies with pre-post intervention data, that is, immediately before and after the standardized, 8-week MBSR intervention protocol because the majority of studies meeting inclusion criteria had inadequate, if any, follow-up data on their program participants (Grossman et al., 2004). People who take MBSR attend 2-hour weekly classes for eight weeks with other program participants and are encouraged to practice both formal and informal meditation practices at home. Pre to post intervention changes in outcomes are of course promising and suggest that the participants gained immediate benefits of MBSR. However, it remains unclear to what extent (if any) post-intervention gains were maintained long-term. Therefore, although participants may have experienced immediate gains from a mindfulness-based intervention course, it is unknown to what extent participants were able to integrate the mindfulness skills into daily life and continue to benefit. A final and probably most troubling limitation of the included studies was that no study quantified changes in dispositional mindfulness as a result of participating in MBSR (Grossman et al., 2004). This is highly problematic because an assumption underlying mindfulness-based interventions is that an increase in trait mindfulness gained through intervention participation (i.e., regular meditation practice) is what "causes" improved health outcomes (e.g., reduced anxiety). If a study does not quantify changes in trait mindfulness when examining mindfulness-based intervention efficacy, it becomes even more unclear to what extent the cultivation of dispositional mindfulness (the primary goal of engaging in mindfulness meditation) was responsible for gains, or if gains were due to "non-mindfulness" factors, for example, the social support provided in the MBSR class format or contact with researchers. Therefore, although this study suggests that MBSR positively impacts physical and mental health,

several questions remain unanswered, including the extent to which improvements are long-lasting, and to what extent gains are due to the mindfulness aspect of the intervention or some other factor (e.g., contact, social support).

In a more recent meta-analytic review, Hofmann and colleagues (2010) examined studies investigating mindfulness-based therapies on mental health outcomes, specifically, anxiety and depression. Thirty-nine studies met inclusion criteria out of 727 initially identified articles about mindfulness-based therapies. Thus, this meta-analysis examined nearly double the number of studies examined in the Grossman (2004) review. To be included in the analysis, studies must have a) examined a mindfulness-based intervention (MBSR, MBCT or close modifications of these programs), b) measured anxiety or depression at pre and post intervention, c) examined an adult sample or a clinical sample, and d) provided sufficient data for effect size calculations. A range of clinical groups was represented in the sample of studies, including cancer, anxiety and depression, fibromyalgia, chronic pain, organ transplant, and others. The authors excluded studies that examined Acceptance and Commitment Therapy or Dialectical Behavior Therapy because of the relatively small role of formal mindfulness training in such therapies as compared with MBSR and MBCT. Thus, included studies in the meta-analysis were studies examining MBSR and MBCT or interventions modeled closely after MBSR and MBCT. Similar in format, these programs involve a 2-hour group meeting once a week for eight weeks and between-session "homework" assignments that include formal sitting meditation and "informal" mindfulness practices (e.g., walking meditation). Both uncontrolled (within-subject, pre-post comparisons) and controlled studies were included. The authors calculated fail safe N's throughout the analysis to

correct for publication bias, which was a major strength of the study. Effect sizes from pre to post intervention were in the moderate range for both anxiety (Hedges' $g = 0.63$) and depression (Hedges' $g = 0.59$), suggesting that mindfulness-based therapies were effective in reducing anxiety and depression symptoms. In contrast with the Grossman (2004) review, this study also examined long-term follow-up data to examine whether or not improvements in anxiety and depression were sustained beyond the immediate post-intervention period. Nineteen of the 39 included studies reported follow-up data on participants; the mean length of follow-up was 27 weeks ($SD = 32$ weeks, median of 12 weeks). Medium, statistically significant effect sizes for anxiety (Hedges $g = .60$) and depression (Hedges $g = .60$) were reported, suggesting that participants experienced somewhat long-lasting gains from participating in mindfulness-based therapies.

Khoury and colleagues (2013) conducted a recent and thorough meta-analysis that provided compelling evidence for the effectiveness of mindfulness-based therapies on both physical health and mental health (e.g., anxiety, outcomes. A wide variety of health conditions were represented in the review, including cancer, headaches, fibromyalgia, obesity, PTSD, anxiety, depression and others. The most common disorders included were mood, cancer, anxiety and physical pain. This review also provided summary data on relevant moderators of treatment effectiveness (e.g., the mindfulness experience of the therapist). In 209 studies involving 12,145 participants diverse with regard to age, gender and clinical diagnosis, mindfulness-based therapies were shown to be moderately effective in pre-post intervention studies. Small to moderate effect sizes were observed for studies comparing mindfulness-based treatment with the following active comparison conditions: relaxation training, supportive therapy, psychoeducation, art therapy, and

imagery. This suggests that perhaps mindfulness-based interventions are superior to these comparison treatments in treating both psychological symptoms and physical health symptoms. However, it is important to note that effect sizes were larger for the treatment of psychological symptoms relative to physical symptoms. Specifically, the largest effect sizes were observed for anxiety symptoms, followed by depression. Also of note, mindfulness-based therapy was not more effective than traditional cognitive-behavioral therapy in studies comparing these two treatments.

Regarding possible long-term gains, the beneficial effects observed immediately post-intervention were generally maintained at follow-up: of the 209 studies, 71 reported follow-up data. The mean follow-up period was 28.92 weeks (range = three weeks to three years). Small to medium effect sizes at follow-up were observed in pre-post studies, waitlist control studies, and treatment-controlled studies. Further, the superiority of mindfulness-based therapies compared with supportive therapies was also observed at follow-up (Hedges $g = .34$). However, mindfulness-based therapies were not found to be more effective than relaxation interventions, psychoeducation, or cognitive-behavioral therapy at follow-up on mental or physical health outcomes (e.g., mood, anxiety, pain). Thus, this meta-analysis provides some compelling support for the effectiveness of mindfulness-based treatments over the long term. However, this report did not include information on the amount of time participants spent in meditation after the intervention had ended, and the authors noted that data on home meditation practice time is generally not included in studies on mindfulness-based interventions. Having such information in future studies would provide insight regarding to what extent meditation practice is actually helping to maintain any observed gains.

Finally, interesting moderating effects were reported that pertain to potential barriers to meditation practice. The meditation experience level of the intervention leader moderated treatment effects, such that participants learning intervention techniques from more experienced mindfulness teachers experienced greater gains. The *clinical* training of the lead therapist did not moderate treatment effects. Therefore, perhaps experiencing barriers to meditation may be related to receiving mindfulness instructions from an individual who is deeply engaged in the practice. Finally, in contrast with prior meta-analyses (e.g., Grossman, 2004), this report provided some evidence that the cultivation of greater dispositional mindfulness through meditation practice is at least partly responsible for improved clinical outcomes in such therapies, as opposed to nonspecific aspects of mindfulness-based therapy (e.g., group contact). In particular, in the 45 studies that quantified changes in dispositional mindfulness throughout the intervention period, results indicated that participants in mindfulness-based therapies were more mindful at the end of treatment. Furthermore, these gains in mindfulness were maintained at follow-up. There was also a strong correlation between dispositional mindfulness levels and clinical gains.

In summary, mindfulness-based interventions have demonstrated effectiveness in promoting health and reducing symptoms of both mental and physical distress. Effect sizes for such interventions are similar to those reported for cognitive-behavioral therapy (Vøllestad, Nielsen, & Nielsen, 2012).

Attrition rates in mindfulness-based interventions.

Studies on manualized, mindfulness-based therapies are useful in understanding the effectiveness of meditation training. Further, attrition rates from such interventions

may also provide some information on potential barriers to meditation practice. Although dropout reporting has been inadequate in many studies on mindfulness-based therapies (see e.g., Grossman, 2004), some valuable data on attrition rates and reasons for attrition exist. In general, there appears to be a range of participant attrition rates in mindfulness-based intervention studies, with some studies reporting high participant attrition and others reporting low participant attrition. For example, inordinately high dropout rates (i.e., 44 percent) were reported in a study with MBSR for nurses (Shapiro et al., 2005). This is higher than the average dropout rate for both mindfulness-based therapies (i.e., 16.25 percent) and also for cognitive-behavioral therapies (i.e., 22.5 percent) as reported by some authors (see Vøllestad, 2013). Likely this high dropout rate of 44 percent was related to the characteristics of the study sample – the nurses who enrolled in MBSR were already over-burdened by work demands, and many of them cited logistical and time-management concerns as reasons for dropping out (Shapiro et al., 2005). Although MBSR is meant to reduce stress, perhaps it is less likely to do so for people who are already over-burdened with work demands and for whom attending the sessions creates a significant additional burden. In contrast, another study with Stage I or Stage II cancer patients (Carlson, Speca, Patel, & Goodey, 2003) reported extremely high compliance to the intervention (MBSR; 78% of the sample completed nearly all mindfulness classes) and substantial time spent in daily, home meditation practice ($M = 24$ minutes per day; SD not reported). Perhaps this high compliance was due to attributes of the cancer patient group (e.g., high motivation, strong desire for stress-reduction or healing techniques). More broadly, the range of participant attrition rates found across studies suggests that group-level characteristics may impact the meaningfulness or usefulness of mindfulness-

based therapies. Knowing more about which clinical groups are most and least likely to benefit from mindfulness meditation training is an important area for future research exploring barriers to meditation. Finally, it is important to emphasize the limitations of relating attrition rates directly to participant barriers to meditation: attrition rates are also influenced by study characteristics (e.g., funding) and therefore attrition rates do not necessarily speak to barriers about practicing meditation. However, the possibility exists that the benefits of training in mindfulness are somehow limited to particular patient groups or individuals (e.g., to those individuals who self-select to continue practicing). These remain important areas of exploration in future studies.

Clinical Importance of Understanding Barriers to Mindfulness Meditation

As discussed, the benefits of mindfulness meditation as a health behavior have been extensively documented. Although extensive empirical attention has been allocated towards documenting benefits of meditation practice, little discussion regarding patients' integration of mindfulness practice into daily life, particularly in the face of challenges and barriers, has occurred.

The basic instructions for mindfulness training are simple: beginning practitioners are often told to focus the attention on the breath, and when the mind wanders, to return the focus back to the sensations of breathing (Kabat-Zinn, 1994). Awareness can be expanded to include bodily sensations, sounds, emotions that may arise in the field of awareness (Brach, 2013). Yet, Mindfulness- Based Stress Reduction founder Dr. Jon Kabat-Zinn writes, "meditation is not for the faint-hearted" (2005; p.22), and psychotherapist and meditation teacher Tara Brach explains, "I've seen how for many people, the single biggest challenge to sustaining a meditation practice is the sense of

doubt: "I'm not doing this right. I'm not getting it. This isn't working. […] They wonder why meditating is so hard" (Brach, 2013). Barriers occurring in mindfulness practice are written about in the centuries-old Buddhists texts from which the present-day, secularized mindfulness training practices are derived (Bodhi, 2005). Such texts include descriptions of unpleasant physical and emotional states arising during the practice, such as restlessness, sleepiness and doubt, as well as unpleasant emotional states such as anger (Bodhi, 2005). Although these clinical and philosophical accounts describe barriers to mindfulness training, researchers in health psychology to date have appropriately emphasized establishing the efficacy of mindfulness training for improving health outcomes, rather than documenting barriers to mindfulness training. However, now that mindfulness-training efficacy has been well-established (Grossman et al., 2004; Hofmann et al., 2010; Khoury et al., 2013) it is now appropriate to empirically address barriers preventing patients and clients from actually *doing* mindfulness training on a regular basis and deriving its positive health benefits. This pattern of research follows that which has occurred in other health behavior research fields, such as aerobic exercise. For instance, the relationship between physical activity and disease risk was largely unknown until the mid-twentieth century (see Blair et al., 2010). Following extensive efficacy research in succeeding decades (Lawlor & Hopker, 2001; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991) it became clear that regular aerobic exercise was an effective intervention for improving a host of health outcomes. Subsequently, research examining exercise barriers, motivation and adherence proliferated in order to address the practical problems around adopting regular exercise into daily life   (Schutzer & Graves, 2004). Similarly, the psychotherapy field first established the effectiveness of therapy for mental health and

wellness (M. L. Smith & Glass, 1977) and research on barriers to help-seeking (Deane & Todd, 1996; Komiya, Good, & Sherrod, 2000) and therapy dropout (Wierzbicki & Pekarik, 1993) subsequently burgeoned. Meditation, having been established as a useful health behavior for improving well-being, may follow in this line of inquiry as well.

Empirical Studies on Barriers to Meditation

Research on barriers to meditation is in its infancy. To date, a handful of studies have explicitly dealt with barriers or challenges with meditation (Lomas, Cartwright, Edginton, & Ridge, 2014; Sears, Kraus, Carlough, & Treat, 2011; Williams et al., 2011; Williams, Ness, Dixon, & McCorkle, 2012) two of which involve the Determinants of Meditation Practice Inventory (DMPI) examined in the present study. That is, the stated purpose of these studies was to empirically explore barriers to meditation practice. Probably the most comprehensive study on barriers to meditation to date was conducted by Sears and colleagues (2011), who examined meditation barriers experienced by novice college student meditators progressing through a semester-long mindfulness-training course. Participants completed in-class meditation exercises ranging from 15-30 minutes in length once per week and were encouraged to practice meditation at home. On a weekly basis, participants were asked to write about perceived doubts and benefits of meditation, and also to report the number of minutes they had spent meditating during the week outside of class. Forty-five percent of participants reported meditating outside of class. There was high variability in voluntary home practice time (range: 0 to 200 minutes; SD = 39 minutes) and on average, participants practiced meditation for 25 minutes per week at home. The authors analyzed the content of the essays using grounded theory methods and developed categories drawing on the theoretical basis of the five hindrances to

meditation (see Bodhi, 2005), psychometric measures of mindfulness, and recurring themes emerging from the data. Doubt categories identified were as follows: a) difficulty maintaining cognitive focus (e.g., "getting past a wandering mind), b) physical issues (e.g., pain, feeling tired) c) general difficulties during meditation (e.g., hard to sit still) d) finding time to meditate outside of class (e.g., "Making time for my formal practice), e) finding motivation to meditate outside of class (e.g., "When am I ever going to find the urge to sit down and meditate by myself?"), f) does meditation really work? (e.g., "It doesn't always make me happy.") g) am I doing it right? (e.g., "That I'm just not getting it"), and h) other (e.g., "Is skiing and climbing meditation?"). The most frequently reported doubts were *difficulty maintaining cognitive focus* and *does meditation really work?* The authors summarized these categories as falling into more general dimensions of cognitive and physical challenges during meditation sessions, difficulty finding time and motivation to meditate outside of formal class sessions, and doubts about the efficacy of meditation or the self-efficacy to engage in it. A major strength of this study is that it documented perceived doubts and barriers in real time; that is, benefits and doubts were documented on a weekly basis while novice meditators were engaged in a meditation intervention. It should be noted that participants perceived far more benefits than doubts – in total, 136 benefits were identified compared with 60 doubts. And, the vast majority of participants reported both benefits *and* doubts about meditation (only 2 out of 65 participants reported doubts without benefits). This demonstrates that on the experiential level, individuals perceive meditation as a beneficial practice, but that they also experience doubts and barriers as they engage in the practice. It is also important to note that 55 percent of participants did not meditate outside of class. The study occurred in the

context of an academic course, and it is possible that these "non-responders" may have withdrawn from the study under other circumstances. It would be useful to know more about why just over half of the student participants did not meditate outside of the class. The authors concluded the study with the suggestion that that further research be conducted on how to assist individuals in persisting in the face of doubts (Sears et al., 2011). The authors discussed how knowing about doubts directly informs how meditation teachings can be altered to address specific doubts, thereby improving participants' experience with meditation.

