



Mindfulness-based training interventions for employees: A qualitative review of the literature

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ARTICLE INFO

Article history:

Received 29 July 2016

Received in revised form 20 March 2017

Accepted 23 March 2017

Keywords:

Mindfulness

Mindfulness training

Stress and well-being

Literature review

ABSTRACT

We provide a comprehensive qualitative review of 67 published studies that have examined mindfulness-based training interventions conducted with employees. The findings indicate that the most common research designs were the pre-test/post-test only design (35.8%) and the randomized waitlist control group design (26.9%). About two-thirds of the studies included a control group (61.2%), with approximately three-quarters (75.6%) of these studies using random assignment. Of the 63 studies that used a conventional experimental design, the majority (65.1%) included only one follow-up assessment, most often immediately after training. Results indicated a great degree of heterogeneity in terms of program content, although many studies used some adaptation of Kabat-Zinn's (1990) Mindfulness-Based Stress Reduction (41.8%), an approach with a strong evidentiary base with clinical populations. All training programs incorporated practice, most (85.1%) used multiple methods of delivering the training material, and training varied considerably in total duration, session length, and the number of training sessions. Our review also found that the intended purpose of mindfulness-based training for employees was most commonly the reduction of stress/strain (80.6%), although a wide range of other targeted outcomes were documented. Based on our findings, we offer suggestions for future research aimed at advancing our understanding of mindfulness-based training interventions with employees.

Published by Elsevier Inc.

1. Introduction

In recent years, interest in mindfulness among organizational scholars and practitioners has grown rapidly (see Good et al., 2015 for a review). Mindfulness refers to various traits, practices, and processes that share a common emphasis the ability to be in the present moment through nonjudgmental attention and awareness (Brown, Ryan, & Creswell, 2007; Kabat-Zinn, 1990). At the core of mindfulness is the ability to pay attention to both internal (e.g., cognitions, bodily sensations) and external (e.g., environmental surroundings, social interactions) stimuli, doing so in a manner that does not evoke judgment or evaluation (Glomb, Duffy, Bono, & Yang, 2011). Mindfulness is a state of consciousness, but it also varies across individuals, suggesting that there are trait-like tendencies as well (Brown & Ryan, 2003; Brown et al., 2007). Mindfulness has also been examined as a

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therapeutic technique or intervention where through a variety of practices, individuals are trained to develop the ability to achieve mindful states (Kabat-Zinn, 1990). Reviews of mindfulness at work often fail to distinguish between lines of research focusing on mindful states, trait-based mindfulness, and mindfulness interventions. To address the need to isolate the effects of mindfulness training and in response to a focal article in *Industrial-Organizational Psychology Perspectives*, Allen et al. (2015) prepared a commentary that focused on a selective review of 27 published studies evaluating mindfulness-based training targeting employees.

The current study extends Allen et al.'s (2015) work in several ways. First, we conducted a comprehensive, systematic, and interdisciplinary qualitative review of the literature on mindfulness-based training intervention research, identifying an additional 40 primary studies for review (representing a 150% increase). We define mindfulness training as a planned intervention offered to employees over some period of time (several hours to months) that is designed to teach mindfulness skills. Second, we catalogued a variety of methodological features (type of research design, control group characteristics, evaluation timeline, sample size) and training characteristics (detailed information on training content, total training duration, session length, number of training sessions, opportunity for practice, specific types of practice) that were not included in Allen et al. Third, the Allen et al. commentary only reported general information on training duration, contact hours, and noted that programs “varied in terms of delivery mode” (p. 654), without providing detail on specific training delivery methods. In the current review we provide detailed information on these training design features, which allows us to better understand how mindfulness-based training has been designed and delivered to employees. Finally, in addition to providing information on the intended purpose of mindfulness training for employees, we document the country in which the study was conducted, industry, and occupation(s). This helps contextualize what we know about mindfulness-based training for employees and identifies industries and occupations that may be important targets for future research.

1.1. What we know about mindfulness-based interventions

A prolific body of research exists on the benefits of mindfulness for a wide range of individual outcomes. This includes meta-analytic research on the positive effects of mindfulness-based approaches to the treatment of both medical conditions (e.g., Abbott et al., 2014; Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Gotink et al., 2015) and psychological disorders (e.g., Galante, Iribarren, & Pearce, 2013; Klainin-Yobas, Cho, & Creedy, 2012; McCarney, Schulz, & Grey, 2012). Meta-analytic and qualitative reviews further document the efficacy of mindfulness-based interventions for adults (e.g., Bohlmeijer et al., 2010; Klainin-Yobas et al., 2012), college students (e.g., Regehr, Glancy, & Pitts, 2013), children and adolescents (e.g., Kallapiran, Koo, Kirubakaran, & Hancock, 2015; Zenner, Herrnleben-Kurz, & Walach, 2014; Zoogman, Goldberg, Hoyt, & Miller, 2015), veterans (e.g., Heffner, Crean, & Kemp, 2016), and prisoners (e.g., Shonin, Gordon, Slade, & Griffiths, 2013).

Although much of the existing research has focused on patient (clinical) populations, some meta-analyses have combined clinical and non-clinical samples, again demonstrating positive effects on a wide range of health and well-being outcomes (e.g., Grossman, Niemann, Schmidt, & Walach, 2004; Visted, Vøllestad, Nielsen, & Nielsen, 2015). A smaller number of meta-analyses have focused specifically on healthy populations, also finding generally positive effects on stress reactions (Chiesa & Serretti, 2009; Khoury, Sharma, Rush, & Fournier, 2015), psychological distress (Virgili, 2015), and indicators of well-being such as the experience of positive emotions, self-attributed mindfulness, and enhanced attention (Eberth & Sedlmeier, 2012).

In recent years, there has been growing interest in the application of mindfulness-based training to improve employee well-being and other organizationally-relevant outcomes (e.g., Burton, Burgess, Dean, Koutsopoulou, & Hugh-Jones, 2016; Hyland, Lee, & Mills, 2015). There are several factors that make mindfulness training of particular interest and potential value within an organizational context. One factor is growing preliminary evidence indicating that mindfulness training is associated with an array of organizational-relevant outcomes such as improved engagement and performance, as well as reduced stress-related strains (Allen et al., 2015). Another factor is the well-publicized success of mindfulness-based training programs implemented by organizations for their employees, including Google, Target, Aetna, Dow Chemical, Intel, and the United States Marine Corps (e.g., Aikens et al., 2014; Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Wolever et al., 2012). Finally, the benefits of mindfulness training as an intervention that can reduce stress is of import to organizations given the high costs associated with employee stress (Anger et al., 2015) and the mixed effects found for organizational approaches to stress management such as job redesign (Briner & Reynolds, 1999).

1.2. Purpose and scope of the present review

Despite increasing interest in mindfulness at work, there has been no attempt to review and synthesize mindfulness-based training intervention research that targets employees. Given growing interest in mindfulness among organizational decision-makers and scholars alike, it is important to take stock of what we know about the design, delivery, evaluation, and outcomes that have been targeted by mindfulness-based training interventions. The current research provides a comprehensive, systematic and interdisciplinary qualitative review of published intervention research focusing on mindfulness-based training interventions for employees.

Consistent with the theme of the Special Issue, the goal of the current review was to provide an in-depth examination of how mindfulness-based training for employees is designed, delivered, and evaluated. We also provide important information about the intended purposes of mindfulness training in organizational settings (e.g., stress reduction, promotion of positive work attitudes, improved self-regulation). This knowledge will help practitioners understand how mindfulness-based training has been applied to

the workplace and identify training features that are common to mindfulness approaches with clinical populations, as well as unique to organizational contexts. It may also identify areas to target for practice improvements. By cataloging research design and evaluation features, our review will be useful for researchers interested in conducting methodologically rigorous studies to examine the effectiveness of mindfulness-based training and identifying training features that may be important to consider in future research. By documenting the relative frequency by which various outcomes have been studied in relation to mindfulness-based training, we are able to determine gaps in the literature to guide future research. Finally, by providing a framework for workplace mindfulness-based training research, we lay the groundwork for meta-analytic research once the literature base matures.

Our decision to conduct a qualitative review of the literature instead of a meta-analytic review was based on several factors. The investigation of the beneficial effects of workplace mindfulness-based interventions is in its infancy and there are numerous definitional, conceptual and measurement issues that need to be resolved before it is appropriate to aggregate primary studies and reach strong conclusions about population effect sizes (Jamieson & Tuckey, 2016; Sutcliffe, Vogus, & Dane, 2016). In addition, a quantitative review would need to consider research design features carefully. First, combining studies that use randomization with those that do not use randomization can artificially inflate effect size estimates (Higgins & Green, 2008). Second, aggregating studies that utilize evaluation designs where the comparison referents are different (e.g., single group pre-test/post-test designs compare the same individual over time whereas pre-test/post-test designs with a control group compare those who receive the intervention to those that do not) renders uninterpretable effect sizes. In gauging the feasibility of conducting a meta-analytic review, we found that the number of primary studies using a particular type of evaluation design and examining common outcomes was quite small (ranging from 0 to 21, with 92% having 5 or fewer primary studies and an average *k* of 2 per outcome; full results available upon request). These small *ks* preclude the examination of potentially important moderators such as training length or program content. Based on these considerations, we lay the groundwork for future meta-analytic work by providing an in-depth qualitative review of literature. We do so by establishing a framework for workplace mindfulness-based training research, cataloging the various training design and delivery features, and providing a qualitative summary of the types of outcomes examined.

