Educational Psychology Review (2024) 36:129
https://doi.org/10.1007/s10648-024-09966-y

REVIEW ARTICLE

The Intervention Effects on Teacher Well-being: A Three-Level Meta-Analysis

Yingxiu Li[1] · Xiang Wang[2] · Junjun Chen[1] · John Chi-Kin Lee[3] · Zi Yan[4] · Jian-Bin Li[5]

Accepted: 16 October 2024

Abstract

This meta-analytical review aims to investigate the overall effect of comprehensive interventions on teacher well-being and the factors that moderate the effect by synthesizing empirical evidence. A total number of 176 effect sizes from 44 studies were included in this study. The results reported the mean effect size of intervention on teacher well-being was significant ($g = 0.35$). The study quality ($F = 5.38$, $p < .01$), intervention type ($F = 3.03$, $p < .05$), and intervention duration ($F = 2.80$, $p < .05$) were identified as the statistically significant moderators for the overall effect. The further multiple moderator model reported a significant outcome ($F = 2.91$, $p < .01$). This study is the first attempt to synthesize the impact of the intervention on teacher well-being using a three-level model. Conceptual, methodological, and practical implications were provided and particular guidelines for professionals and education policy makers to better promote teacher wellness were also presented.

Keywords Teacher · Well-being · Intervention · Meta-analysis

Teaching is widely regarded as a professionally and emotionally demanding profession (Gray et al., 2017). Plenty of evidence has found that teachers nowadays struggle with huge well-being related problems due to increasing accountability, diverse students, demanding parents, challenging school atmosphere, and rapidly-changing initiatives (Pressley, 2021; Ross et al., 2012). For example, Bauer et al. (2006) reported 32.5% of teachers suffered from burnout, particularly 17.7% suffered severe strain, while the size of school classes and behavior of difficult pupils were considered to be the most burdening conditions. Another study from Chen (2019b) reported that teachers described 32 negative emotions (e.g., anger, helplessness, and sadness) due to lack of achievement, imbalance of teacher lives, misunderstanding from parents, and unhealthy collegial competition. Improving teacher well-being therefore seems to be a pressing issue, especially in the post-pandemic period in which the

Extended author information available on the last page of the article

Published online: 05 November 2024

aforementioned issues have been unavoidably more manifest. Literature on teacher well-being has demonstrated that it significantly contributes to their personal and professional development, students' learning process and achievement outcomes, as well as school thriving (Gray et al., 2017; Hascher & Waber, 2021; Patrick et al., 2000; Rahm & Heise, 2019; Spilt et al., 2011; Turner & Theilking, 2019). Consequently, a growing number of interventions have been developed aiming to foster teacher well-being ultimately for school effectiveness and quality education.

The current literature indicates some major types of interventions include mindfulness-based programs, psychology-related interventions like positive psychology-based practice and programs to mitigate negative emotions (Crain et al., 2017; Lang et al., 2020; Schoeps et al., 2019). Along with teacher well-being interventions having gained increasing attention, a number of literature reviews addressing the impact of intervention programs on teacher well-being have also emerged (e.g., Hwang et al., 2017; Ross et al., 2012). These reviews of teacher well-being interventions have made great contributions to optimizing the design of teacher well-being interventions so as to enhance teacher well-being. However, most of these literature reviews utilized a narrative synthesis (e.g., Emerson et al., 2017), a scoping review (Corbett et al., 2022), or traditional systematic analysis (e.g., Vo & Allen, 2022). Meta-analytical reviews concerned with interventions on teacher well-being seem scarce. Meta-analysis is a type of analysis using statistical methods and taking an objective approach to quantitively synthesizing studies (Cooper et al., 2019). Three-level meta-analysis refers to a specific approach used in the meta-analysis when the included studies have the multiple levels of data (Harrer et al., 2021). It enables a more comprehensive analysis of the data and allows for the exploration of individual-level, study-level, and higher-level factors, contributing to the outcomes of interest in meta-analysis. A few current meta-analyses on teacher well-being interventions have focused on the impact of specific types of interventions on teacher well-being (e.g., mindfulness intervention by Carsley et al., 2017; Klingbeil & Renshaw, 2018; Zarate et al., 2019; psychological intervention by Beames et al., 2023). It seems that no attempt has been made to summarize comprehensive types of interventions that focus on teacher well-being, especially utilizing a three-level meta-analysis. Integrating different types of intervention programs for teacher well-being is conducive to understanding the overall effect size of all interventions, comparing effectiveness among different types, and identifying potential moderators more completely. In response to these concerns, this paper aimed to synthesize those studies that not only covered different teacher well-being interventions but also identified significant moderators of teacher well-being interventions. Consequently, this paper will provide comprehensive evidence for improving the design and effect of teacher well-being interventions in future research and practice.

Teacher well-being

Well-being is considered as a multidimensional construct, given the diversity of explanations present in the literature. It seems that no agreements have been reached regarding a unified definition of well-being to date (Acton & Glasgow, 2015; Dreer & Gouasé, 2022; Zhang et al., 2023). This blurred-conceptual

phenomenon has inevitably affected the definition of teacher well-being. The early definition of well-being as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" proposed by the World Health Organization (1946) has been frequently referenced in the literature. Various scholars have also explained well-being from different perspectives. For instance, Diener et al. (1999) considered subjective well-being to be a multidimensional construct that involves a cognitive part with which we evaluate our life satisfaction, and an affective part that concerns our positive or negative emotional reactions. Keyes (2002) integrated emotional, psychological, and social as three facets of well-being. Dodge et al. (2012) described well-being as including a balance between resources and challenges from psychological, social, and physical aspects. Furthermore, Horn et al. (2004) defined occupational well-being as "positive evaluation of various aspects of one's job, including affective, motivational, behavioral, cognitive and psychosomatic dimensions". When specifically considering teacher well-being, some scholars define it as the construction of individual professional fulfillment, satisfaction, purposefulness, and happiness during collaboration with colleagues and students (Acton & Glasgow, 2015; Soini et al., 2010). However, although consensus on the definition of either well-being or teacher well-being has not been achieved, it seems that scholars in well-being science across different disciplines do agree that the nature of teacher well-being is multidimensional (Hascher et al., 2021; Viac & Fraser, 2020).

Roeser et al. (2024) proposed a 2×2 model of teacher well-being. The model distinguishes teacher personal well-being and occupational well-being as two main domains. Within each domain, there are two subdimensions including presence of strengths and absence of symptoms. For personal well-being, it includes the presence of positive personal emotional experiences (i.e., life satisfaction and self-compassion) and the relative absence of negative symptoms (i.e., stress and anxiety). Likewise, for occupational well-being, teacher job satisfaction would be an example of the presence of strengths dimension, while occupational burnout would be an example of the absence of symptoms dimension. This model clearly defines and assesses different types of teacher well-being, which is useful to characterize these experiences. Bearing these in mind, this model was adopted in this paper as the theoretical framework to anchor the categories of teacher well-being. In brief, the multidimensional nature of teacher well-being in this study mainly covers four aspects, namely personal well-being - presence of strengths, personal well-being - absence of symptoms, occupational well-being - presence of strengths, and occupational well-being - absence of symptoms.

Further to the recognition of teacher well-being, research has identified that teacher well-being is related not only to their own performance but also to the sustainable development of students, schools, and even the education system. Particularly, evidence has indicated that teacher well-being affects their subjective happiness and life satisfaction as individuals (Chen, 2019a; Kern et al., 2014; Mahipalan & Sheena, 2019), and their teaching effectiveness, work engagement, and career commitment as professionals (Bentea, 2015; Gan & Cheng, 2021; Zeng et al., 2019). For example, Capone and Petrillo (2018) reported teachers with a higher level of well-being showed higher job satisfaction, self-efficacy, and

collective efficacy, and lower depression and burnout. On the contrary, teachers with a lower level of well-being were prone to experience higher levels of stress and burnout related to personal, work, and interaction with students, which also resulted in higher turnover intention (De Stasio et al., 2017; Fu et al., 2022). The impact of teacher well-being on students is also notable. Previous scholars have verified the significance of teacher well-being facilitating the teacher-student relationship and student learning achievement (Briner & Dewberry, 2007; Glazzard & Rose, 2019; Penttinen et al., 2020; Turner & Theilking, 2019). Moreover, Özü et al. (2017) summarized that teacher well-being was negatively related to student behavioral problems and positively related to student well-being. Furthermore, teacher well-being has been recognized in multiple studies as a key element for school flourishing and retention of education quality (Dreer & Gouasé, 2022; McCallum, 2020a; Shankland & Rosset, 2016; Viac & Fraser, 2020). Teachers themselves have reported frequently encountering various challenges and have experienced negative states indicating teacher well-being is at risk (Chen, 2019b; Turner & Theilking, 2019; Yin et al., 2016; Yu et al., 2022). Given these potential threats, there is an urgent need to understand the effects of interventions to promote teacher well-being and reduce ill-being (Farber, 2000; Ross et al., 2012; Sharrocks, 2014).

Intervention for Teacher well-being

Existing intervention studies focusing on the teacher well-being enhancement may date back to the 1990s. In 1990, Larsson et al. conducted a stress control program to promote physical health, well-being, work satisfaction, work-related ill health, and mood among Swedish high school teachers. The results showed that there were significant differences in well-being among the treatment group and control group (Larsson et al., 1990). Scholars later attempted to explore and verify various intervention programs for teacher well-being development (e.g., Trent, 1997; Anderson et al., 1999; De Jesus & Conboy, 2001).

Regarding the intervention design of teacher well-being, this paper mainly focuses on its type, delivery mode, and duration. All these components matter for the effects. The intervention types refer to different categories or classifications of intervention approaches used to promote teacher well-being. Existing research identified various types of interventions for fostering teacher well-being. They consist of mindfulness-based interventions, psychology-related interventions (i.e., positive psychology-based intervention and practice of mitigating negative emotions), physical-related interventions, and other types of interventions.

First, the well-known interventions are mindfulness-based programs. These types of interventions promote well-being through a series of mindfulness practices and meditations. Existing literature reported various benefits for teachers through mindfulness-based programs. For example, Roeser (2014) described mindfulness-based interventions in educational settings and identified their effect to promote the personal well-being of teachers and students. In addition, the mindfulness-based intervention has been found to improve teacher well-being from the perspectives of

enhancing teacher self-mindfulness, self-compassion, self-regulation, work efficacy, focus and memory, and even sleep quality (e.g., Frank et al., 2015; Roeser et al., 2013) and to reduce teachers' symptoms of depression, anxiety, stress, and burnout (e.g., Jennings et al., 2013; Kemeny et al., 2012).

Second, psychology-related interventions for teacher well-being have also been widely used. These interventions refer to the programs that target teachers' thoughts, feelings, emotions, and responses with relation to stressful situations (Beames et al., 2023). They include various practices to improve mental health or alleviate negative symptoms. The classic one focuses on positive psychology-based strategies to cultivate positive feelings, cognitions, and behaviors (Sin & Lyubomirsky, 2009). For example, Chan (2013) compared gratitude intervention with coping intervention for teachers. The study found that a statistically significant change in life satisfaction and experience of emotions only occurred for the positive gratitude approach. Moreover, Shankland and Rosset (2016) examined positive psychology intervention from four aspects (mindfulness, gratitude, strengths, and positive relationships) and identified promising benefits for teacher and student well-being and school climate as well. In addition, another type of intervention refers to the psychological practice to mitigate negative emotions. For instance, Siu et al. (2014) conducted an intervention with training programs mainly focused on stress management and coping. The result from the teacher group showed they eventually buffered against physical and psychological symptoms such as insomnia and depressed mood. Similarly, teachers reported an improvement in their resilience, subjective attitude, and psychological well-being through interventions centered around identifying stressful thoughts (Zadok-Gurman et al., 2021).

Third, physical-related interventions for teacher well-being focus on incorporating structured physical activity or yoga practice. Physical activity has been reported to improve the mental state of teachers and relieve their negative symptoms. For example, Telles et al. (2018) conducted the 15-days yoga practice that included specific physical postures for primary school teachers to increase their mental well-being and reduce state anxiety. Moreover, Latino et al. (2021) verified an 8-week yoga-based physical exercise intervention consequently reduced burnout among teachers in a public high school. In brief, physical-related interventions highlight the importance of certain physical practices to support physical and mental wellness.

Existing literature also mentioned some other nonuniversal interventions that differ from the types mentioned above. For example, Grant et al. (2010) developed a coaching program that helps teachers receive feedback on their leadership style to enhance their workplace well-being and reduce their stress. In addition, Kennedy et al. (2021) evaluated a teacher classroom management program for Ireland teachers and reported significant improvements in their well-being. In addition, other teacher well-being-related intervention projects were also mentioned mentoring programs (Richter et al., 2013) and techniques-related interventions focusing on smartphone-based recovery (Virtanen et al., 2019). Since these kinds of intervention programs are not widely adopted, it is difficult to further categorize them. Therefore, this study classified these interventions as other types of intervention.