In a recent qualitative study, Lomas and colleagues (2014) interviewed adult males with a preexisting meditation practice about barriers and challenges occurring in the practice. Participants were meditating in various contexts, the majority of which were community meditation centers or groups. Using semi-structured interviews, 30 male participants were interviewed about their experiences in meditation. Participants had a range of prior meditation experiences, and the majority of participants were members of meditation communities. The majority of participants were practicing mindfulness meditation, although some were practicing other types (e.g., loving kindness meditation). The authors noted that meditation was primarily regarded as a rewarding activity, but that barriers to meditation were meaningful to participants, accounting for approximately one quarter of the data that emerged from the interviews. Barriers were grouped into higher order themes. Although most participants were experienced with meditation, they experienced some challenges similar to those experienced by novice meditators in the Sears (2011) study. For example, in a theme named *difficulties learning meditation*, illustrative examples included feeling physical discomfort and experiencing a lack of

self-efficacy for meditation. As mentioned previously, many student participants in the Sears (2011) study wondered if they were "doing it right." Men also reported feeling like meditation was boring or dull. As part of another theme, *troubling experiences of self,* men reported challenges related to contacting difficult feelings and emotions. For example, one participant stated, "you're coming face to face with your own heart and mind, fear, anger, hatred, confusion, frustration and anxiety, all the difficult emotions…That's the whole point…It was certainly challenging"(p. 12). This challenge is similar to challenges experienced in psychotherapy, that is, the challenge of experiencing difficult thoughts and feelings. For example, one study identified the wish to avoid distressing feelings as a barrier to seeking professional help (Komiya et al., 2000). Perhaps there are similar barriers in meditation related to a lack of sufficient resources (e.g., emotional, social) or motivation to contact painful feelings. Related to this theme, another theme titled *exacerbating psychological issues* emerged in the data, and this theme was similarly comprised of examples related to the difficulties inherent in contacting difficult emotions. Participants reported that meditating sometimes had the effect of increasing anxiety and sensitivity, and they reported that meditation was actually *counterproductive* during periods of extremely low mood. Following discussion of these challenges, the authors emphasized the clinical importance of working with meditating clients on the challenging material that may emerge from meditation practice. They also recommended that clients experiencing particularly low moods to be discouraged from practicing mindfulness meditation during these periods, and to perhaps seek alternative coping strategies (e.g., social support seeking).

Qualitative Studies on Experiences with Meditation: Emergent Data Describing

Barriers

In addition to the aforementioned studies on meditation barriers, some descriptions of barriers to meditation can also be located in qualitative studies that were conducted in order to provide in-depth descriptions of the experiences of mindfulness training among various patient and client groups (Cohen-Katz, Wiley, Capuano, Baker, & Shapiro, 2004; Horst et al., 2013; Malpass et al., 2012). That is, the purpose of such studies was not to document barriers per se, but when examining participants' experiences of meditation, descriptions of barriers and challenges naturally emerged. One study (Cohen-Katz et al., 2004) provided very rich description of challenges and barriers to meditation experienced by a group of nurses undergoing the 8-week mindfulness-based stress reduction (MBSR) program. In a qualitative analysis of study documents, including weekly evaluation forms, emails, interviews, and a focus group with the nurse participants, rich data on benefits of MBSR and challenges to MBSR emerged. Physical and emotional challenges included restlessness, sleepiness, physical pain (e.g., "I felt pain in my right arm during the entire body scan" p. 82), experiencing difficult emotions during or resulting from meditation practice, and feeling guilty for taking time for oneself to participate in the MBSR program. Several logistical challenges associated with regular MBSR participation were noted, including work-related barriers, weather/driving issues, and finding time to do the MBSR homework. Of these barriers, restlessness was the most commonly noted barrier.

Notably, the authors tracked benefits and barriers reported over the course of the 8-week program, and observed that restlessness was reported frequently very early in the

program (i.e., at Week 2), and was reported less frequently in later weeks. Physical pain

and emotional difficulties followed a similar pattern, which were reported frequently in

the program's early stages, and then declined in frequency. These data showing

restlessness as an initial challenge in meditation practice are consistent with theoretical

descriptions of impediments to meditation discussed in early Buddhist texts (i.e., the five

hindrances described in the *Upanisa Sutta* see Bodhi, 2005). Therefore, from a theoretical

perspective, restlessness is considered to be a normal, natural experience in meditation,

and teachings offered by contemporary, western meditation instructors corroborate this

(Brach, 2013; Kabat-Zinn, 2009). Given that restlessness appears to have dissipated over

time through continued participation in the MBSR program in the Cohen-Katz (2004)

study, it may be particularly important to normalize and validate experiences of

restlessness and other "negative" experiences with novice meditation participants.

Otherwise, participants may feel that they are "failing" at meditation, and therefore cease

to continue. Data obtained through a meta-ethnography of experiences in MBSR and

MBCT programs (Malpass et al., 2012) corroborates this notion. Participants from

several clinical patient groups (i.e., cancer, chronic pain, major depression, HIV-positive

patient groups and others) had provided data on their experiences in MBSR and MBCT

intervention programs, which were then analyzed in the meta-ethnography. The authors

reported one phenomenon where goal-focused participants tended to judge their practices

as good or bad, viewing their practice as a failure when unable to achieve a valued goal

like relaxation. Therefore, it may be clinically important to emphasize, particularly

among highly goal-oriented individuals, that mindfulness is about cultivating awareness

of things as they are, rather than trying to manipulate the present state into something else (e.g., a relaxed state).

Sears and colleagues (2011) also discussed the importance of continually emphasizing the goal of mindfulness training as developing awareness of things as they are (as opposed to achieving a particular emotional state) when contextualizing their findings on doubts about meditation among college students. One doubt category was concerns about the efficacy of meditation, i.e., *does meditation really work?* For instance, one student wrote, "meditation doesn't instantly transform me." The authors described this as an expectancy violation, and noted that it may be important to explain to new meditators that the goal of meditation is awareness, not an instantaneous pleasant metaphysical experience. The authors further discussed how expectancy violations have been shown to predict dropout in other health behaviors, such as exercise (Sears et al., 2011), and emphasized that these should be addressed clinically. The authors recommended various ways to address doubt, including simply acknowledging it, redirecting attention towards benefits, addressing the specific doubt directly, and repeatedly bringing attention towards the person's intention/goals for meditating.

In addition to judging practices as good or bad, participants in the Malpass (2012) study on participant experiences with mindfulness-based therapies also reported feeling challenged and sometimes overwhelmed by contacting difficult emotions, which is similar to findings reported in the Lomas (2014) study with experienced meditators. Other challenges reported (Malpass et al., 2012) included having unmet expectations, misinterpreting mindfulness as mind control, seeing the practices as irrelevant or weird/strange, and being unsure about "getting it right." The challenge of experiencing

mindfulness practices as weird or strange is similar to findings from another study exploring the experiences of mindfulness use in therapy sessions with therapists and clients. In this study, therapist and client dyads were interviewed about how they experienced the use of mindfulness practices within therapy sessions. Therapists and clients in this study had little experience with mindfulness; therapists were instructed to use brief mindfulness interventions and exercises during sessions. Although the majority of comments by therapy clients about the use of mindfulness in session were positive, some clients reported feelings self-conscious while using mindfulness in session (Horst et al., 2013). This is an important finding – mindfulness may be easily misconstrued as relaxing for clients, and this study suggests some clients may have a negative reaction to the practice.

Finally, it should be noted that although there appear to be cognitive and emotional barriers to practicing meditation (e.g., an unwillingness to contact difficult feelings, doubts about the efficacy of meditation), which may lead to discontinued participation in the practice, logistical and practical concerns might also play a prominent role. For example, one study recorded reasons for dropout in a mindfulness-based stress reduction study with healthcare professionals (Shapiro et al., 2005). In the 18 individuals that were randomized to the 8-week mindfulness training intervention, 8 failed to complete the intervention. These 8 participants reported that they discontinued because of logistical concerns (i.e., a lack of time or increased external responsibilities) rather than a lack of interest in the intervention or lack of need to reduce stress. The authors noted that mindfulness interventions may need modification in order to be feasible for highly stressed, working populations (e.g., helping professionals), perhaps through finding ways

to incorporate mindfulness strategies into work schedules, given that the standard MBSR program includes daily homework assignments typically ranging from 15 minutes to 45 minutes.

Although there are sparse data on barriers to meditation, the aforementioned studies indicate that individuals do experience challenges and barriers when practicing meditation. These barriers can be conceptualized as cognitive barriers (e.g., having difficulty learning how to do mindfulness, misinterpreting mindfulness as stopping one's thoughts), emotional barriers (e.g., feeling unable to unwilling to contact painful feelings arising in meditation, feeling weird/strange during meditation), logistical barriers (e.g., not having enough time), and others. It appears that barriers to meditation may share some similarities with barriers to psychotherapy (e.g., challenges related to contacting painful feelings), and similarities with barriers to other health behaviors requiring a regular time commitment and knowledge about how to engage in the behavior (e.g., regular exercise). However, given that emotional barriers have been specifically identified in the barriers to meditation literature and also in the psychotherapy literature, it would be interesting to explore to what extent variables pertaining to the relationship with internal experience (e.g., pleasant and unpleasant emotions) relate to perceiving barriers to meditation. For example, it is possible that individuals who have a low tolerance for emotional distress and/or who habitually attempt to avoid or attenuate unpleasant emotions may perceive more barriers to meditation relative to those who are more open to internal experience. Finally, it is also likely that the perceived benefits of practicing meditation regularly must outweigh the costs, a phenomenon that has been

observed in psychotherapy research: that is, people seek therapy and stay in therapy when the benefits are perceived as greater than the costs (Vogel, Wade, & Hackler, 2008).

Limitations of Barriers to Meditation Research

The current research on barriers to meditation research is highly limited. Given that so little is known about barriers to meditation, the vast majority of studies specifically examining barriers to date have used qualitative methodologies. Further, although barriers to meditation studies have examined barriers with novice meditators (Sears, 2011) experienced meditators (Lomas, 2014), and participants with a range of previous experience (Malpass, 2012), due to the small number of studies on barriers it is unclear how barriers to meditation vary across participant experience level. Beginning level meditators probably face barriers that are quite different from more experienced meditators. For example, perhaps beginning meditators face difficulties with the meditation sitting posture, whereas more experienced meditators experience barriers related to contacting painful emotional states on a deep level. Future research should explore the relationship between meditation experience/expertise and the perception and experience of barriers. Moreover, it is unclear how barriers to meditation vary across clinical groups and across individuals. For example, perhaps meditation is more difficult for chronic pain patients than for healthy individuals. However, such information is unknown. Furthermore, fewer barriers may be experienced by individuals with specific characteristics (e.g., those who have a strong interest in meditation) relative to others. These remain important questions for future research. Quantitative measurement tools to quantify perceived barriers to meditation will help with understanding systematic variance in perceived barriers to meditation across individuals and groups.

Development of the Determinants of Meditation Practice Inventory

In order to address barriers to meditation from a quantitative approach, Williams and her colleagues (2011) first developed a Likert-type scale to identify barriers titled Determinants to Meditation Practice Inventory (DMPI). Because no qualitative or quantitative data had been recorded on barriers to meditation, the authors referenced discussions of meditation obstacles located in English translations of principal philosophical texts describing meditation practices (Patanjali, 2001; Thompson, 2008), as well as modern day instructional materials about meditation (Iyengar, 1979; Rinpoche, Gaffney, & Harvey, 1994). In addition to these sources, the authors conducted in-depth interviews with expert meditation teachers about meditation barriers. Next, the authors developed *content domains* (i.e., categories) to conceptually summarize the barriers that emerged from the literature review and expert interviews. Following these procedures, the authors developed operational definitions of the content domains and generated 53 items addressing the content domains. The content validity of the items was assessed in conjunction with an expert panel consisting of expert meditation teachers, practitioners, teachers and clinicians. This panel evaluated the items for relevance to the content domains, and for clarity of wording. Items were then systematically eliminated, yielding 22 items. These 22 items were administered to a volunteer, community-based sample consisting of 10 individuals who were diverse with regard to age, race, education level and marital status. This community sample responded to the 22-item questionnaire. Additional items were deleted based upon these participants' responses and feedback. In general, items that showed low response variability and/or were confusing to the participants were removed from the scale, yielding a 17-item measure. Items regarding religious beliefs sparked considerable discussion among the participants and were

retained in the measure in order to observe their function within a larger sample.

Validity and Reliability of the DMPI. The authors next administered the 17-item measure to a sample of 150 community caregivers. This caregiver sample was conceptualized as a proxy for a highly stressed group that would likely benefit from meditation. The majority of participants were white, female, employed, married and Catholic. The authors sought to estimate convergent validity, internal consistency reliability, and test-retest reliability using data obtained from this sample. In order to estimate convergent validity, the authors assessed personality and perceived burden imposed by caregiving, hypothesizing that those participants who were high on neuroticism and also high on perceived burden of caregiving would perceive more barriers to meditation than participants scoring low on these variables. These variables were measured with the Big Five Inventory Neuroticism Subscale (BFI) (John & Srivastava, 1999) and the Caregiver Reactions Assessment (CRA) (Given et al., 1992). This hypothesis was supported: the correlation between perceived barriers and neuroticism was significant and of moderate effect size ($r = .42$) and the correlation between perceived barriers and the perceived burden of caregiving was also significant and of moderate effect size ($r = .32$). However, these correlations are somewhat modest, suggesting that further tests of convergent validity may be indicated. The authors assessed internal consistency using Chronbach's alpha, which was .87. This high value indicates that scores on the DMPI reflect good internal consistency. Regarding test-retest reliability, 108 out of 150 participants completed the retest 1-week later. The ICC was .86, indicating that the DMPI exhibited acceptable test-retest reliability.

