

Cite as: Lomas, T., Medina, J. C., Ivtzan, I., Rupperecht, 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. <http://doi.org/10.1016/j.tate.2016.10.008>

The impact of mindfulness on the wellbeing and performance of educators: A systematic review of the empirical literature.

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Abstract

Given the potentially demanding nature of teaching, efforts are underway to develop practices that can improve the wellbeing of educators, including interventions based on mindfulness meditation. We performed systematic review of empirical studies featuring analyses of mindfulness in teaching contexts. Databases were reviewed from the start of records to January 2016. Eligibility criteria included empirical analyses of mindfulness and wellbeing outcomes acquired in relation to practice.

A total of 19 papers met the eligibility criteria and were included in the systematic review, consisting of a total 1,981 participants. Studies were principally examined for outcomes such as burnout, anxiety, depression and stress, as well as more positive wellbeing measures (e.g., life satisfaction).

The systematic review revealed that mindfulness was generally associated with positive outcomes in relation to most measures. However, the quality of the studies was inconsistent, and so further research is needed, particularly involving high-quality randomised control trials.

Keywords: mindfulness; meditation; education professionals; wellbeing; systematic review

Introduction

There are widespread concerns about the increasingly stressful nature of many professions. This claim is based upon the observation that although the prevalence of mental illness in the general United Kingdom (UK) population has not significantly increased in the last twenty years (Office for National Statistics [ONS], 2014), since 2009 the number of sick days lost to stress, depression and anxiety has increased by 24%, while the number lost to serious mental illness has doubled (Davies, 2014). As the annual report by Sally Davies (2014), the UK's Chief Medical Officer elucidates, mental ill health is the leading cause of sickness absence in the UK, accounting for 70 million sick days (more than half of the 130 million total every year); indeed, each year between 2010 and 2014, a million workers in the UK took sick leave for longer than four weeks. Stress and mental disorders connected to work are a serious problem – obviously for the sufferers themselves, but also for their employers and the wider economy. Davies reports that the indirect costs to the UK of mental ill health in unemployment, absenteeism and presenteeism (leading to loss of productivity) are estimated at between £70 and £100 billion, with £9 billion being paid by employers in terms of sick pay and related costs.

Some jobs are often regarded as particularly stressful. Teaching is widely-regarded as one such profession. Even in countries where it is a well-respected and remunerated occupation, such as Finland (Tirri, 2011), it can still often be a demanding and challenging endeavour, physically, emotionally, cognitively and socially (Blomberg & Knight, 2015). Moreover, these “inherent” challenges are frequently exacerbated by “external” factors, such as politically-driven structural changes and pressures. In the UK, for instance, a recent survey of 3,500 members of the NASUWT (National Association of Schoolmasters Union of Women Teachers) union – a large UK union for teachers and head teachers, comprising over 300,000 members – found that over two-thirds of respondents had considered leaving

the profession in the last 12 months (Precey, 2015). The findings revealed the extent to which respondents felt their wellbeing had been adversely affected by work: 83% reported experiencing workplace stress, while 67% stated that their job had adversely affected their mental or physical health (with 5% actually being hospitalised as a result). Arguably, much of this pressures relates specifically to the current context of teaching in the UK (e.g., systemic pressures in the UK education system). The top concerns cited by respondents as being responsible for their work-related stress was workload (flagged up by 89% of respondents), followed by pay (45%), inspections (44%), and curriculum reform (42%).

Given the burdens of work-related stress – both in teaching, and more generally – there is an increasing recognition of the need to take preventative action to mitigate or ameliorate work-related mental health issues (George, Dellasega, Whitehead, & Bordon, 2013). Some efforts are structural, such as initiatives to provide more flexible working arrangements (Joyce, Pabayo, Critchley, & Bambra, 2010). Other remedial actions focus more on offering clinical and psychotherapeutic help to staff who may be in need; however, workers may be somewhat reluctant to avail themselves of such services, wary lest it appear on their record or prove detrimental career-wise in some way (Chew-Graham, Rogers, & Yassin, 2003). Arguably less problematic are interventions and programmes aimed at alleviating or protecting against issues such as stress. (There may be less of a stigma about attending these kind of programmes, since they are often targeted at staff more “generally,” rather than specific individuals.) Such initiatives can still prove difficult to implement of course; e.g., staff may be reluctant to engage in these due to perceived lack of time (Bears, McMinn, Seegobin, & Free, 2013). However, they are nevertheless increasingly common. In recent years, among the most prominent of these types of initiatives are programmes based around mindfulness meditation – mindfulness-based interventions (MBIs) – which is the focus of this review.

