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RESEARCH ARTICLE

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# Meta-analysis of mindfulness training on teacher well-being

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## Abstract

Teachers are reporting increased incidence of stress, depression, burnout, and anxiety resulting in overall poor mental health and well-being outcomes. Recently, mindfulness-based interventions have emerged as having the potential to improve these deleterious impacts. This meta-analysis investigated the effects of mindfulness-based interventions on educators in schools. To be included in the review, studies must have been printed in English, used a methodology that included a control group with in-service teachers as the primary participants. In addition, the intervention needed to have mindfulness as a major component. The search procedures led to the identification of 18 manuscripts that included a total sample of 1,001 educators. Mindfulness interventions ranged greatly in dosage, frequency, and delivery model. Using a random effects model, mindfulness-based interventions were found to have significant positive effects across all domains. Mindfulness-based interventions resulted in large effects on feelings of mindfulness, moderate effects for decreases in stress and anxiety, and small effects on feelings of depression and burnout. Discussion includes the quality of the literature base as well as implications for future research.

KEYWORDS

emotional well-being, meta-analysis, mindfulness, stress, teachers

  

## 1 | INTRODUCTION

Research indicates that the mental health of public school teachers is on the decline (Steinhardt, Smith Jaggars, Faulk, & Gloria, 2011). Myriad reasons exist to explain these decreases including increased standardized testing, larger class sizes, challenging student behaviors, increased demands on teacher time, more paperwork, and other environmental factors related to school climate and culture (Abel & Sewell, 1999; Brunsting, Sreckovic, & Lane, 2014; Chang, 2013; Collie, Shapka, & Perry, 2012; Dilekmen & Erdem, 2013). Furthermore, educators, and particularly special education teachers, are reporting increased incidence of related deleterious emotional outcomes such as depression, burnout, anxiety, and poor physical health (American Federation of Teachers [AFT] & Badass Teachers Association [BAT], 2017; Brunsting et al., 2014; Chang, 2013; Devos, Dupriez, & Paquay, 2012). When compared with other professions, teacher's rates of "poor mental" health and stress are significantly higher than other workers (AFT & BAT, 2017; Childs & Stoeber, 2012). These factors are drastically impacting educator well-being and effectiveness. Further compounding this issue, researchers have found that nearly all teachers characterized themselves as feeling high levels of stress with only 7% of teachers having felt they were well adjusted and able to manage their feelings of stress (Herman, Hickmon-Rosa, & Reinke, 2018). This study indicates that without intervention, school personnel will continue to experience social and emotional challenges that directly impact their ability to provide meaningful instruction and support to students.

Teacher emotional well-being and emotional exhaustion are multifaceted constructs that include stress, burnout, and work-related satisfaction. For the purposes of this paper, we defined emotional well-being and emotional exhaustion as the capacity to manage feelings related to stress exhaustion, and satisfaction. The terms emotional well-being and emotional exhaustion are used interchangeably. Educator well-being demonstrates more feelings of work satisfaction and a capability to manage stress readily, whereas emotional exhaustion reflects the opposite.

Well-being has both physical and mental influences on teachers. Teachers are experiencing higher rates of emotional exhaustion due to decreased feelings of enjoyment and increased feelings of anger (Keller, Chang, Becker, Goetz, & Frenzel, 2014). In a survey of over 30,000 educators in the United States from the American Federation of Teachers, 73% stated that their work was often stressful and 26% reported poor levels of mental health (AFT & BAT, 2015). Similarly, Childs and Stoeber (2012) found that teachers experience higher rates of burnout over time due to socially prescribed perfectionism, a personality characteristic in which individuals strive for flawlessness and are judgmental towards their own behaviors. Moreover, a significant body of research has found a teacher's experiences of negative emotions, including feelings of heightened anxiety, tiredness, and increases in stress and depression exacerbate educator burnout and increase the likelihood that teachers leave the classroom (Brunsting et al., 2014; Capel, 1991; Chang, 2013; Jones & Youngs, 2012). This is particularly true for teachers who encounter increased loads of paperwork, students who exhibit externalizing behaviors, and other environmental factors such as role-ambiguity experience higher rates of burnout (Aft & BAT, 2017; Brunsting et al., 2014; Chang, 2013; Collie et al., 2012). These physical and mental responses in teachers can ultimately lead to feelings of burnout. Burnout, which is specific to work context, is broadly defined with three components: exhaustion, cynicism toward the job, and decreased professional efficacy (Maslach, Schaufeli, & Leiter, 2001). These components factor in the high attrition rates of educators (Hagaman & Casey, 2017).

Moreover, not only are teachers leaving the field and reporting higher rates of emotional distress, but students are also feeling the effects of educator burnout. Research has suggested that teacher's feelings of stress and burnout are associated with student emotional well-being and academic achievement (Becker, Goetz, Morger, & Ranellucci, 2014; Klusmann, Richter, & Lüdtke, 2016). Student behavior, such as vandalism, bullying, defiance, and talking back to teachers, is correlated to educator stress and burnout (Geving, 2007; Kokkinos, 2007). Students of teachers that are feeling burned-out tend to cause more behavioral disruptions, be less motivated, and reach their academic goals less frequently (Jennings & Greenberg, 2009). Heightened emotional exhaustion is associated with decreased student growth, and lower scores on student's academic achievement tests as student's feelings of anger and enjoyment are related to their teacher's instructional behaviors (Becker et al., 2014; Klusmann et al., 2016).