2. Method

2.1. Literature search and criteria for inclusion

A comprehensive search of all articles published through January 2016 was conducted to identify research that examined the mindfulness-based training programs for employees (no start date was specified). A search of the following computerized databases was conducted to identify studies for potential inclusion: PsychINFO, Academic Search Complete, Business Source Complete, Education Research Complete, ERIC, Health Source: Nursing/Academic Edition, Hospitality and Tourism Complete, MEDLINE, Social Work Abstracts, SocINDEX with Full Text, and Vocational and Career Collection. The search terms used were “mindfulness training,” “mindfulness intervention,” “mindfulness-based training,” and “mindfulness-based intervention and work.”

Our initial search yielded 3851 potential articles. Several inclusion criteria were used. Because a focus of our review was on study design and evaluation, studies had to include conventional tests of statistical significance on outcomes. Articles that focused exclusively on yoga or meditation, without explicitly incorporating instruction on mindfulness principles (e.g., staying the present moment rather than ruminating, dealing with difficult emotions with acceptance and curiosity), were excluded. In addition, articles had to be written in English and the research design had to allow for some degree of causal inference. As such, following Cook and Campbell's (1979) recommendations, post-test only designs were omitted. We also evaluated studies published by the same authors to identify potential data overlap; no such cases were found.

The abstract of each article was examined by one member of the research team. Non-empirical articles (i.e., commentaries, practitioner articles, reviews), articles based on non-employee samples, and articles that did not evaluate a mindfulness-based intervention for employees were deleted. This resulted in 175 articles that were screened by a member of the research team, using the inclusion criteria noted above. A small number of articles were referred to one of lead authors to determine if inclusion criteria were met. From this process, 67 independent samples, drawn from 67 unique articles, were retained. One article included two separate samples (Hülshager, Feinholdt, & Nübold, 2015), however, only Study 2 met the inclusion criteria of evaluating the effectiveness of a mindfulness-based training intervention targeting working employees.

2.2. Overview of the coding procedure

Coders were trained on the coding process and read background research on mindfulness. For each study we coded the author, year of publication, country of origin, industry, occupation(s), sample size, research design, control group characteristics, evaluation timeline, targeted outcome(s), training program, total training time, number of training sessions, training session length, modes of delivery, and type(s) of practice. Throughout the coding process, group discussion was used to clarify decision rules, resolve coding questions, and standardize the coding process.

The studies were coded in two waves. During the first wave, 27 studies that were included in a prior “bare-bones” review (Allen et al., 2015) that was not duplicative of the current research were coded individually by a member of the research team and then checked by one of the senior authors. In the second wave of coding, the search was expanded to systematically identify all previously published studies examining mindfulness-based interventions for employees. This resulted in the identification of an

additional 40 studies. In this second wave of coding, the original 27 studies were second coded and additional information was captured. Also in the second wave of coding, the additional 40 articles were coded and the result of this coding process was checked by one of the senior authors. Discrepancies were resolved through discussion and if necessary, consultation with one of the other senior authors.

2.2.1. Research design characteristics

Several methodological features of the mindfulness-based training interventions were recorded. Specific features coded included the *type of research design* (e.g., randomized waitlist control group, pre-test/post-test no control group), *control group characteristics* (present or absent; if present, active or inactive), and *evaluation timeline* (e.g., number of post-training follow-ups; timing of follow-ups).

2.2.2. Training content characteristics

In order to provide a fine-grained understanding of the interventions we coded the *training program* [e.g., adapted version of Mindfulness-Based Stress Reduction (MBSR), referred to from here forward as Adapted MBSR; yoga-based mindfulness training; meditation-based mindfulness training] and *training length* (total duration of training; session length; number of training sessions).

2.2.3. Training delivery characteristics

We recorded information on all of the *mode(s) of training delivery* (e.g., lecture, guided practice, audio recordings) described in each study. This was then coded as the presence or absence of lecture, audio recordings, group discussion, written materials, retreat, and on-line modules. We also coded two practice characteristics; whether or not there was the *opportunity for practice*, and if practice was noted, the *type(s) of practice used* (e.g., homework only, in-session only) as part of the training intervention.

2.2.4. Targeted outcome(s)

The name of all dependent variables measured in each of the 67 studies were recorded and then clustered into broader, but conceptually homogeneous outcome categories (Hycner, 1985). It was these broad outcome categories that were used to identify the intended purpose(s) of the training intervention (e.g., stress/strain reduction, enhanced self-compassion, improved well-being) and compare the relative frequency by which different types of outcomes were targeted by the training. In some studies, there were multiple operationalizations (e.g., surface acting, emotion regulation) of a single outcome category (e.g., self-regulation). Because our unit of analysis was the targeted outcome category, in these situations the study in question contributed one “count” toward that targeted outcome. With respect to the prior example, the study that measured both surface acting and emotion regulation (both under the broader targeted outcome of self-regulation) would be counted once in the targeted outcome category of self-regulation.

Table 1
Research design characteristics.

Type of research design	Description	# studies	% of studies
Pre-test/Post-test only	Repeated measures design with pre- and post-test to assess change due to training. Observations recorded at baseline (pre-training) and after training (post-test) on a single group of participants, all of whom receive the training.	24	35.8%
Randomized waitlist control group	Two group design with individuals randomly assigned to training group or placed on waitlist and serve as control for experimental group. After experimental group's training, waitlist control group receives same training provided to experimental group. All participants receive potential benefits of training.	18	26.9%
Randomized pre-test/post-test with control group	Random assignment to either experimental group receiving training or control group(s) not receiving training. Control group(s) may receive no training or receive comparison training.	12	17.9%
Non-randomized pre-test/post-test with control group	Non-random assignment to either experimental group receiving training or control group(s) not receiving training. Control group(s) may receive no training or receive comparison training.	5	7.5%
Non-randomized waitlist control group	Two group design with individuals either non-randomly assigned to training group or placed on waitlist that serves as a control for experimental group. After experimental group's training, the waitlist control group receives the same training provided to experimental group. With this design all participants receive potential benefits of training.	5	7.5%
Multiple baseline	Training introduced in temporal sequence to different behaviors, subjects, or settings to examine change when training is introduced. Baseline phase involves multiple measurements to establish behavioral stability, after which training is introduced. Requires replication of effect across different behaviors, subjects, or settings.	2	3.0%
Randomized switching replications design	Two group design with three measurement waves. Involves baseline (pre-test) assessment for both groups, after which group 1 receives training and group 2 serves as a control. Second wave of assessment occurs post-training and group roles are switched such that group 1 no longer receives training whereas group 2 receives training. After group 2 receives training, a third assessment is conducted. In the second (switching replication) phase, group 1 serves as a comparison control for group 2.	1	1.5%

Note. Based on $N = 67$ studies. Pre-test/post-test only design is also referred to as single group repeated measures design.

3. Results

3.1. Research design characteristics

3.1.1. Type of research design

Table 1 lists the different research designs used, provides a brief description, and indicates the relative frequency of each design. The most common research design was pre-test/post-test only (35.8%). This design involves the comparison of a baseline to post-test measure(s) for a single group of participants, all of whom receive the training. Another 26.9% of the studies used a randomized waitlist control group design whereby individuals were randomly assigned to receive the training or were placed on a waitlist to receive training at a later date. With this design, the waitlist group is used as an inactive control for the training group. After the collection of post-intervention data, the waitlist receives the training so all participants have the potential to eventually benefit from the intervention.

The next most commonly used designs were the randomized pre-test/post-test with control group (17.9%), non-randomized pre-test/post-test with control group (7.5%), and non-randomized waitlist control group (7.5%). The first two of these pre-test/post-test designs include pre-training and post-training assessments for both the training and the control groups; the difference is whether or not participants are randomly assigned to conditions. The non-randomized waitlist control group design is identical to its randomized counterpart, except that participants are not randomly assigned to conditions. Only two studies (3.0%) utilized a multiple baseline design. One of these studies (Singh, Lancioni, Winton, Karazsia & Singh, 2013) used a multiple baseline design across subjects (teachers) and the other (Singh et al., 2015) used a multiple baseline design across settings (group homes). Finally, one study (1.5%) used a randomized switching replications design (Grégoire & Lachance, 2014). This design includes two groups and is similar to a waitlist control group design. Both groups are measured prior to training. Then, Group 1 receives training. After Group 1 receives the training, both groups are given a post-test. Following this assessment, the roles are reversed and following training there is a third assessment. Although not indicated in Table 1, two of the randomized waitlist control designs took an event sampling approach to focus on intra-individual changes over time as a result of mindfulness training (Study 2 from Hülshager, Alberts, Feinholdt, & Lang, 2013; Hülshager et al., 2015).

3.1.2. Control group characteristics¹

We classified studies into four types based on whether they: (1) did not use a control group, (2) employed an inactive control group (training group was compared to a control that did not receive training at the time of comparison), (3) used an active control group (training group compared to control group that received an alternative intervention at time of comparison), or (4) used both an active and inactive control group.

A total of 61.2% studies incorporated a control group and 75.6% of these studies randomly assigned individuals to conditions. Among studies with control groups, inactive control groups (85.4%) were more common than active control groups (12.2%). The one remaining study (Burnett et al., 2015) used a three group design, which included a training condition, an active control group, and an inactive control group. The most common type of inactive control group was a waitlist control group; 48.6% with randomization and 17.1% without randomization. The remaining 12 studies with inactive control groups adopted pre-test/post-test control group designs (17.1% for randomized and 14.3% for nonrandomized) or a randomized switching replication design (2.9%).

A small number of studies (7.5%) used one active control group as a comparison. The comparison groups consisted of education-only ($n = 2$; Malarkey, Jarjoura, & Klatt, 2013; Shonin, Gordon, Dunn, Singh, & Griffiths, 2014), information on health promotion services offered at the organization ($n = 1$; van Berkel et al., 2014), psychomotor therapy program ($n = 1$; Franco et al., 2010), or assessment only ($n = 1$; Wolever et al., 2012). Finally, one study (Burnett & Pettijohn, 2015) adopted a three group experimental design, including an experimental group, an inactive control group, and an active control group that consisted of self-guided mindfulness practice.