Before introducing mindfulness, it is worth noting that many such interventions are not only aimed at ameliorating mental health issues, such as anxiety, but promoting wellbeing in a broader sense. Of course, wellbeing is a contested term, used in different ways in various contexts (deChavez, Backett-Milburn, Parry, & Platt, 2005). For instance, Cooke, Melchert, and Connor (2016) identified four prominent conceptualisations of wellbeing: (1) hedonic wellbeing, also known as ‘subjective wellbeing’ (Diener, 2000), which encompasses constructs like positive affect and life satisfaction; (2) eudaimonic wellbeing, also known as ‘psychological wellbeing’ (Ryff, 1989), which includes considerations such as meaning in life; (3), quality of life (Frisch, Cornell, Villanueva, & Retzlaff, 1992), which often encompasses both hedonic and eudaimonic processes; and (4) ‘wellness,’ which tends to be used interchangeably with quality of life.

In addition, other conceptualisations of wellbeing emphasise its multidimensional nature. For instance, Pollard and Davidson (2001, p.10) define wellbeing as ‘a state of successful performance across the life course integrating physical, cognitive and social-emotional function.’ (In constructing wellbeing as being multidimensional in this way, such definitions align with influential multidimensional conceptualisations of health, such as Engel’s (1977) biopsychosocial model, and the World Health Organization’s (1948) inclusive definition of health as ‘a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity’.) As such, in the current review, we are not only interested in the amelioration of mental health issues, but also in the promotion of ‘positive’ wellbeing. Thus, our analysis will consider outcomes pertaining to all four conceptualisations identified by Cooke et al. (2016), including hedonic constructs (e.g., positive affect) and eudaimonic constructs (e.g., meaning in life). We shall also look to appraise wellbeing in a multidimensional way, e.g., encompassing health and relationships. With that in mind, let’s consider what mindfulness is.

Mindfulness

The past few decades have seen a burgeoning interest in mindfulness in the West, spanning clinical practice, academia, and society more broadly. Mindfulness is generally regarded as having originated in the context of Buddhism around the 5th millennium B.C., though its roots stretch back at least as far as the third millennium B.C. as part of the Brahmanic traditions in India, from which Buddhism subsequently emerged (Cousins, 1996). However, it came to prominence in the West particularly through the work of Kabat-Zinn (1982), who harnessed it for an innovative “mindfulness-based stress reduction” (MBSR) programme (discussed further below) which was successfully used to treat chronic pain. Somewhat confusingly, the term “mindfulness” is frequently used to refer to both: (1) a state or quality of mind; and (2) a form of meditation that enables one to cultivate this particular state/quality. Both uses will be deployed in this review, though the context will make clear which particular usage is being used.

In terms of (1), the most prominent and influential operationalisation of mindfulness as a state/quality of mind is Kabat-Zinn’s (2003, p.145) widely-cited definition, which constructs mindfulness as “the awareness that arises through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment.” Expanding on this idea, Shapiro, Carlson, Astin, and Freedman (2006) formulated a theoretical elucidation of Kabat-Zinn’s (2003) definition, deconstructing it into three key “axioms” or components: intention (i.e., a teleological motivation for paying attention in this way, e.g., a commitment to psychological development); attention (i.e., the cognitive processes and mechanisms through which said attention is enacted); and attitude (i.e., the emotional qualities with which one imbues one’s attentive focus, like compassion).

The second main usage of the term mindfulness is for the forms of meditation practice which may facilitate this “mindful” state/quality of mind. Mindfulness meditation, and

meditation more broadly, refer to a diverse spectrum of mental activities, which share a common focus on training the self-regulation of attention and awareness (Author et al., 2015a), with the goal of enhancing voluntary control of mental processes, thereby increasing wellbeing (Walsh & Shapiro, 2006). Lutz, Slagter, Dunne, and Davidson (2008) offer a useful way of differentiating between types of meditation, suggesting that most common forms can be identified as featuring either “focused attention” or “open- monitoring” processes. Focused attention can be operationalised in terms of the co-ordination of various attention networks (Mirsky, Anthony, Duncan, Ahearn, & Kellam, 1991; Posner & Petersen, 1990), including sustained attention (e.g. towards a selected target, like the breath), executive attention (e.g., preventing one’s focus from “wandering”), attention switching (e.g., disengaging from distractions), selective attention and attention re-orienting (e.g. redirecting focus back to the target), and working memory (Lutz et al., 2008; Vago & Silbersweig, 2012). In contrast, open-monitoring refers to a broader receptive capacity to detect events within an unrestricted “field” of awareness, without a specific focus (Raffone & Srinivasan, 2010); this capacity can include processes of “meta- awareness” (i.e., in which practitioners are able to reflect on the process of consciousness itself).

Mindfulness – both as a meditation practice, and as a state/quality of mind – is commonly presented as an example of open-monitoring (Kabat-Zinn, 2003). However, in practice, mindfulness meditation usually involves a combination of focused attention and open-monitoring, since it usually begins with a period of focused attention on a target, such as the breath, in order to focus awareness, followed by the more receptive state of open-monitoring (Chiesa, Calati, & Serretti, 2011).