Educators that suffer from burnout have decreased classroom organization and a diminished ability to model emotional regulation. Educators who experience higher levels of emotional exhaustion facilitate less student motivation, impacting academic outcomes (Shen et al., 2015), deleteriously impacting the students they serve. Studies have shown emotions to be contagious, and educators that lack the coping skills to deal with stressful environments are less capable of attending to student demands as they are limited in their emotional capacity (Jennings & Greenberg, 2009). This body of research indicates that the well-being of teachers is a valuable factor in the ultimate success of the students in which they seek to serve.

Consequences of emotional exhaustion are grave for the profession as a whole. Teachers report emotional stress and poor emotion management amongst their primary reasons for leaving the classroom (Collie et al., 2012; Montgomery & Rupp, 2005) with teachers in the United States leaving the teaching profession at alarming rates. According to Gray and Taie (2015) in a nationally representative sample, of the teachers that began teaching in the 2007–2008 school year, 17% left the classroom after their third year of teaching. This is further corroborated by a policy brief conducted by *The National Commission on Teaching and America's Future* which found that in urban populations the rate of teacher attrition exceeds 20% yearly (Carroll, 2007). Furthermore, turnover rates continue to grow, increasing over 50% in the past 15 years, and these high rates of turnover are estimated to cost the United States over $7.3 billion a year (Boe, Cook, & Sunderland, 2008; Carroll, 2007). Not only are these costs draining on our economy, but also damaging our relationships with students and impacting academic outcomes (Jacob, Vidyarthi, Carroll, & TNTP, 2012; Redding & Henry, 2018). To create a sustainable and economically sound teaching profession, methods for decreasing feelings of anxiety, stress, depression, and burnout are crucial.

## 1.1 | Mindfulness as a workplace well-being intervention

Mindfulness, which is increasing in popularity, has roots that can be traced back over 2,500 years and has evolved and changed into several types of modern-day practices (Ditrich, 2016). Across professional domains, mindfulness-based interventions (MBI) have shown promise, and researched for their use in calming pediatric-care palliative patients, decreasing chronic pain, managing posttraumatic stress disorder, and even smoking cessation amongst other conditions (Colgan, Chistopher, Michael, & Wahbeh, 2016; Kabat-Zinn, Lipworth, & Burney, 1985). Mindfulness can be seen as one component under the umbrella term of meditation, whereas different types of mindfulness exist such as everyday mindfulness. Everyday mindfulness is defined as being aware of everyday situations such as walking, talking, and "present focus of attention during day-to-day life," and mindfulness during meditation (Thompson & Waltz, 2007, p. 1876). The pioneer of modern mindfulness practices in the United States, Jon Kabat-Zinn, defines mindfulness "as momenttomoment, nonjudgmental awareness, cultivated by paying attention in a specific way, that is, in the present moment, and as nonreactively, as nonjudgmentally, and as openheartedly as possible" (Kabat-Zinn, 2015). For the purpose of this paper, the Kabat-Zinn (2015) definition of mindfulness will be used.

Several emotion well-being interventions are researched for their usefulness on decreasing educator exhaustion. Methods such as exercise and yoga have shown promising outcomes for general stress reduction and well-being (Lin, Huang, Shiu, & Yeh, 2015). While it is no surprise that physical activity leads to a healthier life, the levels in which exercise can significantly decrease symptoms of depression are unclear as research about educators using physical activity as a method to reduce burnout and stress is currently limited (Rethorst, Wipfli, & Landers, 2009). Similarly, yoga is proven to be an effective intervention for stress reduction and increased well-being, however, often these interventions contain a multifaceted approach involving group practice which may build social support, physical movement, as well as meditation (Frank, Reibel, Broderick, Cantrell, & Metz, 2015; Harris, Jennings, Katz, Abenavoli, & Greenberg, 2016; Kemeny et al., 2012). Due to the complexities of yoga, it is challenging to ascertain which aspects directly impact an educator's well-being and stress.

Mindfulness for teachers has recently made its way into the research domain. Klingbiel and Renshaw (2018) conducted a meta-analysis on differing mindful practices for teachers in the workplace. Their review of 29 studies suggests that mindfulness interventions are effective in reducing psychological distress and increasing educator

wellness. Klingbiel and Renshaw (2018) did a comprehensive search of the literature and coded for a variety of intervention characteristics. Their review included a total of 1,493 participants and interventions spanned from 2 to 36 weeks, with dosages at varying levels. Overall, Klingbiel and Renshaw found MBI's to have a moderately positive effect across outcomes. Interestingly, they report findings on mindfulness dosage, stating, "there may also be a point of diminishing returns for MBI dosage, as there was a slight negative effect of increasing formal intervention time beyond 24 hr" (Klingbiel & Renshaw, 2018, p. 507). Differences between this review and the Klingbiel and Renshaw review are discussed in the methods section of this manuscript.