3.1.3. Evaluation timeline

Evaluation timeline refers to the timing of post-training assessments. Four studies were excluded from these calculations because they used an experience sampling methodology (Study 2 from Hülshager et al., 2013; Hülshager et al., 2015) or multiple baseline design (Singh et al., 2006, 2015). Based on the remaining 63 studies, the average number of post-training evaluation time points was 1.41 (ranging from 1 to 3; modal number of time points = 1). Specifically, 65.1% of these studies included one follow-up, 28.6% included 2 follow-ups, and 6.3% included 3 follow-ups. Almost all of the first follow-ups were immediately after training (87.3%). The remaining first follow-ups were 1 week (6.3%), 2 weeks (1.6%), 6 weeks (1.6%), 8 weeks (1.6%) and 52 weeks (1.6%). For the 22 studies that included a second post-training follow-up, the average time from the end of training was 15 weeks (ranging from 2 weeks to 52 weeks; modal time lapse to second follow-up = 12 weeks). Among the 4 studies that conducted 3 follow-ups, the average time since the end of training was 28 weeks (ranging from 8 weeks to 52 weeks).

¹ Two studies (Jha et al., 2013; Jha, 2015) compared a military intervention group to both a military inactive control group and a civilian inactive control group. Only the results of the comparison between the military intervention and military control group are reported here. One study used sample of Marine Corps reservists (Jha et al., 2010) and the other study used a sample of active duty Army personnel. Similarly, Wolever et al. (2012) included two active control groups (information only, Viniyoga). However, the study purpose was to compare the mindfulness-based workplace intervention to the information only control condition. The Viniyoga condition was included to compare to the information only control condition and no predictions were made regarding the effectiveness of Viniyoga versus mindfulness. As such, for the purpose of this review, only the findings comparing mindfulness to the information only condition are reported.

3.2. Training content characteristics

3.2.1. Training program

Information on the training program can be found in Table 2. By far, the most common training program was Adapted Mindfulness-Based Stress Reduction (MBSR), which was reported in 41.8% of the studies. Standard MBSR programs consist of an initial 2.5-hour group orientation session, eight weekly classes of 2.5 h in duration, an all-day silent retreat during the sixth week of the

Table 2
Mindfulness training programs.

Program	Description	N	%
Adapted Mindfulness-Based Stress Reduction (MBSR) training	Based on Kabat-Zinn's (1990) MBSR 8-week program. Specific programs may be shorter or longer in duration than MBSR and incorporate some (but not necessarily all) activities and goals associated with MBSR. For example, Roeser et al. (2013) developed a program for public school teachers to foster mindfulness and self-compassion, based on MBSR principles.	28	41.8%
Adapted Mindfulness-Based Stress Reduction (MBSR) & Mindfulness-Based Cognitive Therapy (MBCT) training	Incorporates elements of Kabat-Zinn's (1990) MBSR with Segal, Williams, and Teasdale's (2002) MBCT (described below). For example, Hülshager et al. (2015) developed a 10-day self-training program that incorporated key features of MBCT and MBSR.	9	13.4%
Targeted mindfulness training	Mindfulness-based training developed for specific target behaviors or outcomes. Examples include Eat for Life (Bush et al., 2014) designed to promote healthy eating through mindfulness, Mindfulness-Based Mind Fit Training (MMFT; Jha et al., 2010) designed to help military personnel manage cognitive demands and regulate emotions in high stress combat situations, and Mindfulness-Based Positive Behavior Support (Singh et al., 2015) which focuses on improving employee interactions with patients with developmental disabilities and reducing dysfunctional patient behaviors.	8	11.9%
High Fidelity Mindfulness-Based Stress Reduction training (MBSR; Kabat-Zinn, 1990)	MBSR as originally developed by Kabat-Zinn (1990) . The goal of MBSR is to continually cultivate the seven attitude factors; non-judging, patience, a beginner's mind, trust, non-striving, acceptance, and letting go. Training typically includes a combination of meditation, total body awareness and yoga through an 8-week program with an all-day, 7.5-hour silent retreat during week six. Complete program includes certified instruction, group sessions, and home practices. Standards of MBSR include formal (body scan meditation, gentle hatha yoga, sitting meditation, walking meditation) and informal (awareness of routine, daily activities such as breathing, eating, weather, walking, driving, and interpersonal communications) practices. For example, in Davidson et al. (2003) MBSR was delivered by John Kabat-Zinn and was directly modeled on the MBSR intervention originally developed at the University of Massachusetts Medical Center.	5	7.5%
Yoga-based mindfulness training	Described as focusing on yoga as a means to promote mindfulness. Includes the use of postural movement as well as gentle movement, along with breathing techniques, guided relaxation, mental techniques, and education about home practice (e.g., Harris et al., 2015 CALM program based in gentle yoga and mindfulness practices).	4	6.0%
Meditation-based mindfulness training	Described as having an emphasis on meditation. Specific programs include mindfulness mediation (Baccarani et al., 2013) and meditation awareness training (Shonin et al., 2014).	4	6.0%
Acceptance and Commitment Therapy (ACT)-based (Hayes, Strosahl, & Wilson, 1999) training	Based on ACT, which uses mindfulness-based cognitive behavior therapy as a strategy for stress reduction (e.g., Flaxman & Bond, 2010). The goal of ACT is to increase psychological flexibility by strengthening six core processes: 1) acceptance, 2) cognitive defusion, 3) being present, 4) self as context, 5) values, and 6) committed action. Activities used with ACT include meditative exercises, cognitive defusion exercises, and goals/values clarification exercises.	3	4.5%
Other	Programs that incorporated multiple elements such as mindfulness practice, loving kindness meditation, and cognitive therapy (Pidgion et al., 2014) or did not provide sufficient information to be classified elsewhere but clearly focused on mindfulness (e.g. Franco et al., 2010).	3	4.5%
Acceptance and Commitment Therapy (ACT)-based & Adapted Mindfulness-Based Stress Reduction (MBSR) training	Incorporates elements of Hayes et al.'s (1999) ACT and Kabat-Zinn's (1990) MBSR (both described above). For example, Foureur et al. (2013) developed a 1-day workshop for midwives based on both MBSR and ACT, and combined this with an audio recording to guide self-practice at home for 20 min a day for 8 weeks.	2	3.0%
Mindfulness-based Cognitive Therapy (MBCT; Segal et al., 2002)	MBCT was developed by Segal and colleagues based on teachings of Mindfulness-based Stress Reduction (MBSR) with the specific intent to treat depression. MBCT combines cognitive behavioral therapy, mindfulness, and meditation with the goal of reducing automatic processing and allowing greater acceptance of thoughts and feelings without judgment (Marx et al., 2014).	1	1.5%

Note. Based on N = 67 studies.

program, and daily homework assignments that involve 45 min per day of formal practice and 5–15 min of informal practice 6 days a week per week for the duration of the course (Kabat-Zinn, 1990; Santorelli, 2014). Adapted MBSR training programs are based on this 8-week program, but did not follow MBSR with high fidelity. For example, adapted programs might have been for a duration shorter than 8 weeks or not include a silent retreat.

The next most commonly used training program was a combination of Adapted MBSR and Mindfulness-based Cognitive Therapy (MBCT) (13.4%), followed by targeted mindfulness training (11.9%). The former refers to hybrid versions of Adapted MBSR and MBCT (a variant of MBSR that incorporates principles of cognitive behavior therapy). Targeted mindfulness training characterizes programs developed to target specific behaviors or situations such as healthy eating (Bush, Rossy, Mintz, & Shopp, 2014), high stress combat military situations (Jha et al., 2010), or mindfulness skills to improve teacher interactions with students (McGarrigle & Walsh, 2011; Singh et al., 2013). Less common programs reported included high fidelity MBSR (7.5%), yoga-based mindfulness training (6.0%), meditation-based mindfulness training (6.0%), Acceptance and Commitment Therapy (ACT)-based training (MBCT with values clarification and goal setting; 4.5%), ACT and modified MBSR (3.0%), and MBCT (1.5%). The remaining (4.5%) studies were classified as “other,” typically because insufficient information was provided to allow for categorization elsewhere.

3.2.2. Training length

The total duration of the training program, the number of training sessions, and the length of individual training sessions were recorded for each study. All studies provided information on the average training duration, although in one study training duration varied across training groups so this study was not included in calculating the average. The average total training duration was 8.46 weeks [ranging from 0.14 weeks (1 day) to 52 weeks; modal training length 8 weeks]. The average number of training sessions was 8.79 (ranging from 1 to 64 sessions), based on 62 studies [1 study did not report information, 3 studies were not applicable (self-guided training), and in 1 study the number of sessions varied across training groups]. In terms of the length of individual training sessions, in 7 studies (10.4%) this information was not reported, in 3 studies (4.5%) this was not applicable (self-guided training), and in 26 studies (38.8%) session length varied. For the remaining 31 studies (46.3%) that reported a consistent session length, the average session length was 98 min (ranging from 10 min to 420 min).

3.3. Training delivery characteristics

3.3.1. Mode(s) of training delivery

In order to examine how mindfulness-based training was delivered to participants, we reviewed the description of the training program and coded all of the methods used to deliver training for each study. In all but 10 studies (85.1%), at least two modes of delivery were used. As shown in Table 3, lecture was used in over 95% of the studies. Other frequently used methods to deliver training material were audio recordings (often for guided meditation or breathing exercises) (58.2%) and group discussion (50.7%). A little more than one-third of the studies (38.8%) used written materials to deliver some of the training content. Retreats were also used in 16.4% of the studies. Finally, 6.0% of the studies delivered the training using on-line modules.