According to Shapiro et al. (2006), the main significance of mindfulness – as a quality/state of mind, and as a meditation practice that can facilitate this – is that it involves a meta-mechanism known as “reperceiving.” The three components of mindfulness

(intention, attention and attitude) combine to generate what is described as a “fundamental shift in perspective,” in which “rather than being immersed in the personal drama or narrative of our life story, we are able to stand back and witness it” (p.377). Thus, in practising mindfulness, people are seen as learning how to enter into a different *relationship* with their subjectivity: being able to “stand back” and dispassionately view subjective qualia as phenomena passing through their internal world, rather than identifying with and attaching to or becoming averse to such qualia (Bishop et al., 2004). This “standing back” – referred to by Shapiro et al. as “reperceiving” – is also known as “decentring,” defined as “the ability to observe one’s thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true” (Fresco et al., 2007, p.234).

Crucially, Shapiro et al. (2006) theorise that reperceiving/decentring has a positive impact upon wellbeing. In MBIs, the aim is not to change participants’ thoughts/feelings per se, as cognitive therapy might seek to, but to help people “become more aware of, and relate differently to” this content (Shapiro, Astin, Bishop, & Cordova, 2005, p.165). For example, Mindfulness-Based Cognitive Therapy (MBCT) is an adaptation of MBSR, designed to prevent depressive relapse (Segal, Williams, & Teasdale, 2002). In MBCT, people are taught to decentre from their cognitions, thus helping prevent a “downward spiral” of negative thoughts and worsening negative affect which could otherwise trigger a depressive relapse. Thus MBCT, and mindfulness interventions generally, involve “retraining awareness” so that people have greater choice in how they relate and respond to their subjective experience, rather than habitually responding in maladaptive ways (Chambers, Gullone, & Allen, 2009, p.659). The positive impact of retraining awareness in this way is not limited to depression, but extends to mental health generally. For instance, the development of decentring capabilities can help people tolerate otherwise distressing qualia, which is important given that the *inability* to tolerate such qualia is a transdiagnostic factor underlying diverse

psychopathologies (Aldao, Nolen-Hoeksema, & Schweizer, 2010), from depression (Borton, Markowitz, & Dieterich, 2005) to substance abuse (Garland, Gaylord, Boettiger, & Howard, 2010).

Mindfulness interventions were initially limited to clinical settings. The first such intervention was Kabat-Zinn's (1982) MBSR program, which was initially used to treat chronic pain, then was subsequently applied in the treatment of various other conditions, from cancer (Ledesma & Kumano, 2009) to migraine (Schmidt et al., 2010). Kabat-Zinn's (1982) work was also followed by other clinical interventions which adapted the MBSR protocol for the treatment of specific mental health problems, including MBCT for the treatment of depression (Segal et al., 2002), and Mindfulness- Oriented Recovery Enhancement for the treatment of substance abuse (Garland et al., 2014).

However, since the late 1990s, there has been increasing interest in the use of mindfulness interventions in occupational contexts, not only for staff who may be suffering with stress and mental health issues, but for workers "in general" (e.g., as a protective measure against future issues). For instance, in one such early study, Shapiro, Schwartz, and Bonner (1998) reported that MBSR was effective at reducing stress among medical and pre-medical students.

Indeed, such interventions may be particularly valuable for educators, given their vulnerability to stress and other adverse work-related mental health outcomes (as discussed above). However, there have currently been no reviews assessing the impact of MBIs on the health and wellbeing of educators specifically. This is not to say that there are no summaries on the value of mindfulness in educational contexts: there have been numerous reviews into the burgeoning literature on the value of MBIs for *students* (e.g., Waters, Barsky, Ridd, & Allen, 2015; Kallapiran, Koo, Kirubakaran, & Hancock, 2015), which generally show mindfulness to be efficacious in promoting health and wellbeing, as well as outcomes such

as academic performance. However, only two such reviews have been conducted on the use of MBIs with educators per se: one was by Albrecht, Albrecht, and Cohen (2012), which only featured three studies that had been published at that time, while a more recent report by Weare (2014) featured 13 studies. As such, to provide an updated assessment of this area, a systematic review was conducted, featuring empirical studies of the impact of mindfulness on the mental health and wellbeing of educators.

Methods

The literature search was conducted using the MEDLINE and Scopus electronic databases. The search was conducted as part of a broader systematic review on mindfulness in all spheres of occupation (which is still ongoing). The criteria for the broader review were: mindfulness AND work OR occupation OR profession OR staff (in all fields in MEDLINE and limited to article title, abstract, and keywords in Scopus). The dates selected were from the start of the database records to 10th January 2016. For this current review into educators, in terms of PICOS (participants, interventions, comparisons, outcomes and study design) the key criteria were: participants – currently employed in an educational context; outcomes – any pertaining to mindfulness, mental health and wellbeing; and study design – any empirical study featuring data collection. Although we were principally interested in studies of MBIs in educational workplaces, as a secondary concern we were also interested in non-intervention studies on mindfulness in the workplace (e.g., regression analyses of the association between trait mindfulness and health and wellbeing outcomes). Studies were required to be published (or in press) in a peer-reviewed academic journal, and to be in English. The review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). The review protocol for the broader systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO) database on 5th

January 2016. Registration number: CRD42016032899
(<http://www.crd.york.ac.uk/PROSPERO>).

