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One-on-one Mindfulness Meditation Trainings in a Research Setting

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Abstract

We created a standardized one-on-one mindfulness meditation intervention with six weekly 90-minute training sessions and home practice. The trainings included didactic instruction, discussion and guided meditations, and home-practice guided meditations and mindfulness exercises. Twenty-eight participants completed mindful awareness, nonjudgment, perceived stress, positive and negative affect, and credibility/expectancy scales before and after the intervention. There were no adverse events or unanticipated side effects. Participants' mindful awareness and nonjudgment scores and perceived credibility of the intervention increased after the intervention, while negative affect and perceived stress decreased. There was no change in positive affect. Future research is needed comparing group versus one-on-one formats incorporating participant preference in the randomization, personality, and other predictors as measures.

Keywords

Mindfulness; meditation; group; individual; one-on-one

Introduction

Mindfulness meditation was introduced to the West in a secular and standardized clinical format about 30 years ago (Kabat-Zinn, 1982) and growing evidence of positive outcomes has amassed for its diverse clinical and research applications in various physical and mental/emotional conditions (Allen, Chambers, & Knight, 2006; Grossman, Niemann, Schmidt, & Walach, 2004; Keng, Smoski, & Robins, 2011). Mindfulness is incorporated into many standardized clinical programs, such as the Mindfulness Based Stress Reduction (MBSR) program (Kabat-Zinn, 1982; Kabat-Zinn et al., 1992), Mindfulness Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), Mindfulness-Based Eating Awareness Training (Kristeller & Wolever, 2011), Mindfulness Based Relapse Prevention

(Bowen et al., 2009), and Mindfulness-Based Childbirth and Parenting (Duncan & Bardacke, 2010). Mindfulness concepts are interwoven as a common theme into these programs even though their content and application may vary. While mindfulness-based interventions are traditionally taught in a group setting with a standardized number of sessions of prescribed length, alternative delivery formats may support both clinical and research applications.

Group mindfulness-based interventions have shown positive effects in a variety of health conditions and the group format has many benefits (Grossman, et al., 2004). The group format usually costs less than individual therapy because one therapist can see many patients in a session. Groups can also provide motivation and synergistic learning opportunities for the participants. Meeting other people with similar or other issues can give the participants a wider perspective of their own situation and allow them to see how others handle their problems. Participants can provide encouragement and emotional support for each other instilling a sense of camaraderie (Allen, et al., 2006).

In certain clinical and research applications of mindfulness-based interventions, alternative delivery methods, such as a one-on-one format, may be useful. In research settings, scheduling group sessions is challenging because research participants often have very different schedules. Coordinating pre- and post-assessments can be difficult, especially since all participants' assessments must occur in the same time window. Recruitment is also more challenging because rigid group times exclude potential participants who are not available during the allotted time. Importantly, social dynamics from participant-instructor interactions may positively or negatively influence study results and thus impact outcome variability (Imel, Baldwin, Bonus, & Maccoon, 2008). Alternative delivery formats that allow for scheduling flexibility and remove the group social dynamics may improve research study recruitment and precision in assessing efficacy of mindfulness interventions.

From a clinical perspective, an alternative one-on-one format may be beneficial for some participants who are unwilling to receive treatment in a group setting, such as those who are severely ill, immobile, highly stressed, or have sensitive diagnoses, aversions to group sharing, or constrained schedules. In an MBSR study in combat veterans with posttraumatic stress disorder, out of 382 clinician referred patients who were eligible for an MBSR class, only 44% agreed to go to an orientation. Of those who attended the orientation and entered the MBSR study, 26% were considered non-compliant for their failure to attend at least four classes (Kearney, McDermott, Malte, Martinez, & Simpson, 2012). Unique participant characteristics may also influence the likelihood of enrollment and completion of group mindfulness therapy. Participants with insecure adult attachment styles in an MBSR study were twice as likely as the those with secure attachment styles to drop out of group treatment (Cordon, Brown, & Gibson, 2009). A one-on-one format may provide an alternative choice to clinical patients who would otherwise not receive the therapy and may also improve compliance and reduce attrition. Others have suggested similar recommendations (Lau & Yu, 2009) and brief clinical cases of individual mindfulness delivery applications have been reported (de Lisle, Dowling, & Allen, 2011); however, no standardized individual format program has been documented to date.

The one-on-one curriculum was based on MBCT rather than MBSR for several reasons, including the explicitness and detail of the published training material and the shorter duration of the training, (i.e. 2 hours rather than 2.5 and no retreat) (Segal, Williams, & Teasdale, 2002). The standard program for MBSR includes eight 2.5-hour weekly sessions, about 45–60 minutes of daily home practice, and a full-day retreat. Some researchers have adapted mindfulness-based programs like MBSR to address the time constraints that standardized programs cause for some participants. For example, Carlson and colleagues

shortened the MBSR program for cancer patients to 1.5-hour sessions and only a three-hour retreat (Carlson, Speca, Patel, & Goodey, 2003). Gross and colleagues kept the session length at 2.5 hours but did not include any retreat with organ transplant patients (Gross et al., 2004). A workplace MBSR adaptation used 1-hour weekly sessions, 20-minute daily practice of meditation/yoga, and the full-day retreat was omitted (Klatt, Buckworth, & Malarkey, 2008). The reduction in class and home practice hours is rationalized by the lack of evidence for the minimum number of hours required for clinical effects. Reducing session length and/or number of sessions does not appear to diminish the effects of mindfulness meditation interventions. The above studies using adapted programs reported positive benefits. Also, a meta-analysis of 30 MBSR studies found that the number of in-class hours did not correlate with mean psychological outcome effect size in both clinical and non-clinical samples. The authors concluded that adaptations to reduce in-class hours may be appropriate for participants when the longer time commitment is an obstacle to their participation and when psychological distress is an issue (Carmody & Baer, 2009). Creating a standardized, alternative mindfulness meditation program in order to improve enrollment and compliance is reasonable.