3.3.2. Practice characteristics

We also coded whether or not there was the *opportunity for practice* and if so, the *types of practice* used as part of the training intervention. All 67 studies (100%), included the opportunity for practice. Table 4 lists the type(s) of practice used. Over half (50.7%) of the studies used a combination of in-session practice and homework. In approximately 30% of the studies, in-session practice was used, along with both homework and at-work practice. In 9.0% of studies, only in-session practice was used. Finally, in-session and at work practice was used in 6.0% of the studies, whereas homework was used in the remaining 4.5%. Looking across the categories in Table 4, only 4.5% of the training programs did not use some form of in-session training ($n = 3$, 4.5% used homework only).

Table 3

Modes of delivering training.

Mode of delivery	Description	N	%
Lecture	Didactic teaching and guided instruction by content expert.	64	95.5%
Audio recordings	Pre-recorded audio or audiovisual information such as guided meditation and video clips.	39	58.2%
Group discussion	Activities completed by the entire training group or in smaller groups. Includes sharing of personal experiences, debriefing on in-class exercises, and giving-receiving feedback.	34	50.7%
Written materials	Includes handouts, worksheets, written exercises, diaries, etc.	26	38.8%
Retreat	Group off-site experiential activity. May include silent meditation, walking meditation, or other mindfulness activities.	11	16.4%
On-line modules	Whole or part of training offered via the internet or other form of distance-learning such as telephone (e.g., mindfulness coaching).	4	6.0%

Note. Based on information from $N = 67$ studies. The sum of percentages exceeds 100% because many studies used multiple modes of delivery.

Table 4
Opportunities for mindfulness practice.

Practice type	Description	N	%
In-session & homework	Training programs where practice is both built into the curriculum delivered to participants and homework is assigned.	34	50.7%
In-session, at work, & homework	Training programs where practice is built into the curriculum delivered to participants. In addition, participants are encouraged to practice in the workplace and homework is provided.	20	29.9%
In-session only	Training programs where the opportunity for practice is built into the curriculum delivered to participants. No mention is made regarding practicing after the training session.	6	9.0%
In-session & at work	Training programs where practice is both built into the curriculum delivered to participants and participants are encouraged to practice in the workplace.	4	6.0%
Homework only	Training programs where the only stated opportunity for practice involves assignments to be completed at home on the participant's own time.	3	4.5%

Note. Based on $N = 67$ studies. At work only practice is not noted because no studies used this method of practice.

3.4. Outcome characteristics

3.4.1. Targeted outcome(s)

We used a rule of thumb whereby only targeted outcome categories that included 3 or more independent studies were reported. Table 5 lists the targeted outcome categories, a conceptual definition of each outcome, examples of measured variables, the number of studies in each category, and the corresponding percentage. Because many of the studies targeted multiple outcomes, the cumulative percentages exceed 100%. The data reported in Table 5 represents a total of 277 outcomes coded from the 67 reviewed studies.²

The most frequently targeted outcome of training was stress/strain (80.6%), which includes subjective perceptions of emotional, mental, or physical tension. This is followed by self-reported mindfulness (58.2%), most often measured using the Five Facet Mindfulness Questionnaire (43.6%; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) or the Mindful Attention Awareness Scale (30.8%, Brown & Ryan, 2003). Improvements in well-being were the focus of training in about one-third of the studies (34.3%), which includes positive assessments of one's personal or life circumstances, as well as overall happiness, feelings of authenticity, and the availability of psychological resources to withstand set-backs and stress. In about one-quarter (26.9%) of the studies, increased compassion toward others or oneself was an intended purpose of training.³ Self-regulation was targeted in 16.4% of the studies, and included both self-reported ability to regulate one's emotions in response to feedback and perceived confidence in one's ability to engage in self-regulation. Some mindfulness training also focused on state-based affect (14.9%), which included both general positive and negative affect, as well as discrete state-based affective experiences and moods such as anger, sadness, and anxiety. Self-reported health behaviors such as sleep quality, sleep quantity, and dietary habits were targeted in 14.9% of the studies. Less frequently examined outcomes include objective indicators of physiological stress responses (salivary cortisol, 11.9%; autonomic nervous system indicators, 9.0%; neural indicators, 6.0%), performance (11.9%), patient/customer outcomes (7.5%), job satisfaction (9.0%), and engagement (4.5%).

3.5. Supplementary study information

With reviews such as this one, decisions regarding what to report were required. Because it may be of interest to readers of this journal, Appendix A lists each study alphabetically and includes information on the country of origin, industry in which the field study was conducted, occupation(s) targeted for mindfulness-based training, total sample size, research design, control group, evaluation timeline, and targeted outcome(s). Appendix B provides study-level information on the training program, total training duration, number of training sessions, training session length, modes of delivery, and types of practice.

4. Discussion

The purpose of this research was to provide a comprehensive qualitative review of the literature investigating mindfulness-based training interventions for employees. From our findings, several general conclusions can be reached. First, there is considerable and growing interest in mindfulness-based training for employees. In fact, 73% of the included studies were published between 2013 and the end of January 2016. Second, about two-thirds of the studies used evaluation designs that included some sort of control group. This allows for stronger inferences regarding intervention effects (Cook & Campbell, 1979) and bodes well for the knowledge base in this area. Third, Kabat-Zinn's (1990) mindfulness intervention (MBSR) has been highly influential in the

² There were 16 other evaluation outcomes (from 10 studies) that were initially identified as relevant for the review but could not be coded because they were not measured with sufficient frequency across studies (i.e., <3 studies). These outcomes were: attitudes toward mindfulness, emotional intelligence, pain interference, family functioning, relational trust, teaching efficacy, job control, job demands, mindfulness knowledge, competence in mindfulness, absenteeism, satisfaction with team functioning, and immune functioning/inflammatory processes.

³ One of the commonly used measures of compassion is by Neff (2003). This measure assesses self-compassion and one of the subscales is mindfulness. To avoid construct overlap, for studies that used this measure and provided results at the subscale level, the mindfulness subscale was not coded as an indicator of self-compassion. Rather, the research findings using the mindfulness subscale was placed in the targeted outcome category of mindfulness. This was only done in instances when it was clear the authors used this compassion subscale in place of an alternative mindfulness measure.

Table 5

Types of targeted outcome(s) and percentage of studies including each targeted outcome.

Outcome	Conceptual definition	Representative examples	N	%
Stress/Strain	Subjective perceptions of physical, emotional, or mental strain or tension; Occurs when the demands of a situation exceed the personal and social resources available to the individual to meet those demands.	e.g., perceived stress, depression, burnout	54	80.6%
Mindfulness	Intentionally paying attention to present-moment experiences involving physical sensations, affective states, thoughts, perceptions, and imagery in a non-judgmental way such that non-reactive awareness is cultivated.	e.g., state-based mindfulness, trait-based mindfulness	39	58.2%
Well-being	Positive evaluations of one's life and personal circumstances; Perceived pleasure or happiness; Feelings of personal growth, self-realization, authenticity, and the pursuit of meaning in life; Presence of psychological resources.	e.g., life satisfaction, general well-being, resiliency	23	34.3%
Compassion	Self-reported feelings of sympathy, empathy and concern toward others or oneself.	e.g., self-compassion, compassion toward others, empathy	18	26.9%
Self-regulation	Intentional behavior based on a sense of goal directedness and reliance on feedback as a guide for altering one's course of behavior.	e.g., surface acting, emotion regulation, effective regulation of emotions, self-efficacy for emotional regulation	11	16.4%
Affect	Subjectively experienced affective state reflecting the current state of an individual in relation to his or her environment. Includes generalized feeling states that are not associated with a particular object or event (moods) as well as affective reactions associated with specific events or experiences (emotions).	e.g., positive affect, negative affect, anger, anxiousness, sadness	10	14.9%
Health behaviors	Self-reported behavior that promotes health.	e.g., sleep quality, sleep duration, dietary habits	10	14.9%
Objective physical: Salivary cortisol	Cortisol is part of the hypothalamic-pituitary-adrenal (HPA) axis. The HPA axis controls reactions to stress and regulates body processes such as the immune system, mood and emotions.	i.e., salivary cortisol	8	11.9%
Performance	Quality and/or quantity of tasks performed at work or skills necessary for high work performance.	e.g., work performance, attention and concentration	8	11.9%
Job satisfaction	Affective reactions and cognitions related to job tasks, work relationships, or other aspects of the work environment.	e.g., general job satisfaction, intrinsic job satisfaction, compassion satisfaction	6	9.0%
Objective physical: Autonomic nervous system (ANS)	Indicates arousal; Activation of flight or fight response.	e.g., tonic and phasic galvanic skin response, resting heart rate, blood pressure, biomarkers such as neuropeptide Y	6	9.0%
Patient/Customer outcomes	Positively valenced affective or behavioral outcomes as experienced by patients or customers, as a result of employee behavior.	e.g., client satisfaction, reduction in patient maladaptive behavior	5	7.5%
Objective physical: Neural	Speed and strength of electrical signals traveling between two or more points in the brain; Often recorded using electrodes placed on the scalp or eye area. Used to capture change in affect, cognition, etc.	e.g., electroencephalogram (EEG), electroculogram (EOG)	4	6.0%
Engagement	The extent to which individuals invest physical, emotional, and cognitive energy during role performance.	e.g., work engagement	3	4.5%

Note. Based on $N = 67$ studies. The sum of percentages exceeds 100% because many studies targeted outcomes in more than one category.

design of employee training programs; however, our review also reveals that there is considerable variability regarding the specific content, modes of delivery, types of practice, total duration of the training, session length, and number of training sessions. Fourth, although the most commonly targeted focus of mindfulness training is the reduction of stress/strain, programs often have other intended purposes as well.