It is worth noting that teacher well-being interventions are delivered in multiple ways. One common approach is to conduct the program face to face (Vo & Allen,

2022). Online training is also considered as an effective way to deliver interventions (Lang et al., 2020). Furthermore, blended learning training with online and offline modes was also used for conducting interventions (Zadok-Gurman et al., 2021). The duration of the intervention is also a matter of relevance. The duration of interventions varied from one day to over a year (Dreer & Gouasé (2022). The majority of durations of intervention for teacher well-being were spread over eight weeks or more. Likewise, the frequency and the session length of the interventions varied across studies (Beames et al., 2023; Vo & Allen, 2022; Zarate et al., 2019).

Regarding intervention effectiveness, the existing literature reported inconsistent findings. For instance, the systematic review from Emerson et al. (2017) reported that effect size and the quality of mindfulness-based intervention for school teachers varied among studies. Similarly, Lomas et al. (2017) summarized that the vast majority of studies reported facilitating mindfulness from the intervention, while only a few findings did not show an increasing effect. Furthermore, one analysis focusing on psychology-based intervention clarified that studies provided mixed results for well-being and depression (Sin & Lyubomirsky, 2009). Therefore, it is necessary to conduct a meta-analysis by combining data from multiple studies to improve the accuracy and precision of overall treatment effects estimation. Moreover, the more effective and less effective intervention programs will be identified for future preventions and interventions.

Prior meta-analyses of Intervention for Teacher well-being

By reviewing existing literature, three meta-analyses of teacher well-being have been identified. First, Klingbeil and Renshaw (2018) synthesized the effects of mindfulness-based interventions on the domains of therapeutic process and treatment outcome among teachers. They reported interventions promoting mindfulness, psychological well-being, and decreasing psychological distress among teachers. Second, Zarate et al. (2019) examined mindfulness-based intervention on teachers as the primary participants and showed the intervention enhanced teacher feelings of mindfulness and reduced their stress, anxiety, and feelings of depression and burnout. Third, Beames et al. (2023) inclined to summarize the impact of various psychological programs on teacher stress, anxiety, depression, professional burnout, and well-being.

Based on these three studies, several research gaps can be identified for better discussion of the interventions for teacher well-being. The first one is to summarize various types of interventions for teacher well-being, not only focus on one specific type of intervention (e.g., mindfulness intervention), and verify their overall effects on teacher well-being. Second, focusing on a pure teacher sample may provide more precise outcomes and avoid bias on the impact of interventions on teacher well-being. Third, identifying potential moderators of intervention effects on teacher well-being to explore the heterogeneity source in terms of effect size. Fourth, conducting a three-level meta-analysis to provides a more comprehensive and accurate the estimate of effect sizes.

The three-level meta-analysis is an advanced meta-analytic approach that considers three different variance components distributed over the three levels of the model, which enables effect sizes to exhibit variability between participants (level 1), outcomes (level 2), and studies (level 3) (Assink & Wibbelink, 2016). Compared to the typical meta-analyses that accounts for two levels of variability (sample level and study level), the three-level meta-analysis can better explore sources of variability at multiple levels. Besides, previous meta-analyses applied strategies such as combining effect sizes or removing parts of effect sizes (Cheung, 2014) in order to follow the assumption of the independence of effect sizes. These may result in either the loss of valuable information or the underestimation of differences between effect sizes. In contrast, a three-level meta-analysis can overcome these limitations by addressing data dependence and enhancing the statistical power. When specifically focusing on the existing teacher well-being literature, the understanding of the three levels can be explained as follows. Level 1 refers to the outcome for the smallest unit of participants' well-being through a "pooled" form (e.g., authors indicated with the mean and standard deviation of well-being indicators for studied sample) and report the aggregated effect size. Level 2 considers that various literature divides well-being into several indicators or different subgroups and examine well-being with different measurements within study. On this basis, we nest these effect sizes within several clusters at this level. Lastly, level 3 captures the variability of effect sizes in well-being across different studies. By interpreting these variance components, we can better understand not only the overall effectiveness of the interventions but also the potential moderators those are most effective for teacher well-being.

In summary, based on previous studies, this study aims to summarize the effect size of the comprehensive interventions on well-being through pure teacher samples, and identify potential factors that moderate the effect size of intervention on teacher well-being via a three-level meta-analysis. This can provide a more comprehensive and rigorous picture of the evidence on teacher well-being development.

Moderators of the Intervention Effect on well-being

Moderators of intervention effect on well-being refer to the potential factors that influence the effectiveness of interventions aimed at improving teacher well-being. These moderators help explain variability in effectiveness, allowing for targeted and tailored interventions that enhance teacher well-being and inform further implementation strategies. Understanding these moderators leads to more effective approaches in facilitating teacher well-being across diverse educational settings. Therefore, it is necessary to identify the potential moderators in this study.

Since there is currently limited literature specifically considering the moderators of intervention on teacher well-being, the potential moderators will be discussed from the research on intervention for well-being in the general population. Several moderators of intervention effects on well-being have been mentioned, which can be roughly divided into sample/population characteristics (e.g., Carsley et al., 2017), study/design/methodology characteristics (e.g., Fikrat-Wevers et al., 2021; Klingbeil

& Renshaw, 2018), and intervention/program characteristics (e.g., Klingbeil & Renshaw, 2018).

Regarding sample characteristics, the research mentions that factors, such as participants' gender, cultural orientation, and work experience, moderate the effect of the intervention on well-being. For instance, some research suggests that females may be more responsive to intervention programs (e.g., Parker et al., 2014, Pinquart & Sörensen, 2001), Carsley et al. (2017) reported that individual differences in terms of gender and developmental periods affect the effectiveness of mindfulness training among students. In addition, individual cultural beliefs can moderate the effect of well-being intervention. For example, Layous et al. (2013) mentioned the effects of intervention on well-being were moderated by participants' cultural orientation. Participants from the United States and South Korea reported the significant differences in the effect improvement after a positive activity intervention. They emphasized that cultural factors should be considered when designing activities to increase happiness and well-being. It is noted that current research generally suggests that cultural differences can be primarily divided into collectivism and individualism (Oyserman & Lee, 2008; Triandis, 1996, 2018). Individuals from East Asian countries (i.e., China, Japan, and South Korea) primarily exhibit collectivism (e.g., Yeh, 2015), while individuals from the United States and other Western European countries have high scores on the individualism dimension (e.g., Hofstede, 2001). Moreover, other studies have indicated that participants with different working years may perform differently in some stress-reduction inventions (e.g., Subel et al., 2022), which can also be considered to have working experience as a potential moderator.

For research characteristics, several factors including sampling method, experimental condition, and participant assignment can be considered as the potential moderators. For example, Klingbeil and Renshaw (2018) coded whether random assignment occurred in terms of design characteristics and tried to predict heterogeneity in the overall treatment effects. In addition, Fikrat-Wevers et al. (2021) considered publication source, study design which distinguished experiments and quasi-experiments, and implementation quality as the moderator indicators.

For intervention characteristics, the existing research mentioned the factors including intervention types, and frequency, and duration. For instance, Roeser (2014) discussed the duration of the intervention in terms of intervention characteristics, while Carsley et al. (2017) mentioned the types of interventions as one part of the moderator analysis to examine its effects on mindfulness intervention for mental health in youth. Similarly, Klingbeil and Renshaw (2018) also consider both types of interventionists and intervention dosages as potential moderators.

When specifically focusing on the intervention effect on teacher well-being, the current studies either lacked sufficient effect sizes to explore moderators or failed to find statistically significant moderators (Emerson et al., 2017; Zarate et al., 2019). Specifically, Zarate et al. (2019) reported that moderator analyses were not conducted due to insufficient studies which would lack stability for subsequent coefficients. Furthermore, Klingbeil and Renshaw (2018) reported no moderators were statistically significant when discussing mindfulness-based interventions for teachers. These previous meta-analysis reviews and studies inspired this review to

identify potential moderators based on an adequate amount of research and a more holistic perspective to better facilitate teacher well-being. On this basis, this study examined whether the effect differs across sample, study, and intervention characteristics and aimed to identify potential moderators of the effect of interventions on teacher well-being.

Research Questions

Based on the considerations above, this meta-analysis aims to answer two specific research questions (RQ):

RQ1: What is the overall effect of interventions on teacher well-being?
RQ2: What factors moderate the effect size of interventions on teacher well-being?

Method

In this part, we describe the searching strategy and the criteria of selection first, followed by the coding procedure. The effect size calculation and data analysis procedure are also provided.

Searching Strategy and Inclusion Criteria

Several strategies were utilized to identify relevant studies. First, the time range for this review was set from 1990 to 2022 to meet our aims of conducting a comprehensive meta-analysis of teacher well-being interventions. We searched relevant studies published since 1990 because the existing intervention studies specifically focus on improving teacher well-being since 1990s and most of these kinds of studies were published after 1990. As some journals make adjustments of their publications, we conducted a final search to reduce any omissions in April 2023. Second, Scopus was selected as the major database for this review because it is the largest searchable source of citations and abstracts which is continually expanded and updated (Chadegani et al., 2013; Schotten et al., 2017). The merits of using Scopus as the primary database is that Scopus provides broader and superior coverage compared to Web of Science and other databases. It continues to be the primary source for citation information and literature searches. Mongeon and Paul-Hus (2016) claimed that "Scopus has a larger number of exclusive journals than WoS in all fields" (p.7). Many studies have chosen Scopus as the primary source for documents due to it comprehensively covers published materials in the field of education and social science (Hallinger & Kovačević, 2019; Martín-Martín et al., 2021). This decision was further supported by comparative studies (Gavel & Iselid, 2008; Martín-Martín et al., 2021) that examined the characteristics of different databases. On this basis, we searched the title, abstract, and keyword of papers in Scopus using the searching string *("teacher" AND*

"well-being") OR ("teacher" AND "wellbeing") AND ("intervention"). Third, we used Google Scholar to supplement potential omissions. Fourth, to further reduce the risk of omissions, we searched the table of contents of several key journals: *Educational Psychology*, *Educational Psychology Review*, *International Journal of Environmental Research and Public Health*, *Journal of Educational Psychology*, *Journal of School Psychology*, *Mindfulness*, *Teachers and Teaching*, *and Teaching and Teacher Education.* Fifth, we also adopted a "snowball" strategy (Dietrichson et al., 2017) to scan through the reference list of previous review papers to double check for omissions of eligible articles (e.g., Dreer & Gouasé, 2022; Hwang et al., 2017; Zarate et al., 2019). A total of 1850 articles was yielded in the pilot search.

After removal of duplicates, the retrieved articles from the search were screened by title and abstract. The inclusion criteria for final meta-analysis were as follows. (1) The study should use a pure sample of K-12 in-service teachers. Some study samples which included both teachers and principals, teaching assistants, administrative staffs, pre-service teachers, retired teachers, or other educators were excluded. (2) The study should be an experimental/quasi-experimental design and should have conducted intervention programs using a controlled design, a pre-test/ post-test design, or a combination of controlled experiments and pre-post test. (3) The selected intervention programs should specifically target teacher well-being or include well-being as an outcome. (4) The study should clearly mention well-being or the related concept as an indicator of well-being (e.g., job/ life satisfaction, self-compassion, etc.). (5) The study should provide sufficient information (e.g., sample size, means, standard deviations) to be able to calculate the effect sizes. (6) The study should be published in English in peer-journal articles and the full-text had to be downloadable. A total of 44 journal articles were finally selected. The PRISMA flow chart (Moher et al., 2009) reported the process through which eligible articles were selected (see Fig. 1).

Coding Procedure

Coding procedure included study quality assessment, data extraction, reliability of coding. Once the selected articles were confirmed, a coding scheme was firstly designed to conduct quality assessment for each study. Secondly, the data of article information, sample characteristic, study characteristic, intervention characteristic, and outcome variables were extracted. Note that the coding of moderators is included in the data extraction part. Finally, the reliability in coding procedure is reported.