Another important issue in assessing effects of mindfulness meditation interventions is the evaluation of program adherence. Evaluating adherence and its influence on outcomes will ensure accurate evaluation of the efficacy of mindfulness-based interventions. Adherence to mindfulness meditation interventions can be measured as class attendance and home practice. Class attendance can be easily collected, although it is not always reported. Home practice adherence is usually assessed through self-report. Although self-reporting is an improvement from not measuring home practice adherence at all, it has limitations. Self-report adherence data are rarely reported (Flegal, Kishiyama, Zajdel, Haas, & Oken, 2007; Sannes, Mansky, & Chesney, 2008; Wahbeh, Haywood, Kaufman, Harling, & Zwickey, 2009) and are easily altered by the patient, as is well known in medication trials (Osterberg & Blaschke, 2005). Results based on self-report home practice logs must be interpreted with caution because there are no objective measures validating the accuracy of them (Carmody & Baer, 2008, 2009; Flegal, et al., 2007; Rosenzweig et al., 2010). Drug trials regularly use Medication Event Monitoring System and pill counts as objective adherence measures. No such standards exist in mindfulness meditation research.

We developed a standardized one-on-one (1-1) mindfulness meditation intervention (MMI) program with shorter hours as an alternative delivery method that may be more accessible and feasible in clinical and research applications. The MMI is taught 1-1 with six weekly 90-minute sessions and is based on MBCT (Segal, et al., 2002). MMI differs from MBCT primarily in the absence of explicit cognitive therapy components and explicit focus on depression. MMI differs from MBSR primarily by the absence of practice in mindful yoga and mindful, assertive communication. It retains the practice in mindfulness of breath, bodily sensations, thoughts, and emotions that is common to both established programs. Our primary goal for this paper is to describe the MMI curriculum. Our secondary goals are to report on the preliminary effects of the intervention on mindfulness, positive and negative affect, perceived stress, and credibility and to evaluate participant adherence to the program.

Methods

Data for this report were collected as part of a larger, ongoing, randomized controlled trial of MMI in stressed 50–85 year olds that is collecting self-rated and physiological outcome measures related to stress. Brief descriptions of the randomized controlled trial study design and methods are described in Procedures. Only pre- and post-training data from all participants who have completed the MMI to date are included here in order to address the

primary and secondary goals of this report. The full randomized controlled trial methods and outcomes will be reported when the study is complete.

Participants

Participants were recruited with newsletters, email list serves, and flyers at Oregon Health & Science University (OHSU) and around the Portland, Oregon Metro Area. Participants were screened for eligibility via telephone interviews. Inclusion criteria are: (a) age 50 – 85 years old; (b) baseline Perceived Stress Scale score ≤ 9 (Cohen, Kamarck, & Mermelstein, 1983); (c) score ≤ 6 on the Geriatric Depression Scale (van Marwijk et al., 1995); and (d) no prior experience with meditation classes or other mind-body classes (e.g. yoga, tai chi) within the last 24 months or more than 5 minutes daily practice in the last 30 days. The age criterion was chosen because older adults have less physiological reserves and are more likely to demonstrate changes in the physiological outcome measures related to stress. Exclusion criteria are: (a) evidence of cognitive impairment reflected by a score of less than 25 on the Modified Telephone Interview for Cognitive Status (Welsh, Breitner, & Magruder-Habib, 1993); (b) significant patient-reported medical/neurologic disease (e.g., major organ failure; insulin-dependent diabetes, active cancer, or alcoholism); (c) taking medications or have health condition that globally affects central nervous system function or physiologic measures; and (d) cannot understand the instructions. The study was approved by the OHSU Institutional Review Board, and written informed consent was obtained from all participants.

The research assistant received 108 calls from interested parties, 22 of which were unreachable when called back. The research assistant gave additional information to 86 interested people, 23 of which were not interested after they heard more about the study. Sixty-three telephone screenings were completed and 49 people qualified for the study (14 people who completed the telephone screening were ineligible according to the inclusion/exclusion criteria). An additional 7 did not enter the study because of scheduling conflicts or decided they didn't want to participate. The remaining 42 volunteers signed the consent form and enrolled in the study. Of the 42, participants, 28 have completed the MMI, ten are still in trainings, and four dropped out after randomization. Two drop-outs were due to extenuating personal circumstances, and one was due to untreated, chronic major depression that precluded continuation in the study. A fourth drop-out endorsed high stress during the screening which subsequently reduced below the inclusion level before the first study visit and she did not feel stressed enough to continue with the study. Participant demographics are listed in Table 1.

Materials

Questionnaires—The *Mindfulness Attention Awareness Scale* (MAAS) was used to assess each participant's ability to be aware of and attentive to the present moment. The MAAS is a 15-item self-report questionnaire that measures the frequency of general and specific present-awareness mindfulness states in daily life with higher scores reflecting greater mindfulness. The MAAS has a strongly supported uni-dimensional factor structure, shows strong internal consistency ($\alpha = .82$) and expected convergent and discriminant correlations (Brown & Ryan, 2003).