Mindfulness interventions for teachers may improve their perceptions of working conditions and provide a means for managing stress, impacting teacher retention and assisting them to provide a more positive classroom environment (Hwang, Bartlett, Greben, & Hand, 2017). Mindfulness promotes greater attention to the immediate environment and assists teachers to respond proactively when negative events occur in the classroom. In addition, mindfulness is associated with improved mental and physical health outcomes and reductions in stress, anxiety, and depression (Vibe et al., 2017; Miller, Fletcher, & Kabat-Zinn, 1995; Taylor et al., 2016). Many different adaptations of mindfulness have shown positive results. These intervention's range from mindfulness trainings and professional developments occurring weeks apart to daily mindfulness practices on and off school grounds by trained facilitators, and even interventions that involved group discussion, lecture, and home practice (Benn, Akiva, Arel, & Roeser, 2012a; Beshai, Mcalpine, Weare, & Kuyken, 2016; Harris et al., 2016; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013). For this paper, mindfulness-based interventions components include meditations, breathwork, body scans, and visualization exercises all intending to bring awareness to the present moment.

### 1.2 | Purpose

Other systematic reviews have shown promising results on teacher well-being as it relates to mindful practices. Recently, Klingbeil and Renshaw (2018) conducted a meta-analysis of mindfulness-based interventions for teachers. Results demonstrated consistently positive effects on teacher stress and emotional well-being. However, the meta-analysis included any study which self-reported using any mindfulness components as an intervention, and as a result, Klingbeil and Renshaw included studies that examined mindfulness training alongside other methods such as yoga and talk-therapy. As such, there is currently no meta-analysis that has examined the effects of mindfulness training on teacher emotional well-being in isolation of other components. The purpose of the present study, therefore, was to analyze the use of mindfulness training on teacher emotional well-being using mindfulness-based interventions as the primary intervention component. This meta-analysis was guided by the following research questions:

1. Are mindfulness-based interventions effective for reducing educator feelings of stress, depression, burnout, and anxiety?
2. What are the overall treatment effects of mindfulness-based interventions on educators feelings of stress, depression, burnout, and anxiety?

## 2 | METHODS

### 2.1 | Search and screening process

A systematic literature search was conducted using the ERIC and PsycINFO electronic databases. Studies were not limited to peer review as to include dissertations and combat positive publication bias and the "file-drawer effect." The search was completed in May of 2018. The following Boolean search terms were used to search for relevant studies: "mindfulness OR mediation" AND "teacher*" AND "intervention*"; "mindful*" AND "teacher" AND "implementation"; "mindful*" AND "educator*" AND "intervention*"; "mindful*" AND "educator*" OR "teacher*"; and "mindful*" AND

"educator*" OR "teacher*" AND "empirical". Date restrictions were not applied to the search. Results from the ERIC database search yielded 332 titles and abstracts; whereas PsycINFO yielded 857 titles and abstracts. Five total studies were duplicates and found on both databases. The primary investigator analyzed titles and abstracts for mention of mindfulness as an intervention component and teachers as participants, which narrowed the pool of applicable papers to 52. Studies were then further reviewed using the investigator's inclusion criteria.

Inclusion criteria for the current study included (a) articles were written and published in English, (b) the research used a group-based experimental or quasi-experimental design to investigate the effectiveness of the intervention, (c) the study's participants must include in-service teachers as 50% or more of the participant population, and (d) the mindfulness component of the intervention comprised more than 25% of the intervention time because many studies had multiple intervention components. The percentage of total intervention minutes was computed by dividing the number of minutes using mindfulness techniques such as visualization and breathwork were calculated when applicable by the total number of minutes an intervention session lasted. Moreover, it is important to note that single-case studies were not included in this review because the focus was on teacher mental health, which is conceptualized as a latent construct rather than a readily observable behavior that is the focus of single-case methods. As such, the research team determined that these outcomes, and their unique approaches to measurement, were not sufficiently comparable with combine into a single review.

After screening using the inclusion criteria and removing duplicate titles between the PsycINFO and ERIC database searches, 17 manuscripts met all inclusion criteria, however, three of these papers (Crain, Schonert-reichl, & Roeser, 2017; Roeser et al., 2013; Taylor et al., 2016) used the data from the same study. While mindfulness outcomes were reported for all three studies, only the data from the original, Roeser et al. (2013) study was included to ensure there was no violation of sample independence. Lastly, after reading the Klingbeil and Renshaw (2018) meta-analysis and comparing included studies, one additional unpublished manuscript (James, 2016) was found to be eligible for a total of 18 manuscripts included in this paper. Finally, the second author, a doctoral student, reviewed titles and abstracts of all studies that the primary investigator deemed did not meet inclusion criteria, and found no additional qualifying studies.

## 2.2 | Coding procedures

Once the articles were identified, the coding process began. Articles were coded for participant demographics, intervention types, outcome measures, and quality indicators. The Council for Exceptional Children's (CEC) quality indicators for classifying evidenced-based practices were used to assess the quality of the included articles (Cook et al., 2015). In addition to methodological indicators, the research team developed a coding manual to document the characteristics of the participants, settings, intervention, and outcomes. The purpose of this portion of the coding was to provide additional detail on the included studies and allow for the testing of moderator variables to determine if any of the variance in effects could be explained by conceptually important variables.