4.1. Integration with existing training models and theories of training effectiveness

4.1.1. Training content

Our review demonstrates that a variety of training programs are being used to deliver mindfulness information and practice. MBSR and its variants are the most popular, which helps explain why stress/strain is the most commonly targeted set of outcomes in training. As organizations are interested in a wider variety of outcomes including job satisfaction, performance, and employee engagement, we may find that additional training content may be important to consider. For example, training oriented toward identifying distractions at work that interrupt motivational flow and using mindfulness practices to bring one back to the present moment may be particularly effective in enhancing safety, engagement, or job performance. As another example, training that incorporates mind-body movement and flexibility may be useful if the target is improved health behaviors or reduced health symptoms.

4.1.2. Training delivery

We found that most training programs used multiple methods for delivering content, which is consistent with prior meta-analytic work on training effectiveness (Arthur, Bennett, Edens, & Bell, 2003). Notably, lecture was used in almost all mindfulness training. Despite the common perception that lecture-based training delivery can be boring and mundane, Arthur et al. (2003) found that this method (used by itself or combined with other modes of content delivery) yielded generally favorable outcomes

across evaluation criteria and skills trained. This is a promising finding, particularly because the use of lecture in mindfulness training with employees can help them understand the mind-body connection, the science behind mindfulness-based approaches to stress reduction, and provide instructive guidance on how to apply mindfulness principles at work.

Another potentially important feature of training involves deliberate planning for when, where, and how much time trainees intend to dedicate to training (Sitzmann & Johnson, 2012). This has been found to both enhance learning and to reduce attrition from training, presumably by facilitating effective self-regulation and goal setting. Building trainee planning into mindfulness-based training may be particularly important because becoming more mindful takes sustained practice and self-regulatory processes, both of which are essential components of learning (Sitzmann & Ely, 2011) as well as mindfulness (Glomb et al., 2011). Moreover, although Sitzmann and Johnson (2012) examined planning in the context of a self-directed computer-based tasks, their finding that planning was positively related to time-on-task suggests that spending time discussing how to build mindfulness practices into one's daily routine (as a form of planning behavior) may predict adherence to practice mindfulness post-training. Other research by Sitzmann and Ely (2010) suggests that reminders can prompt employees to engage in the self-regulation necessary to learn more in training. Extending this work, post-training reminders, in the forms of pre-determined situational or behavioral cues at home and at work, may facilitate the continued use of mindfulness skills in daily life.

4.1.3. *Intended purpose of training, targeted industries and occupations*

Although stress/strain was by far the most common target of mindfulness-based training, it is interesting to note that well-being, compassion, self-regulation, affect, health behaviors, performance (including quality and/or quantity of tasks performed as well as patient/customer outcomes), and work attitudes were also targeted in some intervention studies. This provides an indication of the potential breadth of mindfulness-based applications at work. However, it also underscores the nascent condition of the empirical base to date, as there are few primary studies for many of the targeted outcomes other than stress/strain. One approach for identifying promising targeted outcomes for future study is to consider research that has examined trait mindfulness and outcomes. For example, several studies have linked trait mindfulness with self-reported safety (Zhang, Ding, Li, & Wu, 2013; Zhang & Wu, 2014). Research is now needed to determine if mindfulness training can impact safety-related outcomes. Given the high cost of safety incidents, such research could have enormous implications for organizations (Beus, McCord, & Zohar, 2016). Leadership is another high potential area for intervention research that has been associated with trait mindfulness (Reb, Narayanan, & Chaturvedi, 2014). Based on the findings of Reb et al., mindfulness training for leaders could benefit their followers as well as leaders. A variety of mechanisms have been proposed to help explain why mindfulness training results in improvements across an array of outcomes (Glomb et al., 2011; Good et al., 2015). As the intervention literature matures it will also be important to identify the cognitive, behavioral, and affective mechanisms and pathways by which mindfulness may affect specific targeted employee outcomes.

In terms of sample characteristics, as shown in Appendix A, many of the studies included in this review focused on education and healthcare industries. For education this includes interventions for teachers, administrators and staff working in pre-school through university settings. In the healthcare industry, studies have sampled nurses, midwives, surgeons and physicians, behavioral health professionals, and psychologists. Given that the intended purpose of mindfulness-based training at work is often stress/strain reduction, we encourage researchers to consider conducting intervention studies among employees working in particularly high stress occupations. Some high stress occupations have been represented. Our review includes five primary studies examining mindfulness-based training with military personnel, with some evidence of positive effects (see Appendix A; Haase et al., 2016; Jha et al., 2015; Johnson et al., 2014; Klatt et al., 2009; Meland et al., 2015). Likewise, the one study of police officers found beneficial effects of mindfulness-based training across a wide range of targeted outcomes (Christopher et al., 2015). However, there is a clear need to expand this research to other high stress occupations such as other first responders (firefighters, emergency medical technicians), airline pilots, and machine operators (Dill, 2016; Selbe, 2016).

4.1.4. *Transfer of training*

Colleagues, managers, and the organizational context may all play a role in enhancing the transfer of mindfulness training to the workplace. Obstacles such as situational constraints (e.g., workload, opportunity to practice, opportunity to use skills) and aspects of the organizational climate or culture may reduce the likelihood that individuals will engage in daily practice (Brown & Sitzmann, 2011; Salas, Weaver, & Shuffler, 2012). With mindfulness in particular, a supportive climate for transfer may include dedicated space and the opportunity for practice, posters that convey mindfulness principles, and periodic refresher sessions to maintain mindfulness practice. There is also considerable evidence that trainee characteristics such as pre-training self-efficacy predict subsequent transfer (Thayer & Teachout, 1995). This suggests that marketing and communicating mindfulness training as a skill that can be learned by anyone, even with no prior experience, may boost self-efficacy prior to training and ultimately enhance transfer.

4.2. *Methodological strengths and opportunities for improvement*

Although mindfulness training for employees is growing, the research overall is still relatively nascent. Documenting the type of designs upon which the current literature base is founded is important in that different designs are prone to different threats to validity. Understanding the methodological rigor of existing intervention studies helps clarify the degree to which existing findings from the primary studies can be considered robust. This information also can help guide future research so that stronger

inferences may be made regarding the beneficial effects of mindfulness training for employees, as well as the specific aspects of mindfulness training that drive results.

4.2.1. Control groups

Our review indicated that almost two-thirds of studies used some type of control group. However, the majority did not employ an active control group. Control groups serve the important function of controlling for threats to internal validity. An active control group goes further by allowing investigation of whether one type of intervention is more or less superior to another type of intervention (Freedland, Mohr, Davidson, & Schwartz, 2011). For instance, Malarkey et al. (2013) used an active lifestyle education control group taught by a similarly qualified instructor, for the same amount of time, and with the same type of training experiences (e.g., homework, 1-day retreat, lecture) as the mindfulness training group. This allowed for more confident conclusions that mindfulness, rather than non-specific attention associated with the receipt of training, was the “active ingredient” (Freedland et al., 2011, p. 13) in predicting training outcomes. Despite the benefits of an active control group, it is challenging to identify the appropriate content and there are few guidelines available for doing so for mind-body therapies such as mindfulness training (Kinser & Robins, 2013). As the literature advances, one approach would be to compare mindfulness-based training with other health and/or wellness training programs in place within the company (e.g., exercise programs, relaxation training).

4.2.2. Sustainability of training effects

Our review indicated that in most cases, post-training data were collected once and that there was considerable variation in the time-lag used across studies. Many questions remain concerning the appropriate time lag for identifying effects. Historically, time has been a relatively neglected topic within the organizational sciences (Mitchell & James, 2001). Nonetheless, it is beginning to receive attention (Shipp & Cole, 2015). As mindfulness research matures, it will be important to develop theoretically-based models that can be used to predict when change in mindfulness and other outcomes is expected to occur. Moreover, rate and pattern of change also deserve consideration. We need a better understanding of what conditions and for what outcome variables we should expect to observe linear effects, asymptotic effects, or curvilinear effects.

4.3. Key unresolved issues and questions for future research

4.3.1. What are the key features of practice to consider?

Practice is an important component of mindfulness training. As such, it was not surprising to discover that 100% of the studies incorporated some sort of practice. As the literature progresses, more knowledge is needed concerning adherence to practice by participants and the types of practice that are most effective for transfer to the workplace and the sustained use of mindfulness principles in daily life. With this said, we understand the challenges associated with accurately monitoring both the frequency and type of practice outside of training, which are typically based on participant self-reports. We also know little about the extent that individuals were held accountable for practicing or how practice was encouraged, monitored, and/or reinforced. Another challenge to advancing this line of inquiry is that different targeted outcomes (e.g., anxiety versus performance) may relate differentially to various forms of practice (e.g., mindfulness yoga versus walking meditation). For example, practice that focuses on mindful breathing (focusing attention on the inhalation and exhalation of one's breath) and incorporates progressive relaxation may be particularly beneficial for reducing anxiety and calming one's physiological response to stress. Clearly, there are numerous high priority areas for research on the role of practice in workplace mindfulness training.

4.3.2. Who benefits the most from mindfulness-based training?

Some employees may be more receptive and predisposed to benefit from mindfulness-based interventions than others. For example, there is considerable evidence that motivational variables (e.g., motivation to learn), cognitive ability, and self-efficacy predict learning from training (see Salas et al., 2012). Moreover, there is initial evidence from two randomized controlled experiments indicating that inducing mindfulness enhances effective coping with stress more so for individuals reporting higher perceived stress (Donald & Atkins, 2016). This suggests the potential utility of targeting occupations characterized by high emotional labor demands, particularly if compassionate responding is required (e.g., social work, behavioral health counseling, nursing). It also suggests that employees who are more prone to experience stress, such as those lower in resiliency or higher in neuroticism may benefit more from mindfulness-based training.