The "Accepting (or allowing) without Judgment" subscale (Nonjudgment) of the *Kentucky Inventory of Mindfulness Skills* (KIMS) was administered. The other subscales were not administered because our previous studies have found this subscale to correlate with the effects of stress (Wahbeh & Oken, 2011). Nonjudgment is a nine-item self-report subscale used to evaluate non-judgmental acceptance of internal processes, namely how willing is the respondent to allow reality or what is there, to be as it is without judging, avoiding, changing, or escaping it. It consists of items 4, 8, 12, 16, 20, 24, 28, 32, and 36 of the KIMS

and is reversed scored on a five-point Likert scale ranging from one (never or very rarely true) to five (almost always or always true). Higher scores reflect more mindfulness. The subscale has strong internal consistency ($\alpha = .76 - .91$), shows expected convergent and discriminant correlations, strong test-retest reliability ($r = .83$), and good content validity correlating with other mindfulness scales (Baer, Smith, & Allen, 2004).

The *Perceived Stress Scale* (PSS) is a 10-item self-report instrument that uses Likert scales to measure respondents' perceived stress, including specific inquiry about how unpredictable, uncontrollable, and overloaded respondents find their lives (Cohen, 1988). It has good internal reliability ($\alpha = .76$) and strong construct validity. Higher scores reflect greater perceived stress.

The *Credibility/Expectancy Questionnaire* (CEQ) is a six-item questionnaire that assesses participant treatment expectancy and rationale credibility resulting in a credibility score and expectancy score (Devilly & Borkovec, 2000). The scale has a high internal consistency ($\alpha = .84$) and good test-retest reliability (.82 expectancy; .75 credibility). Higher scores reflect higher credibility and expectancy. A credibility example question is "At this point, how logical does MMI training seem?" An expectancy example question is "At this point, how much do you really feel MMI training will help you reduce your stress?" Only the pre- and post-MMI credibility scores are used in this analysis as the expectancy score is only relevant to pre-MMI values for the ongoing randomized controlled trial.

Adherence data collection—Adherence was measured with session attendance, and subjective and objective home practice adherence. Subjective adherence was collected with a participant log where meditation practice time was recorded. Objective adherence was collected from iMINDr, a custom software application developed for use with an iPod Touch; (iTouch) (Apple, Inc.) to more accurately track home practice adherence (Wahbeh, Zwickey, & Oken, 2011). Participants listened to their home practice meditations on the device which then recorded date and time of listening, and length of listening time. 1356 total possible home practice minutes were assigned to all participants.

Procedures

The study design for the parent randomized controlled trial is as follows. All participants had a telephone screening, Visit 1 (week 1), six-week MMI (weeks 2–7 for MMI group or weeks 9–14 for Waitlist group), Visit 2 (week 8), and Visit 3 (week 15). Demographic data (age, gender, race, ethnicity, education, and annual household income) were collected during the telephone screening and Visit 1. Questionnaires were administered at Visit 1, 2, and 3. Adherence data was collected throughout the intervention period. Following volunteer inquiries, consents were mailed for review. Interested volunteers were then screened via telephone phone to insure a high likelihood of eligibility. This telephone screening was approved with a Waiver of Authorization from the Institutional Review Board. Eligible participants were then scheduled for Visit 1 where eligibility was finalized and questionnaires completed. Participants were then randomized with a computer generated randomization program to receive the MMI immediately (MMI group) or after week 8 following Visit 2 (Waitlist group). Questionnaires were completed again at Visit 2. The waitlist group received the MMI intervention between weeks 9 and 14, after Visit 2. They then completed the questionnaires again at week 15 Visit 3. The data included in this report are the questionnaires completed at the visit before and after the MMI and adherence during the intervention period for the MMI and Waitlist groups.

1-1 MMI Overview—The 1-1 MMI consisted of six weekly standardized 90-minute trainings. A six-week format was chosen to enhance the acceptability of the intervention for

the participants. It was deemed sufficient to include the elements of the core mindfulness components of the MBCT program. Elements including education about the phenomenology of depression and the cognitive theory of depression, as well as practice in mindful walking and other mindful movement exercises were eliminated. The six trainings followed a similar format. Most sessions began with a 30-minute guided meditation, followed by discussion about the participant's meditation experience, conversation about home practice, presentation of new materials, and explanation of home practice (Table 2). Trainings were held in a small room with a table, two office chairs, a straight-back chair, a reclining chair, and a computer with speakers for playing audio tracks. Audio tracks of the guided meditations were used for this research study to reduce variability in their presentation, rather than the live guided meditations normally used in a clinical setting. During the guided meditations, the facilitator dimmed the lights and left the room to allow for privacy. A one-way audio monitoring system was in place so that participants could request assistance during the guided meditations, and the facilitator would re-enter the room if needed. The facilitator (EG) is trained as a meditation instructor, experienced in teaching meditation in secular and Buddhist contexts to a variety of populations, and has had a personal meditation practice for seven years. Prior to study onset, the facilitator practiced the curriculum with authors JBL and BSO to ensure proper adherence to the standardized protocol. During the study, the facilitator had regular meetings with JBL, HW, and BSO to ask questions about the curriculum and review the protocol and its implementation.