The primary investigator and second author double coded all studies and discussed discrepancies. Before coding, the first author created a manual, which operationally defined all codes as well as provided scoring criteria. The second author was trained to use the criteria manual using the first four articles, in which the two authors sat side by side to code and discuss the binary system. Once the training phase was over, authors independently coded each article and then compared codebooks to obtain interrater reliability. Initially, interrater agreement was 92.22%, following discussion the reviewers agreed on a final code before data analysis resulting in 100% agreement.

### 2.2.1 | Participants and setting

Studies were examined for demographic information reported. The two authors coded for (a) participant level demographics: gender; ethnicity, (b) role in school: general education teacher; special education teacher; teacher

unspecified; staff unspecified; parent; other, (c) location: American; international; urban; suburban, or rural; (d) intervention setting: within school grounds; off of school grounds.

### 2.2.2 | Intervention components

Investigators reviewed intervention frequency, dosage, and techniques. Studies were coded using the following response items (a) frequency: more than once a week, once weekly, biweekly, or other amount of occurrence. In addition, studies were coded for duration: (b) total number of weeks the intervention spanned; (c) total hours of the intervention; (g) total hours per 1 week of the intervention; and (d) total supplemental hours done outside of typical intervention time (e.g., retreats or home based meditation). In addition, descriptions of intervention techniques were coded using response options that were self identified in each paper. Response options (e) breathwork; (f) yoga; (g) mental exercises such as visualization techniques; (h) meditation; and (i) lecture and/or discussion.

### 2.2.3 | Outcomes

Investigators coded for 26 study outcomes. Once all articles were coded, the first author calculated sums for each category and the categories with four highest number of articles measuring that outcome were used in this meta-analysis. Those outcomes were: (a) mindfulness, (b) stress, (c) anxiety, and (d) burnout.

### 2.2.4 | Methodological quality

The first and second authors coded for methodological quality using 23 codes to indicate a papers quality using the CEC indicators. A binary code system was used where zero (unmet) and one (met) were used as the coding scheme.

*Context and setting*

One code was used as an indicator to describe critical features relevant to this review, *1.1 Context and setting*. Authors clarified and considered the criteria met if an article reported on either a geographic location or a community setting (Cook et al., 2015).

*Participants*

Relevant to this review one quality indicators was coded, *2.1Participant Demographics*. This indicator was considered met if an article reported on either gender or race of the participants (Cook et al., 2015).

*Intervention agent*

Two indicators of relevance regarding the critical features of the intervention agent were coded. These included *3.1 Role of the Intervention agent* and *3.2 Specific Training*. Authors agreed that indicator 3.1 was met if the article described the individual providing the intervention. In addition, indicator 3.2 was met if training or other qualifications were mentioned for the individual providing the intervention were discussed (Cook et al., 2015).

*Description of practice*

Two components of this indicator were used to determine study quality, *4.1 Detailed intervention procedures* and *4.2 Materials description*. Studies were considered to meet the criteria if they provided a description of topics covered for each session or provided a citation in which this information could be obtained. Respectively, criteria were met if materials needed for the intervention were mentioned (Cook et al., 2015).

*Implementation of fidelity*

Quality of implementation fidelity was assessed using three components, *5.1 Implementation fidelity related to adherence*, *5.2 Implementation fidelity related to dosage*, and *5.3 Reporting on Implementation fidelity*. Authors agreed that *5.1 Implementation Fidelity* was met if the paper reported the use of direct and reliable measures such as a checklist when measuring their own fidelity. Component *5.2* was met if the study reported attendance procedures as well as length and frequency of sessions. Finally, component *5.3* was considered met if articles reported their frequency of checking for implementation fidelity (Cook et al., 2015).

*Internal validity*

Six indicators of quality were coded including: *6.1 Researcher control; 6.2 Baseline Conditions; 6.3 Limited access to treatment; 6.4 Assignment to groups; 6.8 Overall attrition;* and *6.9 Differential Attrition*. With regard to components 6.1 an 6.2 the conditions were met if the paper described how the intervention was delivered and manipulated as well as treatment conditions for both the intervention and comparison group. Similarly, indicator 6.3 was considered met if participants in the control group and treatment group were at different geographic locations. Studies must have reported ways in which groups were assigned, and the criteria for item 6.4 was considered met if they had done so. Finally, statistics for attrition rates overall as well as within groups must have been reported to meet the criteria for indicators 6.8 and 6.9 (Cook et al., 2015).

*Outcome measures/dependent variables*

Outcome measure quality was rated using five indicators, *7.1 Social importance; 7.2 Measurement of dependent variables; 7.3 Reports on effect size; 7.5 Internal reliability;* and *7.6 Evidence of validity*. With regard to *7.1 Social importance*, review authors agreed that studies met the criteria if outcome measures were meant to improve quality of life either emotionally or physically for participants. Papers in which methods of collecting outcome data were reported met the criteria for indicator 7.2. In addition, components *7.3 Reports on effect size*, *7.5 Internal Reliability*, *and 7.6 Evidence of validity*, were all considered met if through the explanation of outcomes measures each was mentioned respectively (Cook et al., 2015).

*Data analysis*

Two indicators were used to assess quality of data analysis procedures, *8.1 Data analysis techniques* and *8.3 Appropriate effect size*. Studies met these criteria if techniques utilized were appropriate for group comparisons and if appropriate effect size statistics were reported for all outcomes relevant to this review (Cook et al., 2015).