Study Quality Assessment

To ensure the quality of the selected articles, we utilized a five-criteria quality assessment to evaluate the overall quality of each study. This five-criteria quality assessment was adopted from but modified based on Thomas et al.'s (2004) model. It consists of selection bias, study design, confounders, scale collection, and

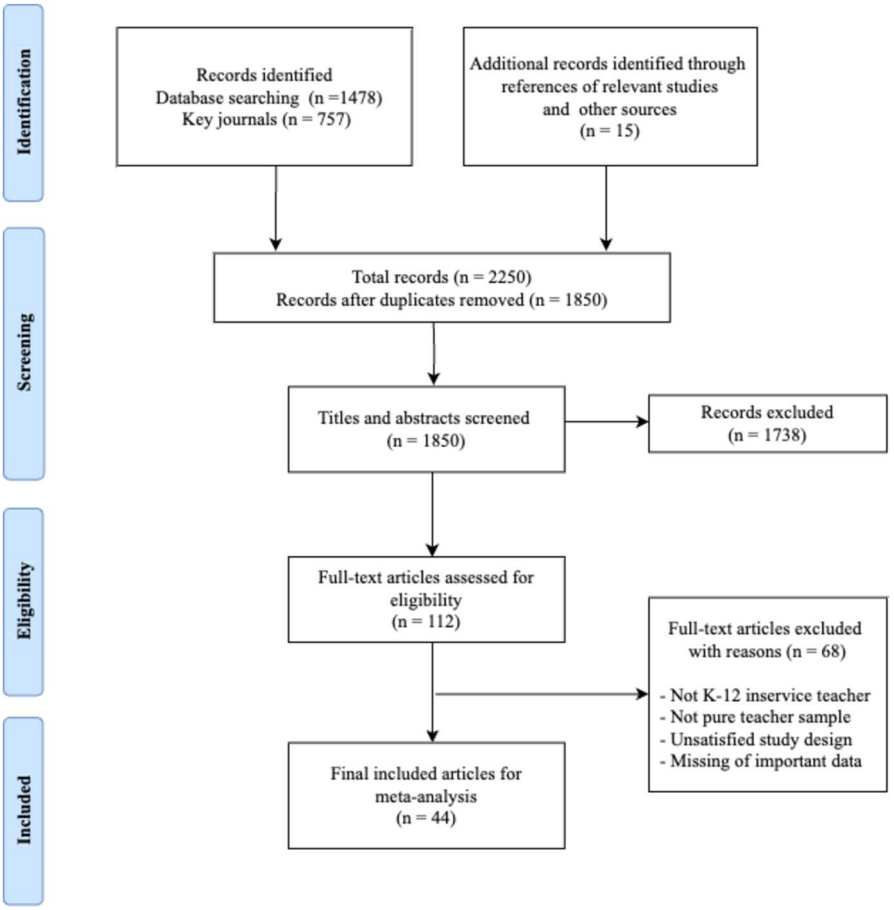

Fig. 1 PRISMA diagram of identification, screening, and inclusion process

dropouts (Table 1). These five dimensions were all evaluated using three categories including strong, moderate, and weak.

The first dimension refers to sampling and defines random sampling as strong, systematic sampling as moderate, and convenient sampling as weak. The second dimension focuses on method designs and considers studies that utilized control group design plus random assignment as strong, studies with pre-post design with or without random assignment as moderate, and those with no control group plus no random assignment as weak. The third dimension classified studies that reported and controlled potential confounders as strong; studies that reported but did not control potential confounders as moderate; and those didn't report or control the potential confounders as weak. For the fourth dimension, scales adopted from an authoritative inventory with high internal consistency and reporting Cronbach's alphas for the current study were considered as strong; scales adopted from an authoritative inventory but which did not show the reliability coefficient for the current study

Table 1 Quality assessment component and ratings for selected paper

Component	Strong (3)	Moderate (2)	Weak (1)
Sampling	Random sampling	Systematic sampling	Convenient sampling
Method designs	Experimental study utilized control group design plus random assignment	Pre-post design with or without random assignment	No control group plus no random assignment
Confounders	Reported and controlled potential confounders	study reported but not controlled potential confounders	didn't report and control the potential confounders
Scale	The adopted scale from an authoritative inventory with high internal consistency and reported Cronbach's alphas for the current study	The scales adopted from an authoritative inventory but did not show the reliability coefficient for the current study	The source of the adopted scale was not clearly stated or measured well-being only with a single item
Attrition rate	attrition rate below 0.20	Attrition rate between 0.20 and 0.40	Attrition rate above 0.40
Overall quality	A study with average scores from 2.4 to 3	A study with average scores from 1.7 to 2.3	A study with average scores from 1 to 1.6

were considered as moderate; when the source of the adopted scale was not clearly stated or measured well-being only with a single item studies were considered as weak. For the fifth dimension, an attrition rate below 0.20 was considered as strong, between 0.20 and 0.40 as moderate, and above 0.40 as weak.

In addition to evaluating the quality of studies from the five dimensions mentioned above, this study also synthesized an additional indicator representing the overall quality of each study. Based on the criteria of Thomas et al. (2004) and Yan et al. (2023), we quantitatively updated and assigned values for each quality level with 1 = "weak", 2 = "moderate", and 3 = "strong". The average score of the sum of five dimensions was then calculated to represent the overall quality. A study with average scores from 1 to 1.6 was considered as "weak" overall in study quality, from 1.7 to 2.3 was considered as "moderate", and from 2.4 to 3 was considered as "strong". This additional indicator may provide an overview of the quality of the selected articles.

Data Extraction

Following the guidelines proposed by Lipsey and Wilson (2001), this study developed a coding scheme to record study characteristics. A total of five coding categories (i.e., article information, sample characteristic, design characteristic, intervention characteristic, and outcome variables) were extracted from each study to calculate effect size and identify a list of potential moderators to explain the variation in effect sizes.

The first was article information, including the titles, published year, author name(s), and data location. It reflected the descriptors of the selected studies. The second type was sample characteristics, involving the means of age, gender ratio, research culture, and teaching experience of participants. The third type of information extracted was the design characteristic, including *sampling method* (convenient, random, or systematic sampling), *control group* (within or without), *random assignment* (within or without), *attrition rate*, and *quality* (weak, moderate, or strong). The fourth type was intervention characteristics, containing *intervention type* (mindfulness, psychological, physical, of other), *implementation form* (online, offline, or hybrid mode), *frequency* (within 1time/day, or without 1time/day), *duration of the interventions*, and *the type of responding well-being* (personal well-being - the presence of strengths, personal well-being - the absence of distress, occupational well-being - the presence of strengths, and occupational well-being - the absence of distress). The fifth type was the outcome variables, including the sample sizes of the studies, means, and standard deviations. Note that the coding content from sample characteristic, design characteristic, and intervention characteristic were also regarded as potential moderators for analysis.

Reliability of Coding Procedures

All selected papers were independently coded by authors. The reliability of the coding procedure was assessed in three ways. First, one coder coded all the data, while the other coder took 20% of random sample studies to code to ensure the reliability (Krippendorff, 2018). Inter-rater reliability (*Cohen's Kappa*) between the two coders was

above 0.80 with strong agreement (Landis & Koch, 1977). Second, doubts or controversial points were recorded for discussion till consensus was achieved within the team. Third, memos were utilized, including analytical reflections to ensure coding quality.

Effect size Calculation and data Analysis Procedure

In addition to the process of effect size calculation, the procedures of polling effect size, robustness estimation, and publication bias test are demonstrated as follows.

Cohen's *d* (also known as the standardized mean difference) (Cohen, 2013) values were calculated for all 178 sets of data identified in 44 studies to indicate their effect sizes. Because of differences in the studies' experimental design, the estimation of effect size was conducted through the following two ways.

First, for independent-groups pre-post-intervention designs ($k = 111$), we calculated the effect sizes through changes from the baseline. The following formulas were used:

$$d_1 = \frac{(\bar{x}1 - \bar{x}2)}{S_{pooled}} \tag{1}$$

$$S_{pooled} = \sqrt{\frac{(n1-1)s1^2 + (n2-1)s2^2}{(n1-1)+(n2-1)}} \tag{2}$$

$$SE_1 = \sqrt{\frac{n1+n2}{n1n2} + \frac{d^2}{2(n1+n2)}} \tag{3}$$

$$S_{E,\,Change} = \sqrt{\mathrm{SD}^2_{E,\,\mathrm{baseline}} + \mathrm{SD}^2_{E,\mathrm{final}} - (2 \times Corr \times \mathrm{SD}_{E,\mathrm{basseline}} \times \mathrm{SD}_{E,\,\mathrm{final}})} \tag{4}$$

where $\bar{x}\,1$, $\bar{x}\,2$ is obtained by subtracting the post mean from the pre mean; $n1$ and $n2$ are the sample sizes for those two groups, respectively; Standard deviation (SD) of change (i.e., $s1$, $s2$) is transformed by the following formula, and *Corr* was assumed as 0.5 between baseline and follow-up (Higgins et al., 2019).

Second, for those studies that did not have a control group (i.e., single-group pre-post intervention design) ($k = 65$), the effect size was calculated using the formula of Becker (1988) as follows:

$$d_2 = \frac{\bar{x}_{t1} - \bar{x}_{t2}}{\frac{\sqrt{(s^2_{t1}+s^2_{t2})/2}}{\sqrt{2(1-r_{t1t2})}}} \tag{5}$$

$$SE_2 = \sqrt{\frac{2(1 - r_{t1t2})}{n} + \frac{d2^2}{2n}} \tag{6}$$

where $\bar{x}_{t1}$ and $\bar{x}_{t2}$ are the post-test and pre-test mean outcomes for the experimental group; s_{t1} and s_{t2} are the standard deviations for this group; n is the sample size for this group; r_{t1t2} is the correlation between the outcome on both timepoints. However, the pre-post correlation of a variable is rarely ever reported in published research, which is a drawback of the formula. Therefore, we calculated the effect size by imputing a correlation of 0.50. Furthermore, it has been found that Cohen's *d* effect size has an upward bias when the sample size is small. Therefore, all the Cohen's values were converted into Hedges' *g* using the following formula suggested by Hedges (1981) so as to correct overestimation.

$$g = d \times (1 - \frac{3}{4n - 9}) \tag{7}$$

Because the majority of studies (31 studies, 68.89%) measured multiple types of well-being, one of the core assumptions of traditional meta-analysis that each effect size is independent was violated (Higgins et al., 2019). Therefore, we employed a three-level meta-analysis model (Cheung, 2014; Van den Noortgate et al., 2013; Noortgate et al., 2015). Three different categories of variability sources were differentiated by this model. On Level 1, variation of each effect size from sampling error; on Level 2, variation of each effect size from the same study; on Level 3, variation of each effect size from the difference between studies.

The three-level model extends the two-level model by adding a higher-level grouping or contextual level. It enables a more comprehensive analysis of the data and allows for the exploration of individual-level, study-level, and higher-level factors that contribute to the outcomes of interest in meta-analysis. A likelihood ratio test (LRT) was used to identify whether a three-level model was better than a two-level model (between-studies and within-studies) for explaining data. Furthermore, the variance observed at each of these levels was examined by moderator variables, introduced one by one in the three-level model. If there was more than one variable that had a significant impact on overall effect size, the multiple moderator model would be conducted.

To guarantee the robustness of the findings, we used the multilevel model for pooling effect size after removing the outlier. The outlier refers to the effect size that is in the outside of the interval ($\bar{x}$ – 2sd, $\bar{x}$ +2sd) (Acuna & Rodriguez, 2004). Finally, visual analysis funnel plots (Light & Pillemer) and the Egger's regression test (Egger et al., 1997; Fernández-Castilla et al., 2021) were used to identify the existence of publication bias. If two tests detect publication bias, we would employ the selection model of Vevea and Woods (2005) for acquiring corrected overall effect size based on publication bias. All the analyses were performed in R 4.2.3 with a package of *metafor* (Viechtbauer, 2010) and *weightr* (Coburn et al., 2019).

Results

Descriptive Statistics

A total of 44 studies was included in this study and 176 effect sizes were reported. The sample size of studies ranged from 5 to 1,428 participants, with the female ratio ranging from 0.4 to 1. The mean age of the participants was 40 years (ranging from 26 to 51 years), while teaching experience was between 3 and 27 years. The included studies were published between 1990 and 2022. Most studies (around 85%) were conducted based on Western contexts.

Overall Effect size

The current study conducted either a comparison between a control group and an experiment group ($n=31$, $k=112$) or a pre/post comparison of an intervention for teacher well-being ($n=14$, $k=66$). Two outliers were detected in the group of studies (Hedges' g was above 1.46 or below −0.73). According to the scatter plot of the effect sizes in Fig. 2, it is clear that the number of positive effect sizes ($n=147$) is greater than the negative ones ($n=28$), and there was one effect size of zero. On this basis, a total of 176 effect sizes was finally included. The overall effect of interventions on teacher well-being was 0.35, which was statistically different from zero ($SE=0.039$; 95% CI [0.273–0.428]; $t=8.98$; $p<.001$, $k=176$ in 44 studies). The estimated variance components were $\tau^2_{\text{Level 3}}=0.035$ and $\tau^2_{\text{Level 2}}=0.040$. This indicated that $I^2_{\text{level3}}=29.73\%$ of the total variation can be attributed to the between-cluster heterogeneity and $I^2_{\text{level2}}=34.41\%$ of the total variation goes to the within-cluster heterogeneity. The three-level model provided a significantly

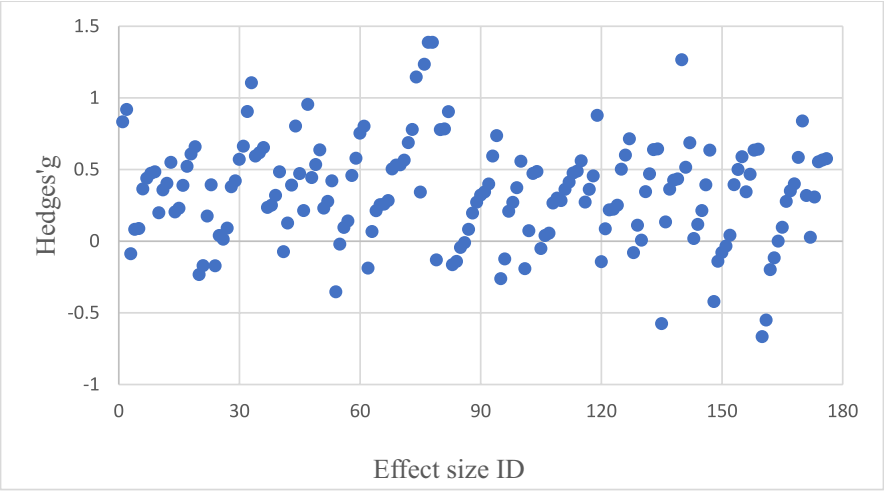

Fig. 2 Scatter plot of effect sizes

better fit compared to a two-level model with level 3 heterogeneity constrained to zero (between studies: LRT: $X^2 = 9.49$, $p < .01$; within studies: LRT: $X^2 = 37.75$, $p < .001$). Follow-up analyses found that variance at the sampling, within-study, and between-study levels was 35.86%, 34.41%, and 29.73%, respectively. Hunter and Schmidt (1990) suggested that when less than 75% of the variance can be explained by sampling variability, heterogeneity is considered significant. In such instances, exploring how the characteristics of the study and effect sizes moderate the overall effect can be a valuable endeavor. In this study, the value of the sampling variance was less than 75%, suggesting that pursuing further analysis of potential moderating variables would be desirable.