For home practice, participants were strongly encouraged to meditate at least 30 minutes per day between trainings and complete a daily "Awareness Exercise" assignment. Participants were loaned an iPod Touch with the iMINDr application installed to play the guided meditation and record objective adherence at home (Table 3). They were also given a binder with handouts and asked to bring the binder to training sessions so handouts can be added. The facilitator's contact information is also in the binder, and participants are strongly encouraged to contact the facilitator with any questions about the iPod Touch or the home practice.

Each week, participants receive a new "Home Practice Log" to record when and for how many minutes they meditate each day, if they complete the daily awareness exercise, and any helpful comments for the next training check-in. During the trainings, the facilitator attempted to skillfully motivate participants to practice at home while also trying to avoid the notion of "success" and "failure," which can erroneously lead to all-or-nothing thinking and inhibit practice. Participants were asked by the interventionist each week if they encountered any obstacles or had negative experiences with their practice.

MMI week by week curriculum—The 1-1 MMI curriculum described in this report is based on *Mindfulness-Based Cognitive Therapy for Depression: A New Approach to Preventing Relapse* (Segal, et al., 2002), and handouts that come directly from this book will be noted by an asterisk, "*". Adapted or newly created handouts or material will be noted as such.

Week One: The first training begins with the facilitator asking the participant about his or her experience with, understanding of, and expectations regarding mindfulness meditation. The facilitator describes an overview of the secular origins and nature of the course, Jon Kabat-Zinn's definition of mindfulness, "Paying attention in a particular way—on purpose, in the present moment, non-judgmentally," and a brief history about Kabat-Zinn's clinical introduction of mindfulness meditation to the West.

Participants are told that the program is just one approach to learning about mindfulness, and it incorporates both formal meditation and informal methods of cultivating mindfulness in

daily life. We are all capable of being mindful, but it takes time and practice to develop fully. To begin understanding mindfulness, participants reflect on activities they engage in while on “automatic pilot,” such as driving while preoccupied by thinking about the past or planning for the future, then arriving at a destination without recalling how they got there. “Summary of Session 1: Automatic Pilot”^{*} is used as a script to introduce the notion that while in “automatic pilot” mode, people can develop patterns of thinking that are stress-producing or counterproductive to wellbeing, and mindfulness can empower them to have greater freedom and choice over their thought processes as an antidote.

To practice the newly learned mindfulness concept, the facilitator gives the participant a few raisins and reads a transcript of the Raisin Exercise.^{*} The participant’s experience of the exercise is then discussed. To elicit conversation, the facilitator may ask, “How might this be different from the way you would normally eat a raisin?” or “Did you notice your mind wandering during the exercise?”

Participants then move to a recliner chair for a guided meditation. Participants listen to a 30-minute pre-recorded Body Scan. After the meditation, the facilitator reenters the room and asks participants to share any observations about their experience with the Body Scan. A handout from Session 2, “Tips for the Body Scan,”^{*} is used for discussion points.

To conclude the training, the facilitator reiterates the theme of increased awareness--or mindfulness--as a tool to step out of automatic pilot. Participants are given two handouts: “A Definition of Mindfulness”^{*} and “Summary of Session 1: Automatic Pilot.”^{*} The facilitator describes the home practice: listen to the 6-minute introduction to home practice recording at least once, practice the full body scan each day, and complete an awareness exercise each day. The awareness exercises include bringing moment-to-moment awareness to a chosen daily activity, and similar to the raisin activity, noticing when they are being mindful of what they are eating.

Week Two: The participants arrive at their second training with their iPod Touch and binder. They start by doing the Body Scan meditation as the facilitator examines the Home Practice Log and uploads the iMINDr data. All subsequent trainings also begin with a meditation, as well as reviewing and uploading data. After the guided meditation, the participant and facilitator discuss the Body Scan experience and home practice. Sitting meditation is then introduced. The facilitator presents main points from “The Breath”^{*} handout and assists the participant to sit in a manner that is comfortable and conducive to sustained practice. A 10-minute Introduction to Sitting Meditation is then played, after which the experience is discussed. The facilitator then reviews three handouts with the participant: “Staying Present”^{*} engages the main theme; “Mindfulness of the Breath”^{*} supplements the recording by outlining the steps of Sitting Meditation; and “The Breath”^{*} introduces the breath as a bodily process conducive to anchoring our awareness in the present moment. Home practice for the following week is then explained: 1) Pleasant Events Calendar^{*} (Kabat Zinn 1990; Segal et al. 2002), where participants identify one pleasant experience—big or small—and *really* experience it as it is happening in the present moment. First, they are to ask themselves, “How does my body feel right now?” After pausing to acknowledge the answer to that question, they are to ask themselves the following questions with a sense of open curiosity and interest: “What is my mood? What are my feelings? What are my thoughts?” They then articulate the responses to these questions by writing them down on the calendar, completing one entry per day. 2) Body Scan daily, and 3) 10–15 minutes of Sitting Meditation daily.

Week Three: In the third week, the 3-Minute Breathing Space^{*} is introduced. After a 30-minute Sitting Meditation and discussion of the experience and the home practice, the

facilitator points out that the real purpose of meditation is to help us bring mindful awareness into daily life. After habituating oneself with the experience of being still and present during longer meditations, the experience can be accessible in shorter meditations interspersed throughout the course of the day. Then, a 4-minute audio track is played titled, "Introduction to the 3-Minute Breathing Space." The facilitator stays in the room and does the brief meditation along with the participant, illustrating the fact that he or she does not just talk about meditation but also practices him or herself. Afterwards, the facilitator and the participant discuss ways that the 3-Minute Breathing Space may help to bring mindfulness into daily life. For instance, it is helpful for some people to choose three specific times a day to listen to the recording on the iPod Touch, and others prefer to be more flexible, fitting it in when they can. Either way, it is a formal practice that contains three steps: (1) "Awareness," or taking stock of what is occurring in the present moment with one's thoughts, feelings, and body sensation; (2) "Gathering," or focusing single-pointedly on the area where they feel the breath the most, as is identified during the longer Sitting Meditation; and (3) "Expanding" one's attention from single-pointed focus on the breath to the body as a whole, focusing particularly on any remaining points of tension.