The inclusion criteria for the broader systematic review were: 1) participants currently employed by a company or organisation; 2) empirical assessment undertaken in the context of participants' engagement with a company or organisation; 3) empirical assessment of mindfulness, mental health and wellbeing outcomes; 4) quantitative or qualitative analysis, supported by appropriate methodology; 5) published (or in press) in a peer-reviewed academic journal; and 6) written in English. Exclusion criteria were theoretical articles or commentaries without statistical or qualitative analyses. In addition to these criteria, the review in the current paper had an additional inclusion criterion namely participants currently employed in an educational context.

Papers were divided into intervention studies and non-intervention studies. For intervention studies, the following variables were extracted from each paper: type of design (e.g., RCT versus convenience sample); occupation of participants; number of experimental participants, and number of control participants (if applicable); type of MBI; length of MBI; nature of control; principal mental health and wellbeing outcomes; and the significance level of principal outcomes (for statistical analyses). For non-intervention studies, the following variables were extracted from each paper: type of analysis (e.g., regression versus qualitative); occupation of participants; number of experimental participants; principal mental health and wellbeing outcomes; and the significance level of principal outcomes (for statistical analyses).

The primary summary measures were mindfulness, mental health and wellbeing outcomes. These were principally psychometric scales pertaining to mindfulness, mental health (e.g., anger, anxiety, burnout, depression, distress, stress), wellbeing (engagement,

satisfaction), and physical health (e.g., illness, diet, exercise, and sleep). Secondary summary measures of interest were outcomes that *pertain* to mental health and wellbeing (e.g., compassion, empathy, emotional intelligence and regulation, resilience, and spirituality). Finally, tertiary summary measures of interest were outcomes relating to job performance.

The Quality Assessment Tool for Quantitative Studies (QATQS; National Collaborating Centre for Methods and Tools, 2008) was used to assess the quality of the studies. QATQS assesses methodological rigor in six areas: (a) selection bias; (b) design; (c) confounders; (d) blinding; (e) data collection method; and (f) withdrawals and drop-outs. Each area is assessed on a quality score of one to three (one = strong; two = moderate; three = weak). Scores for each area were collated, and a global score was assigned to each study. If there are no weak ratings, the study is given a score of one (judged as strong); one weak rating leads to a score of two (moderate); and two or more weak ratings generates a score of three (weak) (Supplementary Materials). QATQS scoring was conducted (II) and checked independently (TL). Any discrepancies were resolved by discussion with agreement reached in all cases.

Results

Search Results.

For the broader systematic review (i.e., mindfulness across all occupations), following removal of duplicate citations, 722 potentially relevant papers were identified. In the current specific systematic review (focusing specifically on educators), from reviewing the abstract, 606 papers were excluded.

Table 1. Overview of Intervention Studies.

Authors	Occupation	Design	Expt. group	Control group	Intervention	Length	Control	Primary outcome(s)
Baccarani et al. (2013)	University administrators	RCT	10	10	Mindfulness program (specific to study)	4 weeks	NR	PI > general wellbeing ($p = .002$) & selective attention ($p = .011$)
Beshai et al. (2015)	Teachers	Convenience sample	49	40	.b Foundations course	9 session	Wait-list	PI < stress ($p < .01$). PI > compassion ($p < .01$), mindfulness ($p < .01$), & wellbeing ($p < .01$).
Flook et al. (2013)	Teachers	RCT	9	9	MBSR adaptation	8 weeks	Wait-list	PI < burnout ($p < .05$) & distress ($p < .001$). PI > attention ($p < .05$) & mindfulness ($p < .05$).
Franco et al. (2010)	Teachers	RCT	34	34	Mindfulness program (specific to study)	10 weeks	Music listening	PI < anxiety ($p = .008$), depression ($p = .001$), & distress ($p = .001$).
Frank, Riebel, et al. (2015)	Teachers	RCT	18	18	MBSR	8 weeks	Wait-list	PI > self-regulation ($p = .003$), calmness ($p = .002$), mindfulness ($p = .01$), self-compassion ($p = .003$), sleep duration ($p = .01$) & sleep quality ($p = .001$). PI >> anxiety, burnout, depression.
Gold et al. (2010)	Teachers (9) and assistants (2)	Convenience sample	11	-	MBSR	8 weeks	N/A	PI < depression ($p < .02$), stress ($p < .05$). PI >> anxiety & mindfulness.
Harris et al. (2015)	Teachers	RCT	34	30	CALM	16 weeks	Wait-list	PI > distress tolerance ($p < .01$), health ($p < .05$), mindfulness ($p < .05$) & positive affect ($p < .01$). PI >> burnout or sleep quality.
Hue and Lau (2015)	Trainee teachers	Convenience sample	35 (78)	35	Mindfulness program (specific to study)	6 weeks	Nothing	PI > mindfulness ($p = .023$) & wellbeing ($p = .022$). PI >> anxiety, depression & stress.
Jennings et al. (2011)	Teachers	Convenience sample	31 (1) & 43 (2)	-	Cultivating awareness & resilience in education **	1 month (2 w'end)	N/A	PI >> depression, mindfulness, negative affect, positive affect, self-efficacy, & time pressure.
Jennings et al. (2013)	Teachers	RCT	25	25	Cultivating awareness & resilience in education **	1 month (2 w'end)	Wait-list	PI < time pressure ($p = .025$). PI > health ($p = .004$), mindfulness ($p = .003$), & self-efficacy ($p = .002$). PI >> negative affect, positive affect.
Klatt et al. (2009)	University employees	RCT	22	20	MBSR adaptation			PI < stress ($p = .002$). PI > mindfulness ($p = .014$), sleep quality ($p = .016$).
Malarkey et al. (2013)	University employees	RCT	93	93	Mindfulness program (specific to study)	8 weeks	Lifestyle education programme	PI > mindfulness ($p = .003$). PI >> depression, sleep quality & stress.
Poulin et al. (2008)	Teachers	RCT	28	16	Mindfulness-based wellbeing education	8 weeks	Nothing	PI > mindfulness ($p < .001$), satisfaction with life ($p < .05$), self-efficacy ($p < .05$), & self-rated health ($p < .05$). PI >> distress