Strengths of this study include thorough and systematic exploration of content

validity with meditation experts. For instance, rather than develop a measure with a panel of psychologists who happen to use mindfulness in clinical practice, the authors invited a panel of meditation teachers with thousands of hours of meditation experience to develop in the items. In the absence of empirical studies on barriers to meditation, the authors referenced meditation texts from which the secularized mindfulness practices used in contemporary clinical psychology were derived. Furthermore, the authors pilot tested the items to assess clarity of wording with meditation naïve individuals from the community. However, the DMPI scale construction process was limited in several respects. First, the authors constructed the DMPI in the absence of factor analyses and without clearly defining the psychological constructs purported to underlie the item indicators. Rather, the authors constructed the scale through procedures emphasizing face validity of the items and internal consistency, which limits the validity of the scale. Second, the estimates of construct validity are questionable. First, the correlations with the related constructs (i.e., neuroticism and perceived burden of caregiving) were modest, suggesting that further tests of construct validity are indicated. Furthermore, perceived burden of caregiving applies uniquely to caregivers, and it does not apply to the population more generally. Therefore, it would be useful to understand how scores on the DMPI relate to scores on psychological measures that apply to a broader segment of the population. The present study addressed these limitations in order to strengthen the DMPI as a measure of barriers to meditation.

The Present Study

The present study conceptually and psychometrically evaluated the Determinants of Meditation Practice Inventory through exploratory and confirmatory factor analyses in

two large, community samples. The construct validity of the DMPI was estimated

through comparison with constructs hypothesized as related to perceived barriers to

meditation. Specifically, experiential avoidance, distress tolerance and curiosity were

examined in comparison with perceived barriers to meditation. These constructs were

selected based on the extant literature on barriers to meditation. As discussed, a common

barrier that practicing meditators experience is contacting difficult emotions and

experiences (Malpass, 2012; Lomas, 2014). Specifically, qualitative data have indicated

that engaging with painful emotional material can be a challenging aspect of meditation

(Cohen-Katz et al., 2005; Lomas et al., 2014; Malpass et al., 2012). Perhaps being

resistant towards or fearful of experiencing the full range of internal experience presents

a barrier to engaging in meditation practice. Although this has not been documented in

the mindfulness meditation literature, findings from the counseling literature provide

some credence to this notion. Specifically, one study (Komiya et al., 2000) documented a

positive relationship between emotional openness and favorable attitudes towards help-

seeking. That is, individuals who were high in emotional openness also reported more

favorable attitudes towards seeking counseling relative to students who were low in

emotional openness. This suggests that being open to experiencing feelings may be

associated with a greater willingness or openness to exploring such feelings with a

counselor. It may be that a similar phenomenon exists in perceptions of meditation; that

is, those who are open to internal experiences/emotions may hold more favorable

perceptions of meditation relative to people who are closed off to internal experiences

and emotions. The selected constructs for establishing construct validity in the present

study (i.e., experiential avoidance, distress tolerance and curiosity) pertain to the

relationship with internal experience (i.e., being avoidant/fearful of experience or feeling open to experience). Each of these constructs is discussed in detail in the following sections.

Experiential avoidance. Experiential avoidance has been extensively explored in the clinical literature and has been defined as a process involving excessive negative evaluation of unwanted private events (e.g., thoughts, feelings and sensations), a general unwillingness to experience such events, and deliberate efforts to escape from or control such events (Hayes, 1994; Hayes et al., 1999). Given that mindfulness meditation involves opening to and accepting the full range of experience, including both pleasant and unpleasant internal events, those scoring high in experiential avoidance might perceive more barriers to meditation practice relative to those low in experiential avoidance. Therefore, it was hypothesized that perceived barriers to meditation and experiential avoidance would correlate positively.

Distress Tolerance. Distress tolerance is characterized as the capacity to tolerate negative emotional states (Simons & Gaher, 2005)**.** Individuals low in distress tolerance are more likely to report distress as being unbearable, less likely to accept their internal experiences, and more likely to make efforts to avoid or attenuate negative internal states as quickly as possible relative to those high in distress tolerance. Given that mindfulness meditation involves contacting directly both painful states and pleasant states, which has been identified as a challenging aspect of meditation (Bodhi, 2000; Lomas et al., 2014; Malpass et al., 2012) it is likely that those who are low in distress tolerance will perceive more barriers to meditation relative to those high in distress tolerance. As such, it was

hypothesized that scores on measures of distress tolerance and perceived barriers to meditation would be negatively correlated.

Curiosity. Curiosity has been described as the extent to which people seek out novel information and experiences, as well as the extent to which they hold a general willingness to embrace the unpredictable and uncertain nature of daily life (Kashdan et al., 2009). Mindfulness meditation instructions often include the suggestion to maintain an attitude of curiosity and openness towards whatever arises in the present moment experience (Brach, 2013; Kabat-Zinn, 2009). Further, maintaining curiosity, openness and interest towards that which arises in the present moment has been described as a quality of dispositional mindfulness (Bishop et al., 2004). Perhaps those high in curiosity, being more open to novel experiences and tolerant of uncertainty, may be more open to trying meditation and perceive fewer barriers to the practice. Therefore, it was hypothesized that there would be a negative correlation between scores on curiosity and scores on the DMPI.

Chapter 3: Statement of the Problem

The DMPI was constructed using systematic procedures emphasizing content validity and internal consistency of the items, which limits the validity of the scale. Further measurement development is necessary in order to establish the DMPI as a psychometrically valid measure of perceived barriers to meditation practice. Recommended practices in psychological scale development encourage factor analysis as a crucial component in developing valid psychometric measures (Worthington & Whittaker, 2006). Factor analysis is a set of statistical techniques designed to identify and/or confirm a smaller number of latent constructs from a set of test items, allowing for an understanding of how many dimensions or constructs underlie a set of items (see Worthington et al., 2006). The DMPI was constructed in the absence of factor analyses, which limits the validity of the scale.

Furthermore, although the DMPI is purported to assess meditation barriers falling into three categories (i.e., *Perceptions and Misperceptions, Pragmatic Concerns,* and *Sociocultural Beliefs*; see Table 1), the psychological constructs described as underlying the DMPI items could be more clearly defined. As described by Williams and her colleagues (2011), the categories seek to capture a very wide variety of attitudes, beliefs, values, and perceptions about meditation. For example, the authors define the category *Pragmatic Concerns* as including items pertaining to the environment, time and priorities, as well as to intrinsic and extrinsic motivation regarding meditation (Williams and colleagues, 2011). The category *Perceptions and Misperceptions* is defined as including items pertaining to the participant's understanding of meditation practice,

presumed outcomes of meditation, as well as to the perceptions of constraints necessary to practice. Meanwhile, *Sociocultural Beliefs* is defined as including items addressing the respondent's social and cultural barriers to practicing meditation, religious beliefs and perceived friend support. Overall, the authors sought to capture a wide variety of attitudes, values and beliefs about meditation that might interfere with meditation behavior. The scale may benefit from more exact specification of the psychological constructs underlying the DMPI item indicators. Exploratory factor analyses may assist with such conceptual specification.

	Item	Hypothesized Construct
1	I can't stop my thoughts.	Perceptions and Misperceptions
2	I am uncomfortable with silence.	Perceptions and Misperceptions
3	I can't sit still long enough to meditate.	Perceptions and Misperceptions
4	I prefer to be accomplishing something.	Perceptions and Misperceptions
5	Meditation might be boring.	Perceptions and Misperceptions
6	It is a waste of time to sit and do nothing.	Perceptions and Misperceptions
7	I don't know much about meditation.	Perceptions and Misperceptions
8	Prayer is my form of meditation.	Perceptions and Misperceptions
9	There is no quiet place where I can meditate.	Pragmatic Concerns
10	I don't have time.	Pragmatic Concerns
11	There is never a time when I can be alone.	Pragmatic Concerns
12	I wouldn't know if I were doing it right.	Pragmatic Concerns
13	I'm concerned meditation will conflict with my religion.	Sociocultural Beliefs
14	My family would think it was unusual.	Sociocultural Beliefs
15	I would feel odd meditating.	Sociocultural Beliefs
16	I don't believe meditation can help me.	Sociocultural Beliefs
17	I wonder if meditation might harm me.	Sociocultural Beliefs

Table 1: Items and constructs as hypothesized by Williams (2011)

Following factor analyses, further tests of construct validity in larger, more diverse samples are necessary in order to examine the construct validity of the DMPI as a measure of barriers to meditation. In the initial construction of the DMPI, DMPI total

scores were correlated with total scores on measures of neuroticism and perceived burden of caregiving in order to estimate convergent validity in a sample of caregivers. The authors hypothesized that those perceiving a higher burden of caregiving would also perceive more barriers to meditation than those perceiving a lower burden of caregiving, and that those high in neuroticism would also perceive more barriers to meditation than those low in neuroticism. These hypotheses were supported, suggesting adequate construct validity of the DMPI. However, caregivers represent a highly unique group, and the caregiver group recruited for initial DMPI development was demographically homogenous – most participants were white, female, employed, married and Catholic. It is possible that this relatively homogenous caregiver sample provided biased validity estimates. It is therefore necessary to establish construct validity using measures that apply to community members more generally (i.e., beyond caregivers), and ideally, in samples with greater racial and ethnic diversity relative to the sample used to initially develop the scale. These steps are necessary to explore the validity of the DMPI and to increase its applicability in health and psychological research.

The Present Study

The overarching aim of the present study was to psychometrically and conceptually evaluate the Determinants of Meditation Practice Inventory (DMPI). The DMPI is purported to assess perceived barriers to meditation; that is, perceptions, attitudes, beliefs and concerns that might interfere with meditation behavior. However, given the wide variety of perceived barriers conceptualized by Williams and colleagues (2011), extensive exploratory factor analyses were conducted allowing for bi-factor models as well as 1, 2, 3 and 4-factor exploratory models. The best fitting model was

tested with confirmatory factor analyses. Construct validity was estimated by correlating DMPI total scores with scores on measures of experiential avoidance, distress tolerance and curiosity.

Factor Analyses. Full information maximum likelihood exploratory factor analyses (EFA) and confirmatory factor analyses (CFA) with oblique rotation were performed in MPlus (Muthén & Muthén, 2012). Model fit was assessed using recommended metrics, including the chi square goodness of fit, RMSEA, CFI and SRMR (Bentler, 1990; Worthington & Whittaker, 2006).

Construct Validity. Measures assessing constructs hypothesized to relate to perceiving barriers to meditation were administered along with the DMPI in order to provide estimates of construct validity. Specifically, three constructs were explored in conjunction with perceived barriers to meditation: 1) experiential avoidance, 2) distress tolerance and 3) curiosity. These constructs were selected based upon the literature documenting contact with unpleasant emotional material as a common barrier/challenge related to meditation. As such, each of these constructs pertains to how one relates to internal experience (i.e., being avoidant/fearful of experience or feeling open to experience). Conceivably, being open to experience rather than avoidant or repressive of internal experience may be associated with perceiving fewer barriers to meditation practice. Findings from the counseling literature documenting a positive relationship between emotional openness and positive attitudes towards help-seeking supports this notion (Komiya, 2000). As such, it was hypothesized that perceived barriers to meditation would be positively associated with experiential avoidance, and negatively correlated with both distress tolerance and curiosity. Specifically, DMPI total scores will

be correlated with the total scores on curiosity, experiential avoidance and distress tolerance.

Hypotheses.

1. Exploratory Factor Analysis.

The latent factor structure of the DMPI will be investigated in an exploratory fashion through exploratory and exploratory bi-factor analyses (i.e., no a priori hypotheses).

2. Confirmatory Factor Analysis.

Confirmatory factor analyses using maximum likelihood estimation in a new sample will either confirm or disconfirm the latent factor structure identified in the exploratory factor analysis phase.

3. Construct Validity.

3a. Distress tolerance will be negatively correlated with Perceived Barriers to Meditation (i.e., DMPI total scores).

Distress tolerance is defined as the capacity to tolerate negative emotional states (Simons & Gaher, 2005). Mindfulness meditation involves contacting directly both painful states and pleasant states. Furthermore, the process of directly experiencing unpleasant emotional states has identified as a challenging aspect of meditation (Bodhi, 2000; Lomas et al., 2014; Malpass et al., 2012). Therefore, it is likely that those who are low in distress tolerance will perceive more barriers to meditation relative to those high in distress tolerance. Distress tolerance total scores will be used because the distress tolerance scale is characterized by a general distress tolerance factor and four first-order factors. Total scores on the distress tolerance scale reflective of the general distress

tolerance factor have been used previously to establish construct and criterion validity of the distress tolerance scale (Simons & Gaher, 2005).

3b. Experiential avoidance will be positively correlated Perceived Barriers to Meditation (i.e., DMPI total scores).

Experiential avoidance has been characterized as a process involving excessive negative evaluation of unwanted private events (e.g., thoughts, feelings and sensations), a general unwillingness to experience such events, and deliberate efforts to escape from or control such events (Hayes, 1994; Hayes et al., 1999). Given that mindfulness meditation involves opening to and accepting the full range of experience, including both pleasant and unpleasant internal events, those scoring high in experiential avoidance might perceive more barriers to meditation practice relative to those low in experiential avoidance. Total scores on experiential avoidance will be used because the Acceptance and Action Questionnaire is characterized by a one-factor structure (see Bond, 2011).

3c. Curiosity will be negatively correlated with Perceived Barriers to Meditation (i.e., DMPI total scores).

Curiosity has been characterized as a general motivation to seek new experiences and a willingness to embrace the uncertain nature of day-to-day life (Kashdan et al., 2009). Mindfulness meditation instructions include the suggestion to maintain openness and curiosity towards that which arises in momentary experience. Furthermore, openness to experience has been positively associated with favorable attitudes towards help-seeking (Komiya et al., 2009). Therefore, perhaps curiosity, a construct characterized by openness to uncertainty and

interest in new experiences, will be related to perceived barriers to meditation.

Curiosity total scores will be used because the curiosity subscale scores correlate

very highly, and it has therefore been recommended to use the curiosity total

score in research (see Kashdan, 2009).

Chapter 4: Method

Design Statement

Exploratory and Confirmatory Factor Analyses.

Full information maximum likelihood exploratory factor analyses and exploratory bi-factor analyses with oblique rotation were performed using MPlus software (Muthén & Muthén, 2012). Decisions on the optimal number of factors to extract were made using parallel analysis (Hayton, Allen, & Scarpello, 2004), a recommended procedure that extracts factors based upon variance explained in comparison with factors generated by random datasets. Fit indices (i.e., CFI, RMSEA and SRMR) and recommended cutoff scores (Hu & Bentler, 1999) were evaluated for each exploratory model, as well as factor loadings, presence of cross-loadings, and conceptual interpretability. Recommendations to retain items with loadings at or above .400 were considered, as well as recommendations to remove items with low communalities (i.e., below .400) (Worthington & Whittaker, 2006). Low communalities suggest that latent factors of interest fail to explain a substantive portion of variance in the items; such items can be considered for deletion (Worthington & Whittaker, 2006).