4.3.3. How long does mindfulness training need to be?

We also know very little about the appropriate timing and delivery of mindfulness training. High fidelity MBSR is 8 weeks in duration, however as we documented in this review, this is infrequently used with employee samples. While speculative, we expect that an 8-week training program like MBSR is likely to pose logistical hurdles for widespread organizational adoption and begs the question of whether briefer training programs can yield similar beneficial effects. If brief programs are a goal, then it will also be critical to identify the essential content of such programs and the most effective modes of delivery. In other words, what is potentially lost by not using high fidelity MBSR in organizational settings? Conversely, what might be gained by a shortened approach that is more geared toward the use of mindfulness in the workplace? The optimal session duration, number of sessions, and time lapse between sessions are related considerations given what we know about the benefits of spaced learning (Cepeda, Pashler, Vul, Wixted, & Rohrer, 2016). There are also important programming questions such as whether an intensive weekend retreat adds greater value than shorter sessions across multiple weeks. Another variation is on-site training followed

by e-coaching or internet-based practice (e.g., Bazarko, Cate, Azocar, & Kreitzer, 2013; van Berkel, Boot, Proper, Bongers, & van der Beek, 2014).

4.4. Limitations and implications for practice

Our conclusions are limited by several factors. Because our review is qualitative, we do not provide effect size estimates that indicate the outcomes for which mindfulness-based training may be more or less effective. As the literature continues to develop and the evidence base grows, meta-analytic research will be an important next step. However, the diversity of research design and evaluation features identified in our review foreshadow the challenges associated with meta-analytic work on mindfulness-based interventions. There are several specific concerns here. First, the referent for comparison is often different across various evaluation designs. For example, in single group pre-test/post-test only designs the comparison is the same participant over time whereas in waitlist control or pre-test/post-test designs with a control group the comparison is between participants who receive the intervention to different participants who do not receive the intervention. Second, combining studies that use randomization with those that do not can obscure findings, as nonrandomized studies tend to artificially inflate effect size estimates (Higgins & Green, 2011). Finally, combining studies that use active control groups with those that employ inactive control groups has been criticized because the comparison referents in each case are unique (no treatment versus an alternative treatment, respectively; Freedland et al., 2011).

Despite these limitations, our review contributes to practice by focusing exclusively on mindfulness-based training studies with employees. This helps practitioners understand how mindfulness-based training has been applied to the workplace and identifies training features that are common to mindfulness approaches with clinical populations, as well as unique to organizational contexts.

5. Conclusion

We provide a comprehensive, interdisciplinary review of the literature on mindfulness-based training interventions for employees. By parsing out the intended purposes of mindfulness-based training, the training features that have been examined, and the evaluation designs used in prior research, we set the stage for future studies that can continue to advance our knowledge concerning when, how, and for what outcomes mindfulness training may be beneficial within organizational settings.

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Appendix A. Additional information on studies included in the review and methodological features.

Author/Publication date	Country	Industry	Occupation(s)	Sample size	Research design	Control group	Evaluation timeline	Targeted outcome(s)
Aggs & Blamling (2010)	Australia	Healthcare	Mental health professionals (e.g., psychologists, counselors, social workers)	47	Pre-test/Post-test only	None	1-week	Mindfulness, Stress/Strain
Aikens et al. (2014)	United States	Energy/chemical	Unspecified (salaried employees only)	66–89	Randomized waitlist control group	Inactive	Immediate and 6-month	Engagement, Health Behaviors, Mindfulness, Stress/Strain, Well-being
Amutio, Martínez--Taboada, Hermosilla, & Delgado (2015)	Spain	Healthcare	Physicians	21–42	Randomized waitlist control group	Inactive	Immediate and 9 to 10-month	ANS, Mindfulness, Well-being
Ancona & Mendelson (2014)	United States	Education	Elementary school and middle school teachers	43	Randomized pre-test/post-test with control group	Inactive	Immediate	Stress/Strain
Baccarani, Mascherpa, & Minozzo (2013)	Italy	Education	University administrative managers	20	Randomized waitlist control group	Inactive	Immediate	ANS, Neural, Performance, Well-being
Bazarko, Cate, Azocar, & Kreitzer (2013)	United States	Healthcare	Nurses	36–38	Pre-test/Post-test only	None	Immediate	Compassion, Stress/Strain, Well-being
Beshai, McAlpine, Weare, & Kuyken (2015)	United Kingdom	Education	Secondary school teachers and staff	89	Non-randomized waitlist control group	Inactive	Immediate	Compassion, Mindfulness, Stress/Strain, Well-being
Brady, O'Connor, Burgermeister, & Hanson (2012)	United States	Human services	Behavioral health professionals	16	Pre-test/Post-test only	None	Immediate	Compassion, Mindfulness, Stress/Strain
Brooker et al. (2013)	Australia	Healthcare	Disability support employees and managers	34	Pre-test/Post-test only	None	Immediate	Affect, Compassion, Job Satisfaction, Mindfulness, Stress/Strain, Well-being
Brooker et al. (2014)	Australia	Human Services	Disability support employees and managers	12	Pre-test/Post-test only	None	1-year	Patient/Customer Outcomes

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Author/Publication date	Country	Industry	Occupation(s)	Sample size	Research design	Control group	Evaluation timeline	Targeted outcome(s)
Burnett, & Pettijohn (2015)	United States	Healthcare	Health care professionals (unspecified)	55	Randomized pre-test/post-test with control group	Active and Inactive	Immediate	Stress/Strain
Bush, Rossy, Mintz, & Schopp (2014)	United States	Education	Female university employees	124	Non-randomized waitlist control group	Inactive	Immediate	Health Behaviors, Mindfulness, Stress/Strain, Well-being
Christopher et al. (2015)	United States	Law enforcement	Police officers	43–52	Pre-test/Post-test only	None	Immediate	Affect, Health Behaviors, HPA, Mindfulness, Self-regulation, Stress/Strain, Well-being
Davidson et al. (2003)	United States	Biotechnology	Multiple	41	Randomized waitlist control group	Inactive	Immediate and 4-month	Affect, Neural, Stress/Strain
Duchemin, Steinberg, Marks, Vanover, & Klatt (2015)	Unspecified	Healthcare	Surgical intensive care unit employees	32	Randomized waitlist control group	Inactive	1-week	HPA, Job Satisfaction, Mindfulness, Stress/Strain
Flaxman & Bond (2010)	United Kingdom	Government	Multiple (e.g., clerical/administrative, managerial)	127–191	Randomized waitlist control group	Inactive	Immediate and 3-month	Stress/Strain
Flook, Goldberg, Pinger, Bonus, & Davidson (2013)	United States	Education	Elementary school teachers	13–18	Randomized waitlist control group	Inactive	Immediate	Compassion, HPA, Mindfulness, Performance, Self-regulation, Stress/Strain
Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel (2013)	United States	Healthcare	Primary care clinicians	23–28	Pre-test/Post-test only	None	Immediate, 2-month and 9-month	Compassion, Stress/Strain, Well-being
Foureur, Besley, Burton, Yu, & Crisp (2013)	Australia	Healthcare	Nurses and midwives	28	Pre-test/Post-test only	None	4 to 8 weeks	Stress/Strain, Well-being
Franco, Mañas, Cangas, Moreno, & Gallego (2010)	Spain	Education	Secondary school teachers	68	Randomized pre-test/Post-test with control group	Active	Immediate and 4-month	Stress/Strain
Frank, Reibel, Broderick, Cantrell, & Metz (2015)	United States	Education	Secondary school teachers, administrators, and staff	36	Non-randomized waitlist control group	Inactive	Immediate	Compassion, Health Behaviors, Mindfulness, Self-regulation, Stress/Strain
Galantino, Baime, Maguire, Szapary, & Farrar (2005)	Unspecified	Healthcare	Direct care providers and administrators	42–69	Pre-test/Post-test only	None	Immediate	Compassion, HPA, Stress/Strain
Gauthier, Meyer, Grefe, & Gold (2015)	Unspecified	Healthcare	Pediatric ICU nurses	38–45	Pre-test/Post-test only	None	Immediate and 1-month	Compassion, Job Satisfaction, Mindfulness, Stress/Strain
Geary & Rosenthal (2011)	United States	Healthcare	University healthcare employees (e.g., nurses, nurse practitioners, respiratory therapists)	91–108	Non-randomized pre-test/post-test with control group	Inactive	Immediate and 1-year	Stress/Strain, Well-being
Goodman & Schorling (2012)	United States	Healthcare	Multiple (e.g., physicians, nurses, social workers, psychologists)	73	Pre-test/Post-test only	None	Immediate	Stress/Strain
Grégoire & Lachance (2014)	Canada	Finance/banking	Call center agents and managers	43	Randomized Switching replications design	Inactive	Immediate	Affect, Mindfulness, Patient/Customer Outcomes, Stress/Strain
Gregory (2015)	Unspecified	Social work	Social workers	11	Non-randomized pre-test/post-test	Inactive	Immediate	Job Satisfaction, Stress/Strain