Ramsey and Jones	Teachers	RCT	13 (22)	24 (29)	Mindfulness workshop (specific to Mindfulness Training)	1 day	NR	PI > relationships [perceived instigated ostracism] ($p = .014$).
Roeser et al. (2013)	Teachers	RCT	54	59	Mindfulness Training	8 weeks	Wait-list	PI < anxiety ($p < .01$), burnout ($p < .01$), depression ($p < .01$), stress ($p < .01$). PI > self-compassion ($p < .01$) & mindfulness ($p < .01$). PI >> blood pressure. Qualitative focus groups. PI > self-regulation
Schussler et al. (2015)	Teachers	Convenience	50	-	CARE	8 weeks	N/A	Qualitative focus groups. PI > self-regulation
Taylor et al. (2015)	Teachers	RCT	26	30	SMART	8 weeks	Wait-list	PI < stress ($p < .001$). PI >> compassion.

Note. < = decreases in; > = increases in; >< = no change in; ! = mindfulness associated with worsened outcome; expt = experimental group; cnt = control group; PI = post-intervention; NR = not-reported; MBCT = mindfulness-based cognitive therapy; MBSR = mindfulness-based stress reduction; MBST = mindfulness-based stress reduction therapy. CALM = community approach to learning mindfully. CARE = cultivating awareness and resilience in education. SMART = stress management and relaxation training. MM = mindfulness meditation; NCC = neural correlates of consciousness; NR = not recorded; N/A = not applicable; NA = not available; RCT = randomized controlled trial; * = number in parenthesis is the initial sample size (if different from sample size featured in analysis); ** = mindfulness just one component of broader intervention

Table 2. Overview of non-intervention studies

Authors	Workplace	Meditators	Non-meditators	Analysis	Primary result
Frank, Jennings et al. (2015)	Teachers	-	918 (263, 263, 392)	Regression	Mindfulness correlation: < burnout ($p < .01$). > behaviour management efficacy ($p < .01$).
Jennings (2015)	Early childhood teachers	-	35		Mindfulness correlation: > emotional support ($p < .001$). >< classroom organisation & instructional support.

Note. < = negative correlation with; > = positive correlation with; >< = no correlation;

Relationship between Mindfulness and Key Outcomes

An overview of the findings is shown in table 3 below. This shows whether outcomes were either: (a) increased in relation to an MBI; (b) did not change in relation to an MBI (or in exceptional cases, changed in a “negative” direction); or (c) were found in non-intervention studies to be associated with mindfulness (i.e., through regression analyses). A more detailed presentation of the results is then shown in table 4 below; this lists all the specific assessment tools used for each measure, together with the specific studies deploying that tool.