The daily home practice this week consists of the full 25-minute Sitting Meditation, the 3-minute Breathing Spaces three times per day, and the Unpleasant Events Calendar.* The facilitator explains that becoming more aware of especially predominant bodily sensations, moods, thoughts and feelings—whether positive or negative—helps us to step out of automatic pilot and understand how we relate to our experiences. It is also important to point out that this exercise is not intended to encourage participants to look for or focus on negative experiences; it is simply meant to help us notice when they arise.

Week Four: A new meditation called, "Sitting with Difficulty Meditation"* is introduced. It focuses on how to deal with difficult experiences as they arise in meditation, bring them into the practice, and adopt an attitude of acceptance. After the meditation, the experience and home practice are discussed, including conversation about whether participants are experiencing any obstacles with incorporating the 3-Minute Breathing Spaces into their daily lives.

The Coping Space is introduced with a 4-minute guided recording titled "Extended Breathing Space."* It is a mindfulness technique that is intended to be used whenever participants are facing challenges of any sort. The facilitator gives a few examples: "It could be any time, from waiting in a long line in the grocery store to getting cut off in traffic to having a quarrel with your spouse." The Coping Space is a three-step process. The first step entails an active engagement in mentally describing experiences. Exploration of one's experience includes present-moment awareness of thoughts, feelings, bodily sensations, and the facilitator reminds participants that they practiced cultivating this type of overall awareness with the Pleasant and Unpleasant Events Calendars, as well as the audio-guided Coping Space. So, for example, a participant may say to himself, "I am wishing things were different from how they are right now. A feeling of anger is arising. And I am clenching my jaw." In the second step, one redirects attention single-pointedly to his breath. The third step involves expanding his attention to his entire physical body and re-approaching the troubled thoughts or feelings with a new perspective. If there is any discomfort, tension, or resistance in the body, one can breathe into it on the in-breath and out from it on the out-breath, softening and opening. It may also be helpful to say to oneself, "It's OK. Whatever it is, it's OK. Let me feel it." This concept of acceptance is further elaborated when the facilitator reads the "Summary of Session 4: Allowing/Letting Be."*

Finally, the home practice this week is discussed. It includes doing the full 25-minute Sitting Meditation, practicing the 3-minute Breathing Spaces three times per day, and tracking of how many times the Coping Space technique is applied throughout the day.

Week Five: The fifth training begins the same way as the fourth training, with the “Sitting With Difficulties” guided meditation. Afterwards, the facilitator asks if the participant noticed anything new this time around. Initial experiences with the Coping Space are discussed, and the rest of the home practice is also talked about. Then, the facilitator presents the idea that thoughts, which may or may not accurately reflect reality, have a major influence on how we feel and what we do using “Thoughts are Not Facts”^{*} for discussion points. The facilitator presents ideas about exploring and challenging one’s relationship with his or her thoughts using “Ways You Can See Thoughts Differently”^{*} and “When you Become Aware of Negative Thoughts”^{*} for discussion points. The facilitator points out that the Breathing Space and Coping Space are just “first steps” before taking a wider perspective on thoughts and feelings. “Using the Breathing Space: The Action Step”^{*} discusses actions to take for dealing with difficult feelings, and “When Feelings are Overwhelming”^{*} addresses depression and facing particularly low moods.

The facilitator reminds the participant that the next training session is the last one, and thus they should reflect on how they can best maintain the practice going forward; “Take some time to reflect this week on how meditation and mindfulness may have had an impact on you.” Home Practice includes the Breathing Space three times daily, the Coping Space whenever needed, and a full-length meditation practice—choosing between the body scan and the sitting meditation—on a daily basis. The facilitator encourages participants to really get curious over the next week about what type of meditation schedule will work best for them so that they can discuss it the following week. When looking to the future, the facilitator explains, “Unfortunately, mindfulness is not like riding a bike. In order for it to be available to us when we need it, we must continue to habituate our minds to the experience of present-moment awareness.”

Week Six: The final training begins with the Body Scan guided meditation. After the meditation, the facilitator and participant discuss whether there were any differences from the very first Body Scan in Week 1, as well as how the home practice went. The facilitator and participants discuss what has been learned and what obstacles have arisen over the six weeks. They talk about how to best keep up the momentum and discipline developed over the six sessions in both formal and informal practice. The correlation between recognizing the personal benefits of mindfulness and developing intrinsic motivation for practice is discussed. Participants are left with the sentiment that this training is simply an introduction to mindfulness.

Throughout the six-week course, the facilitator nurtures the broader context and strategy for cultivating mindfulness. Longer meditation sessions are necessary for habituating one’s mind with the state of being in the present moment. Shorter formal meditations (e.g. Breathing Space) allow the opportunity to meditate whenever we can find a few minutes in our busy lives. When we notice that we are struggling in some way, we have the three-step Coping Space method for applying mindfulness. When we distance ourselves from our disturbing thoughts and feelings, we can challenge them by recognizing that they are not facts and that we have autonomy over the way we respond to them.