Moderator Analyses

Our analyses identified three types of moderators, namely sample characteristics, design characteristics, and intervention characteristics. The results of the meta-regression analysis for each variable and the categories within each variable are set out in Tables 2 and 3. It shows that three moderators were statistically significant for overall effects. These moderators were derived from study quality design characteristics, intervention type and intervention duration characteristics.

Sample Characteristics

There were no significant moderators of sample characteristics identified although some differences were observable (Table 2). For example, there was a slight difference between the mean effect size of teachers from eastern cultures ($g = 0.33$, $p < .001$) and their counterparts from western cultures ($g = 0.36$, $p > .05$).

Design Characteristics

Quality of the study had significant impact on the mean effect size, $F_{(2, 173)} = 5.38$, $p = .005$ (Table 2). The studies with strong quality had the highest mean effect size ($g = 0.53$, $p < .01$), followed by weak quality ($g = 0.40$, $p > .05$) and the figure for studies with moderate quality was 0.26 ($p < .001$). No other design characteristics significantly moderated the effects of the interventions. However, we observed some differences (Table 2). For instance, the mean effect size of studies with a control group ($g = 0.39$, $p > .05$) was larger than those without ($g = 0.26$, $p < .001$). In terms of sampling method, the mean effect size of studies that used random sampling ($g = 0.39$, $p > .05$) was nearly the same as those with systematic sampling ($g = 0.36$, $p > .05$), but slightly larger than those with convenient sampling ($g = 0.34$, $p < .001$).

Intervention Characteristics

Both intervention type ($F_{(3, 172)} = 3.03$, $p = .019$) and duration ($F_{(4, 166)} = 2.80$, $p = .028$) were found to statistically and significantly moderate the effect of the

Table 2 Differences in effect sizes of teacher well-being for moderator variables

Category	Moderator	$N_{\text{Effect size}}$	Estimate (95%CI)	Test Statistic	*p* value
Sample characteristic					
Mean age	Intercept		0.339 [−0.125 − 0.803]	$t_{(1, 159)} = 0.00$	0.953
	Year	161	0.000 [−0.011 − 0.012]		
Teaching experience	Intercept		0.400 [0.175 − 0.625]	$t_{(1, 97)} = 0.09$	0.770
	Year	99	−0.002 [−0.017 − 0.013]		
Gender	Intercept		0.240 [−0.331 − 0.812]	$t_{(1, 163)} = 0.12$	0.727
	Female (%)	165	0.121 [−0.562 − 0.803]		
Culture	Eastern	24	0.332 [0.140 − 0.524]	$t_{(1, 174)} = 0.05$	0.823
	Western	152	0.356 [−0.187 − 0.235]		
Design characteristics					
Sampling method	Convenient	136	0.337 [0.244 − 0.430]	$F_{(2, 173)} = 0.85$	0.430
	Random	35	0.430 [−0.096 − 0.282]		
	Systematic	5	0.157 [−0.641 − 0.282]		
Control group	With	111	0.390 [−0.027 − 0.288]	$t_{(1, 174)} = 2.67$	0.104
	Without	65	0.259 [0.130 − 0.389]		
Random assignment	With	85	0.358 [−0.143 − 0.171]	$t_{(1, 174)} = 0.03$	0.860
	Without	91	0.344 [0.230 − 0.459]		
Quality	Weak	45	0.401 [−0.097 − 0.389]	$F_{(2, 173)} = 5.38$	*0.005*
	Moderate	110	0.255 [0.161 − 0.349]		
	Strong	21	0.529 [0.107 − 0.441]		
Intervention characteristics					
Online mode	With	147	0.298 [−0.311 − 0.193]	$F_{(2, 173)} = 0.18$	0.840
	Without	20	0.356 [0.269 − 0.444]		
	Hybrid	9	0.418 [−0.305 − 0.428]		
Intervention type	Mindfulness	79	0.394 [0.277 − 0.510]	$F_{(3, 172)} = 3.03$	*0.019*
	P-Psychology	29	0.383 [−0.208 − 0.184]		
	N-Psychology	13	0.154 [−0.496 − 0.017]		
	Physical	5	0.730 [−0.015 − 0.689]		
	Other	50	0.241 [−0.322 − 0.019]		
Frequency(1time/day)	With	55	0.274 [0.141 − 0.406]	$t_{(1, 148)} = 3.65$	0.058
	Without	95	0.443 [−0.006 − 0.345]		
Duration	< 2 weeks	25	0.102 [−0.065 − 0.269]	$F_{(4, 166)} = 2.80$	*0.028*
	3–4 weeks	24	0.430 [0.076 − 0.579]		
	5–6 weeks	17	0.379 [−0.016 − 0.571]		
	7–8 weeks	70	0.395 [0.088 − 0.499]		
	Over 8 weeks	35	0.445 [0.108 − 0.578]		
Well-being type	PWB-PS	83	0.444 [0.338 − 0.549]	$F_{(4, 171)} = 2.50$	0.061
	PWB-AS	33	0.312 [−0.025 − 0.650]		
	OWB-PS	30	0.280 [−0.051 − 0.610]		
	OWB-AS	30	0.241 [0.087 − 0.395]		

k number of effect size; P-Psychology = positive psychology-based intervention; N-Psychology = practice of mitigating negative emotions; PWB-PS = personal well-being: the presence of strengths; PWB-AS = personal well-being - absence of symptoms; OWB-PS = occupational well-being - presence of strengths; OWB-AS = occupational well-being - absence of symptoms

Table 3 Results of the multiple moderator model

	s	k	Estimate (95%CI)	*t*	$F_{(df1, df2)}$
Multiple moderator model	43	171			$F_{(9,160)} = 2.91^{**}$
Intercept			0.209 [0.008 − 0.411]	2.05*	
Other (vs. mindfulness)			−0.165 [−0.342 − 0.013]	−1.83	
Physical (vs. mindfulness)			0.295 [−0.056 − 0.645]	1.66	
P-Psychology (vs. mindfulness)			−0.067 [−0.269 − 0.135]	−0.66	
N-Psychology (vs. mindfulness)			−0.315 [−0.575 − −0.055]	−2.39*	
3–4 weeks (vs. < 2 weeks)			0.138 [−0.142 − 0.419]	0.97	
5–6 weeks (vs. < 2 weeks)			0.154 [−0.181 − 0.489]	0.91	
7–8 weeks (vs. < 2 weeks)			0.100 [−0.137 − 0.337]	0.83	
Over 8 weeks (vs. < 2 weeks)			0.189 [−0.069 − 0.447]	1.44	
Strong (vs. moderate)			0.273 [0.084 − 0.462]	2.85**	
Weak (vs. moderate)			0.150 [−0.101 − 0.400]	1.18	

s = number of independent studies; *k* = number of effect size; P-Psychology = positive psychology-based intervention; N-Psychology = practice of mitigating negative emotions; * $p < .05$; ** $p < .01$; *** $p < .001$

intervention. For intervention types, although the effects of physical-related intervention had the highest mean effect size ($g = 0.73$), its effect was not statistically significant ($p > .05$). In the comparison between mindfulness-based interventions ($g = 0.39$), positive psychology-based intervention ($g = 0.38$), practice of mitigating negative emotions ($g = 0.15$) and other interventions ($g = 0.24$), only the mindfulness-based interventions showed significant effects ($p < .001$). The effect size of the other three types of interventions were not significant ($p > .05$). For the duration of intervention, the outcomes showed an interesting trend. When intervention lasted more than 8 weeks, the mean effect size was the largest ($g = 0.45$, $p < .001$), followed by 3–4 weeks ($g = 0.43$, $p < .05$), and the figure for 7–8 weeks ($g = 0.40$, $p < .001$) tended to be fairly similar with 5–6 weeks ($g = 0.38$, $p > .05$). When the duration did not reach 2 weeks, the mean effect size was only 0.10 ($p > .05$).

There were no other significant moderators of intervention characteristics although some differences were observed. For the mode of intervention, the mean effect size showed a declining trend when the intervention was an applied approach using both online and face-to-face ($g = 0.42$, $p > .05$), face-to-face ($g = 0.36$, $p > .05$), and online mode ($g = 0.30$, $p > .05$) respectively. For frequency, when the intervention was not 1 time/day, the mean effect size was larger ($g = 0.43$, $p > .05$) than when 1 time/day ($g = 0.32$, $p < .001$). For the well-being types, the mean effect size for personal well-being - the presence of strengths ($g = 0.44$, $p < .05$) was the highest, and the figure for personal well-being - absence of symptoms ($g = 0.31$, $p > .05$) was larger than for occupational well-being - presence of strengths ($g = 0.28$, $p > .05$) and occupational well-being - absence of symptoms ($g = 0.24$, $p < .05$).

Multiple Moderator Model

We conducted the multiple moderator model to examine the unique effect of the variables of significant moderators (i.e., study quality, intervention type and intervention duration) using meta-regression analysis (Table 3). The results showed a significant outcome ($F_{(9, 160)} = 2.91$, $p < .01$), and revealed that strong quality and practice of mitigating negative emotions had a unique moderation effect on the intervention effect.

Publication bias

We identified potential publication bias by funnel plots and the Egger regression test. Asymmetry can be discovered in the funnel plot (Fig. 3). Moreover, it is confirmed by the Egger regression test ($B = 1.61$, $p < .001$). The selection model of Vevea and Woods (2005) indicated that the adjusted pooled effect of teacher well-being intervention assuming moderate publication bias is 0.235. Therefore, the overall effects observed for these comparisons may be somewhat inflated.

Discussion

Intervention is regarded as an effective way to reduce teacher stress and benefit their well-being (Emerson et al., 2017; Shankland & Rosset, 2016; Vo & Allen, 2022). This meta-analysis yields the first synthesis of the effects of

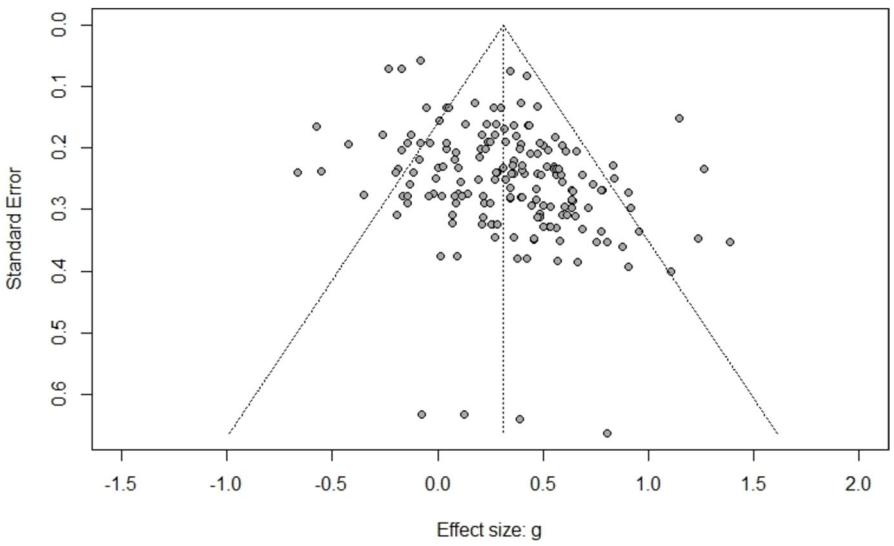

Fig. 3 Funnel Plot

comprehensive interventions on teacher well-being and identifies the factors that moderate the effect size. A total of 176 effect sizes from 44 studies reporting either an experimental-control comparison or a pre-post comparison was included in this research. The overall effect of the intervention on teacher well-being will be firstly discussed, followed by the moderating effect of study quality, intervention type, and intervention duration.