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Author/Publication date	Country	Industry	Occupation(s)	Sample size	Research design	Control group	Evaluation timeline	Targeted outcome(s)
Haase et al. (2016)	United States	Military	Marine infantry personnel	287	with control group Randomized pre-test/post-test with control group	Inactive	2-week	Health Behaviors, Mindfulness, Neural, Well-being
Hallman, O' Connor, Hasenau, & Brady (2014)	United States	Healthcare	Multiple (e.g., physicians, social workers, school teachers, nursing staff)	12	Pre-test/Post-test only	None	Immediate and 2-month	Mindfulness, Stress/Strain
Harris, Jennings, Katz, Abenavoli, & Greenberg (2016)	Unspecified	Education	Middle school educators (e.g., teachers, paraprofessionals)	63	Randomized waitlist control group	Inactive	Immediate	Affect, ANS, Health Behaviors, HPA, Mindfulness, Self-regulation, Stress/Strain, Well-being
Huang, Li, Huang, & Tang (2015)	Taiwan	Healthcare	Critical care nurses	144	Randomized waitlist control group	None	Immediate, 1-month and 2-month	Stress/Strain
Hue & Lau (2015)	Hong Kong	Manufacturing	Unspecified	70	Non-randomized pre-test/post-test with control group	Inactive	Immediate	Mindfulness, Stress/Strain, Well-being
Hülshager, Albers, Feinholdt, & Lang (2013)	Netherlands and Belgium	Education	Teachers	64	Randomized pre-test/post-test with control group	Inactive	10 ESM daily diaries	Job Satisfaction, Mindfulness, Self-regulation, Stress/Strain
Hülshager, Feinholdt, & Nübold (2015)	Germany	Various	Multiple (e.g., teachers, social workers, physicians, service employees, clerks)	140	Randomized waitlist control group	Inactive	10 ESM daily diaries	Health Behaviors, Mindfulness, Well-being
Jha et al. (2015)	United States	Military	Marine Corps reservists awaiting deployment; also one civilian control group	89	Randomized pre-test/post-test with control group	Inactive	Immediate	Performance, Self-regulation
Jha, Stanley, Kiyonaga, Wong, & Gelfand (2010)	United States	Various	Multiple (e.g., clerks, hairdressers, business owners, consultants, teachers)	48	Non-randomized pre-test/post-test with control group	Inactive	1-week	Affect, Performance
Johnson et al. (2014)	United States	Military	Active duty Army awaiting deployment to Afghanistan; also one civilian control group	40–215	Non-randomized pre-test/post-test with control group	Inactive	1-week	ANS, Neural
Klatt, Buckworth, & Malarkey (2009)	United States	Military	Marine infantry personnel attending pre-deployment training	42	Randomized waitlist control group	Inactive	Immediate	Health Behaviors, HPA, Mindfulness, Stress/Strain
Krasner et al. (2009)	United States	Education	Multiple	51–68	Pre-test/Post-test only	Inactive	Immediate and 3-month	Compassion, Mindfulness, Stress/Strain
Lalande, King, Bambling, & Schweitzer (2015)	Australia	Healthcare	Primary care physicians	61	Pre-test/Post-test only	None	Immediate	Affect, Mindfulness
Lan, Subramanian, Rahmat, & Kar (2014)	Malaysia	Mental health services	Counseling and clinical psychologists	37	Pre-test/Post-test only	None	Immediate	Mindfulness, Stress/Strain, Well-being
Leroy, Anseel, Dimitrova, & Sels (2013)	Unspecified	Various	Multiple (e.g., health insurance, public services, consultants, architecture)	68–76	Non-randomized waitlist control group	Inactive	2-month	Engagement, Mindfulness, Self-regulation
Longshore & Sachs (2015)	United States	Sports	Coaches	20	Non-randomized waitlist control group	Inactive	Immediate	Affect, Mindfulness, Stress/Strain
Malarkey, Jarjoura, & Klatt (2013)	United States	Education	Multiple	170	Randomized pre-test/post-test with control group	Active	Immediate, 6-month and 1-year	Health Behaviors, HPA, Mindfulness, Stress/Strain

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Author/Publication date	Country	Industry	Occupation(s)	Sample size	Research design	Control group	Evaluation timeline	Targeted outcome(s)
Manotas, Segura, Eraso, Oggins, & McGovern (2014)	Colombia	Healthcare	Multiple (e.g., doctors, nurses)	83	Randomized waitlist control group	Inactive	Immediate	Mindfulness, Stress/Strain
Martín-Asuero & García-Banda (2010)	Spain	Healthcare	Healthcare professionals (e.g., doctors, nurses)	27–29	Pre-test/Post-test only	None	Immediate and 3-month	Affect, Self-regulation, Stress/Strain
Martín-Asuero et al. (2014)	Spain	Healthcare	Multiple (e.g., physicians, nurses, social workers, psychologists)	68	Randomized waitlist control group	Inactive	Immediate	Compassion, Mindfulness, Stress/Strain
Marx, Strauss, Williamson, Karunavira, & Taravajra (2014)	United Kingdom	Mental health services	Multiple (e.g. nurses, ward managers, occupational therapist, psychologists)	18–37	Pre-test/Post-test only	None	Immediate and 3-month	Compassion, Stress/Strain
McConachie, McKenzie, Morris, & Walley (2014)	Unspecified	Human services	Intellectual disabilities support staff	87–98	Randomized waitlist control group	Inactive	Immediate and 6-week	Mindfulness, Self-regulation, Stress/Strain, Well-being
McGarrigle & Walsh (2011)	Unspecified	Human services	Unspecified	12	Pre-test/Post-test only	None	Immediate	Mindfulness, Stress/Strain
Meland, Fonne, Wagstaff, & Pensgaard (2015)	Norway	Military	Combat aircraft squadron	10–12	Pre-test/Post-test only	None	Immediate	Self-regulation, Stress/Strain
Michel, Bosch, & Rexroth (2014)	Germany	Various	Unspecified	191–246	Randomized waitlist control group	Inactive	Immediate and 2-week	Mindfulness, Stress/Strain, Well-being
Moody et al. (2013)	United States and Israel	Healthcare	Multiple (e.g., nurses, social workers, physicians, psychologists)	47	Randomized pre-test/post-test with control group	Inactive	Immediate	Stress/Strain
Noone, & Hastings (2010)	Unspecified	Education	Support staff for individuals with intellectual disabilities	34	Pre-test/Post-test only	None	Immediate	Stress/Strain
Pidgeon, Ford, & Klaassen (2014)	Australia	Human services	Human service professionals (unspecified)	16–35	Randomized pre-test/post-test with control group	Inactive	Immediate, 1-month and 4-month	Compassion, Mindfulness, Well-being
Raab, Sogge, Parker, & Flament (2015)	Canada	Mental health services	Direct mental healthcare providers	22	Pre-test/Post-test only	None	Immediate	Compassion, Mindfulness, Stress/Strain, Well-being
Roeser et al. (2013)	United States and Canada	Education	Elementary and secondary school teachers	113	Randomized waitlist control group	Inactive	Immediate and 3-month	ANS, Compassion, HPA, Mindfulness, Performance, Stress/Strain
Schenström, Rönnberg, & Bodlund (2006)	Sweden	Healthcare	Primary care physicians and staff	41–48	Pre-test/Post-test only	None	Immediate and 3-month	Mindfulness, Stress/Strain, Well-being
Shapiro, Astin, Bishop, & Cordova (2005)	United States	Healthcare	Health care professionals (e.g., physicians, nurses, social workers)	38	Randomized waitlist control group	Inactive	Immediate	Compassion, Stress/Strain, Well-being
Shonin, Van Gordon, Dunn, Singh, & Griffiths (2014)	United Kingdom	Various	Middle managers	133	Randomized pre-test/post-test with control group	Active	Immediate and 3-month	Job Satisfaction, Performance, Stress/Strain
Singh et al. (2015)	Unspecified	Healthcare	Group home direct care staff	9	Multiple Baseline	None	Immediate and 32–37 weeks	Patient/Customer Outcomes, Stress/Strain
Singh, Lancioni, Winton, Karazsia, & Singh (2013)	Unspecified	Education	Pre-school teachers	3	Multiple Baseline	None	Immediate	Patient/Customer Outcomes
Singh, Singh, Sabaawi, Myers, & Wahler (2006)	Unspecified	Mental health services	Treatment team for adult inpatient psychiatric hospital	18	Pre-test/Post-test only	None	Immediate	Patient/Customer Outcomes, Performance

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Author/Publication date	Country	Industry	Occupation(s)	Sample size	Research design	Control group	Evaluation timeline	Targeted outcome(s)
Taylor et al. (2015)	Canada	Education	Elementary and secondary school teachers	56	Randomized waitlist control group	Inactive	Immediate and 4-month	Compassion, Self-regulation, Stress/Strain
van Berkel, Boot, Proper, Bongers, & van der Beek (2014)	Netherlands	Research	Unspecified	230–235	Randomized pre-test/post-test with control group	Active	Immediate and 6-month	Affect, Engagement, Mindfulness, Stress/Strain
Whitesman & Mash (2015)	South Africa	Healthcare	Medical practitioners and psychologists in clinical practice	23	Pre-test/Post-test only	None	Immediate	Compassion, Mindfulness, Stress/Strain, Well-being
Wolever et al. (2012)	United States	Insurance	Unspecified	129	Randomized pre-test/post-test with control group	Active	Immediate	ANS, Health Behaviors, Mindfulness, Performance, Stress/Strain

Note. Sample sizes based on pre-post assessments. A sample size range indicates that sample sizes varied for different outcome measures and/or among multiple post-test assessments. Country of origin only reported if explicitly noted in text.