Analysis—Means, medians, and standard deviations were calculated for each variable, and values were examined for outliers and normality of distribution. Paired *t*-tests were used to assess differences between pre- and post-MMI values on all measures (MAAS, Nonjudgment, positive and negative affect, perceived stress, credibility, and expectancy).

Standardized mean differences between assessments (pre- and post-MMI) with 95% confidence intervals and effect sizes (Cohen's *d*) were calculated. A paired *t*-test and Spearman's correlation were used to assess differences and correlations between objective and subject adherence. As this is a preliminary pilot, there was no a priori power calculation for this analysis, no multiple comparison corrections were made, and a *p*-value of 0.05 was considered significant.

Results

Questionnaires

Mindfulness (MAAS and Nonjudgment) and perceived credibility of the intervention values increased from before to after MMI. Negative affect and perceived stress decreased from before to after MMI. Positive affect did not change (Table 4).

Adherence

Session attendance- The 28 participants who completed the study attended all six sessions. Home practice adherence- Participants listened to 976 (283) minutes (median = 984; range = 172–1603) during MMI according to the objective iMINDr application. Participants reported 943 (336) (median = 995; range = 160–1809) minutes on their subjective meditation logs. The objective and subjective adherence were similar and highly correlated ($t(27) = 0.80$; $p = .43$; Spearman's $r = .63$ $p < .001$; (Figure 1).

Discussion

We created an MMI of six weekly 90-minute trainings with daily home practice between sessions. The program included 1-1 didactic trainings, in-lab guided meditations, and at-home meditations and mindfulness exercises. The primary goal of the paper was to describe the MMI. The secondary goals were to assess preliminary effects of the MMI on mindfulness, positive and negative affect, perceived stress, and credibility measures and describe adherence to the program.

After the intervention, participants had a significant increase in mindfulness (attention/awareness and nonjudgment) and perceived credibility of the intervention. Also, negative affect and perceived stress decreased. Although our sample size is small and not specifically powered to detect changes in these measures, our initial observations are promising. Other non-standardized mindfulness-based interventions used clinically provide support for the use of 1-1 formats in standardized mindfulness-based interventions also. For example, components of Dialectical Behavior Therapy (Linehan, Heard, & Armstrong, 1993) and Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) are conducted in a one-on-one setting. In this pilot study, there was no change in positive affect. The MMI does not specifically engage participants in focusing on positive emotions thus an increase or decrease in positive emotions is not necessarily expected. A larger sample size or longer follow-up time may be necessary to detect any effects in positive affect.

As of yet, no study has tested whether group versus individualized mindfulness meditation programs show differential effects. A comparison of our study's effect sizes with previous studies that have examined group programs show similar effects. One study assessed the MAAS and the Nonjudging subscale of the Five Factor Mindfulness Questionnaire (this subscale is not exactly the same as the KIMS subscale but is similar) before and after a group MBSR program and found comparable effects sizes (MAAS, $d = 0.46$; Nonjudging, $d = 0.50$) in 177 participants with cancer (Garland, Tamagawa, Todd, Specia, & Carlson, 2012). Another study of 25 participants with major depressive disorder who received a

group MBCT program showed improvements in the MAAS pre-post with a medium ($d = 0.70$) effect size (Michalak, Heidenreich, Meibert, & Schulte, 2008). Another study of group MBSR found a comparable small effect size ($d = 0.49$) for perceived stress improvement in 73 participants with asthma. These three studies did not have control groups, and effect sizes were calculated from pre- to post-training scores. Another group MBSR study examined the MAAS, Nonjudgment subscale of the KIMS, positive and negative affect with a Global Mood Scale, and perceived stress with the Perceived Stress Scale in 60 stressed adults compared to a waitlist control group. Effect size was calculated for between groups pre- to post- differences: (a) MAAS, $d = 0.55$; (b) Nonjudgment, $d = 0.44$; (c) positive affect, $d = 0.73$; (d) negative affect, $d = 0.36$; and (e) perceived stress, $d = 0.64$. Compared to our study, the MAAS and Nonjudgment were similar, the positive affect was larger, the negative affect was smaller, and the perceived stress was larger. More research is needed to directly assess the group versus individual format on these measures.

The group versus 1-1 format has been directly examined in other therapies with no outcome differences found between the two formats across a variety of diseases. One study of group versus individual cognitive behavioral therapy for social anxiety disorder found equivalent effects in both groups and remarked that social anxiety disorder treatment has been moving towards individual rather than group because of high attrition rates and under-utilization of group dynamics (Bjornsson et al., 2011). Another study looking at group versus individual therapy for workplace depression found no difference between groups at a one-year follow-up (Sandahl et al., 2011). Group versus individual cognitive treatment for Obsessive-Compulsive Disorder found similar effects for depression and worry, and the individual treatment was more effective in decreasing scores on dysfunction beliefs and in decreasing the use of suppression as a thought control strategy (Belloch et al., 2011). A meta-analysis of group versus individual exercise interventions for women with breast cancer found no difference between the two intervention types on quality of life (Floyd & Moyer, 2009). These studies indicate that a group format versus an individual format may not be a major factor in receiving the positive benefits of a mindfulness meditation program.