Table 3. *Summary of common outcomes across all studies*

Outcome	Number of studies	Improvement related to mindfulness intervention	No change in relation to mindfulness	Association (benign) with
Anxiety	3	2	1	0
Burnout &	7	4	2	1
Compassion &	4	3	1	0
Depression	4	3	1	0
Distress & anger	5	3	2	0
Emotional	3	3	0	0
Health	8	5	5	0
Job performance	4	2	0	3
Mindfulness &	14	12	2	0
Stress & strain	6	4	2	0
Wellbeing &	6	5	2	0

Table 4. *Common outcomes across all studies*

Outcome	Measure	Improvement (positive change) related to mindfulness intervention	No change in relation to mindfulness intervention	Association (benign) with mindfulness
Anxiety	State trait anxiety inventory Symptom checklist-90-R [anxiety]	Johnson et al. (2015), Roeser et al. (2013) Franco et al. (2010)		
Burnout	Connor David resiliency scale Maslach burnout inventory	Klatt et al. (2015) Flook et al. (2013), Roeser et al. (2013)	Frank, Riebel. et al. (2015), Harris et al. (2015)	Frank, Jennings, et al. (2015)
	Utrecht work engagement scale [vigour]	Klatt et al. (2015)		
Empathy & compassion	Santa Clara brief compassion scale Self-compassion scale		Taylor et al. (2015)	
		Beshai et al. (2015), Frank, Riebel. et al. (2015) Roeser et al. (2013)		
Depression	Beck depression inventory Brief symptom inventory	Roeser et al. (2013))	Frank, Riebel. et al. (2015)	
	Symptom checklist-90-R [depression]	Franco et al. (2010)		
Distress & anger	Brief symptom inventory		Frank, Riebel. et al. (2015)	
	Distress tolerance scale	Harris et al. (2015)		
	Kessler 10 psychological distress scale		Poulin et al. (2008)	
	Symptom checklist-90-R	Flook et al. (2013), Franco et al. (2010)		
Emotional intelligence & regulation	Affective self-regulatory efficacy scale	Frank, Riebel. et al. (2015)		
	Emotion regulation questionnaire	Jennings et al. (2013)		
	Qualitative interviews	Schussler et al. (2015)		
Health	Blood pressure		Roeser et al. (2013)	
	Daily physical symptoms scale	Harris et al. (2015), Jennings et al. (2013)	Jennings et al. (2011)	
	Interleukin 6		Malarkey et al. (2013) !	
	Perceived stress scale [sleep duration]		Klatt et al. (2009)	
	Perceived stress scale [sleep quality]	Klatt et al. (2009)		
	Pittsburgh sleep quality index	Frank, Riebel. et al. (2015)		
	Self-rated health	Poulin et al. (2008)		
	Sleep-related impairment scale		Harris et al. (2015)	

Job performance	Behaviour management efficacy scale		Frank, Jennings, et al. (2015)
	Classroom assessment scoring system [organization & instructional support]		Jennings (2015)!
	Classroom assessment scoring system [emotional support]		Jennings (2015)
	Teachers' self-efficacy scale	Jennings et al. (2013)	
	Teachers' sense of efficacy scale	Poulin et al. (2008)	
Mindfulness & awareness	Five facets of mindfulness questionnaire	Beshai et al. (2015), Flook et al. (2013) , Frank, Riebel. et al. (2015) , Harris et al. (2015) , Jennings et al. (2013) , Manotas et al. (2014)	Jennings et al. (2011)!
	Kentucky inventory of mindfulness skills	Roeser et al. (2013)	
	Mindful attention and awareness scale	Poulin et al. (2008)	
	Selective attention (not specified)	Klatt et al. (2009)	
	Sustained attention	Baccarani et al. (2013)	
	Toronto mindfulness scale	Flook et al. (2013)	
		Malarkey et al. (2013)	
Stress & strain	Occupational stress survey	Taylor et al. (2015)	
	Perceived stress scale	Klatt et al. (2009)	Malarkey et al. (2013)
	Salivary cortisol	Roeser et al. (2013)	
	Self-reported job stress	Roeser et al. (2013)	
	Time urgency scale		Jennings et al. (2011)
Wellbeing & satisfaction	Positive & negative affect scale	Harris et al. (2015)	Jennings et al. (2011), Jennings et al. (2013)
	Psychological general wellbeing	Baccarani et al. (2013)	
	Satisfaction with life scale	Poulin et al. (2008)	
	Smith relaxation disposition inventory	Poulin et al. (2008)	
	Warwick-Edinburgh mental wellbeing scale	Beshai et al. (2015)	

Note. RCT studies are highlighted in bold.

Discussion

The main finding to emerge from the systematic review is that MBIs overwhelmingly had a positive impact upon all outcome measures, with the exception of burnout (where the findings were more equivocal). Thus, overall, the review corroborated the positive appraisal of the value of mindfulness for educators provided by Albrecht et al. (2012) and Weare (2014). Before dealing with the various outcomes in turn, we can begin by observing that the MBIs certainly appeared effective at facilitating the development of mindfulness, which was assessed by 14 intervention studies: of these, the vast majority found increased mindfulness in relation to the MBI ($n = 12$), with only two finding no increase. It is interesting to note that a range of different psychometric scales ($n = 10$) were deployed across the studies, which is perhaps both a weakness and a strength. It is a weakness inasmuch as the lack of a dominant standardised scale makes it difficult to draw comparisons across studies, and to aggregate the findings through meta-analyses. The latter is particularly important in terms of trying to draw any more substantive conclusions around the value of mindfulness. This inconsistency in the use of scales across different studies was a common theme in this review, and is something that mindfulness scholars may wish to address going forward (as discussed further below).