Full information maximum likelihood confirmatory factor analyses were also performed in MPlus (Muthén & Muthén, 2012). In accordance with recommended practices (Worthington & Whittaker, 2006), the CFA model was evaluated using the chi square goodness of fit statistic, the Comparative Fit Index (CFA; cutoff score of .95), root mean squared error of approximation (RMSEA; cutoff score of .06), and the standardized root mean squared residual (SRMR; cutoff score of .08) (Hu & Bentler, 1999).

Construct Validity.

In order to estimate construct validity, Pearson's correlations were computed between total scores on the DMPI and total scores on measures of curiosity, distress tolerance and experiential avoidance in SPSS v22. Curiosity was measured with the Curiosity and Exploration Inventory (CEI-II) (Kashdan et al., 2009). Distress tolerance was measured with the Distress Tolerance Scale (DTS) (Simons & Gaher, 2005). Experiential avoidance was measured with the Acceptance and Action Questionnaire (AAQ-II) (Bond et al., 2011). DMPI total scores were hypothesized to correlate positively with total scores on the AAQ and negatively with scores on both the CEI-II and the DTS.

Participants

Participants were recruited via Amazon's mechanical Turk (mTurk), an online survey administration platform and crowd sourcing website. MTurk participants are typically paid between 10 and 15 cents for completing a battery of surveys (Buhrmester, Kwang, & Gosling, 2011). Participants in this study were compensated on average 26.6 cents for completing the study survey. In general, research recruitment through mTurk has grown in recent years, with some findings suggesting that the amount of monetary compensation does not appreciably influence the quality of participant responses to survey questions (Buhrmester et al., 2011). MTurk users are demographically similar to the general US population (Ross, Irani, Silberman, Zaldivar, & Tomlinson, 2010), and some authors have argued that mTurk samples are more representative of the general US population than college student samples (Paolacci, Chandler, & Ipeirotis, 2010). In order to maximize the likelihood of obtaining a diverse sample, all mTurk users (i.e.,

individuals living in the United States and also international users) were eligible. Surveys were administered in four separate rounds of administration on the mTurk survey platform.

Eight hundred participants consented to participate in the study and were compensated. Seven hundred and fifty-seven mTurk users successfully completed the entire survey. These participants' data were downloaded through Qualtrics survey software and were analyzed. Data were first examined for data quality purposes in SPSS v22. Two validity items (i.e., "please select the number "2" below"; please select the number "54" below) had been included a priori to identify random responders. Forty cases were removed due to incorrect responses to one or more of these validity questions. Next, 7 cases were removed due having 100% missing data on the 17 DMPI items, as well as missing participant location information (latitude/longitude coordinates), suggesting that these surveys were invalid. Thirty-seven duplicate cases were identified (i.e., 37 mTurk users completed the surveys twice). These 37 surveys were deleted. These procedures left 673 remaining cases. Next, those participants reporting substantial previous meditation experience were removed from the analysis, yielding 504 cases. Specifically, participants reporting that they had engaged in more than "novice, minimal practice" were removed from the analysis. This is because the DMPI is designed to assess perceived barriers to meditation among meditation naïve individuals. Datasets for exploratory and confirmatory factor analyses were then delineated based upon chronological date of survey administration. Specifically, data obtained via surveys administered on the first two rounds of administration were included in the EFA analysis (n = 247) and data obtained via surveys on the second two rounds of administration (n =

257) were included in CFA analyses. A recommended sample size for confirmatory factor analysis constitutes a 10:1 ratio of participants to parameter estimates (Worthington & Whittaker, 2006); therefore, these samples sizes are adequate to perform the present analyses. DMPI data were examined for missing data. All retained cases had complete data on the DMPI (i.e., no missing items).

Two hundred and forty-seven cases were included in the EFA. Participants reported their gender as follows: 51% male, 48% female and .8% transgender. Racial and ethnic characteristics of the sample were reported as follows: White/European American (61.9%), Asian-Indian/Pakistani (16.7%), Hispanic/Latino (a) (6.1%), African American/Black (6.5%), Asian American/Pacific Islander (4.5%), Native American/Native Alaskan (1.6%), Biracial/Multiracial (1.2%). Fewer than 1% of participants selected Middle Eastern/Arab or other categories. The mean age of participants was 34.8. There was a relatively even distribution of reported yearly household income among the three lowest income categories, which were defined as a) less than $24,000, b) $25,000 to 49,000 and c) $50,000 to $99,000. A small portion of the sample (7.7%) reported yearly income corresponding to the highest category (i.e., $100,000 or more). Regarding religious and spiritual beliefs, 42.5% reported that Christianity best described their religious or spiritual beliefs, followed by Agnosticism (14.4%), Hinduism (11.7%) and Atheism (11.7%). Others reported being spiritual but not religious (6.5%), and a small number of participants reported that Judaism (1.6%), Islam (1.6%), and Buddhism (.4%) best described their religious spiritual or beliefs. Ten percent of the sample reported non-identification with any religious group, or endorsed "other" to describe religious/spiritual affiliation.

Two hundred and fifty-seven cases were included in the CFA analysis. Participants reported their gender as follows: 54% female, 44.4% male and .8% transgender. Just over half of the sample reported their race as White/European (52.1%), followed by Asian-Indian/Pakistani (27.6%), African American/Black (9.3%), Hispanic/Latino (3.5%) and Asian American/Pacific Islander (3.5%), other categories (1.9%), Biracial/Multiracial (1.6%), and Native American/Native Alaskan (.4%). The mean age of participants was 34.6. There was a relatively even distribution of reported yearly household income among the three lowest income categories, which were defined as a) less than $24,000, b) $25,000 to 49,000 and c) $50,000 to $99,000. A small portion of the sample (i.e., 10.1%) reported yearly income corresponding to the highest category (i.e., $100,000 or more). Regarding religious beliefs, 38.5% of the sample reported that Christianity best described their religious beliefs, followed by Hinduism (20.6%), being spiritual but not religious (10.1%), Atheism (9.7%), Agnosticism (7%), not identifying as religious or spiritual (6.2%), other (5.1%), Islam (2.3%), Judaism (2.3%), and Buddhism (.4%). Therefore, there were small but possibly meaningful differences in the racial/ethnic breakdown in this sample as compared with the sample used in the EFA, as well as differences in how participants identified with regard to gender and religion. Specifically, there was a greater representation of participants identifying as Asian-Indian or Pakistani in the CFA sample, as well as a greater proportion of participants identifying with Hinduism.

Measures

Demographics. Participants provided demographic data on a series of demographic questions and previous engagement with meditation as defined by the CDC.

Participants also responded to a series of quantitative and open-ended questions about previous meditation experience, as well as anticipated concerns about meditation and perceived benefits of meditation (see Appendix A).

The DMPI. Participants completed the original, 17-item DMPI measure (Appendix B). The DMPI assesses perceived barriers to meditation, and is designed to be administered to meditation naïve participants. The DMPI has demonstrated good internal consistency (Chronbach's alpha = .87) and test-retest reliability (ICC = .86) in a community sample of meditation naïve individuals (Williams et al., 2011). In the present sample, internal consistency for the 17 items was high (Cronbach's alpha = .84). Items on each scale are summed to yield a total DMPI score. Example items include, "I wonder if meditation might harm me" (1 = strongly disagree, 5 = strongly agree) (see Appendix B). Possible total scores range from 17 to 85; higher scores indicate more perceived barriers to meditation according to Williams and her colleagues (2011).

Experiential Avoidance. Experiential avoidance was assessed with the Acceptance and Action Questionnaire II (AAQ-II) (Bond et al., 2011), a 7-item questionnaire with a one factor structure (see Appendix C). The AAQ-II has demonstrated adequate internal consistency (mean Chronbach's alpha coefficient = .84) and test-retest reliability (3 month = .81; 12 month = .79) in community samples. In the present sample, internal consistency was high (Cronbach's alpha = .92). The AAQ-II has also demonstrated adequate convergent and discriminant validity in community samples (Bond et al., 2011). Items are scored on 7-point Likert scales (1 = never true, 7 = always true). Possible total scores range from 7 to 49; higher scores indicate greater experiential avoidance. Example items include, "I worry about not being able to control my worries

and feelings; My painful experiences and memories make it difficult for me to live a life that I would value."

Curiosity. Curiosity was assessed with the Curiosity and Exploration Inventory-II (CEI-II) (Kashdan et al., 2009) (see Appendix D). This 10-item instrument contains two subscales reflecting its 2-factor structure: 1) Stretching (motivation to seek out knowledge and new experiences; items 1, 3, 5, 7, and 9), and 2) Embracing (a willingness to embrace the uncertain and unpredictable nature of everyday life; items 2, 4, 6, 8, and 10). Items are summed to create subscale scores and summed to create a total score. Scores on the Stretching and Embracing subscales have been shown to correlate highly, and it is therefore recommended to use the total curiosity score (Kashdan, 2009). Thus, the curiosity total score will be used in the present analysis. Participants respond to items on 5-point Likert scales (1= very slightly or not at all; 2 = a little; 3 = moderately; 4 = quite a bit; 5 = extremely) (see Appendix D). Total scores range from 10 to 50; higher scores reflect greater levels of curiosity. The CEI-II has demonstrated good internal consistency (Chronbach's alpha = .85) and convergent validity (Pearon's correlations with related constructs ranging from .22 to .51) in student samples (Kashdan et al., 2009). In the present sample of community members, internal consistency was high (Cronbach's alpha = .90).

Distress Tolerance. Distress tolerance was assessed via the Distress Tolerance Scale (DTS), a 15-item instrument (see Appendix E). The structure of the DTS is characterized by one general distress tolerance factor and four first-order factors (i.e., Tolerance, Appraisal, Absorption and Regulation) that are indicators of general distress tolerance (Simons & Gaher, 2005). Participants respond to items on 5-point likert type

scales (1 = Strongly Disagree, 2 = Mildly Disagree, 3 = Feel Neutral, 4 = Mildly Agree, 5 = Strongly Agree). When completing the DTS, participants are prompted to think about specific times when they feel distressed or upset, and then respond based upon how they experience and respond to such distress. Example items include, "when I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels", "My feelings of distress or being upset scare me." Subscale scores are calculated by calculating the mean of subscale items. The general distress tolerance score is calculated by averaging the mean of all four subscales. Item 6 is reverse scored. Possible total scores range from 1 to 5; higher scores indicate higher tolerance for emotional distress. Adequate internal consistency has been demonstrated for the general distress tolerance factor (Chronbach's alpha = .82) and for the four first-order factors (Chronbach's alpha coefficients ranging from .70 to .82) in student samples. In the present sample, internal consistency was high (Cronbach's alpha = .91). Test-retest reliability over a 6-month interval has also been established for scores on the DTS (ICC = .61) in student samples. The distress tolerance scale has also demonstrated criterion validity; specifically, distress tolerance was shown to predict self-reported tendencies to attenuate negative internal states with substance use in student samples (Simons & Gaher, 2005). The DTS total score reflects the general, overarching distress tolerance factor on the DTS; this total score has been used previously to establish criterion and construct validity of the DTS scale. Therefore, the DTS total score was used in the present analysis to estimate construct validity of the DMPI.

Procedures

      Participants were recruited with a recruitment paragraph describing the study as a study about experience with and attitudes about meditation (see Appendix F). After providing informed consent, participants completed the survey in a single sitting. Surveys were administered on MTurk on four separate days. Participants were compensated on average 26.6 cents per survey. All survey responses were downloaded through Qualtrics software and de-identified in order to maintain participant confidentiality.

Chapter 5: Results

Exploratory Factor Analyses

Several exploratory models were run on data obtained from the 17 DMPI items. First, 1, 2, 3 and 4- factor exploratory factor models as well as 1, 2, 3 and 4-factor bi-factor exploratory factor models were examined. Parallel analysis (Patil, Singh, Mishra, & Donavan, 2007) suggested that 4-factor solutions were optimal. Therefore, solutions under closest consideration were the 4-factor exploratory model and the bi-factor exploratory model with one general barriers to meditation factor and three correlated, specific factors. However, fit indices failed to support the appropriateness of each of these solutions, and these solutions were also characterized by several cross loadings and low factor loadings. Most notably, the communalities for several DMPI items were extremely low (i.e., less than .300). In accordance with recommended procedures (Worthington & Whittaker, 2006), low communality items were thus sequentially removed based upon the magnitude of each communality, beginning with the lowest. With each iteration, the loadings, communalities, and fit indices associated with the 4-factor solution supported by the parallel analysis were evaluated. This process was repeated until all communalities were at or above the cutoff level of .400. Specifically, the lowest communality (.136) corresponded to item 1, "I can't stop my thoughts" which was removed first. Next, item 3, "I can't sit still long enough to meditate," was removed, followed by item 8 ("prayer is my form of meditation"), item 2 ("I am uncomfortable with silence"), and item 4 ("I prefer to be accomplishing something"), yielding 12 items remaining. At this juncture, all communalities were above the threshold of .400.

Next, the parallel analysis was re-run. Comparison of the magnitude of eigenvalues barely supported a 3-factor solution for the 12 items (i.e., the 4th eigenvalue generated from the random datasets was .01 unit larger than the 4th eigenvalue generated by the present dataset). Therefore, 3 and 4-factor solutions were considered as potential solutions for the data obtained from the 12 items. First, loadings and fit indices were examined for the exploratory 3 and 4-factor solutions. Model fit was extremely poor for the 3-factor solution. The 4-factor solution exhibited better fit, although it was marginal according to current standards (Chi square = 70.20, df = 24, p <.001; CFI =.94; RMSEA = .089; 90% CI: .065-.011; SRMR = .03). Examination of factor loadings revealed that item 15 ("I would feel odd meditating") cross-loaded onto two factors and at fairly low magnitudes on each (i.e., .378 and .436, respectively). It was therefore determined to be an unstable indicator of any single factor and was removed, yielding 11 items. The parallel analysis on the 11 items again supported a 3 or 4-factor solution (i.e., the first three eigenvalues in the sample were greater than the those generated by random datasets, and the 4th eigenvalues were exactly equal at 1.108). Then, 3 and 4 factor models were re-run on the 11 items. Model fit was very poor for the 3-factor solution, and several cross loadings and low loadings were also evident. Model fit was very good for the 4-factor model (Chi square = 714.734, df = 55, p <.001; RMSEA = .06, 90% CI = .028 - .092; CFI = .98; SRMR = .02), simple structure was achieved, with items loading at high magnitudes onto one of each of 4 single factors (range of loadings: .566 - .855). Furthermore, the loadings grouped together into a conceptually interpretable fashion (see Tables 2 through 5).

	Eigenvalues
1	3.83
2	1.56
3	1.42
4	1.11
5	0.67
6	0.56
7	0.44
8	0.42
9	0.36
10	0.35
11	0.29

Table 2: Eigenvalues.