Group classes have benefits, such as being more cost-effective and including positive group dynamics, supporting its use in many settings over an individual therapy; however, a 1-1 format may be a viable alternative in other settings where a group version is not feasible or acceptable to the participants. The group setting may allow for insight and empathy from other group members and beneficial group dynamics during meditations. However, it also allows for participants to avoid discussion, ask questions about tangential problems they may be having, and share extensively about their own personal experience. A skillful teacher may try to elicit comments from everyone in a group class; however, this is not always attempted or successful. In a research setting, there is less variability in 1-1 compared to group settings since the group dynamic adds outcome variation even if the group setting may be more beneficial for some people. Our experience of group-related issues of high attrition, non-enrollment, non-engagement, and scheduling conflicts in a research setting suggests that efficacy outweighs cost. Again, no study has yet assessed a group versus 1-1 comparison in mindfulness meditation programs. Future studies examining differences in effect and cost are warranted.

However, asking whether group and individual mindfulness meditation training are equally effective may not be the most appropriate question. For example, group training may be very effective for someone who is extraverted, loves groups, and thrives in a social setting, while not as effective for an introvert who feels intimidated in groups. Therefore, participant preference and personality may be important factors to take into account when assessing whether the two formats are equivalent. A meta-analysis compared the treatment outcome differences from 2,300 clients across 26 studies that were matched or not-matched to a

preferred treatment. They found that matched clients have a 58% chance of showing greater improvement, and are about half as likely to drop out of treatment when compared with clients not receiving a preferred treatment (Swift & Callahan, 2009). Thus, it would be useful for a study to incorporate either participant preference in the randomization or at least assess personality and other potential predictors for format recommendations.

Besides the difference in format, the number and length of sessions is different in our study compared to other standardized mindfulness-based interventions. Our intervention had six weekly 90-minute sessions, which is shorter than most other mindfulness-based interventions. It may be the case that true learning from mindfulness meditation comes from continued daily practice rather than in-training experience, and it is also possible that longer classes may more firmly institute the habit of daily practice and provide structure for the participant to ask more questions. A meta-analysis of session-hour effects on psychological outcomes found no influence (Carmody & Baer, 2009). Other intervention types have also found no relationship between session hours and outcomes. A meta-analysis of self-help interventions for depression found no significant associations between outcomes and the session length, content, delivery mode or therapist background (Gellatly et al., 2007). A systematic review of 98 mindfulness meditation studies found that only 24 of them evaluated the associations between actual home practice and measures of clinical function with 13 of the studies demonstrating at least partial benefits of practice (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009). Thus, it is unclear whether in-session time, at-home practice time, or both are important for effects. To date, no study has directly examined dose of either in-session or at-home practice time in mindfulness meditation trainings. In order to rigorously test the question of dose response, a study examining different numbers of in-session hours and at-home practice hours with objective adherence measures would be valuable.

Twenty-eight participants have completed the program thus far. Participants who completed the study were highly compliant with 100% attendance at the six sessions, and 75% adherence to home practice. Objective and subjective adherence were highly correlated confirming accurate subjective reporting of home practice. Four participants dropped out of the study after randomization resulting in an 88% completion rate. The drop-outs were unrelated to the intervention and there were no adverse or unanticipated events related to the intervention.

There were some limitations to the study. Only a small number of participants have completed the intervention to date so these results are preliminary and should be interpreted as such. The results are from a pre-post study design and did not include a control group. A future study will include a control group to more rigorously assess effects. The measures were assessed one week after the intervention and did not allow for analysis of longer term effects. Potential effects may be larger immediately after an intensive six-week meditation experience than after some time has elapsed (Valentine & Sweet, 1999). While the facilitator informally met with BSO and JL to review the protocol administration, there was no formal assessment of protocol fidelity. Also, the assessment of mindfulness was done with self-report questionnaires which may be problematic (Grossman, 2008).

In conclusion, we created a standardized 1-1 MMI in a research setting that was successfully carried out without any significant problems. Preliminary results are promising and more research is needed to definitively demonstrate improvements in mindfulness, negative affect, perceived stress, and credibility of the intervention. A 1-1 format may be a useful offering in addition to group formats, especially for patients and research participants who are unwilling to engage in group therapy. Individualized assignments to group or alternative formats based on participant/patient preference may be beneficial although this has yet to be tested. Future

research is needed to test group versus 1-1 mindfulness meditation trainings, as well as the influence of participant preference on the efficacy and effectiveness. We encourage clinicians and researchers to implement this standardized curriculum in their practice and research in order to learn more about its efficacy and potential application.

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Daily Home Practice Adherence

Figure 1.

Subjective = minutes of practice recorded in participant log; Objective = minutes of practice recorded by the iMINDr software.

Table 1

Participant Characteristics

Characteristic	% or <i>M</i>	<i>SD</i>
Sex (% female)	82%	
Age	61.0	7.5
Race (% Caucasian)	100%	
Education years	16.6	2.7
Married	54%	
SES (greater than \$45,000)	64%	

Note. SES = socioeconomic status as assessed by income.