Overall Effect of Interventions on Teacher well-being

The interventions were found to be helpful for teacher well-being in this synthesis, with a small-to-moderate significant effect size ($g = 0.35$) (Sanchez et al., 2018). This finding aligns with the existing research on various groups of participants including general population, students, and teachers. First, this study is consistent with the findings of Weiss et al. (2016) on well-being interventions in the general population, providing evidence that well-being can indeed be improved by behavioral intervention. Second, the findings of this study echo the results from Zoogman et al. (2014), which focus on intervention for youth well-being, indicating mindfulness treatments have a small-to-moderate range of effect size on their health. Third, the result also aligns with the studies focusing on specific types of intervention for teacher well-being. For example, Klingbeil and Renshaw (2018) reported a small-to-medium effect size of the mindfulness-based intervention for psychological well-being with $g = 0.43$. Similarly, the review by Beames et al. (2023) revealed a significant effect size of psychological programs on teacher well-being, with randomized controlled trials ($g = 0.56$) and non-randomized controlled trials ($g = 0.38$) respectively. Compared with these studies, the mean effect size in this present synthesis is slightly smaller than the current meta-analyses of teacher well-being intervention. This is probably because this study involved comprehensive types of interventions, which may leverage the effect sizes of specific intervention to some extent. However, this assumption needs further investigation in future research. Nevertheless, this study has provided a more comprehensive perspective to verify the effectiveness of comprehensive interventions on teacher well-being from quantitative synthesis.

Moderators of Intervention for Teacher well-being

This study attempted to identify the potential moderators of the interventions for teacher well-being from sample characteristics, design characteristics, and intervention characteristics. A total of three significant moderators was found in this meta-analysis, namely study quality, intervention type, and intervention duration. Finally, the multiple moderator model is also discussed.

First, the result showed the strong and moderate effect sizes of study quality were statistically significant, while one with weak effect size was not statistically significant. This finding differs from previous studies that reported quality score

was weakly moderated between mental health and well-being outcome or did not typically moderate the outcomes (Carsley et al., 2017; Khoury et al., 2015). A possible explanation for this might be that the criteria of quality evaluation focuses more on assessing the experimental design from a holistic perspective. Moreover, the measurements were closely related to the study quality. The higher reliability of measurement contributed to the greater effect size (Plonsky, 2011). In addition, most included studies (37/44) were identified in the range from moderate quality to strong quality in this project. Specifically, the pretest and posttest designs of the control and experimental groups were used in these studies. Furthermore, most scales for measuring outcome variables were widely recognized. These findings provide evidence indicating that interventions with rigorous research design, such as randomized controlled trials, reporting and controlling confounding variables, or utilizing authoritative questionnaires might improve the reliability on the effectiveness of well-being interventions.

Second, although interventions on teacher well-being were found to have a statistically significant overall effect, this effect was moderated by the specific intervention type. Only mindfulness-based interventions were found to be effective. The other types of interventions did not have statistically significant effects on teacher well-being. Three interesting findings were yielded for discussion. The first finding of intervention types is that physical intervention contributed the largest effect size. Although the effect size is not statistically significant, it is near the edge of the threshold. According to a previous study of physical interventions on well-being, Netz et al. (2005) reported a significant effect of exercise on well-being in older adults. Later, Buecker et al. (2020) also indicated a similar significant outcome for physical activity on subjective well-being in healthy individuals. Despite the lack of meta-analysis of physical intervention specifically for teacher well-being, the finding in this study can be attributed to the small number of studies included in the analysis compared with those studies for other populations. The meta-analysis included only a small number of studies indicating insufficient statistical power, which may result in no statistical significance (Borenstein et al., 2021). The second intriguing finding is that mindfulness intervention demonstrated a relatively high effect size and was statistically significant. This result is in line with other studies indicating that mindfulness-based intervention promoted mental health outcomes and released self-reported psychological distress (Benn et al., 2012; Franco et al., 2010; Grossman et al., 2004). It can be seen as a powerful way to reduce teachers' psychological symptoms and increase well-being. The third interesting finding is that psychology-related interventions (i.e., positive psychology-based intervention and practice of mitigating negative emotions) showed small-to-moderate and small effects but were not statistically significant. The result is inconsistent with some studies reporting that psychology intervention had small effects but was significant for well-being (Bolier et al., 2013). This discrepancy might be explained by the varying quality of the studies on psychology-related interventions selected for this paper.

Third, the result regarding intervention duration in this study demonstrated an intriguing trend. Broadly, the effect of intervention showed an increasing trend with a longer duration, but it fell back after an intervention of more than 3–4

weeks. Subsequently, the effect size continued to increase and reached the maximum when interventions lasted more than 8 weeks. The results are explained in four observations in detail. The first observation is that an intervention smaller than 2 weeks was without significant effect. This is consistent with the study from Dreer and Gouasé (2022) reporting interventions with a short duration like under one week did not contribute significant effects. The second observation is that the effect size of a duration of 3–4 weeks was statistically significant and higher than one of less than 2 weeks. It echoes with the results of the current research with an intervention design of 3–4 weeks, showing that appropriate longer periods can effectively improve the positive mental state of the participant and relieve their stress and depression (Jennings et al., 2013; Telles et al., 2018). The third observation is that the result of this study revealed the effect size of a duration of 3–4 weeks was better than one of 5–6 weeks. This seems to contradict the evidence that longer intervention produces a greater effect (Bolier et al., 2013; Sin & Lyubomirsky, 2009). However, some interventions with shorter but more intense durations had a larger effect than prolonged but less frequent interventions (Eamons & Mc Cullough, 2003; Kerr et al., 2014). This suggests that the interactive effect of both frequency and duration of interventions also needs to be considered. The fourth observation is that an intervention of over 8 weeks has the largest effect size. This echoes with Sin and Lyubomirsky (2009) claiming positive psychology intervention with longer duration is more likely to produce greater well-being (e.g., 8–12 weeks or more than 12 weeks). Similarly, many current studies agreed that interventions longer than 8 weeks have a better effectiveness (e.g., Chiesa & Serretti, 2011; Khoury et al., 2015).

Unlike the meta-analysis from Sun et al. (2021) which revealed the effect size of intervention increased first and then decreased over time, this result shows that the effect size would rebound and reach a peak after a decline with the extension of duration. This might be explained by the potential mechanisms underlying changes in participant engagement, motivation, and adherence. It is possible that the effect of intervention decreases as time pressure increases, and the participant may become fatigued or lose motivation and interest to continue the activity (Hakanen et al., 2006; Xie et al., 2006). However, more opportunities for changes were provided as the intervention lasted longer. Participants may realize the benefit of intervention or have developed rapport-building with the instructors (e.g., Kiken et al., 2015; Langley & Klopper, 2005), which probably leads to the effect size increasing again.

Fourth, the finding of the multiple moderator model showed a significant outcome and reflected that studies with strong quality have unique moderation effect. It re-emphasizes the significance of the intervention design based on the results of the multiple moderator model. It reveals that rigorous and high-quality intervention can ensure validity and effectiveness through appropriate controls, randomization, blinding, and other methods to minimize bias. In addition, the significant results of practices aimed at mitigating negative emotions indicate that this type of intervention has the potential to improve well-being when study quality and intervention duration are controlled. However, the effect size is smaller than mindfulness-based intervention.

Limitations and Future Directions

Several potential limitations of this meta-analysis should be considered when interpreting the results. First, selection criteria of this study were limited to peer-reviewed journal articles published in English. Grey literature or publications with other languages were not included, which may affect the statistical power. It indicates that future research may consider more diverse types of publications (e.g., dissertation, book chapters) to acquire more comprehensive findings. In addition to Scopus as the primary database, other multiple databases may be considered to minimize potential omissions of relevant publications. Second, the analysis includes possible reporting bias as the measurement used in all studies was based on self-reported questionnaire. Additional studies may consider using multiple sources to reduce the potential of publication bias. Third, the outcome from the selection model of Vevea and Woods (2005) revealed the overall effect may be overestimated. These initial results should be revisited in future studies. Finally, this study generalized various types of interventions targeting teacher well-being and focused on their overall effect, rather than elaborating on the effect of specific intervention types on well-being as there are variants of mindfulness-related and psychology-related interventions. In addition to limitations, several future directions can be summarized. First, it is suggested that future research may compare and discuss specific effects of different types of interventions. Second, future research may seek to develop a theoretical framework to better categorize and differentiate various types of teacher well-being interventions. Third, it would be worthwhile to explore the effect differences across different subcategories within the same type of well-being intervention. For example, researchers could further examine and compare the impacts of positive psychology practices versus emotion regulation practices within the broader category of psychological interventions.

Implications and Conclusion

This study has provided conceptual, methodological, and practical implications. Conceptually, this meta-analysis summarized diverse types of interventions for teacher well-being and discussed the overall effect of these interventions. It generalized a synthetical outline including mindfulness-based programs, positive psychology-based interventions, negative emotion mitigating practices, physical-related and other types of interventions. This study complements current research on teacher well-being interventions and provides a conceptual reference for future studies related to these aspects. Methodologically, the assessment of study quality in this study helps to identify varying methodological quality, which contributes to the internal validity and heterogeneity of meta-analysis. Use of the assessment of study quality is helpful to generate robust results. Furthermore, this meta-analysis applied a three-level model, an innovative approach which better distinguishes the variance at three levels including the sample, with-study, and within-study, which improves the validity and reliability of the result (Harrer et al., 2021). This is the first attempt

to use this type of analysis to examine the effects of interventions on teacher well-being, which provides considerations for future research. Practically, the interventions aiming at promoting well-being among teachers were verified as effective. From the personal aspect, it indicated that teachers could relieve their stress and depression at work, and adjust and refresh themselves under the high working demand atmosphere to maximize pleasant experiences. These may then motivate their sense of achievement, responsibility, and mission. From the organizational aspect, enhancing teacher well-being contributes to the prosperity of a school and the thriving of the educational system. School leaders and policy makers should purposely create the optimal conditions and environment to support teacher well-being. In general, the significant effect size of teacher well-being interventions highlights the significance of developing targeted programs for teachers to ensure sustainable educational goals. Meanwhile, the outcome of moderator analysis also provided inspiration for practical implication. For professionals, it is recommended that they carry out scientific and precise interventions and also consider using multicomponent intervention types and appropriate duration during the design process. For education policy makers, it encourages them to create conditions such that teachers can have more chances to receive more professional programs and so prompt their well-being. It may provide more efforts to boost the function of the school without sacrificing teacher wellness.

In closing, this meta-analysis provides an updated synthesis of the effect of intervention on teacher well-being. Interventions with mindfulness-based programs with appropriate duration and designed by RCT had positive and significant effects on teacher well-being. The study quality, intervention type, and intervention duration were considered to moderate the overall effect, while studies with strong quality had a robust moderating effect significantly according to the multiple moderator model. Future studies may especially focus on the perspectives that this study leaves out to advance the meta-analysis synthesis of teacher well-being interventions.

Funding This study was funded by The Central Reserve Allocation Committee of the Education University of Hong Kong (grant number F141-31-04A4).

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

References

Acton, R., & Glasgow, P. (2015). Teacher wellbeing in neoliberal contexts: A review of the literature. *Australian Journal of Teacher Education*, *40*(40). https://doi.org/10.14221/ajte.2015v40n8.6

Acuna, E., & Rodriguez, C. (2004). A meta analysis study of outlier detection methods in classification. *Technical paper, Department of Mathematics, University of Puerto Rico at Mayaguez*, *1*(25), 14.

Anderson, V. L., Levinson, E. M., Barker, W., & Kiewra, K. R. (1999). The effects of meditation on teacher perceived occupational stress, state and trait anxiety, and burnout. *School Psychology Quarterly*, *14*(1), 3. https://doi.org/10.1037/h0088995

Assink, M., & Wibbelink, C. J. (2016). Fitting three-level meta-analytic models in R: A step-by-step tutorial. *The Quantitative Methods for Psychology*, *12*(3), 154–174.

Bauer, J., Stamm, A., Virnich, K., Wissing, K., Muller, U., Wirsching, M., & Schaarschmidt, U. (2006). Correlation between burnout syndrome and psychological and psychosomatic symptoms among teachers. *International Archives of Occupational and Environmental Health, 79*(3), 199–204. https://doi.org/10.1007/s00420-005-0050-y

Beames, J. R., Spanos, S., Roberts, A., McGillivray, L., Li, S., Newby, J. M., O'Dea, B., & Werner-Seidler, A. (2023). Intervention programs targeting the mental health, professional burnout, and/or wellbeing of school teachers: Systematic review and meta-analyses. *Education Psychology Review, 35*(1), 26. https://doi.org/10.1007/s10648-023-09720-

Becker, B. J. (1988). Synthesizing standardized mean-change measures. *British Journal of Mathematical and Statistical Psychology, 41*(2), 257–278. https://doi.org/10.1111/j.2044-8317.1988.tb00901.x

Benn, R., Akiva, T., Arel, S., & Roeser, R. W. (2012). Mindfulness training effects for parents and educators of children with special needs. *Developmental Psychology, 48*(5), 1476. https://doi.org/10.1037/a0027537

Bentea, C. C. (2015). Relationships between personality characteristics and attitude towards work in school teachers. *Procedia - Social and Behavioral Sciences*, *180*, 1562–1568. https://doi.org/10.1016/j.sbspro.2015.02.307

Beshai, S., McAlpine, L., Weare, K., & Kuyken, W. (2015). A non-randomised feasibility trial assessing the efficacy of a mindfulness-based intervention for teachers to reduce stress and improve well-being. *Mindfulness*, *7*(1), 198–208. https://doi.org/10.1007/s12671-015-0436-1

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health*, *13*(1), 1–20. https://doi.org/10.1186/1471-2458-13-119

Bonde, E. H., Fjorback, L. O., Frydenberg, M., & Juul, L. (2022). The effectiveness of mindfulness-based stress reduction for school teachers: A cluster-randomized controlled trial. *European Journal of Public Health*, *32*(2), 246–253. https://doi.org/10.1093/eurpub/ckab223

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2021). *Introduction to meta-analysis*. Wiley.