	1	2	3	4
1	1			
2	0.37	1		
3	0.16	0.24	1	
4	0.29	0.19	0.36	1

Table 3. Factor intercorrelations.

Communalities	
Meditation might be boring	0.53
It is a waste of time to sit and do nothing	0.71
I don't know much about meditation	0.72
There is no quiet place where I can sit and be alone	0.42
I don't have time	0.44
There is never a time when I can be alone	0.77
I wouldn't know if I were doing it right	0.57
I'm concerned meditation will conflict with my religion	0.56
My family would think it was unusual	0.44
I don't believe meditation can help me	0.60
I wonder if meditation might harm me	0.52

Table 4. Item communalities associated with 4-factor solution.

Item	Geomin Rotated Loadings			
	Lack of Interest	Knowledge Concerns	Pragmatic Concerns	Sociocultural Beliefs
[a]Meditation might be boring	**0.63**	0.20	0.01	-0.02
[a]It is a waste of time to sit and do nothing	**0.79**	0.03	0.03	0.10
[a]I don't know much about meditation	0.09	**0.82**	-0.03	-0.05
[a]There is no quiet place where I can sit and be alone	-0.02	0.12	**0.58**	0.07
[b]I don't have time	0.29	-0.01	**0.62**	-0.18
[b]There is never a time when I can be alone	-0.02	0.00	**0.86**	0.06
[b]I wouldn't know if I were doing it right	-0.04	**0.74**	0.03	0.10
[c]I'm concerned meditation will conflict with my religion	-0.01	-0.02	-0.05	**0.77**
[c]My family would think it was unusual	0.01	0.19	0.08	**0.57**
[c]I don't believe meditation can help me	**0.60**	-0.02	-0.04	0.36
[c]I wonder if meditation might harm me	0.10	0.00	0.11	**0.67**

Table 5. Pattern of factor loadings from 4-factor exploratory factor analysis (n = 247). This model provided the best fit to the 11 items (communalities >.400). The items loaded together in a conceptually interpretable fashion that shared some similarities with the original Williams (2011) conceptualization and that also exhibited differences. Constructs as originally postulated (Williams et al., 2011): [a]*Perceptions and Misperceptions*, [b]*Pragmatic Concerns*, [c]*Sociocultural Beliefs.*

Exploratory bi-factor models. One, two, three and four factor bi-factor models were also examined using data obtained from the 12 items with communalities above .400. Model fit for the 3-factor solution (i.e., a model with one general barriers to meditation factor and two specific, first-order factors) was poor. The best fitting bi-factor model was a model with one general barriers to meditation factor and three specific, first-order factors (Chi square = 70.20, df = 24 $p < .001$; CFI .94; RMSEA = .09; 90% CI: .065-.011; SRMR = .03). Simple structure was less clearly achieved with this model versus the 4-factor exploratory solution with 11 items. For example, item 10 ("I don't have time") cross-loaded somewhat onto more than one specific factor (i.e., it loaded it loaded significantly at .259 and also at .571 (see Table 6)

The three specific factors conceptually seemed to reflect the similar constructs as those emerging in the 4-factor solution. The general barriers factor did not seem to provide additional conceptual understanding of the data, and many of its factor loadings were quite low. Furthermore, fit indices were inferior to the 4-factor model, and the model was less parsimonious. Therefore, the bi-factor model was gauged as inferior to the 4-factor exploratory model, and the 4-factor EFA model was tested in confirmatory analyses.

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Item	Geomin rotated loadings			
	Lack of Interest	Knowledge Concerns	General Barriers	Pragmatic Concerns
Meditation might be boring	**0.54**	0.21	**0.46**	-0.02
It is a waste of time to sit and do nothing	**0.65**	0.03	**0.49**	0.02
I don't know much about meditation	0.10	**0.67**	**0.49**	-0.01
There is no quiet place where I can sit and be alone	-0.05	0.03	**0.36**	**0.53**
I don't have time	**0.26**	0.05	**0.23**	**0.57**
There is never a time when I can be alone	-0.06	-0.07	**0.40**	**0.78**
I wouldn't know if I were doing it right	-0.04	**0.53**	**0.52**	0.04
I'm concerned meditation will conflict with my religion	-0.08	**-0.34**	**0.58**	-0.05
My family would think it was unusual	-0.11	-0.11	**0.70**	0.03
I would feel odd meditating.	0.13	0.10	**0.74**	0.00
I don't believe meditation can help me	**0.49**	-0.14	**0.60**	-0.07
I wonder if meditation might harm me	-0.01	-0.30	**0.67**	0.67

Table 6. Best fitting exploratory bi-factor model.

Confirmatory Factor Analysis

According to selected criteria, model fit for the 4-factor model was in the marginal to adequate range (Chi square = 107.41, df = 38, $p < .0001$; RMSEA = 0.08, 90% CI: 0.06 – 0.10; CFI = 0.91, SRMR = 0.06). Standardized loadings were high in magnitude and statistically significant at the .05 level (see Table 7). All factors were significantly correlated (p < .001) and at small to medium magnitude (range = .21 - .52), with the exception of factors 1 and 3, *Lack of Interest* and *Pragmatic Concerns* (r = .14, *p* = .07).

	Estimate	S.E.	R^2	Mean
Lack of Interest				
Meditation might be boring	0.80	0.04	0.60	2.75
It is a waste of time to sit and do nothing	0.80	0.04	0.62	2.41
I don't believe meditation can help me	0.73	0.06	0.54	2.11
Knowledge Concerns				
I don't know much about meditation	0.82	0.07	0.67	3.17
I wouldn't know if I were doing it right	0.69	0.08	0.48	3.10
Pragmatic Concerns				
There is no quiet place where I can sit and be alone	0.70	0.05	0.48	2.74
I don't have time	0.68	0.06	0.45	2.93
There is never a time when I can be alone	0.90	0.04	0.80	2.71
Sociocultural Beliefs				
I'm concerned meditation will conflict with my religion	0.74	0.05	0.55	2.14
My family would think it was unusual	0.72	0.05	0.52	2.11
I wonder if meditation might harm me	0.71	0.06	0.50	1.69

Table 7. Factor loadings, standard errors, R^2 values and item means.
All loadings were significant at the .05 level.

Construct Validity

Pearson's correlations to estimate construct validity of the DMPI were computed using 504 cases (i.e., the EFA and CFA datasets were collapsed for these analyses). Items were summed to create DMPI subscale scores and a DMPI total score. The construct validity of the DMPI was examined through correlations between total scores on the Acceptance and Action Questionnaire (AAQ) assessing experiential avoidance, the Curiosity and Exploration Inventory-II (CEI-II) assessing curiosity, and the Distress Tolerance Scale (DTS) assessing distress tolerance. It was hypothesized that AAQ total scores and DMPI total scores would be positively correlated. This hypothesis was supported by a significant, positive correlation with a medium effect size (i.e., .37) (see Table 8). No a priori hypotheses were made with regard to the DMPI subscale scores; however, significant correlations were also observed between all DMPI subscales with AAQ total scores. These correlations were generally of medium magnitude. It was also hypothesized that DMPI total scores would negatively correlate with total scores on the CEI-II and with scores on the DTS. These hypotheses were not supported. However, significant, negative correlations representing a small effect size were observed between the Knowledge Concerns subscale of the DMPI with total scores on both the CEI-II and the DTS total scores. Negative correlations with small effect sizes were observed between the Pragmatic Concerns and Sociocultural Beliefs subscales with CEI-II total scores. Positive correlations representing small effect sizes were observed between Pragmatic Concerns and Sociocultural Beliefs subscales with CEI-II total scores; however, these correlations did not reach statistical significance.

	No. of items	M(SD)	r with AAQ (total score)	r with CEI-II (total score)	DTS Total Score
Lack of Interest	3	3.48 (3.10)	0.24**	-0.05	0.01
Knowledge Concerns	2	6.26 (2.17)	0.28**	-0.10*	-0.10*
Pragmatic Concerns	3	8.27 (3.17)	0.17**	0.10	0.00
Sociocultural Beliefs	3	5.78 (2.79)	0.38**	0.10	-0.05
DMPI Total Score	11	27.81 (7.89)	0.37**	0.02	0.04

Table 8. Descriptive statistics and correlations with measures to estimate construct validity.

AAQ: Experiential Avoidance; CEI-II: Curiosity; DTS: Distress Tolerance

** significant at .01 level

*significant at .05 level

In order to further investigate the construct validity of the DMPI in an exploratory manner, several correlations were computed between DMPI subscales and total scores with Likert type items that were written for the present study pertaining to meditation attitudes and meditation behavior (see Table 9). No a priori hypotheses were made with regard to these items; however, significant correlations representing small to medium effect sizes were observed between several of these items (i.e., "How likely are you to seek an opportunity to meditate in the near future," "How interested are you in doing meditation," "How interested are you in learning more about meditation," and "How difficult do you think it would be to learn meditation.") and the Lack of Interest subscale, the Knowledge Concerns subscale, and the DMPI total scores.

	Q1: Likelihood of Doing Meditation	Q2: Interest in Meditation	Q3: Interest in Learning	Q4: Perceived Difficulty of Meditation
Lack of Interest	-0.48**	-0.57**	-.54**	.01
Knowledge Concerns	-0.03	0.07	.14*	.33**
Pragmatic Concerns	0.00	0.07	.09	.11
Sociocultural Beliefs	0.12	0.00	-.03	.01
DMPI Total Score	-0.18**	-0.20**	-.18**	.18**

Table 9: Correlations between DMPI subscales and total scores with Likert scale items written for the present study.
Q1: How likely are you to seek an opportunity to meditate in the near future?
Q2: How interested are you in doing meditation?
Q3: How interested are you in learning more about meditation?
Q4: How difficult do you think it would be to learn meditation?
** significant at .01 level
*significant at .05 level

Chapter 6: Discussion

The overarching purpose of the Determinants of Meditation Practice Inventory (DMPI) (Williams, 2011) was to quantify the attitudes, concerns and beliefs that might ultimately prevent an individual from engaging in meditation behavior. The aim of the present study was to conceptually refine and psychometrically validate the DMPI. Williams and her colleagues (2011) had initially developed the DMPI by examining formative philosophical texts on meditation and by interviewing expert meditation teachers to develop categories of commonly perceived barriers to meditation among meditation naïve individuals. Perceived barriers identified during this process were then used to develop and operationalize content domains, or categories, of perceived barriers. These categories were titled *Perceptions and Misperceptions*, *Pragmatic Concerns*, and *Sociocultural Beliefs*. Each of these categories included several psychological constructs pertaining to beliefs and concerns relating to meditation practice. Next, DMPI items were generated and refined based upon a series of procedures that emphasized content validity and internal consistency.

Although the content domain categories were operationally defined, each content domain category encompassed numerous psychological constructs (e.g., intrinsic and extrinsic motivation, perceptions of time and priorities). Given the lack of clear construct definition, the factor analytic procedures employed in the present study explored the possibility of one, two, three and four-factor models, as well as bi-factor models allowing for a general, overarching barriers to meditation factor along with specific, first order factors. Several important findings emerged from exploratory analyses. First, the high residual variances (i.e., low communalities) of six of the DMPI items suggested perhaps

that these items (e.g., "prayer is my form of meditation", "I am uncomfortable with silence") were not informative indicators of attitudes, beliefs and concerns about meditation. Following sequential removal of such items, exploratory analyses supported a four-factor solution with factors *Lack of Interest, Knowledge Concerns, Pragmatic Concerns and Sociocultural Beliefs.* The four-factor solution was supported in confirmatory factor analyses by adequate fit indices and a pattern of high factor loadings. Therefore, these analyses support the use of a 4-factor, 11-item DMPI scale to assess perceived barriers to meditation in meditation naïve individuals.

The DMPI factors reflect barriers to meditation as reported in the current literature. Although barriers to meditation research is limited, qualitative studies with participants who have had some exposure to meditation (Cohen-Katz et al., 2004; Lomas et al., 2014; Sears et al., 2011) inform the conceptual understanding of the factor scales and also support the relevancy of the factor scales for barriers to meditation research more generally. Given the parallels between mindfulness meditation and psychotherapy (see Germer, 2004), as well as the current emphasis on mindfulness meditation as a standardized intervention in health psychology settings (see Kabat-Zinn, 2003), the present discussion emphasizes mindfulness meditation above other forms of meditation as defined by the CDC (Peregoy, 2014). In the following section, the conceptual definition of each of the factors and findings related to that factor will be discussed and contextualized in the current barriers to meditation literature.

Conceptual Definition of Subscale Factors

Lack of Interest. Lack of Interest reflects a low level of intrinsic interest in meditation and includes the following item indicators: "It is a waste of time to sit and do

nothing", "meditation might be boring," and "I don't believe meditation can help me."

This factor appears to reflect a general view of meditation as uninteresting and unappealing, such that the individual is uninterested in engaging in meditation behavior. It is well known that some level of intrinsic interest is a prerequisite for sustained, meaningful engagement in a pursuit, a phenomenon that has been documented within numerous domains (e.g., academic and sport performance) (see Deci & Ryan, 2008). It also appears that this general lack of interest in meditation may be impacted by a perceived lack of benefit of meditation, as indicated by the item, "I don't believe meditation can help me." Some beginning level meditators have doubted the efficacy of meditation prior qualitative research (Sears et al., 2011), and in the help-seeking field, empirical data indicate that individuals must perceive the benefits of therapy to outweigh the costs in order to initiate and sustain treatment (Vogel et al., 2008). Therefore, cost-benefit analysis may play a role in meditation naïve individuals' appraisal of their interest level in engaging in meditation. Research on factors that pique and sustain interest in meditation would provide deeper insight into why individual express varying levels of intrinsic interest in engaging in meditation.

Knowledge Concerns. Knowledge Concerns reflects psychological concern regarding real or imagined lack of knowledge of meditation techniques, and consists of just two item indicators (i.e., "I don't know much about meditation," and "I wouldn't know if I were doing it right"). Conceptually, this factor reflects qualitative accounts from both beginning-level and also more experienced meditators describing difficulties learning meditation, experiencing doubts about their self-efficacy for meditation, and questioning the correctness of their meditation technique (Lomas et al., 2014; Sears et

al., 2011). Therefore, the Knowledge Concerns subscale assesses a relevant construct for both meditation naïve individuals and also for those who have had some exposure to meditation (i.e., those who have received meditation instructions). Further research is needed to ascertain why certain individuals may question or doubt their knowledge of self-efficacy for meditation more than others, and the implications of these concerns for meditation initiation and adherence.