## 2.3 | Effect size computation and meta-analysis procedures

Effect sizes were computed to index the magnitude of intervention effect for each relevant measure reported across the included studies. The purpose of the meta-analysis was to supplement information on the program and methods characteristics by evaluating intervention effectiveness. Posttest means and standard deviations were used to compute standardized mean difference effect sizes for teacher mindfulness and related subdomains including stress, anxiety, burnout, and depression. Effect sizes were computed by dividing the difference in mean outcomes between the groups by the pooled standard deviation of the outcome (Lipsey & Wilson, 2001). Effect sizes were maintained in their original interpretation with negative values representing the intended therapeutic direction and indicating improvement.

Meta-analyses provided estimates of the average intervention effect and allowed for estimation of heterogeneity across effect sizes. Separate meta-analyses were conducted for each outcome measure. For each meta-analysis, random effects models were used to estimate the combined effect sizes across the included studies. Random effects models assume that the variance is derived from subject-level sampling error and random sources of error that were not measured (Lipsey & Wilson, 2001). Heterogeneity across the effect sizes was evaluated using two indices including (a) the Q-statistic which is the ratio of observed to expected variation in the effect sizes and, if significant, indicates that the effect sizes are indeed heterogeneous and (b) $I^2$ index which represents the

proportion of variance across the effect sizes. Moderator analyses were not conducted given that the low number of studies contribute to an underpowered set of analyses and the instability of subsequent coefficients.

## 3 | RESULTS

### 3.1 | Included studies

Coded and included in this review are 18 total studies. The ERIC database yielded nine studies while, 12 studies were found on the PsycINFO database. Studies dated from 1999 to 2017. All studies were in English. Studies included 15 peer reviewed articles and three dissertations. Geographic locations that were self-disclosed by study authors included seven studies conducted in urban environments and 6 conducted in suburban/rural locations (Figure 1).

### 3.2 | Participants

Participants in the 18 studies totaled 1,001 with a mostly even split between participants in treatment groups and control groups. Generally, participants were white, female educators, without specified teaching placements, reflective of the teaching population (Taie & Goldring, 2018). Three studies collected and

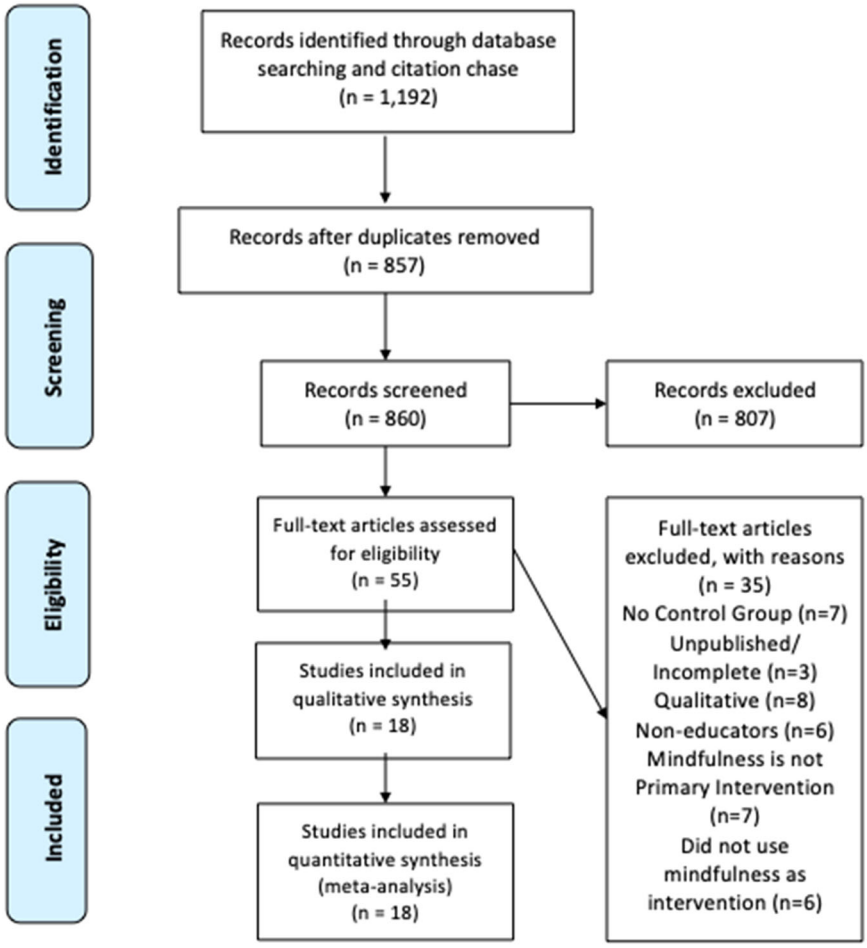


**FIGURE 1** PRISMA flowchart describing the search process [Color figure can be viewed at wileyonlinelibrary.com]

reported the type of teacher, general education, or special education. Table 1 reports further participant demographic data.