Braun, S. S., Roeser, R. W., & Mashburn, A. J. (2020). Results from a pre-post, uncontrolled pilot study of a mindfulness-based program for early elementary school teachers. *Pilot and Feasibility Studies*, *6*(1), 178. https://doi.org/10.1186/s40814-020-00718-7

Briner, R., & Dewberry, C. (2007). *Staff well-being is key to school success*. Worklife Support Ltd/Hamilton House.

Buecker, S., Simacek, T., Ingwersen, B., Terwiel, S., & Simonsmeier, B. A. (2020). Physical activity and subjective well-being in healthy individuals: A meta-analytic review. *Health Psychology Review*, *15*(4), 574–592. https://doi.org/10.1080/17437199.2020.1760728

Capone, V., & Petrillo, G. (2018). Mental health in teachers: Relationships with job satisfaction, efficacy beliefs, burnout and depression. *Current Psychology*, *39*(5), 1757–1766. https://doi.org/10.1007/s12144-018-9878-7

Carroll, A., Sanders-O'Connor, E., Forrest, K., Fynes-Clinton, S., York, A., Ziaei, M., Flynn, L., Bower, J. M., & Reutens, D. (2021). Improving emotion regulation, well-being, and neuro-cognitive functioning in teachers: A matched controlled study comparing the mindfulness-based stress reduction and health enhancement programs. *Mindfulness*, *13*(1), 123–144. https://doi.org/10.1007/s12671-021-01777-4

Carroll, A., York, A., Fynes-Clinton, S., Sanders-O'Connor, E., Flynn, L., Bower, J. M., Forrest, K., & Ziaei, M. (2021b). The downstream effects of teacher well-being programs: Improvements in teachers' stress, cognition and well-being benefit their students. *Frontiers in Psychology*, *12*, 689628. https://doi.org/10.3389/fpsyg.2021.689628

Carsley, D., Khoury, B., & Heath, N. L. (2017). Effectiveness of mindfulness interventions for mental health in schools: A comprehensive meta-analysis. *Mindfulness*, *9*(3), 693–707. https://doi.org/10.1007/s12671-017-0839-2

Chadegani, A. A., Salehi, H., Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ebrahim, N. A. (2013). A comparison between two main academic literature collections: Web of Science and Scopus databases. *Asian Social Science*, *9*(5). https://doi.org/10.5539/ass.v9n5p18

Chan, D. W. (2010). Gratitude, gratitude intervention and subjective well-being among Chinese school teachers in Hong Kong. *Educational Psychology*, *30*(2), 139–153. https://doi.org/10.1080/01443410903493934

Chan, D. W. (2013). Counting blessings versus misfortunes: Positive interventions and subjective well-being of Chinese school teachers in Hong Kong. *Educational Psychology*, *33*(4), 504–519. https://doi.org/10.1080/01443410.2013.785046

Chen, J. (2019a). Exploring the impact of teacher emotions on their approaches to teaching: A structural equation modelling approach. *British Journal of Educational Psychology, 89*(1), 57–74. https://doi.org/10.1111/bjep.12220

Chen, J. (2019b). Teacher emotions in their professional lives: Implications for teacher development. *Asia-Pacific Journal of Teacher Education, 48*(5), 491–507. https://doi.org/10.1080/1359866x.2019.1669139

Cheng, X., Zhang, H., Cao, J., & Ma, Y. (2021). The effect of mindfulness-based programs on psychological distress and burnout in kindergarten teachers: A pilot study. *Early Childhood Education Journal*, *50*(7), 1197–1207. https://doi.org/10.1007/s10643-021-01254-6

Cheung, M. W. (2014). Modeling dependent effect sizes with three-level meta-analyses: A structural equation modeling approach. *Psychological Methods*, *19*(2), 211–229. https://doi.org/10.1037/a0032968

Chiesa, A., & Serretti, A. (2011). Mindfulness-based interventions for chronic pain: A systematic review of the evidence. *The Journal of Alternative and Complementary Medicine*, *17*(1), 83–93. https://doi.org/10.1089/acm.2009.0546

Coburn, K. M., Vevea, J. L., & Coburn, M. K. M. (2019). Package 'weightr': Estimating Weight-Function Models for Publication Bias.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic.

Cook, C. R., Miller, F. G., Fiat, A., Renshaw, T., Frye, M., Joseph, G., & Decano, P. (2017). Promoting secondary teachers' well-being and intentions to implement evidence-based practices: Randomized evaluation of the achiever resilience curriculum. *Psychology in the Schools*, *54*(1), 13–28. https://doi.org/10.1002/pits.21980

Cooper, H., Hedges, L. V., & Valentine, J. C. (2019). *The handbook of research synthesis and meta-analysis*. Russell Sage Foundation.

Corbett, L., Bauman, A., Peralta, L. R., Okely, A. D., & Phongsavan, P. (2022). Characteristics and effectiveness of physical activity, nutrition and/or sleep interventions to improve the mental well-being of teachers: A scoping review. *Health Education Journal*, *81*(2), 196–210. https://doi.org/10.1177/00178969211062701

Crain, T. L., Schonert-Reichl, K. A., & Roeser, R. W. (2017). Cultivating teacher mindfulness: Effects of a randomized controlled trial on work, home, and sleep outcomes. *Journal of Occupational Health Psychology*, *22*(2), 138–152. https://doi.org/10.1037/ocp0000043

Datu, J. A. D., Lee, A. S. Y., Fung, W. K., Cheung, R. Y. M., & Chung, K. K. H (2022). Prospering in the midst of the COVID-19 pandemic: The effects of PROSPER-based intervention on psychological outcomes among preschool teachers. *Journal of School Psychology*, *94*, 66–82. https://doi.org/10.1016/j.jsp.2022.08.003

De Carvalho, J. S., Oliveira, S., Roberto, M. S., Goncalves, C., Barbara, J. M., de Castro, A. F., Pereira, R., Franco, M., Cadima, J., Leal, T., Lemos, M. S., & Marques-Pinto, A. (2021). Effects of a mindfulness-based intervention for teachers: A study on teacher and student outcomes. *Mindfulness*, *12*(7), 1719–1732. https://doi.org/10.1007/s12671-021-01635-3

De Jesus, S. N., & Conboy, J. (2001). A stress management course to prevent teacher distress. *International Journal of Educational Management*, *15*(3), 131–137. https://doi.org/10.1108/09513540110384484

De Stasio, S., Fiorilli, C., Benevene, P., Uusitalo-Malmivaara, L., & Chiacchio, C. D. (2017). Burnout in special needs teachers at kindergarten and primary school: Investigating the role of Personal resources and work wellbeing. *Psychology in the Schools*, *54*(5), 472–486. https://doi.org/10.1002/pits.22013

Dicke, T., Elling, J., Schmeck, A., & Leutner, D. (2015). Reducing reality shock: The effects of classroom management skills training on beginning teachers. *Teaching and Teacher Education*, *48*, 1–12. https://doi.org/10.1016/j.tate.2015.01.013

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*(2), 276–302.

Dietrichson, J., Bøg, M., Filges, T., & Klint Jørgensen, A. M. (2017). Academic Interventions for Elementary and Middle School Students with Low Socioeconomic Status: A systematic review and Meta-analysis. *Review of Educational Research*, *87*(2), 243–282. https://doi.org/10.3102/0034654316687036

Dodge, R., Daly, A., Huyton, J., & Sanders, L. (2012). The challenge of defining wellbeing. *International Journal of Wellbeing*, *2*(3), 222–235. https://doi.org/10.5502/ijw.v2i3.4

Dreer, B., & Gouasé, N. (2022). Interventions fostering well-being of schoolteachers: A review of research. *Oxford Review of Education*, *48*(5), 587–605. https://doi.org/10.1080/03054985.2021.2002290

Eamons, B., & Mc Cullough, M. E. (2003). Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, *84*(2), 377–389. https://doi.org/10.1037/0022-3514.84.2.377

Eddy, C. L., Herman, K. C., Huang, F., & Reinke, W. M. (2022). Evaluation of a bibliotherapy-based stress intervention for teachers. *Teaching and Teacher Education*, *109*. https://doi.org/10.1016/j.tate.2021.103543

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *Bmj*, *315*(7109), 629–634. https://doi.org/10.1136/bmj.315.7109.629

Emerson, L. M., Leyland, A., Hudson, K., Rowse, G., Hanley, P., & Hugh-Jones, S. (2017). Teaching mindfulness to teachers: A systematic review and narrative synthesis. *Mindfulness*, *8*(5), 1136–1149. https://doi.org/10.1007/s12671-017-0691-4

Farber, B. A. (2000). Treatment strategies for different types of teacher burnout. *Journal of Clinical Psychology*, *56*(5), 675–689. https://doi.org/10.1002/(sici)1097-4679(200005)56:5<675::Aid-jclp8>3.0.Co;2-d

Fernandes, L., Peixoto, F., Gouveia, M. J., Silva, J. C., & Wosnitza, M. (2019). Fostering teachers' resilience and well-being through professional learning: Effects from a training programme. *The Australian Educational Researcher*, *46*(4), 681–698. https://doi.org/10.1007/s13384-019-00344-0

Fernández-Castilla, B., Declercq, L., Jamshidi, L., Beretvas, S. N., Onghena, P., & Van den Noortgate, W. (2021). Detecting selection bias in meta-analyses with multiple outcomes: A simulation study. *The Journal of Experimental Education*, *89*(1), 125–144. https://doi.org/10.1080/00220973.2019.1582470

Fikrat-Wevers, S., van Steensel, R., & Arends, L. (2021). Effects of family literacy programs on the emergent literacy skills of children from low-SES families: A meta-analysis. *Review of Educational Research*, *91*(4), 577–613. https://doi.org/10.3102/0034654321998075

Franco, C., Mañas, I., Cangas, A. J., Moreno, E., & Gallego, J. (2010). Reducing teachers' psychological distress through a mindfulness training program. *The Spanish Journal of Psychology*, *13*(2), 655–666. https://doi.org/10.1017/S1138741600002328

Frank, J. L., Reibel, D., Broderick, P., Cantrell, T., & Metz, S. (2015). The effectiveness of mindfulness-based stress reduction on educator stress and well-being: Results from a pilot study. *Mindfulness*, *6*, 208–216. https://doi.org/10.1007/s12671-013-0246-2

Fu, W., Pan, Q., Zhang, C., & Cheng, L. (2022). Influencing factors of Chinese special education teacher turnover intention: Understanding the roles of subject well-being, social support, and work engagement. *International Journal of Developmental Disabilities*, *68*(3), 342–353. https://doi.org/10.1080/20473869.2020.1780553

Gan, Y., & Cheng, L. (2021). Psychological Capital and Career Commitment among Chinese Urban Preschool teachers: The Mediating and Moderating effects of Subjective Well-being. *Frontiers in Psychology*, *12*, 509107. https://doi.org/10.3389/fpsyg.2021.509107

Gavel, Y., & Iselid, L. (2008). Web of Science and Scopus: A journal title overlap study. *Online Information Review*, *32*(1), 8–21. https://doi.org/10.1108/14684520810865958

Glazzard, J., & Rose, A. (2019). The impact of teacher well-being and mental health on pupil progress in primary schools. *Journal of Public Mental Health*, *19*(4), 349–357. https://doi.org/10.1108/jpmh-02-2019-0023

Grant, A. M., Green, L. S., & Rynsaardt, J. (2010). Developmental coaching for high school teachers: Executive coaching goes to school. *Consulting Psychology Journal: Practice and Research*, *62*(3), 151–168. https://doi.org/10.1037/a0019212

Gray, C., Wilcox, G., & Nordstokke, D. (2017). Teacher mental health, school climate, inclusive education and student learning: A review. *Canadian Psychology/Psychologie Canadienne*, *58*(3), 203–210. https://doi.org/10.1037/cap0000117

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*, *57*(1), 35–43. https://doi.org/10.1016/S0022-3999(03)00573-7

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, *43*(6), 495–513. https://doi.org/10.1016/j.jsp.2005.11.001

Hallinger, P. (2023). Bibliometric Review Methodology and State of the Science Bibliometric Review of Research on Problem-based Learning, 2017–2021. *The Interdisciplinary Journal of Problem-Based Learning*, *17*(2). https://doi.org/10.14434/ijpbl.v17i2.35761

Hallinger, P., & Kovačević, J. (2019). A bibliometric review of research on educational administration: Science mapping the literature, 1960 to 2018. *Review of Educational Research*, *89*(3), 335–369.