Pragmatic Concerns. Pragmatic Concerns reflects psychological concern regarding the space and time requirements for meditation, and the belief that these requirements will prohibit meditation behavior (e.g., "I don't have time"). This construct reflects previously documented themes in the barriers to meditation literature. Specifically, beginning-level meditators progressing through mindfulness-based programs have reported pragmatic concerns with meditation practice. For instance, both college students in a semester long mindfulness class and healthcare professionals in an MBSR course reported difficulty making time for home mindfulness practice (Sears et al., 2011). Furthermore, logistical barriers (e.g., work-related impediments, transportation issues) have impeded participation in MBSR classes (Cohen-Katz et al., 2004) and been linked with MBSR dropout (Shapiro et al., 2005). Therefore, pragmatic concerns are relevant barriers to meditation in various contexts, and further research is needed to explore why individuals vary on pragmatic concerns about meditation. Given that some individuals do successfully either perceive or acquire the time to meditate (e.g., those who complete mindfulness-based interventions or otherwise become classified as long-term meditators), further research is needed to explore the factors that assist individuals in overcoming pragmatic concerns.

Sociocultural Beliefs. Sociocultural Beliefs reflects sociocultural beliefs pertaining to family and religion that are perceived as likely to interfere with meditation behavior (e.g., "I'm concerned meditation will conflict with my religion", "my family would think it was unusual", "I wonder if meditation might harm me"). Higher scores on this factor reflect a higher perception that sociocultural beliefs will impede meditation behavior. In the qualitative studies on barriers to meditation conducted to date, no study has reported on sociocultural factors that create barriers to meditation or that facilitate meditation behavior. However, it is possible that culturally relevant, group-level factors impact individuals' likelihood of initiating and sustaining a meditation practice. For example, in certain cultural or religious groups where meditation or contemplative practices are highly valued, social support for meditation might be present and serve a facilitative function. Conversely, there may be cultural or religious frameworks where meditation is viewed negatively or with suspicion; under such circumstances, sociocultural factors tied to religion or spirituality might impede meditation behavior. Perceived social support, cultural values and religiosity have been shown to relate to attitudes towards other health behaviors (e.g., psychotherapy) (Shea & Yeh, 2008; Wallace, 2005). Further research is needed on sociocultural factors that may hinder or facilitate engaging in meditation.

Construct Validity

Construct validity of the revised DMPI scale was explored in conjunction with three constructs hypothesized as related to perceived barriers to meditation: experiential avoidance, distress tolerance, and curiosity. These constructs were assessed with the Acceptance and Action Questionnaire (AAQ) (Bond et al., 2011), the Distress Tolerance

Scale (DTS) (Simons & Gaher, 2005), and the Curiosity and Exploration Inventory-II (CEI-II) (Kashdan et al., 2009), respectively. The AAQ is characterized by a single factor structure, and therefore, AAQ total scores were correlated with DMPI total and subscale scores. The CEI-II has two subscales (Stretching and Embracing); however, data from these subscales tend to correlate highly, and it is therefore recommended to use CEI-II total scores in research (Kashdan et al., 2009). Thus, CEI-II total scores were correlated with DMPI total and subscale scores. The DTS is characterized by a general distress tolerance factor four first-order factors (i.e., Tolerance, Appraisal, Absorption and Regulation) that are indicators of the general distress tolerance factor (Simons & Gaher, 2005). Given that the DTS total score reflects the general, overarching distress tolerance factor on the DTS, and that the total score has been used previously to establish criterion and construct validity of the DTS scale (Simons & Gaher, 2005), DTS total scores were correlated with DMPI total and subscale scores.

Construct validity hypotheses were made based upon review of the literature on barriers to meditation and on barriers to psychotherapy. Specifically, several qualitative studies identified meditation barriers related to contacting challenging internal experiences (e.g., emotions, physical sensations) (Cohen-Katz et al., 2004; Lomas, 2014; Malpass et al., 2012). Furthermore, the desire to avoid internal experience has previously been identified as a barrier to professional help-seeking (Komiya et al., 2000). As such, it was anticipated that the degree of openness towards or tolerance for inner experience might relate with perceived barriers to meditation. Therefore, measures pertaining to the degree of openness and tolerance towards inner experience were selected to estimate construct validity of the perceived barriers to meditation scale. It was generally

hypothesized that individuals having a lower tolerance for emotional distress and/or who habitually attempt to avoid or attenuate unpleasant emotions might score higher on perceived barriers to meditation relative to those who are more open to internal experience.

Experiential avoidance. Tests of construct validity provided initial support for the convergent validity of the DMPI. As hypothesized, statistically significant, positive correlations of small to moderate effect size (.17-.38) were observed between Acceptance and Action Questionnaire total scores assessing experiential avoidance and DMPI subscale and total scores. These results suggest that individuals who habitually avoid internal experiences report higher levels of concerns and beliefs perceived as likely to interfere with meditation behavior. These concerns and beliefs pertain to lower levels of intrinsic interest in meditation, greater concerns about meditation knowledge, concerns about pragmatic barriers, and the role of sociocultural factors. Consistent with published findings on emotional avoidance as a barrier to help seeking (Komiya et al., 2000) a desire to avoid contact with the internal experience may also ultimately present a barrier to meditation behavior. Although those who habitually avoid internal experience may perceive meditation less favorably as suggested by the present data, such individuals may possibly have the most to gain from meditation practice. Similar to psychotherapy in many respects (see Germer, 2004), mindfulness meditation involves directly contacting the full range of internal experience, which is inherently challenging. However, one of the many hypothesized mechanisms of mindfulness meditation practice is simply the position that repeated exposure to habitually avoided states (e.g., interoceptive sources of discomfort) promotes healing (see Germer, 2004). Although the individuals queried in

the present study were inexperienced in meditation and probably lacked familiarity with the hypothesized mechanisms of mindfulness meditation, a link nonetheless emerged between experiential avoidance and perceived barriers to meditation. Future studies should explore relationship between experiential avoidance, perceived barriers to meditation, and meditation initiation in meditation naïve individuals.

Curiosity. The hypothesized negative relationship between the CEI-II assessing curiosity and perceived barriers to meditation showed less support, although a statistically significant, negative correlation representing a small effect size was observed between the CEI-II (i.e., -.10) and the Knowledge Concerns subscale. Curiosity is characterized by tolerance for uncertainty and openness to novel experiences (Kashdan, 2009). The present findings indicate that knowledge concerns are relevant barriers for meditation naïve individuals, and recent data indicate that despite having studied meditation, some beginning and advanced level meditators continue to question whether or not they are "doing it right" (Lomas, 2014; Malpass; 2012; Sears, 2011). Given that the CEI-II reflects tolerance for uncertainty, perhaps those individuals that are more highly concerned about whether or not their knowledge levels of meditation are sufficient to practice meditation have difficulty tolerating uncertainty more generally. Given that the remaining subscales were uncorrelated with the CEI-II, results indicate that curiosity as a construct was generally unrelated to perceptions of barriers to meditation.

Distress tolerance. The hypothesized negative relationship between the DTS assessing distress tolerance and perceived barriers to meditation also showed less support, although a statistically significant, negative correlation representing a small effect size was observed between the DTS (i.e., -.10) and the Knowledge Concerns subscale. The

DTS scale invites participants to describe how they respond under conditions of internal distress. It may be that this measure was not well selected to establish construct validity for the DMPI in meditation naïve individuals. In the barriers to meditation literature, it was relatively experienced meditators that reported engaging with distressing and painful emotional material as a challenging aspect of meditation (Lomas et al., 2014; Malpass et al., 2012). For instance, relatively long term meditators reported contact with strong emotions like anger, hatred and fear (Lomas, 2014) as challenging. It may be that meditation naïve meditators' lack of experience with contacting distressing states during meditation made the distress tolerance scale items (e.g., "there's nothing worse than feeling distressed or upset") less relevant as construct validity indicators. An important avenue for future barriers to meditation research is systematic examination of how barriers to meditation vary across participant experience levels.

Interest in meditation behavior. Given that the DMPI is meant to quantify the latent attitudes, concerns and beliefs that might ultimately prevent an individual from engaging in meditation behavior, predictive validity (i.e., the extent to which the scale predicts *actual* behavior) would best support the validity of the DMPI. As such, we included four Likert-type items asking about participants' intentions towards actual meditation behavior in the study survey. Higher DMPI total scores (i.e., higher levels of perceived barriers) were associated with reduced self-reported likelihood of seeking an opportunity to meditate, lower levels of interest in doing meditation, and reduced interest in learning more about meditation. Higher DMPI total scores were also associated with a higher perception of meditation as a difficult skill to learn. These correlations were statistically significant and of small to moderate effect size. These results suggest that

perceived barriers to meditation as assessed by the DMPI may be associated with

intentions towards meditation behavior. The criterion validity of the DMPI as a measure

of perceived barriers to meditation could be enhanced in future studies by correlating

DMPI scores in meditation naïve individuals with actual meditation behavior.

Specifically, it would support the criterion validity of the DMPI if DMPI scores were to

predict meditation initiation and adherence in a sample of meditation naïve individuals

gaining exposure to meditation through a mindfulness-based meditation class or therapy

program (e.g., Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive

Therapy) (Kabat-Zinn, 2003; Kabat-Zinn, 1982; Segal et al., 2012).

Correlations with Likert-type items pertaining to meditation behavior also

supported the both the convergent validity and discriminant validity of the DMPI

subscales. Statistically significant, negative correlations of medium to large effect size

(i.e., -.48 to -.57) were observed between Lack of Interest and self-reported interest in

doing meditation, interest in learning more about meditation, and self-reported likelihood

of seeking an opportunity to meditate. These correlations support the convergent validity

of the Lack of Interest subscale as an assessment of the hypothesized underlying

construct (i.e., low intrinsic interest in meditation). Meanwhile, discriminant validity of

the Lack of Interest subscale was supported by a non-significant relationship with the

Likert type item assessing perceived difficulty of meditation (i.e., a construct

hypothesized as unrelated to intrinsic interest levels). Although it is unclear what

precisely causes variance in interest levels in meditation (as discussed, it is possible that

cost-benefit analyses may play a role as with interest levels in seeking professional help,

see Vogel, 2008); however, it was not anticipated to be related to perceived difficulty of

meditation as a learned skill. As one might expect, however, perceived difficulty of

meditation *was* positively related to Knowledge Concerns as evidenced by a statistically

significant correlation representing a medium effect size. That is, those with greater

psychological concern about their knowledge of meditation also perceived meditation as

difficult to learn. Relatedly, Knowledge Concerns was also positively correlated with

interest in learning more about meditation, suggesting that those with greater concerns

about lacking knowledge also expressed a desire to learn more. These relationships lend

support to the construct validity of the Knowledge Concerns factor as an assessment of

the hypothesized construct. Finally, correlations between scores on the Pragmatic

Concerns and Sociocultural Beliefs subscales with Likert-style items pertaining to

meditation behavior were non-significant. The present study did not include Likert-type

items designed to assess the construct validity of these subscales specifically. Construct

validity of these specific subscales could be strengthened through comparison with

measures or items hypothesized as directly related to perceived sociocultural barriers and

pragmatic barriers. For example, these subscales could be compared with items querying

about perceived availability of time and space for meditation, perceived family and friend

support of meditation practice, or perceived value of meditation held by one's cultural

group.

Research and Clinical Implications

The revised DMPI measure and factor subscales may assist in exploring clinically

relevant research questions pertaining to perceived barriers to meditation practice. To

date, research on barriers to meditation has been limited to qualitative methodologies, and

the present psychometric validation of the DMPI provides an opportunity to explore

barriers from a quantitative approach.

Given that the present analyses have supported the conceptual distinctiveness of the four

DMPI factor scales, potential research and clinical implications associated with each of

these will be discussed in the following sections.

   Lack of Interest. Although the mindfulness meditation literature has yet to

systematically examine the relationship between interest in meditation practice with

meditation adherence, research data from various activity domains demonstrate that

having a spontaneous and intrinsic interest in an activity supports successful consistent

engagement in the activity (Deci & Ryan, 2008). From a research perspective, the DMPI

could be reliably used to examine the relationship between interest level and adherence in

the meditation context. A pervasive limitation of meditation efficacy studies is the

remaining possibility that the benefits of meditation so widely reported in mindfulness

meditation efficacy studies are limited to those who self-select to continue or persist in

meditation (i.e., study completers). Conceivably, such persistence might be due to an a

priori interest in mindfulness meditation. The DMPI may allow for quantitative

assessment of interest level and a potentially more meaningful understanding of the

diverse attrition rates observed across mindfulness meditation studies (see Vøllestad et

al., 2012). Another important research question potentially addressable using this

subscale of the DMPI is the extent to which a general lack of interest in meditation is

modifiable. For example, would psychoeducation about the benefits of meditation

increase interest levels in meditation and thereby improve adherence? Or, would it simply

be better to suggest alternative interventions to patients expressing low levels of intrinsic

interest in meditation? It may be worthwhile to consider that many individuals are simply not interested in meditation, and that they may be more likely to benefit from alternative strategies.

Knowledge Concerns. It appears that meditation naïve individuals' concerns about their knowledge levels of meditation were particularly salient to them when considering meditation barriers. In both samples queried, means on the Knowledge Concerns subscale were above the Likert-type scale midpoint, whereas all other means were below. As stated, Knowledge Concerns refers to psychological concern regarding real or imagined lack of knowledge of meditation techniques. Theoretically, one would expect meditation naïve individuals' knowledge concerns to decrease in response to participation in a meditation class or intervention (i.e., in response to exposure to education about meditation). However, certain personality or psychological characteristics might also associate with a preoccupation with knowing the perfect meditation technique, or with experiencing a lack of self-confidence as to one's competence to engage in meditation (e.g., neuroticism, anxiety). In other health behavior domains (e.g., physical activity), lack of confidence in one's core knowledge or skills related to the activity has been cited as a barrier to participation (Allender, Cowburn, & Foster, 2006). Therefore, meditation naïve individuals can likely benefit from a) simply learning more about meditation techniques, and b) being reassured that their understanding of the basic meditation instructions (i.e., knowledge level) is sufficient to practice meditation. Beyond concerns about knowledge levels, future measurement development on barriers to meditation should seek to capture the relationship between meditation self-efficacy beliefs (i.e., belief in one's ability to succeed in a specific

situation) (Bandura, 1982) and meditation behavior, perhaps by developing meditation self-efficacy scales.