## 3.3 | Intervention components

Studies comprised a wide variety of activities that included mindfulness practices, shown in Table 2. All studies included in this meta-analysis contained a meditation component as part of their intervention. Most studies also included breathwork, mental exercises such as visualizations or emotion regulation, as well as some discussion. However, less than half of the included studies contained a yoga component. Excluding Taylor (2016) and Roeser et al. (2013) due to the duplicate studies, generally, the intervention phase of papers lasted slightly over 7 weeks ($M = 7.03$, $SD = 3.75$) and on average, over 20 hr of mindfulness per intervention ($M = 20.58$, $SD = 12.31$). Interventions had stark differences in mindfulness delivery models, such as how often an intervention occurred and how many minutes or hours an intervention lasted. Total hours of intervention time ranged from 4.5 hr up through 42 hr, similarly, interventions spanned the course of as little as 3 weeks up through 16 total weeks (Table 3).

## 3.4 | Meta-analytic results

Table 4 provides an overview of the results for each meta-analysis. As can be seen, mindfulness training resulted in consistent, positive effects across all domains examined. For instance, teachers exposed to mindfulness training improved their overall mindfulness nearly a full standard deviation above those not receiving the intervention. Moreover, mindfulness led to statistically significant reductions on measures of emotional well-being with effect sizes ranging from small to moderate gains (Fritz, Morris, & Richler, 2012). In addition, the heterogeneity statistics varied across the domains with the results of mindfulness varying to a large degree; stress and anxiety to a moderate degree; and burnout and depression to a low degree.

**TABLE 1** Sample demographics for intervention and control groups

| Characteristics | *n* = 1,001 |
|---|---|
| Treatment group | 518 (51.75%) |
| Control group | 483 (48.25%) |
| Gender[a] | |
| Female | 759 (84.99%) |
| Male | 134 (15.01%) |
| Race[b] | |
| White | 453 (68.22%) |
| Black | 80 (12.05%) |
| Hispanic | 75 (11.30%) |
| Asian | 22 (3.31%) |
| Other | 34 (5.12%) |
| Teacher[c] | |
| Special education | 31 (20.80%) |
| General education | 118 (79.19%) |

[a]Percentages based on studies that disclosed gender information, ($n = 893$).
[b]Race percentages based on studies thatdisclosed ethnographic information, ($n = 664$).
[c]Teacher percentages based on studies that disclosed employment type, ($n = 149$).

**TABLE 2** Sample, research design, and intervention components for included studies

| Study | *n* | Type | Intervention | Dosage (hr) | Weeks | Intervention activities | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Breathwork | Yoga | Mental exercises | Meditation | Discussion |
| Ancona and Mendelson (2014) | 43 | RCT | HLF | 4.5 | 1.5 | Yes | Yes | No | Yes | Yes |
| Anderson et al. (1999) | 91 | RCT | Standardized meditation | 8.5 | 5 | Yes | No | No | Yes | Yes |
| Bakosh (2013) | 16 | Quasi | Inner explorer | 8.83 | 10 | Yes | No | No | Yes | No |
| Benn et al. (2012a) | 28 | RCT | SMART-in-education | 36 | 5 | Yes | No | Yes | Yes | Yes |
| Beshai et al. (2016) | 89 | Quasi | Foundations course | 10 | 8 | No | No | Yes | Yes | No |
| Crain et al. (2017)[a] | 113 | RCT | SMART-in-education | 36 | 8 | Yes | No | Yes | Yes | Yes |
| Flook et al. (2013) | 18 | RCT | Adpated MBSR | 26 | 8 | Yes | Yes | Yes | Yes | Yes |
| Franco, Mañas, Cangas, Moreno, and Gallego (2010) | 68 | Quasi | Flow | 15 | 10 | Yes | No | Yes | Yes | Yes |
| Frank et al. (2015) | 36 | Quasi | Adapted MBSR | 16 | 8 | Yes | Yes | No | Yes | Yes |
| Gouda et al. (2016) | 29 | Quasi | MBSR | 24 | 8 | No | Yes | No | Yes | No |
| Harris et al. (2016) | 64 | RCT | CALM | 21.3 | 16 | Yes | Yes | Yes | Yes | No |
| James (2016) | 39 | RCT | Headspace | 1.67 | 1.42 | Yes | No | Yes | Yes | No |
| Jennings et al. (2017) | 224 | RCT | CARE for teachers | 30 | 5 | Yes | Yes | Yes | Yes | Yes |
| Jennings et al. (2013) | 50 | RCT | CARE for teachers | 30 | 6 | Yes | No | Yes | Yes | Yes |
| Kemeny et al. (2012) | 76 | RCT | Meditation/emotion regulation training | 42 | 8 | No | Yes | Yes | Yes | Yes |
| Roeser et al. (2013)[a] | 113 | RCT | SMART-in-education | 36 | 8 | Yes | No | Yes | Yes | Yes |
| Taylor (2016) | 17 | Quasi | MBEB | 27.5 | 9 | Yes | No | Yes | Yes | Yes |
| Taylor et al. (2016)[a] | 56 | RCT | SMART-in-education | 36 | 8 | Yes | No | Yes | Yes | Yes |

Abbreviations: CALM, community approach to living mindfully; CARE, cultivating awareness and resilience in education; HLF, holistic life foundation curriculum; MBSR, mindfulness-based stress reduction; MBEB, mindfulness-based emotional balance program; SMART, stress management and relaxation techniques.