That said, the diversity of measures does allow us to discern nuances in the development of mindfulness. The most popular tool, used in eight studies, was Baer, Smith, Hopkins, Krietemeyer, and Toney's (2006) 39-item Five Facets of Mindfulness Scale. This widely used tool (with 2,171 citations as of January 2016) features five different dimensions/skills: describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. In contrast, Brown and Ryan's (2003) Mindful Attention and Awareness Scale is arguably more prevalent in the literature (with 4,127 citations as of January 2016), but featured in only one study here. This assesses dispositional mindfulness, gauging "individual differences in the frequency of mindful states over time" (p.824). It focuses on a single, core characteristic of mindfulness, namely open and receptive awareness, which essentially aligns with Kabat-Zinn's (2003) definition cited above. Clearly, this complements the multidimensionality of Brown and Ryan's (2003) scale, and

in future we would recommend that studies use both tools.

Turning to the specific outcomes, on balance mindfulness appears to have a beneficial impact upon most metrics of mental health, although the results were by no means unequivocal. For instance, with burnout, while three studies found that this was reduced in relation to an MBI (Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Klatt, Steinberg, & Duchemin, 2015; Roeser et al., 2013), two found no significant changes (Frank, Reibel, Broderick, Cantrell, & Metz, 2015; Harris, Jennings, Katz, Abenavoli, & Greenberg, 2015), although in the latter two studies the results were certainly close to significance in the expected direction. Similarly, with depression, while three studies found that an MBI significantly reduced this (Franco, Mañas, Cangas, Moreno, & Gallego, 2010; Gold et al., 2010; Roeser et al., 2013), Frank et al. (2015) found no significant change (although the results were again approaching significance). With stress, four studies observed a reduction in connection with an MBI (Gold et al., 2010; Klatt et al., 2015; Roeser et al., 2013; Taylor et al., 2015), while two found no significant change (Jennings, Snowberg, Coccia, & Greenberg, 2011; Malarkey, Jarjoura, & Klatt, 2013).

Away from mental health per se, mindfulness was also associated with wellbeing generally, with four studies finding MBIs significantly increasing wellbeing/satisfaction (Baccarani, Mascherpa, & Minozzo, 2013; Beshai, McAlpine, Weare, & Kuyken, 2015; Harris et al., 2015; Poulin, Mackenzie, Soloway, & Karayolas, 2008), while two found no significant changes (Jennings et al., 2011; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013). The positive impact of MBIs spanned outcomes including positive affect (Harris et al., 2015), relaxation (Poulin et al., 2008), satisfaction with life (Poulin et al., 2008), and psychological wellbeing satisfaction (Baccarani et al., 2013; Beshai et al., 2015). The findings for health were rather more equivocal, with five studies finding significant improvements in health relating to an MBI (Frank et al., 2015; Klatt, Buckworth, & Malarkey, 2009; Harris et al., 2015; Jennings et al., 2013; Poulin et al., 2008), but a further five finding no significant changes (Klatt et al., 2009; Harris et al., 2015; Jennings et al., 2011; Roeser et al., 2013; Malarkey et al., 2013). With health, the positive changes included reduced daily physical

symptoms (Harris et al., 2015; Jennings et al., 2011) and improved sleep (Klatt et al., 2009). However, no changes were observed in relation to blood pressure (Roeser et al., 2013), while Malarkey et al. (2013) found that inflammation – as indexed by Interleukin 6, an endogenous chemical active in inflammation – actually worsened in relation to an MBI.

In addition to these primary wellbeing outcomes, mindfulness was also linked to various skills and qualities that are associated with wellbeing, and which may help to provide an *explanation* for the generally positive outcomes adumbrated above. For instance, three studies examined the relationship between mindfulness and emotional regulation, with all three suggesting that MBIs significantly increased emotional regulation (Frank et al., 2015; Jennings et al., 2013; Schussler, Jennings, Sharp, & Frank, 2015). As outlined above, according to Shapiro et al. (2006), the key mechanism through which mindfulness exerts its positive effects is that of “reperceiving,” also known as decentring (Fresco et al., 2007). This ability means that people are better able to detach themselves from distressing qualia that might otherwise precipitate feelings of stress etc. More generally, reperceiving could be regarded as an aspect of a more general capacity of emotion regulation. For instance, Walsh and Shapiro (2006) define meditation as “a family of self-regulation practices that focus on training attention and awareness in order to bring mental processes under greater voluntary control and thereby foster general mental well-being” (pp.228-229). Thus, the suggestion is that mindfulness might positively impact on wellbeing in the following way: (a) mindfulness involves introspective practices that facilitate the development of attention and awareness skills; (b) the development of these skills leads to enhanced emotional regulation and intelligence (including abilities such as reperceiving); and (c) emotional regulation and intelligence are meta-skills that subserve multiple health and wellbeing outcomes (while, conversely, poor emotion regulation skills are a transdiagnostic factor underlying diverse psychopathologies; Aldao et al., 2010). Future work may help to elucidate these hypothesised causal chains further, e.g., through longitudinal studies deploying regression analyses.