Harrer, M., Cuijpers, P., Furukawa, T. A., & Ebert, D. D. (2021). *Doing meta-analysis with R: A hands-on guide*. CRC.

Hascher, T., & Waber, J. (2021). Teacher well-being: A systematic review of the research literature from the year 2000–2019. *Educational Research Review*, *34*. https://doi.org/10.1016/j.edurev.2021.100411

Hascher, T., Beltman, S., & Mansfield, C. (2021). Teacher wellbeing and resilience: Towards an integrative model. *Educational Research*, *63*(4), 416–439. https://doi.org/10.1080/00131881.2021.1980416

Hayes, R., Titheradge, D., Allen, K., Allwood, M., Byford, S., Edwards, V., Hansford, L., Longdon, B., Norman, S., Norwich, B., Russell, A. E., Price, A., Ukoumunne, O. C., & Ford, T. (2020). The incredible years teacher classroom management programme and its impact on teachers' professional self-efficacy, work-related stress, and general well-being: Results from the STARS randomized controlled trial. *British Journal of Educational Psychology*, *90*(2), 330–348. https://doi.org/10.1111/bjep.12284

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics*, *6*(2), 107–128. https://doi.org/10.3102/10769986006002107

Hepburn, S. J., Carroll, A., & McCuaig-Holcroft, L. (2021). A complementary intervention to promote wellbeing and stress management for early career teachers. *International Journal of Environmental Research and Public Health*, *18*(12). https://doi.org/10.3390/ijerph18126320

Higgins, J. P., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (2019). *Cochrane handbook for systematic reviews of interventions*. Wiley.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage.

Horn, J. E., Taris, T. W., Schaufeli, W. B., & Schreurs, P. J. G. (2004). The structure of occupational well-being: A study among Dutch teachers. *Journal of Occupational and Organizational Psychology*, *77*(3), 365–375. https://doi.org/10.1348/0963179041752718

Hwang, Y. S., Bartlett, B., Greben, M., & Hand, K. (2017). A systematic review of mindfulness interventions for in-service teachers: A tool to enhance teacher wellbeing and performance. *Teaching and Teacher Education*, *64*, 26–42. https://doi.org/10.1016/j.tate.2017.01.015

Hwang, Y. S., Noh, J. E., Medvedev, O. N., & Singh, N. N. (2019). Effects of a mindfulness-based program for teachers on teacher wellbeing and person-centered teaching practices. *Mindfulness*, *10*(11), 2385–2402. https://doi.org/10.1007/s12671-019-01236-1

Jennings, P. A., Doyle, S., Oh, Y., Rasheed, D., Frank, J. L., & Brown, J. L. (2019). Long-term impacts of the CARE program on teachers' self-reported social and emotional competence and well-being. *Journal of School Psychology*, *76*, 186–202. https://doi.org/10.1016/j.jsp.2019.07.009

Jennings, P. A., Frank, J. L., Snowberg, K. E., Coccia, M. A., & Greenberg, M. T. (2013). Improving classroom learning environments by cultivating awareness and resilience in education (CARE): Results of a randomized controlled trial. *School Psychology Quarterly*, *28*(4), 374–390. https://doi.org/10.1037/spq0000035

Kemeny, M. E., Foltz, C., Cavanagh, J. F., Cullen, M., Giese-Davis, J., Jennings, P., Rosenberg, E. L., Gillath, O., Shaver, P. R., & Wallace, B. A. (2012). Contemplative/emotion training reduces negative emotional behavior and promotes prosocial responses. *Emotion*, *12*(2), 338. https://doi.org/10.1037/a0026118

Kennedy, Y., Flynn, N., O'Brien, E., & Greene, G. (2021). Exploring the impact of incredible years teacher classroom management training on teacher psychological outcomes. *Educational Psychology in Practice*, *37*(2), 150–168. https://doi.org/10.1080/02667363.2021.1882944

Kern, M. L., Waters, L., Adler, A., & White, M. (2014). Assessing employee wellbeing in cchools using a multifaceted approach: Associations with physical health, life satisfaction, and professional thriving. *Psychology*, *5*(6), 500–513. https://doi.org/10.4236/psych.2014.56060

Kerr, S. L., O'Donovan, A., & Pepping, C. A. (2014). Can gratitude and kindness interventions enhance well-being in a clinical sample? *Journal of Happiness Studies*, *16*(1), 17–36. https://doi.org/10.1007/s10902-013-9492-1

Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 207–222. https://doi.org/10.2307/3090197

Khoury, B., Sharma, M., Rush, S. E., & Fournier, C. (2015). Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of Psychosomatic Research*, *78*(6), 519–528. https://doi.org/10.1016/j.jpsychores.2015.03.009

Kidger, J., Turner, N., Hollingworth, W., Evans, R., Bell, S., Brockman, R., Copeland, L., Fisher, H., Harding, S., Powell, J., Araya, R., Campbell, R., Ford, T., Gunnell, D., Murphy, S., & Morris, R. (2021). An intervention to improve teacher well-being support and training to support students in UK high schools (the WISE study): A cluster randomised controlled trial. *PLoS Medicine*, *18*(11), e1003847. https://doi.org/10.1371/journal.pmed.1003847

Kiken, L. G., Garland, E. L., Bluth, K., Palsson, O. S., & Gaylord, S. A. (2015). From a state to a trait: Trajectories of state mindfulness in meditation during intervention predict changes in trait mindfulness. *Personality and Individual Differences*, *81*, 41–46. https://doi.org/10.1016/j.paid.2014.12.044

Klingbeil, D. A., & Renshaw, T. L. (2018). Mindfulness-based interventions for teachers: A meta-analysis of the emerging evidence base. *School Psychology Quarterly*, *33*(4), 501–511. https://doi.org/10.1037/spq0000291

Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 159–174.

Lang, S. N., Jeon, L., Sproat, E. B., Brothers, B. E., & Buettner, C. K. (2020). Social emotional learning for teachers (SELF-T): A short-term, online intervention to increase early childhood educators' resilience. *Early Education and Development*, *31*(7), 1112–1132. https://doi.org/10.1080/10409289.2020.1749820

Langley, G., & Klopper, H. (2005). Trust as a foundation for the therapeutic intervention for patients with borderline personality disorder. *Journal of Psychiatric and Mental Health Nursing*, *12*(1), 23–32. https://doi.org/10.1111/j.1365-2850.2004.00774.x

Larsson, G., SETTERLIND, S., & Starrin, B. (1990). Routinization of stress control programmes in organizations: A study of Swedish teachers. *Health Promotion International*, *5*(4), 269–278. https://doi.org/10.1093/heapro/5.4.269

Latino, F., Cataldi, S., & Fischetti, F. (2021). Effects of an 8-Week yoga-based physical exercise intervention on teachers' burnout. *Sustainability*, *13*(4). https://doi.org/10.3390/su13042104

Layous, K., Lee, H., Choi, I., & Lyubomirsky, S. (2013). Culture matters when designing a successful happiness-increasing activity: A comparison of the United States and South Korea. *Journal of Cross-Cultural Psychology*, *44*(8), 1294–1303. https://doi.org/10.1177/0022022113487591

Lipsey, M. W., & Wilson, D. (2001). *Practical meta-analysis*. SAGE Publications.

Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. J. (2017). The impact of mindfulness on the wellbeing and performance of educators: A systematic review of the empirical literature. *Teaching and Teacher Education*, *61*, 132–141. https://doi.org/10.1016/j.tate.2016.10.008

Mahipalan, M., & Sheena, S. (2019). Workplace spirituality and subjective happiness among high school teachers: Gratitude as a moderator. *Explore*, *15*(2), 107–114. https://doi.org/10.1016/j.explore.2018.07.002

Martín-Martín, A., Thelwall, M., Orduna-Malea, E., & Delgado López-Cózar, E. (2021). Google Scholar, Microsoft Academic, Scopus, dimensions, web of Science, and OpenCitations' COCI: A multidisciplinary comparison of coverage via citations. *Scientometrics*, *126*(1), 871–906. https://doi.org/10.1007/s11192-020-03690-4

Matiz, A., Fabbro, F., Paschetto, A., Cantone, D., Paolone, A. R., & Crescentini, C. (2020). Positive impact of mindfulness meditation on mental health of female teachers during the COVID-19 outbreak in Italy. *International Journal of Environmental Research and Public Health*, *17*, 6450. https://doi.org/10.3390/ijerph17186450

Matos, M., Albuquerque, I., Galhardo, A., Cunha, M., Pedroso Lima, M., Palmeira, L., Petrocchi, N., McEwan, K., Maratos, F. A., & Gilbert, P. (2022). Nurturing compassion in schools: A randomized

controlled trial of the effectiveness of a compassionate mind training program for teachers. *PLoS One*, *17*(3), e0263480. https://doi.org/10.1371/journal.pone.0263480

Matos, M., Palmeira, L., Albuquerque, I., Cunha, M., Pedroso Lima, M., Galhardo, A., Maratos, F. A., & Gilbert, P. (2021). Building compassionate schools: Pilot study of a compassionate mind training intervention to promote teachers' well-being. *Mindfulness*, *13*(1), 145–161. https://doi.org/10.1007/s12671-021-01778-3

McCallum, F. (2020). The changing nature of teachers' work and its impact on Wellbeing. In M. A. White, & F. McCallum (Eds.), *Critical perspectives on Teaching, Learning and Leadership*. Springer. https://doi.org/10.1007/978-981-15-6667-7_2

McCallum, F. (2020a). The changing nature of teachers' work and its impact on wellbeing. *Critical Perspectives on Teaching Learning and Leadership: Enhancing Educational Outcomes*, 17–44.

Moher, D., Liberati, A., Tetzlaf, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internet Medicine, 151*(4), 264–270. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of web of Science and Scopus: A comparative analysis. *Scientometrics*, *106*, 213–228. https://doi.org/10.1007/s11192-015-1765-5

Montero-Marin, J., Taylor, L., Crane, C., Greenberg, M. T., Ford, T. J., Williams, J. M. G., Garcia-Campayo, J., Sonley, A., Lord, L., Dalgleish, T., Blakemore, S. J., team, M., & Kuyken, W. (2021). Teachers finding peace in a frantic world: An experimental study of self-taught and instructor-led mindfulness program formats on acceptability, effectiveness, and mechanisms. *Journal of Educational Psychology*, *113*(8), 1689–1708. https://doi.org/10.1037/edu0000542

Netz, Y., Wu, M. J., Becker, B. J., & Tenenbaum, G. (2005). Physical activity and psychological well-being in advanced age: A meta-analysis of intervention studies. *Psychology and Aging*, *20*(2), 272–284. https://doi.org/10.1037/0882-7974.20.2.272

Oyserman, D., & Lee, S. W. (2008). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin*, *134*(2), 311.

Özü, Ö., Zepeda, S., Ilgan, A., Jimenez, A. M., Ata, A., & Akram, M. (2017). Teachers' psychological well-being: a comparison among teachers in U.S.A., Turkey and Pakistan. *International Journal of Mental Health Promotion*, *19*(3), 144–158. https://doi.org/10.1080/14623730.2017.1326397

Parker, A. E., Kupersmidt, J. B., Mathis, E. T., Scull, T. M., & Sims, C. (2014). The impact of mindfulness education on elementary school students: Evaluation of the master mind program. *Advances in School Mental Health Promotion*, *7*(3), 184–204. https://doi.org/10.1080/1754730X.2014.916497

Pérez-Escoda, N., Filella, G., Alegre, A., & Bisquerra, R. (2012). Developing the emotional competence of teachers and pupils in school contexts. https://doi.org/10.25115/ejrep.v10i28.1530

Patrick, B. C., Hisley, J., & Kempler, T. (2000). What's everybody so excited about? The effects of teacher enthusiasm on student intrinsic motivation and vitality. *The Journal of Experimental Education*, *68*(3), 217–236. https://doi.org/10.1080/00220970009600093

Penttinen, V., Pakarinen, E., von Suchodoletz, A., & Lerkkanen, M. K. (2020). Relations between kindergarten teachers' occupational well-being and the quality of teacher-child interactions. *Early Education and Development*, *31*(7), 994–1010. https://doi.org/10.1080/10409289.2020.1785265

Pinquart, M., & Sörensen, S. (2001). Gender differences in self-concept and psychological well-being in old age: A meta-analysis. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *56*(4), 195–213. https://doi.org/10.1093/geronb/56.4.P195

Plonsky, L. (2011). The effectiveness of second language strategy instruction: A meta-analysis. *Language Learning*, *61*(4), 993–1038. https://doi.org/10.1111/j.1467-9922.2011.00663.x

Pressley, T. (2021). Factors contributing to teacher burnout during COVID-19. *Educational Researcher*, *50*(5), 325–327. https://doi.org/10.3102/0013189X211004138

Rahm, T., & Heise, E. (2019). Teaching happiness to teachers - development and evaluation of a training in subjective well-being. *Frontiers in Psychology*, *10*, 2703. https://doi.org/10.3389/fpsyg.2019.02703

Richter, D., Kunter, M., Lüdtke, O., Klusmann, U., Anders, Y., & Baumert, J. (2013). How different mentoring approaches affect beginning teachers' development in the first years of practice. *Teaching and Teacher Education*, *36*, 166–177. https://doi.org/10.1016/j.tate.2013.07.012

Roeser, R. W. (2014). The emergence of mindfulness-based interventions in educational settings. In T. Urdan, & S. Karabenick (Eds.), *Motivational interventions* (pp. 379–419). Emerald Group Publishing Limited. https://doi.org/10.1108/S0749-742320140000018010

Roeser, R., Taylor, C., & Harrison, J. (2013). Self-enhancement through self-transcendence: Towards mindful middle schools for teaching and learning. *Middle grades curriculum: Voices and visions of the self-enhancing school*, 179–211.