[a]These studies used whole or partial duplicate data sets and only the original Roeser et al. (2013) set was counted towards totals.

**TABLE 3** Outcome measures

| Study | Mindfulness | Stress | Anxiety | Burnout | Depression |
|---|---|---|---|---|---|
| Ancona and Mendelson (2014) | – | TSI | – | MBI-ES | – |
| Anderson et al. (1999) | – | TSI | STAI-A | MBI | – |
| Bakosh (2013) | MAAS | PSS | – | – | – |
| Benn et al. (2012a) | FFMQ | PSS | STAI-A | | CES-D Scale |
| Beshai et al. (2016) | FFMQ | PSS | – | – | – |
| Crain et al. (2017)[a] | FFM[a] | – | – | – | – |
| Flook et al. (2013) | – | – | – | MBI | – |
| Franco et al. (2010) | – | – | SCL-90-R | – | SCL-90-R |
| Frank et al. (2015) | FFMQ | – | BSI | MBI | BSI |
| Gouda et al. (2016) | FMI | PSQ | HADS-A | | HADS-A |
| Harris et al. (2016) | FFMQ | PSS | – | MBI | – |
| James (2016) | MAAS | DASS | – | – | – |
| Jennings et al. (2017) | FFMQ<br>MTS | PSS | GAD-7 | MBI | – |
| Jennings et al. (2013) | FFMQ | – | – | MBI | CES-D Scale |
| Kemeny et al. (2012) | MAAS | – | TAI | – | BDI |
| Roeser et al. (2013)[a] | FFMQ | NR | STAI-A | MBI | STAI-A |
| Taylor (2016) | Interpersonal Mindfulness in Teaching scale | – | – | – | – |
| Taylor et al. (2016)[a] | – | NR | – | – | – |

Abbreviations: BDI, Beck Depression Inventory; BSI, Brief Symptom Inventory; CES-D Scale, The Center for Epidemiologic Studies Depression Scale; DASS, Depression Anxiety and Stress Scale; FMI, Freiburg Mindfulness Inventory; FFM, Five Factor Mindfulnes Questionaire; FFMQ, Five Facet Mindfulness Questionaire; GAD-7, Generalized Anxiety Disorder 7-item Scale; HADS-A, Hospital Anxiety and Depression Scale; MAAS, Mindful Attention Awareness Scale; MBI, Maslach Burnout Inventory; MBI-ES, Maslach Burnout Inventory-Educator Survey; MTS, Mindfulness in Teaching Scale; NR, not reported; PSS, Percieved Stress Scale; PSQ, Percieved Stress Questionnaire; STAI-A, State-Trait Anxiety Inventory for Adults; SCL-90-R, symptom checklist-90-R; TAI, Trait Anxiety Inventory; TSI, Teacher Stress Inventory.
[a]Study not included in analysis.

## 3.5 | Quality indicators

Manuscripts were assessed for quality using 23 of the indicators from the CEC for evidence based practices of the Council for Exceptional Children (Cook et al., 2015). Using a binary coding system, 1 indicating standard was met and 0 indicated no evidence of standard, papers ranged in quality ($M = 17.61$, $SD = 3.01$). The range of total quality

**TABLE 4** Meta-analysis results comparing intervention and control groups on included outcome measures

| Outcome domain | No. of studies | *n* | Heterogeneity | | Effect size | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | $I^2$ | *p* | SMD | 95% CI | | *z* | *p* |
| Mindfulness | 11 | 788 | 81.0% | <.01 | 0.94 | 0.56 | 1.32 | 4.85 | < .01 |
| Stress | 10 | 743 | 53.5% | .07 | −0.53 | −0.76 | −0.30 | 4.46 | < .01 |
| Anxiety | 8 | 672 | 52.9% | .07 | −0.52 | −0.78 | −0.25 | 3.77 | < .01 |
| Burnout | 8 | 639 | 19.8% | .28 | −0.33 | −0.52 | −0.15 | 3.52 | < .01 |
| Depression | 7 | 407 | 17.5% | .02 | −0.67 | −0.92 | −0.42 | 5.21 | < .01 |

Abbreviations: MBI, mindfulness-based interventions; *n*, number of participants.

score was as low at 10 standards met and as high as 21 standards met. Only five manuscripts met standard 5.1, in which studies assessed for dosage and intervention fidelity using reliable measures such as checklist (Cook et al., 2015). In addition, only one-third of the papers included a mention of the role of the intervention agent or measured across treatment and control groups for comparisons in the baseline conditions. Contrarily, all studies clearly defined their measurement of outcomes and calculated the effects of the intervention using appropriate statistical techniques.

## 4 | DISCUSSION

Teacher emotions significantly influence student academic achievement as well as student emotions (Becker et al., 2014). Research suggests that emotions are contagious; when a teacher is angry, their students are more likely to feel anger, when a teacher is calm the same is true (Becker et al., 2014; Goetz, Lüdtke, Nett, Keller, & Lipnevich, 2013; Hatfield et al., 1993). Thus, if teachers feel burnt out their student's will as well, and this has the potential to diminish student performance. Teacher feelings of stress are common among the profession, leading educators to have poorer mental and physical health outcomes (Herman et al., 2018). This is due to a multitude of reasons, however, can be prevented. Many of the studies in this meta-analysis specifically addressed these challenges through interventions that promote mindfulness practices. This is supported in the work of Chang (2013) and Herman et al. (2018); teachers who take proactive steps are better able to prevent burnout. Having an increased awareness of emotions throughout the day, with the assistance of mindfulness may aid teachers in staving off feelings of burnout and improve emotional outcomes for themselves and their students. These teachers may have a better understanding of the challenges of the profession and attempt to take care of their emotions; which in turn improves classroom climate and achievement for students.