Table 2

Outline of weekly 1-1 training sessions and home practice assignments

Week	In-Training Guided Meditations	Handouts	Home Practice
1	<ul style="list-style-type: none"> Raisin Exercise Body Scan 	<ul style="list-style-type: none"> Summary of Session 1: Automatic Pilot A Definition of Mindfulness Week 1 Home Practice Log 	<p><u>Awareness Exercise</u></p> <ul style="list-style-type: none"> Mindful routine activity <p><u>Guided Meditations</u></p> <ul style="list-style-type: none"> Introduction at least once Body Scan at least once per day
2	<ul style="list-style-type: none"> Body Scan Intro to Sitting Meditation 	<ul style="list-style-type: none"> Summary of Session 2: Dealing with Barriers Tips for the Body Scan Mindfulness of the Breath The Breath Staying Present Pleasant Events Calendar Week 2 Home Practice Log 	<p><u>Awareness Exercise</u></p> <ul style="list-style-type: none"> Pleasant Events Calendar <p><u>Guided Meditations</u></p> <ul style="list-style-type: none"> Body Scan at least once per day 10–15 minutes Sitting Meditation
3	<ul style="list-style-type: none"> Sitting Meditation Intro to Breathing Space 	<ul style="list-style-type: none"> Summary of Session 3: Mindfulness of the Breath The 3-Minute Breathing Space—Basic Instructions Unpleasant Events Calendar Week 3 Home Practice Log 	<p><u>Awareness Exercise</u></p> <ul style="list-style-type: none"> Unpleasant Events Calendar <p><u>Guided Meditations</u></p> <ul style="list-style-type: none"> Sitting Meditation at least once per day Breathing Space at least three times per day
4	<ul style="list-style-type: none"> Sitting with Difficulty Meditation 	<ul style="list-style-type: none"> Summary of Session 4: Allowing/Letting Be Using the Breathing Space—Extended Instructions Week 4 Home Practice Log 	<p><u>Awareness Exercise</u></p> <ul style="list-style-type: none"> Coping Space when needed <p><u>Guided Meditations</u></p> <ul style="list-style-type: none"> Sitting Meditation at least once per day Breathing Space at least three times per day
5	<ul style="list-style-type: none"> Sitting with Difficulty Meditation 	<ul style="list-style-type: none"> Summary of Session 5: Thoughts are Not Facts Ways You Can See Thoughts Differently When you Become Aware of Negative Thoughts When Feelings are Overwhelming/Tips for Action 	<p><u>Awareness Exercise</u></p> <ul style="list-style-type: none"> Coping Space when needed <p><u>Guided Meditations</u></p> <ul style="list-style-type: none"> Sitting Meditation AND/OR Body Scan at least once per day

Week	In-Training Guided Meditations	Handouts	Home Practice
		<ul style="list-style-type: none">Using the Breathing Space: The Action StepHow Can I Best Take Care of Myself?Week 5 Home Practice Log	<ul style="list-style-type: none">Breathing Space at least three times per day
6	<ul style="list-style-type: none">Body Scan	<ul style="list-style-type: none">Summary of Session 6: Using What Has Been Learned to Deal with Future DifficultiesDaily MindfulnessMindfulness Throughout the Day	<div><u>Awareness Exercise</u><ul style="list-style-type: none">Coping Space when needed</div> <div><u>Guided Meditations</u><ul style="list-style-type: none">Sitting Meditation AND/OR Body Scan at least once per dayBreathing Space at least three times per day</div>

Note. This outline was adapted from MBCT (Segal, et al., 2002).

Table 3

Guided meditation and instruction audio tracks

In-Lab Guided Meditations	iMINDr At-Home Guided Meditations
1. Body Scan (29:02)	1. Introduction (6:13)
2. Intro to Sitting Meditation (10:40)	2. Body Scan Meditation (29:45)
3. Sitting Meditation (30:00)	3. Sitting Meditation (26:00)
4. Intro to Breathing Space (4:16)	4. Breathing Space (4:11)
5. Sitting with Difficulty Meditation (30:30)	
6. Extended Breathing Space (4:00)	
7. Closing Meditation (3:30)	

Note. These tracks were used during in-lab trainings and on iPod Touches for home practice. Tracks were recorded by author JBL. The longer home practice tracks contained a verbal prompt and bell to give participants the option of ending their practice before the audio track was over. The home practice Body Scan had bells at the 10- and 15-minute marks, and the Sitting Meditation had bells at 10, 15, and 20 minutes.

Table 4

Pre- and post-intervention values for outcomes

Outcome	Before Training		After Training		Mean Change 95% CI	Paired <i>t</i> -test Statistic (<i>t</i> (27))	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Nonjudgment	30.11	6.92	32.68	6.30	[-4.58, -0.56]	-2.62*	-0.50
Awareness/Attention	3.46	0.81	3.69	0.76	[-0.47, 0.00]	-2.04*	-0.39
Positive Affect	30.96	6.70	31.79	5.98	[-2.31, 0.66]	-1.13	-0.21
Negative Affect	21.71	7.88	18.64	5.62	[1.15, 4.99]	3.28**	0.62
Perceived Stress	19.39	6.44	16.64	5.12	[0.58, 4.92]	2.60*	0.49
Credibility	20.29	3.81	22.7	3.18	[-3.41, -0.44]	-2.67*	-0.52

Notes: CI = Confidence Interval; Nonjudgment (9 items, $\alpha = .91$) = Kentucky Inventory of Mindfulness Skills Nonjudgment subscale; Awareness/Attention (15 items, $\alpha = .85$) = Mindfulness Awareness and Attention Scale; Positive Affect (10 items, $\alpha = .89$) and Negative Affect (10 items, $\alpha = .90$) = Positive and Negative Affect Scale; Perceived Stress (10 items, $\alpha = .88$) = Perceived Stress Scale; Credibility (3 items, $\alpha = .79$) = Credibility and Expectancy Questionnaire. For Cohen's *d* values: $d = 0.2$ –0.5, small effect; $d = 0.5$ –0.8, medium effect; $d = 0.8$ –1.0, large effect.

* $p < .05$.

** $p < .01$.

*** $p < .001$.