Appendix B. Additional information on training program, design, and delivery characteristics of studies included in the review

Author/Publication date	Training program	Total training duration ^a	Number of Training Sessions	Session length ^b	Modes of delivery	Type(s) of practice
Aggs & Bambling (2010)	Adapted MBSR	8	8	90	Group discussion, Lecture, Written materials	In-session, homework
Aikens et al. (2014)	Adapted MBSR	7	7	60	Audio recordings, Lecture, Online modules, Retreat, Written materials	In-session, homework
Amutio, Martínez-Taboada, Hermosilla, & Delgado (2015)	Adapted MBSR	52	19	150–480	Audio Recordings, Lecture, Retreat	In-session, homework
Ancona & Mendelson (2014)	Yoga-based	3	6	45	Group discussion, Lecture	In-session, at work, homework
Baccarani, Mascherpa, & Minozzo (2013)	Meditation-based	4	8	90	Lecture	In-session, homework
Bazarko, Cate, Azocar, & Kreitzer (2013)	Adapted MBSR	8	8	90–480	Audio recording, Group discussion, Lecture, Retreat, Written materials	In-session, at work, homework
Beshai, McAlpine, Weare, & Kuyken (2015)	Adapted MBSR & MBCT	8	9	75	Audio recordings, Lecture	In-session, homework
Brady, O'Connor, Burgermeister, & Hanson (2012)	Adapted MBSR	4	4	60	Audio recordings, Group discussion, Lecture	In-session, homework
Brooker et al. (2013)	Adapted MBSR & MBCT	8	8	120	Audio recordings, Lecture, Written materials	In-session, at work, homework
Brooker et al. (2014)	Adapted MBSR & MBCT	8	8	120	Audio recordings, Lecture, Written materials	In-session, at work, homework
Burnett & Pettijohn (2015)	Adapted MBSR	5	25	10	Audio recordings, Lecture	In-session, at work
Bush, Rossy, Mintz, & Schopp (2014)	Targeted mindfulness	10	11	60–90	Audio recordings, Group discussion, Lecture, Written materials	In-session, at work, homework
Christopher et al. (2015)	Adapted MBSR	8	9	120–360	Group discussion, Lecture	In-session, homework
Davidson et al. (2003)	High Fidelity MBSR	8	8	150–420	Audio recordings, Lecture, Retreat	In-session, homework
Duchemin, Steinberg, Marks, Vanover, & Klatt (2015)	Yoga-based	8	8	60–120	Audio recordings, Group discussion, Lecture,	In-session, at work, homework
Flaxman & Bond (2010)	ACT-Based	24	3	150–180	Lecture	In session
Flook, Goldberg, Pinger, Bonus, & Davidson (2013)	Adapted MBSR	8	8	150–360	Audio recordings, Lecture	In-session, at work, homework
Fortney, Luchterhand, Zakletskaia, Zgierska, & Rakel (2013)	Adapted MBSR	0.71	3	180–420	Audio recordings, Group discussion, Lecture	In-session, at work, homework
Foureur, Besley, Burton, Yu, &	Adapted ACT &	8	1	Not	Audio recordings, Group	In-session,

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Author/Publication date	Training program	Total training duration ^a	Number of Training Sessions	Session length ^b	Modes of delivery	Type(s) of practice
Crisp (2013)	MBSR			reported	discussion, Lecture, Written materials	homework
Franco, Mañas, Cangas, Moreno, & Gallego (2010)	Other	10	10	90	Lecture	In-session, homework
Frank, Reibel, Broderick, Cantrell, & Metz (2015)	Adapted MBSR	8	8	120	Audio recordings, Group discussion, Lecture	In-session, at work, homework
Galantino, Baime, Maguire, Szapary, & Farrar (2005)	Adapted MBSR & MBCT	8	8	120	Audio recordings, Group discussion, Lecture, Written materials	In-session, homework
Gauthier, Meyer, Grefe, & Gold (2015)	Adapted MBSR	4	4	30	Audio recordings, Lecture	In-session, at work, homework
Geary & Rosenthal (2011)	High Fidelity MBSR	8	8	180–480	Audio recordings, Lecture, Retreat	In-session, homework
Goodman & Schorling (2012)	High Fidelity MBSR	8	8	150–420	Audio recordings, Group discussion, Lecture, Retreat	In-session, homework
Grégoire & Lachance (2014)	Meditation-based	5	2	60	Audio recordings	In-session, at work
Gregory (2015)	Yoga-based	3	3	60	Group discussion, Lecture	In-session, homework
Haase et al. (2016)	Adapted MBSR	8	10	120–240	Audio recordings, Lecture	In-session, homework
Hallman, O'Connor, Hasenau, & Brady (2014)	Adapted ACT & MBSR	1.14	4	30	Lecture	In-session, at work
Harris, Jennings, Katz, Abenavoli, & Greenberg (2016)	Yoga-based	16	64	20	Lecture, Written materials	In-session, at work, homework
Huang, Li, Huang, & Tang (2015)	Adapted MBSR	8	8	120	Audio recordings, Group discussion, Lecture	In-session, homework
Hue & Lau (2015)	Adapted MBSR	6	7	150–420	Lecture	In-session, homework
Hülshager, Alberts, Feinholdt, & Lang (2013)	Adapted MBSR & MBCT	1.4	N/A	N/A	Audio recordings, Written materials	Homework
Hülshager, Feinholdt, & Nübold (2015)	Adapted MBSR & MBCT	1.4	N/A	N/A	Audio recordings, Written materials	Homework
Jha et al. (2015)	Targeted Mindfulness	8	4	120	Audio recordings, Lecture, Written materials	In-session, homework
Jha, Stanley, Kiyonaga, Wong, & Gelfand (2010)	Adapted MBSR	8	9	120–480	Audio recordings, Group discussion, Lecture, Written materials	In-session, homework
Johnson et al. (2014)	Adapted MBSR	8	10	60–240	Audio recordings, Lecture	In-session, homework
Klatt, Buckworth, & Malarkey (2009)	Adapted MBSR	6	6	60	Audio recordings, Lecture, Written materials	In-session, at work, homework
Krasner et al. (2009)	Meditation-based	8	19	150–450	Group discussion, Lecture, Retreat	In-session
Lalande, King, Bambling, & Schweitzer (2015)	Targeted Mindfulness	0.28	2	420	Group discussion, Lecture	In-session
Lan, Subramanian, Rahmat, & Kar (2014)	Adapted MBSR & MBCT	5	5	120	Audio recordings, Group discussion, Lecture, Written materials	In-session, homework
Leroy, Anseel, Dimitrova, & Sels (2013)	High Fidelity MBSR	8	8	180	Audio recordings, Lecture	In-session, at work, homework
Longshore & Sachs (2015)	Adapted MBSR	6	1	90	Audio recordings, Group discussion, Lecture, Written materials	In-session, homework
Malarkey, Jarjoura, & Klatt (2013)	Adapted MBSR	8	9	60–120	Audio recordings, Group discussion, Lecture, Written materials	In-session, at work, homework
Manotas, Segura, Eraso, Oggins, & McGovern (2014)	Adapted MBSR	4	4	120	Audio recordings, Group discussion, Lecture	In-session, homework
Martín-Asuero & García-Banda (2010)	Adapted MBSR	8	9	150–480	Group discussion, Lecture	In-session, at work, homework
Martín-Asuero et al. (2014)	Adapted MBSR	8	9	150–480	Audio recordings, Group discussion, Lecture, Written materials	In-session, homework
Marx, Strauss, Williamson, Karunavira, & Taravajra (2014)	MBCT	8	8	Not reported	Lecture	In-session, homework
McConachie, McKenzie, Morris, & Walley (2014)	ACT-Based	0.14	2	240–480	Group discussion, Lecture, Written materials	In-session, homework
McGarrigle & Walsh (2011)	Targeted	8	8	120	Group discussion, Lecture,	In-session, at

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Author/Publication date	Training program	Total training duration ^a	Number of Training Sessions	Session length ^b	Modes of delivery	Type(s) of practice
Meland, Fonne, Wagstaff, & Pensgaard (2015)	mindfulness Adapted MBSR	52	15	180–480	Written materials Audio recordings, Group discussion, Lecture, Retreat	work In-session, homework
Michel, Bosch, & Rexroth (2014)	Adapted MBSR & MBCT	3	N/A	N/A	Audio recordings, Lecture	In-session, homework
Moody et al. (2013)	Adapted MBSR	8	8	60–360	Audio recordings, Group discussion, Lecture	In-session, at work, homework
Noone, & Hastings (2010)	ACT-Based	0.21	2	240–480	Group discussion, Lecture	In-session
Pidgeon, Ford, & Klaassen (2014)	Other	0.36	7	60–150	Lecture, Retreat	In-session
Raab, Sogge, Parker, & Flament (2015)	Adapted MBSR	8	9	150–480	Lecture, Retreat	In-session, homework
Roeser et al. (2013)	Adapted MBSR	8	11	Not reported	Group discussion, Lecture, Written materials	In-session, homework
Schenström, Rönnerberg, & Bodlund (2006)	Adapted MBSR & MBCT	12	4	Not reported	Audio recordings, Lecture, Written materials	In-session, at work, homework
Shapiro, Astin, Bishop, & Cordova (2005)	High Fidelity MBSR	8	8	120	Lecture	In-session, homework
Shonin, Van Gordon, Dunn, Singh, & Griffiths (2014)	Meditation-based	8	8	90	Audio recordings, Group discussion, Lecture	In-session, homework
Singh et al. (2015)	Targeted mindfulness	0.71	7	Not reported	Lecture	In-session, at work, homework
Singh, Lancioni, Winton, Karazsia, & Singh (2013)	Targeted mindfulness	8	8	120	Group discussion, Lecture, Written materials	In-session, at work, homework
Singh, Singh, Sabaawi, Myers, & Wahler (2006)	Targeted mindfulness	Varied between 6 and 11 ^c	Varied between 6 and 11 ^c	60	Lecture	In-session
Taylor et al. (2015)	Adapted MBSR	9	11	Not reported	Group discussion, Lecture	In-session, homework
van Berkel, Boot, Proper, Bongers, & van der Beek (2014)	Other	24	16	90	Group discussion, Lecture, Online modules, Written materials	Homework
Whitesman & Mash (2015)	Targeted mindfulness	9	Not reported	Not reported	Group discussion, Lecture, Online modules, Retreat, Written materials	In-session, homework
Wolever et al. (2012)	Adapted MBSR	12	13	60–120	Lecture, Online modules, Written materials	In-session, at work, homework

N/A indicates not applicable because training was self-guided.

^a Total training duration in weeks.^b Session length in minutes.^c Three different employee groups received different intervention doses; as such, this study was excluded from the calculation of average training duration and average session length.

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