Pragmatic Concerns. The Pragmatic Concerns subscale may also be used inform research questions pertaining to meditation behavior and adherence. As stated, this factor reflects psychological concern regarding the space and time requirements to practice meditation, and the belief that these requirements will prohibit meditation behavior (e.g., "I don't have time"). Although contemporary meditation teachers note that brief practice can be very helpful (Brach, 2013; Hanh, 1991), and that the effectiveness of brief meditation has empirical support (Hutcherson, Seppala, & Gross, 2008; Moore, Gruber, Derose, & Malinowski, 2012), it appears that perceptions of a lack of time and space may prevent some individuals from deriving the positive benefits of meditation. Perceived barriers related to pragmatic concerns (e.g., time pressures) are relevant in other health settings, example, with regard to implementing exercise behavior (Myers & Roth, 1997) and seeking mental and physical health treatment (Mohr et al., 2010). It is possible that pragmatic concerns reflect unnecessarily rigid beliefs that could be modified through psychoeducation or social support. For instance, motivational interviewing techniques have shown to be effective in helping individuals integrate regular exercise into daily routines (McCarthy, Dickson, Katz, Sciacca, & Chyun, 2015). However, it is also possible that perceptions of pragmatic barriers are tied with socioeconomic status, reflecting more prohibitive, external realities. However, in the present sample, Pragmatic Concerns scores were significantly *positively* correlated with reported annual household income, such that higher income individuals had a greater perception that pragmatic issues (i.e., lack of time, space and quietude) would interfere meditation behavior relative

to lower income individuals. One might hypothesize that higher income individuals would have greater access to resources pertaining to time and space. However, research should explore barriers to meditation related to perceptions of pragmatic barriers, and clinical interventions to help individuals cope with such barriers in order to benefit from meditation practice.

Sociocultural Beliefs. Finally, is well known that sociocultural factors, such as adherence to traditional cultural norms (Shea & Yeh, 2008) and specific cultural values (Wallace, 2005) impact attitudes towards professional help seeking. The Sociocultural Beliefs subscale of the DMPI could be used to explore the role of sociocultural beliefs in the context of meditation behavior, as this area is not well understood. It is likely that sociocultural beliefs impact perceptions of and experience with meditation practice differentially across diverse groups, and consequently, intentions and opportunities to engage in meditation. Notably, there is a dire need for empirical research on barriers to meditation experienced by socioculturally diverse groups, and by marginalized groups in particular. Although hundreds of randomized, controlled trials have been conducted on the efficacy of mindfulness-based interventions (MBI's) on health outcomes, a recent meta-analytic review identified only 32 studies on MBI's that specifically targeted marginalized groups, such as African-Americans and refugee populations (Fuchs, Lee, Roemer, & Orsillo, 2013). Just a handful of studies have explored strategies to adapt mindfulness-based interventions to accord with the spiritual and sociocultural ideologies of diverse groups (Dutton, Bermudez, Matas, Majid, & Myers, 2013; Hinton, Pich, Hofmann, & Otto, 2013; Woods-Giscombé & Black, 2010; Woods-Giscombe & Gaylord, 2014). To date, research on mindfulness training for health has essentially ignored issues

of race and ethnicity, and the barriers to meditation potentially experienced by racial and

ethnic minority groups is largely unknown. Further quantitative research employing the

DMPI could be coupled with qualitative methodologies in order to more deeply explore

perceived barriers to meditation related to sociocultural factors.

Limitations, Recommendations and Future Directions

Factor analyses employed in the present study support the revision of the Determinants of Meditation Practice Inventory to an 11-item instrument. Conceptually, the factors reflect latent beliefs and concerns that respondents perceive will interfere with meditation behavior. We recommend that the revised scale be re-named in order to reflect it as an assessment of latent constructs (i.e., Perceived Barriers to Meditation Scale). As currently named (i.e., Determinants of Meditation Practice Inventory), the scale appears to assess the true likelihood of engaging in a behavior (i.e., meditation), which can be misleading.

The present study is limited by convenience sampling through mTurk. As such, the sample was limited to Internet users and mTurk users in particular. Furthermore, a large portion (33%) of the initial sample of survey responders had to be removed due to suspected lack of motivation on the part of participants (i.e., random responding). This was an anticipated limitation of use of mTurk due to the financial motivation of many mTurk users, although a substantive portion of users also describe mTurk activities as a useful way to spend free time (Paolacci et al., 2010). This limitation was addressed through the procedures to eliminate random responders previously described.

Convenience sampling through mTurk also did not allow for purposeful sampling of diverse demographic groups. In the samples obtained, just over over half of the participants identified as White/European (i.e., 50-60%), followed by Indian or Pakistani (16-27%). Furthermore, the CFA sample was slightly different than the EFA sample with regard to race and ethnicity, religious identification, and with regard to gender. Specifically, the CFA sample contained a slightly greater proportion of females, a

slightly greater proportion of individuals identifying as Indian or Pakistani relative to individuals identifying as White/European, and a greater proportion of individuals identifying with Hinduism relative to individuals identifying with Christianity. These differences in the samples may have impacted model fit in confirmatory factor analyses. Although fit indices indicated that the model fit adequately, Hu and Bentler (1999) recommend a CFI cutoff of .95 and an RMSEA cutoff of .06; in the present study, two of the three fit indices used approached these cutoffs (i.e., CFI = .91; RMSEA = .08). However, the SRMR value obtained in the CFA phase (i.e., .06) was below the recommended cutoff value of .08 (Hu & Bentler, 1999). Therefore, it may be informative to test the 4-factor model in additional community samples of meditation naïve individuals to examine model fit. As stated, differences in the participant samples obtained for the exploratory and confirmatory factor analyses may have impacted the differences in model fit between the two phases, as fit indices for the exploratory factor model fell below the recommended cutoff thresholds (Hu & Bentler, 1999).

In conclusion, the DMPI provides a brief, parsimonious measure of perceived barriers to meditation in meditation naïve individuals and demonstrates a pattern of high factor loadings, acceptable communalities, and evidence of conceptual validity and distinctiveness of the four factor subscales. The psychometric properties of the DMPI were established in the present study on a sample of meditation naïve individuals, and therefore, the measure can be reliably used with those with little to no experience with meditation. However, the factor scales also reflect barriers to meditation that have been reported by those with some exposure to meditation practice (Cohen-Katz et al., 2004; Lomas, 2014; Malpass et al., 2012; Sears et al., 2011). Future research should explore

how barriers to meditation vary with meditation experience level, as there is some evidence to suggest that barriers experienced by beginning-level meditators (Sears, 2011) are different than those with greater amounts of meditation experience (Lomas, 2014; Malpass, 2012). Future research should also continue to develop additional quantitative measures that address barriers to meditation. In particular, meditation self-efficacy scales would provide a valuable contribution, as the DMPI does not address self-efficacy (i.e., the degree of confidence in one's ability to perform a behavior in the face of obstacles or barriers). Overall, empirical research on barriers to meditation is in its infancy, and the DMPI provides the first psychometrically validated assessment tool of perceived barriers to meditation. This measure may assist with systematic investigation into important questions pertaining to initiation and adherence to meditation, a health behavior with widely recognized benefits.

Appendix A: Demographics And Meditation Experience Questionnaire

1.   **What is your age?** _____

2.   **What is your gender? (select one)**

☐   Female

☐   Male

☐   Transgender

3.   Other

4.   **What is your race and/or ethnicity? (please select one)**

☐   African American/Black

☐   Asian American/Pacific Islander

☐   Asian-Indian/Pakistani

☐   Biracial/Multiracial

☐   Hispanic/Latino(a)

☐   Middle Eastern/Arab

☐   Native American/Native Alaskan

☐   White/European American

☐   Other (please specify) _____

5.   **What is your country of origin?** _____

6.   **What is the highest level of education you have _completed_? (select one)**

☐   High School or Equivalent

☐   Vocational/Technical School

☐   Associate's Degree

☐   Bachelor's Degree

☐   Master's Degree (please specify type) _____

☐   Doctoral/Ph.D. Degree

☐   Professional Degree (Medical Doctor, J.D.); Specify

type:_____

7.   **What category best describes your yearly household income?**

☐   Less than $24,999

☐ $25,000 to $49,999
☐ $50,000 to 99,999
☐ $100,000 or more

8.   What best describes your religious or spiritual beliefs? (circle one)

☐   Atheism

☐   Agnosticism

☐   Buddhism

☐   Christianity – Catholic

☐   Christianity – Protestant

☐   Hinduism

☐   Islam

☐   Judaism

☐   Spiritual but not religious

☐   Other (Please Specify)_____

☐   I don't identify as religious or spiritual

9.   Do you currently or have you previously practiced meditation

activities?

☐   No *(skip to question 14)*

☐   Yes

10.   Which best describes your meditation practice?

☐   Novice, minimal practice

☐   Intermediate, some practice that might be intermittent

☐   Advanced, regular and extensive practice

11.   What meditation practices do you engage in or have you engaged in previously? (select all that apply)

☐   Mantra meditation (including Transcendental Meditation, relaxation

training)

☐   Mindfulness meditation (including Vipassana, Zen Buddhist meditation,

mindfulness-based stress reduction, and mindfulness-based cognitive

therapy)

☐   Spiritual meditation (including centering prayer and contemplative

meditation)(Peregoy et al., 2014)

☐   Other (please specify) _____

12.   Please describe any meditation or contemplative practices in which you currently engage or have previously engaged (e.g., compassion meditation, prayer, other spiritual activity). Describe how often you use each practice (e.g., 3 times per week) and for how long you have been using it (e.g., since December 2013).

13.   Have completed any prior mindfulness training or education?

☐   No *(skip to question 14)*

☐   Yes

14.   What meditation training or education have you completed? (select all that apply):

☐   Mindfulness or mediation retreat

o   Total number of days of retreat completed _____

☐   Reading books or online information

o   Number of hours of reading completed _____

☐   Watching videos or listening to CDs

o   Number of hours of viewing or listening completed _____

What did you or have you gained from practicing meditation?

What barriers or challenges have you faced when practicing meditation?

15.   If you were to practice meditation regularly, what do you think you would gain from it?

16. What do you think might be difficult or problematic about practicing meditation regularly?

17. How likely are you to seek opportunity to meditate in the near future?

1   2   3   4   5   6
     7

Not at all likely   Neutral
     Extremely likely

DETERMINANTS OF MEDITATION PRACTICE INVENTORY

Following is a list of statements that some people may agree with and other people may disagree with. There are no right or wrong answers. Please circle the response that best represents your thoughts or opinions.
IT WILL BE DIFFICULT FOR ME TO MEDITATE BECAUSE...

1 = Strongly Disagree
2 = Disagree
3 = Neither Agree Nor Disagree
4 = Agree
5 = Strongly Agree

1	I can't stop my thoughts.	1	2	3	4	5
2	I am uncomfortable with silence.	1	2	3	4	5
3	I can't sit still long enough to meditate.	1	2	3	4	5
4	I prefer to be accomplishing something.	1	2	3	4	5
5	Meditation might be boring.	1	2	3	4	5
6	It is a waste of time to sit and do nothing.	1	2	3	4	5
7	I don't know much about meditation.	1	2	3	4	5
8	Prayer is my form of meditation.	1	2	3	4	5
9	There is no quiet place where I can meditate.	1	2	3	4	5
10	I don't have time.	1	2	3	4	5
11	There is never a time when I can be alone.	1	2	3	4	5
12	I wouldn't know if I were doing it right.	1	2	3	4	5
13	I'm concerned meditation will conflict with my religion.	1	2	3	4	5
14	My family would think it was unusual.	1	2	3	4	5
15	I would feel odd meditating.	1	2	3	4	5
16	I don't believe meditation can help me.	1	2	3	4	5
17	I wonder if meditation might harm me.	1	2	3	4	5

Appendix C: Acceptance and Action Questionnaire

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value.		1 2 3 4 5 6 7
2. I'm afraid of my feelings.		1 2 3 4 5 6 7
3. I worry about not being able to control my worries and feelings.		1 2 3 4 5 6 7
4. My painful memories prevent me from having a fulfilling life.		1 2 3 4 5 6 7
5. Emotions cause problems in my life.		1 2 3 4 5 6 7
6. It seems like most people are handling their lives better than I am.		1 2 3 4 5 6 7
7. Worries get in the way of my success.		1 2 3 4 5 6 7

Appendix D: The Curiosity and Exploration Inventory-II

Instructions: rate the statements below for how accurately they reflect the way you generally feel and behave. Do not rate what you think you should do, or wish you do, or things you no longer do. Please be as honest as possible.

1. I actively seek as much information as I can in new situations.

2. I am the type of person who really enjoys the uncertainty of everyday life.

3. I am at my best when doing something that is complex or challenging.

4. Everywhere I go, I am out looking for new things or experiences.

5. I view challenging situations as an opportunity to grow and learn.

6. I like to do things that are a little frightening.

7. I am always looking for experiences that challenge how I think about myself

and the world.

8. I prefer jobs that are excitingly unpredictable.

9. I frequently seek out opportunities to challenge myself and grow as a

person. 10. I am the kind of person who embraces unfamiliar people, events, and

places.

Items 1, 3, 5, 7, and 9 reflect stretching.
Items 2, 4, 6, 8, and 10 reflect embracing. Items are anchored on the following scale: 1= very slightly or not at all; 2 = a little; 3 = moderately; 4 = quite a bit; 5 = extremely.

Appendix E: Distress Tolerance Questionnaire

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1. Strongly agree
2. Mildly agree
3. Agree and disagree equally
4. Mildly disagree
5. Strongly disagree

	Scale
1. Feeling distressed or upset is unbearable to me.	Tolerance
2. When I feel distressed or upset, all I can think about is how bad I feel.	Absorption
3. I can't handle feeling distressed or upset.	Tolerance
4. My feelings of distress are so intense that they completely take over.	Absorption
5. There's nothing worse than feeling distressed or upset.	Tolerance
6. I can tolerate being distressed or upset as well as most people.	Appraisal
7. My feelings of distress or being upset are not acceptable.	Appraisal
8. I'll do anything to avoid feeling distressed or upset.	Regulation
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.	Appraisal
10. Being distressed or upset is always a major ordeal for me.	Appraisal
11. I am ashamed of myself when I feel distressed or upset.	Appraisal
12. My feelings of distress or being upset scare me.	Appraisal
13. I'll do anything to stop feeling distressed or upset.	Regulation
14. When I feel distressed or upset, I must do something about it immediately.	Regulation
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	Absorption

Scoring: Item 6 is reverse scored. Subscale scores are the mean of the items. The higher-order DTS is formed from the mean of the four subscales.

Appendix F: Recruitment Information

Hello! We are interested in learning about your experiences with meditation practices and your attitudes about meditation. Participation in this study will involve completion of a survey. Total time estimated for completion of this survey will range between 15 and 25 minutes, and no longer than 45 minutes. You will be paid twenty-five cents for completing this survey.

Appendix G: Preliminary Factor Analyses Presented in Thesis Proposal

Participants

A sample of 150 meditation naïve community members completed the DMPI (63% female, 83.3% white, mean age = 52.3 (SD = 16.2)) and measures to establish validity and reliability of the DMPI. Detailed data collection procedures and sample characteristics have been described previously (Williams et al., 2011). Data provided by these participants were obtained with permission from the authors of that study for the preliminary analyses described below.