Mindfulness-based interventions have shown promise in assisting professionals with emotion management, improving health outcomes, and decreasing rates of burnout (Jennings et al., 2013; Miller et al., 1995; Vibe et al., 2017). The purpose of this study was to analyze the effects of mindfulness training on teacher perceptions of their mindfulness, stress, anxiety, burnout, and depression.

Overall, this analysis suggests mindfulness to have statistically significant positive outcomes related to increases in teacher mindfulness, and decreases in stress, anxiety, burnout, and depression. This paper includes 18 control-trial studies ($N$ = 1,001), with in-service teachers using mindfulness as a primary intervention were identified and analyzed. Studies were not limited to peer review journals. The small to moderate overall effects of mindfulness practices for teachers mimic similar findings of other meta-analytic reviews (Klingbeil & Renshaw, 2018). Although interventions ranged in length per session, weeks implemented, and variety of employed methods of mindfulness such as visualizations, meditations, breathwork, and yoga, teachers increased their levels of mindfulness substantially.

In addition, mindfulness interventions were shown to be a promising intervention to aid in the decrease in educator feelings of stress and anxiety (e.g., Ancona & Mendelson, 2014; Harris, Jennings, Katz, Abenavoli, & Greenberg, 2016). Similarly, mindfulness-based interventions were an effective method to decrease teacher's feelings depression and burnout (e.g., Anderson, Levinson, Barker, & Kievvra, 1999; Benn et al., 2012a; Gouda, Luong, Schmidt, & Bauer, 2016). Knowing that even the smallest doses of mindfulness are impactful in decreasing feelings of stress, anxiety, and depression, educators, and administrators alike must begin considering their mental health practices for prevention of burnout.

The ability of mindfulness interventions to decrease in-service teacher's feelings of stress, anxiety, burnout, and depression, has important implications for all educators, particularly those in high-stress environments. Educators working with students influenced by trauma, with disabilities, or in intensive environments such as schools within the juvenile justice system, should consider adding mindfulness to their daily school routines. Working, as an educator is a challenge, and far too many teachers are leaving the field due to burnout. Mindfulness is capable of increasing teacher job-satisfaction, and in turn, improving student outcomes. School based practitioners that are feeling burnout, anxiety, or stress should consider implementing mindfulness practices daily or weekly. With

mindfulness-based activities so readily available through phone-based applications, this intervention could decrease the incidence of teacher burnout and thus can be a cost-effective method for decreasing rates of attrition. School districts may consider purchasing mindfulness apps for their educators as part of their wellness initiative or begin using these tools as part of professional development days. The culture of burnout acceptance needs to stop being the norm within our educational system, and promoting wellness through practices such as mindfulness can and should become commonplace for educators in all settings.

## 4.1 | Limitations

Limitations of current mindfulness-based interventions include intervention implementation fidelity. Many of the studies reported here were limited in their reporting on implementation fidelity. As mindfulness interventions have many components, it is difficult to ascertain which particular aspects of these interventions were effective. In addition, future researchers are advised to implement reliability measures such as fidelity checklist, dosage tracking, and even attendance and attrition rates of participants.

A second limitation of this manuscript and the manuscripts of this analysis includes possible positive reporting bias, as all of the participant outcome measures were self-reported questionnaires. Additional caution in the interpretation of results is warranted as studies are often left unpublished when results are null or negative; as the manuscripts included in this paper are only positive, publication bias may be a threat. Future researchers are urged to pre-register their studies to combat this bias. Moreover, replication of previously conducted studies assists this effort as well as the development of the evidence base. Furthermore, many of the interventions employed a variety of mindfulness techniques, making it difficult to draw comparisons amongst the interventions. Limitations of the current review include possible gaps in collecting applicable studies as only two databases were used in the search.

In the future, research regarding mindfulness-based interventions would benefit by narrowing the specific components of mindfulness that are effective in producing positive health outcomes for teachers. In addition, relating outcomes back to student academic achievements, emotional growth, and improvements in student behavior would add knowledge to the field and show even greater benefits of this intervention. As mindfulness finds it's place in the field of education, researchers should be encouraged to look at how mindfulness practices impact rates of burnout and teacher attrition.

Educators may consider using informal and formal practices throughout their days to assist them with personal behavior management. Teachers in high-stress environments may benefit from moments of mindfulness throughout their academic day to improve their wellness and vicariously improve student outcomes. Research indicates that the majority of teachers will experience instances of decreased well-being, and by acknowledging this reality, may combat some effects of burnout effects may combat. Administrators should provide resources such as literature on the indicators of burnout as it relates to the teaching profession. Subsequent activities, such as taking mindful moments before professional development or staff meetings, are an excellent first step in promoting a school climate that values health and wellness.

References marked with an asterisk indicate studies included in the meta-analysis.

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