Roeser, R. W., Mashburn, A. J., Skinner, E. A., Choles, J. R., Taylor, C., Rickert, N. P., Pinela, C., Robbeloth, J., Saxton, E., Weiss, E., Cullen, M., & Sorenson, J. (2022). Mindfulness training improves middle school teachers' occupational health, well-being, and interactions with students in their most stressful classrooms. *Journal of Educational Psychology*, *114*(2), 408–425. https://doi.org/10.1037/edu0000675

Ross, S. W., Romer, N., & Horner, R. H. (2012). Teacher well-being and the implementation of school-wide positive behavior interventions and supports. *Journal of Positive Behavior Interventions*, *14*(2), 118–128. https://doi.org/10.1177/1098300711413820

Sanchez, A. L., Cornacchio, D., Poznanski, B., Golik, A. M., Chou, T., & Comer, J. S. (2018). The effectiveness of school-based mental health services for elementary-aged children: A meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*, *57*(3), 153–165. https://doi.org/10.1016/j.jaac.2017.11.022

Schoeps, K., Tamarit, A., de la Barrera, U., & González Barrón, R. (2019). Effects of emotional skills training to prevent burnout syndrome in schoolteachers. *Ansiedad Y Estrés*, *25*(1), 7–13. https://doi.org/10.1016/j.anyes.2019.01.002

Schotten, M., Meester, W. J., Steiginga, S., & Ross, C. A. (2017). A brief history of Scopus: The world's largest abstract and citation database of scientific literature. In J. Cantu-Ortiz (Ed.), *Research analytics* (pp. 31–58). Auerbach.

Shankland, R., & Rosset, E. (2016). Review of brief school-based positive psychological interventions: A taster for teachers and educators. *Educational Psychology Review*, *29*(2), 363–392. https://doi.org/10.1007/s10648-016-9357-3

Sharrocks, L. (2014). School staff perceptions of well-being and experience of an intervention to promote well-being. *Educational Psychology in Practice*, *30*(1), 19–36. https://doi.org/10.1080/02667363.2013.868787

Shoshani, A. (2021). Growth mindset in the maths classroom: A key to teachers' well-being and effectiveness. *Teachers and Teaching*, *27*(8), 730–752. https://doi.org/10.1080/13540602.2021.2007370

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*(5), 467–487. https://doi.org/10.1002/jclp.20593

Singh, V. K., Singh, P., Karmakar, M., Leta, J., & Mayr, P. (2021). The journal coverage of web of Science, Scopus and dimensions: A comparative analysis. *Scientometrics*, *126*, 5113–5142. https://doi.org/10.1007/s11192-021-03948-5

Siu, O. L., Cooper, C. L., & Phillips, D. R. (2014). Intervention studies on enhancing work well-being, reducing burnout, and improving recovery experiences among Hong Kong health care workers and teachers. *International Journal of Stress Management*, *21*(1), 69–84. https://doi.org/10.1037/a0033291

Soini, T., Pyhältö, K., & Pietarinen, J. (2010). Pedagogical well-being: Reflecting learning and well-being in teachers' work. *Teachers and Teaching*, *16*(6), 735–751. https://doi.org/10.1080/13540602.2010.517690

Spilt, J. L., Koomen, H. M. Y., & Thijs, J. T. (2011). Teacher wellbeing: The importance of teacher-student relationships. *Educational Psychology Review*, *23*(4), 457–477. https://doi.org/10.1007/s10648-011-9170-y

Subel, D., Blane, D., & Sheringham, J. (2022). Workplace interventions to reduce occupational stress for older workers: A systematic review. *International Journal of Environmental Research and Public Health*, *19*(15), 9202. https://doi.org/10.3390/ijerph19159202

Sun, J., Xin, Z., Bao, H., Zhang, X., & Li, C. (2021). The influence of mindfulness training on subjective well-being and its components: A meta-analysis. *Chinese Journal of Clinical Psychology*, *29*(3), 648–652. https://doi.org/10.16128/j.cnki.1005-3611.2021.03.041

Tarrasch, R., Berger, R., & Grossman, D. (2020). Mindfulness and compassion as key factors in improving teacher's well being. *Mindfulness*, *11*(4), 1049–1061. https://doi.org/10.1007/s12671-020-01304-x

Taylor, M. J. (2017). Using CALMERSS to enhance teacher well-being: A pilot study. *International Journal of Disability Development and Education*, *65*(3), 243–261. https://doi.org/10.1080/1034912x.2017.1394985

Telles, S., Gupta, R. K., Bhardwaj, A. K., Singh, N., Mishra, P., Pal, D. K., & Balkrishna, A. (2018). Increased mental well-being and reduced state anxiety in teachers after participation in a residential yoga program. *Medical Science Monitor Basic Research*, *24*, 105–112. https://doi.org/10.12659/MSMBR.909200

Telles, S., Sharma, S. K., Gupta, R. K., Pal, D. K., Gandharva, K., & Balkrishna, A. (2019). The impact of yoga on teachers' self-rated emotions. *BMC Research Notes*, *12*(1), 680. https://doi.org/10.1186/s13104-019-4737-7

Thomas, B. H., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. *Worldviews on Evidence-Based Nursing*, *1*(3), 176–184. https://doi.org/10.1111/j.1524-475X.2004.04006.x

Trent, L. M. (1997). Enhancement of the school climate by reducing teacher burnou: Using an invitatioanl approach. *Journal of Invitational Theory and Practice, 4*(2).

Triandis, H. C. (1996). The psychological measurement of cultural syndromes. *American Psychologist*, *51*, 407–415. https://doi.org/10.1037/0003-066X.51.4.407

Triandis, H. C. (2018). *Individualism and collectivism*. Routledge.

Turner, K., & Theilking, M. (2019). Teacher wellbeing: Its effects on teaching practice and student learning. *Issues in Educational Research*, *29*(3), 938–960.

Van den Noortgate, W., López-López, J. A., Marín-Martínez, F., & Sánchez-Meca, J. (2013). Three-level meta-analysis of dependent effect sizes. *Behavior Research Methods*, *45*, 576–594. https://doi.org/10.3758/s13428-012-0261-6

Van den Noortgate, W., López-López, J. A., Marín-Martínez, F., & Sánchez-Meca, J. (2015). Meta-analysis of multiple outcomes: A multilevel approach. *Behavior Research Methods*, *47*, 1274–1294. https://doi.org/10.3758/s13428-014-0527-2

Vevea, J. L., & Woods, C. M. (2005). Publication bias in research synthesis: Sensitivity analysis using a priori weight functions. *Psychological Methods*, *10*(4), 428. https://doi.org/10.1037/1082-989X.10.4.428

Viac, C., & Fraser, P. (2020). Teachers' well-being: A framework for data collection and analysis. In *OECD: Education working papers No. 213.* Paris: OECD Publishing. https://doi.org/https://doi.org/doi:https://doi.org/10.1787/c36fc9d3-en

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, *36*(3), 1–48. https://doi.org/10.18637/jss.v036.i03

Virtanen, A., De Bloom, J., Annika Reins, J., Syrek, C., Lehr, D., & Kinnunen, U. (2019). Promoting and prolonging the beneficial effects of a vacation with the help of a smartphone-based intervention. *Gedrag & Organisatie*, *32*(4). https://doi.org/10.5117/2019.032.004.003

Vo, D. T., & Allen, K. A. (2022). A systematic review of school-based positive psychology interventions to foster teacher wellbeing. *Teachers and Teaching*, *28*(8), 964–999. https://doi.org/10.1080/13540602.2022.2137138

Weiss, L. A., Westerhof, G. J., & Bohlmeijer, E. T. (2016). Can we increase psychological well-being? The effects of interventions on psychological well-being: A meta-analysis of randomized controlled trials. *PLoS One*, *11*(6), e0158092. https://doi.org/10.1371/journal.pone.0158092

Wilson, D., Rodrigues de Oliveira, D., Palace-Berl, F., de Mello Ponteciano, B., Fungaro Rissatti, L., Pollizi, P., Sardela de Miranda, V., D'Almeida, F., V., & Demarzo, M. (2022). Fostering emotional self-regulation in female teachers at the public teaching network: A mindfulness-based intervention improving psychological measures and inflammatory biomarkers. *Brain, Behavior, & Immunity-health*, *21*, 100427. https://doi.org/10.1016/j.bbih.2022.100427

Xie, K., Debacker, T. K., & Ferguson, C. (2006). Extending the traditional classroom through online discussion: The role of student motivation. *Journal of Educational Computing Research*, *34*(1), 67–89. https://doi.org/10.2190/7BAK-EGAH-3MH1-K7C6

Yan, Z., Wang, X., Boud, D., & Lao, H. (2023). The effect of self-assessment on academic performance and the role of explicitness: a meta-analysis. *Assessment & Evaluation in Higher Education, 48*(1), 1–15.

Yeh, H. J. (2015). Job demands, job resources, and job satisfaction in East Asia. *Social Indicators Research*, *121*, 47–60. https://doi.org/10.1007/s11205-014-0631-9

Yin, H., Huang, S., & Wang, W. (2016). Work environment characteristics and teacher well-being: The mediation of emotion regulation strategies. *International Journal of Environmental Research and Public Health*, *13*(9). https://doi.org/10.3390/ijerph13090907

Yu, D., Chen, J., Li, X., & Yan, Z. (2022). Trajectory of teacher well-being research between 1973 and 2021: Review evidence from 49 years in Asia. *International Journal of Environmental Research and Public Health, 19*(19). https://doi.org/10.3390/ijerph191912342

Zarate, K., Maggin, D. M., & Passmore, A. (2019). Meta-analysis of mindfulness training on teacher well-being. *Psychology in the Schools*, *56*(10), 1700–1715. https://doi.org/10.1002/pits.22308

Zadok-Gurman, T., Jakobovich, R., Dvash, E., Zafrani, K., Rolnik, B., Ganz, A. B., & Lev-Ari, S. (2021). Effect of inquiry-based stress reduction (IBSR) intervention on well-being, resilience and burnout of teachers during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *18*(7). https://doi.org/10.3390/ijerph18073689

Zeng, G., Chen, X., Cheung, H. Y., & Peng, K. (2019). Teachers' growth mindset and work engagement in the Chinese educational context: Well-being and perseverance of effort as mediators. *Frontiers in Psychology*, *10*, 839. https://doi.org/10.3389/fpsyg.2019.00839

Zhang, L., Chen, J., Li, X., & Zhan, Y. (2023). A scope review of the teacher well-being research between 1968 and 2021. *The Asia-Pacific Education Researcher, 33*(1), 171–186. https://doi.org/10.1007/s40299-023-00717-1

Zoogman, S., Goldberg, S. B., Hoyt, W. T., & Miller, L. (2014). Mindfulness interventions with youth: A meta-analysis. *Mindfulness*, *6*(2), 290–302. https://doi.org/10.1007/s12671-013-0260-4

Authors and Affiliations

Yingxiu Li[1] · Xiang Wang[2] · Junjun Chen[1] · John Chi-Kin Lee[3] · Zi Yan[4] · Jian-Bin Li[5]

✉ Junjun Chen
jjchen@eduhk.hk

Yingxiu Li
winnie.liyingxiu@gmail.com

Xiang Wang
wxiang7work@gmail.com

John Chi-Kin Lee
jcklee@eduhk.hk

Zi Yan
zyan@eduhk.hk

Jian-Bin Li
lijianbin@eduhk.hk

[1] Department of Education Policy and Leadership, The Education University of Hong Kong, Hong Kong SAR, China

[2] Department of Sport, Physical Education and Health, Hong Kong Baptist University, Hong Kong SAR, China

[3] Academy for Educational Development and Innovation, The Education University of Hong Kong, Hong Kong SAR, China

[4] Department of Curriculum and Instruction, The Education University of Hong Kong, Hong Kong SAR, China

[5] Department of Early Childhood Education, The Education University of Hong Kong, Hong Kong SAR, China