Statistical Analysis

Exploratory factor analyses were conducted in SPSS 22 using principal axis factoring with promax rotation. A three-factor solution was initially extracted to correspond to the three content domains (Sociocultural Beliefs, Pragmatic Concerns, and Perceptions and Misperceptions) delineated by the initial content validation procedures used to construct the DMPI items (Williams et al., 2011). Oblique rotation was selected a priori because the three content domains established by Williams and colleagues (2011) were anticipated to be correlated. Factor and item retention decisions were based upon recommended best practices (Worthington, 2006), including magnitude of eigenvalues and item communalities, strength and direction of factor loadings, presence of cross-loadings, scree plot inspection, and conceptual interpretability. Factor loadings of .400 or higher were considered acceptable for retention based on recommended practices (Worthington & Whittaker, 2006); however, the loading of an item was considered in concert with its communality, any evidence of cross-loading, and conceptual

interpretability. A communality less than .4 for a particular item suggests that the latent

constructs underlying the data fail to explain a substantive amount of variance in that

particular item; such items may be considered for deletion (Worthington & Whittaker,

2006).

Results

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was adequate (0.82),

and Bartlett's Test of Sphericity was rejected (p < .001). In the initial 3-factor solution,

items hypothesized to reflect the factors Sociocultural Beliefs and Pragmatic Concerns

loaded as expected with satisfactory loadings (.596-.893). These factors emerged as

Factor 1 and Factor 2, respectively. However, the items originally hypothesized by

(Williams et al., 2011) to load onto the Perceptions and Misperceptions showed a less

clear pattern of loadings. For example, the item "I can't stop my thoughts" loaded onto

the Pragmatic Concerns factor at .503, and the item "Meditation might be boring" loaded

at .476 with Factor 1, Sociocultural Beliefs. (see Table 10). Furthermore, several items

exhibited extremely low communalities (see Table 11).

Standardized Factor Loadings (17 Items)			
	Factor		
	1	2	3
I can't stop my thoughts.		0.50	
I am uncomfortable with silence.			0.3
I can't sit still long enough to meditate.			0.5
I prefer to be accomplishing something.			0.8
Meditation might be boring.	0.		
It is a waste of time to sit and do nothing.			0.6
I don't know much about meditation.	0.	0.47	
Prayer is my form of meditation.			
There is no quiet place where I can		0.89	
I don't have time.		0.59	
There is never a time when I can be alone.		0.72	
I wouldn't know if I were doing it right.		0.59	
I'm concerned meditation will conflict with my religion.	0. 628		
My family would think it was unusual.	0.		
I would feel odd meditating.	0.		
I don't believe meditation can help me.	0.		
I wonder if meditation might harm me.	0.		

Table 10: Loadings obtained in the initial 3-factor solution on scores from the 17-item DMPI measure. This solution reflected an unclear pattern of loadings and the presence of several cross-loadings. Loadings <.300, not shown.

Communalities (17 Items)		
	Initial	Extraction
I can't stop my thoughts.	0.406	0.344
I am uncomfortable with silence.	0.310	0.252
I can't sit still long enough to meditate.	0.533	0.555
I prefer to be accomplishing something.	0.465	0.613
Meditation might be boring.	0.475	0.433
It is a waste of time to sit and do nothing.	0.376	0.424
I don't know much about meditation.	0.663	0.518
Prayer is my form of meditation.	0.242	0.029
There is no quiet place where I can meditate.	0.646	0.666
I don't have time.	0.547	0.447
There is never a time when I can be alone.	0.570	0.560
I wouldn't know if I were doing it right.	0.576	0.422
I'm concerned meditation will conflict with my	0.440	0.356
My family would think it was unusual.	0.481	0.421
I would feel odd meditating.	0.689	0.744
I don't believe meditation can help me.	0.620	0.659
I wonder if meditation might harm me.	0.449	0.430

Table 11: Communalities in initial, 3-factor solution. Several items exhibited inordinately low communalities.

Given the unclear pattern of loadings and low communalities, items exhibiting a combination of low loadings, low communalities and/or cross loadings were sequentially removed from the analysis. In total, six items were removed. Furthermore, inspection of the eigenvalues (see Table 3) and the scree plot (see Figure 1) supported a 2-factor solution rather than a 3-factor solution. As such, a 2-factor solution was subsequently extracted. This two-factor solution explained 48% of the variance in the 11 items. Each of the 11 items loaded clearly onto one of two latent dimensions (see Figure 2).

Regarding the interpretation of factors, Factor 1 appeared as a combination of items originally hypothesized to reflect Perceptions and Misperceptions and Pragmatic Concerns theoretically postulated by Williams and colleagues (2011). In order to reflect this combination of items, this factor was named Personal Barriers. Meanwhile, Factor 2 contained only those items originally postulated to reflect Sociocultural Beliefs; therefore, Factor 2 was named Sociocultural Beliefs. Loadings for all items were satisfactory (see Table 4) as were the communalities (see Table 5). As expected, the factors in the final solution were correlated (see Table 6).

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative	Total	% of Variance	Cumulative	Total
1	4.379	39.81	39.81	3.892	35.38	35.38	3.240
2	1.892	17.20	57.01	1.395	12.68	48.06	3.213

Table 12. Total variance explained. The final 2-factor solution explained 48 percent of the variance in the items. In the rotated 2-factor solution, factor 1 and factor 2 explained roughly equal units of variance (3.240 and 3.213, respectively, as shown). Items loaded clearly along these two dimensions, as shown in Figure 2, below.
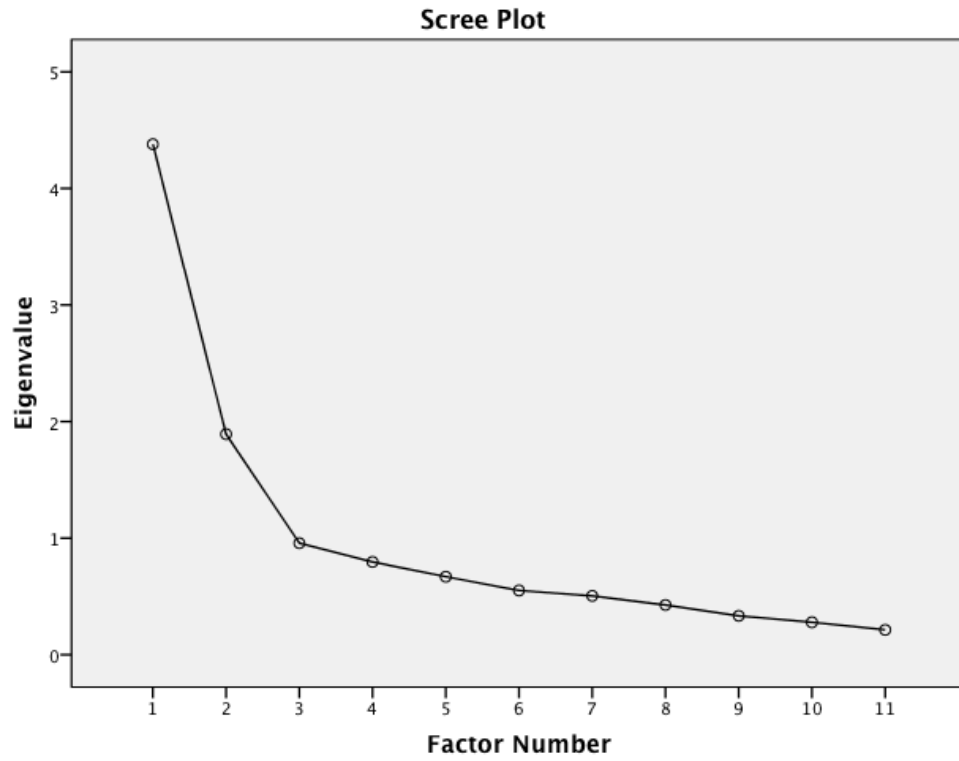
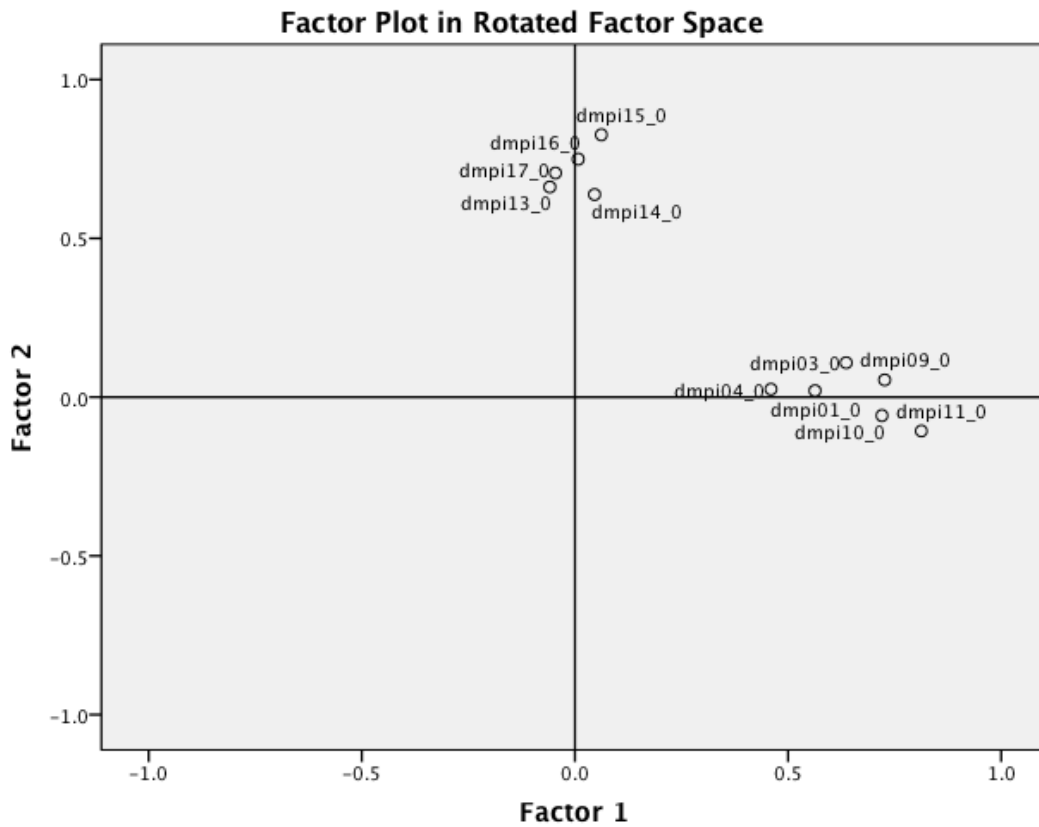**Figure 1**. Scree plot supporting a 2-factor solution.

Figure 2. Items loaded clearly along two dimensions. Factor 1 reflects Personal Barriers, and Factor 2 reflects Sociocultural Beliefs about meditation.

Standardized Factor Loadings		
	Factor	
	Personal Barriers	Sociocultural Beliefs
I can't stop my thoughts.	0.563	
I can't sit still long enough to	0.636	
I prefer to be accomplishing	0.46	
There is no quiet place where I can meditate.	0.727	
I don't have time.	0.72	
There is never a time when I can be alone.	0.813	
I'm concerned meditation will conflict with my religion.		0.662
My family would think it		0.638
I would feel odd meditating.		0.826
I don't believe meditation can help		0.749
I wonder if meditation might harm		0.706

Table 13: Factor loadings in the final 2-factor solution. Loadings <.300, not shown.

Communalities		
	Initial	Extraction
I can't stop my	0.344	0.328
I can't sit still long enough to meditate.	0.517	0.481
I prefer to be accomplishing something.	0.351	0.223
There is no quiet place where I can meditate.	0.588	0.568
I don't have time.	0.48	0.483
There is never a time when I can be alone.	0.54	0.591
I'm concerned meditation will conflict with my religion.	0.411	0.405
My family would think it was unusual.	0.426	0.437
I would feel odd meditating.	0.66	0.734
I don't believe meditation can help me.	0.539	0.567
I wonder if meditation might harm me.	0.434	0.47

Table 14. Communalities in final, 11-item solution.
Although the item "I prefer to be accomplishing
something" has a low communality of .223, the
decision was made to retain the item due to an
acceptable loading of .460 on Factor 1, absence of
cross- loading, and conceptual interpretability among
the other items loading on Factor 1.

Factor Correlation Matrix		
Factor	1	2
1	1	0.467
2	0.4	1

Table 15. Correlations among factors.

Summary of Findings from Exploratory Factor Analysis

Six items were sequentially removed based upon low communalities, low loadings, and/or cross loadings on multiple factors. The 11 remaining items loaded satisfactorily (>.400) onto two interpretable factors, 1) Sociocultural Beliefs (6 items) and 2) Personal Barriers (5 items). The exploratory factor analysis supports revision of the DMPI to an 11-item instrument. These 11 items loaded onto two latent constructs, Sociocultural Beliefs (e.g., "I'm concerned meditation will conflict with my religion) and Personal Barriers (e.g., "I don't have time"). The elimination of 6 items represents a 35% reduction in the DMPI.

The factor Personal Barriers essentially represents a combination of items originally meant to reflect two distinct content domains, *Pragmatic Concerns* and *Perceptions and Misperceptions*. Perhaps there is some overlap between perceptions and misperceptions about meditation with pragmatic concerns. For example, the item "I don't have time" was originally thought to reflect a pragmatic concern, conceivably related to a true inability to schedule time to meditate amidst the concrete demands of daily living. However, the notion "I don't have time" may also reflect a misperception; it could be that the individual actually *does* have time to meditate for a few minutes per day, yet in the hurried, time-pressed work culture of the United States, the person feels that s/he simply cannot allocate time towards self-care practices (e.g., meditation). Some authors discuss the notion of "time-famine" observed in American culture; that is, the perception that time is slipping away despite the actual increased availability of free time observed in most social strata in the United States across the later 21st century (Robinson & Godbey, 2005) A similar

perspective could be applied to the item "there is no quiet place where I can meditate," originally postulated as an indicator of having pragmatic concerns about meditation. This item may also tap into elements of perceptions/misperceptions about meditation, perhaps related to a perceived (or misperceived) inability to structure one's lifestyle so as to arrange quiet time for oneself. Thus, the constructs *Perceptions and Misperceptions* and *Pragmatic Concerns* do not appear distinct; rather, the items originally postulated as indicators of these separate constructs appear to be tapping into a broader construct, *Personal Barriers,* reflecting barriers occurring in one's personal life related to doing meditation practice. These barriers include concerns about not having enough time, a perceived inability to sit still, a preference for engaging in productive activities leading to a sense of accomplishment, and others.

Meanwhile, the latent construct Sociocultural Beliefs emerged from the factor analysis generally as originally postulated by Williams and colleagues (2011). That is, these items reflect beliefs about meditation that might discourage the individual from engaging in meditation practice (e.g., "I would feel odd meditating").

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