Finally, the impact of mindfulness was not limited to the mental health and wellbeing of

employees but also was associated with enhanced job performance, although this was only assessed by a handful of studies. Both Jennings et al. (2013) and Poulin et al. (2008) found that MBIs enhanced teachers' sense of self-efficacy, while non-interventions studies found that mindfulness was associated with outcomes such as behaviour and classroom management (Frank, Jennings, & Greenberg, 2015; Jennings, 2015).

Conclusions and Recommendations

On the whole, the results are relatively encouraging. MBIs did appear to have a largely positive impact on the mental health and wellbeing of educators. With respect to all outcomes, the majority of studies reported statistically-significant improvements. In terms of mental health outcomes, the findings included positive results for anxiety (two out of three studies finding an improvement), burnout and resilience (four out of seven), depression (three out of four), distress and anger (three out of five), and stress and strain (four out of six). With respect to wellbeing outcomes more broadly, the findings included positive results for mindfulness (12 out of 14), compassion and empathy (three out of four), emotional regulation (three out of three), wellbeing and satisfaction (five out of six), health (five out of eight), and job performance (three out of four).

These positive conclusions must be tempered by a number of caveats. Firstly, the quality of the studies was relatively poor. According to the QATQS scoring protocol, the majority of the studies only achieved a global rating of "weak", due to factors such as poor monitoring of attrition and insufficient attention to confounders. Obviously, future research will hopefully remedy these flaws, enabling a stronger and more reliable research base to be built. Secondly, the research is currently largely biased towards interventions that were developed for use in clinical settings, and relatedly, the assessments tend to mostly use metrics pertaining to mental health. While such interventions and metrics are of course valuable, it would be good in future to see interventions and outcomes that are also geared towards more 'positive' wellbeing constructs, such as work engagement (Schaufeli & Bakker, 2003). As a final point, it is also important not to regard MBIs as any kind of panacea for stress, nor as a sustainable remedy for an education system that imposes

such stressors to begin with. It is encouraging that MBIs are helpful to educators, but the encouragement and implementation of such interventions must not come at the expense of trying to create a system that is less inherently stressful. Indeed, this is a broader concern regarding the use of mindfulness in occupational contexts, where some scholars are raising concerns about MBIs being used to help workers “adapt” to a toxic work environment, as opposed to employers striving to reduce the toxicity of the work itself (Van Gordon, Shonin, Zangeneh, & Griffiths, 2014). Nevertheless, all that being said, while educators *are* subjected to these kinds of work-related burdens, then it would appear that MBIs can be of assistance in enabling them to cope.

To conclude, based on the above considerations, we have a number of recommendations regarding the future implementation and assessment of MBIs in the context of teaching and teacher training. Let’s take implementation first. To begin with, given the largely promising results above, it would be ideal to see MBIs being offered in all teacher training courses and in all educational environments. That is, ideally all educators would be given the opportunity to attend at least one MBI, e.g., lasting eight weeks. If resources permit, courses and educational settings could also include provisions for on-going practice (e.g., weekly drop-in sessions). However, if resources did not allow that, the introductory MBI would at least introduce mindfulness to educators, who would then have the opportunity to pursue this on their own time (e.g., in the community). Of course, the caveat above still holds about such interventions not being used to mask a toxic work environment, nor placing the onus on staff to simply be ‘resilient’ to these. In addition, it is vital that participation not be compulsory. While many participants may well benefit, mindfulness may not be to everyone’s taste, or within their ‘comfort zone’ (see e.g., Author et al., 2015b). More seriously, it may be even harmful to people with certain pre-existing or current mental health conditions (see e.g., Dobkin, Irving, & Amar, 2012). As such, a degree of sensitivity will be necessary in terms of encouraging and facilitating participation.

As to *which* MBIs might be offered, this is an interesting question. On the one hand, there are good arguments for using MBIs that have been well-tested and validated, such as MBCT and

MBSR. At the same time though, such MBIs were created primarily for clinical populations. There is thus also an argument for the development of new programmes suited specifically to certain contexts, as we have seen with the creation of bespoke MBIs suited to schoolchildren (Waters et al., 2015). As such, there is certainly room for the development of MBIs particularly suited to educators, as indeed Malarkey et al. (2013) have done. Similarly, such programmes may not only want to focus on a ‘deficit model’ of mental health (e.g., reducing outcomes like anxiety), but may also be able to aim towards more positive wellbeing outcomes, such as work engagement (Schaufeli & Bakker, 2003).

Of course, introducing new initiatives carries its own issues, most notably a lack of empirical validation. As such, the future implementation of MBIs in educational contexts – including the careful development and introduction of new MBIs – will ideally be accompanied by a concomitant program of empirical assessment. With such assessment, researchers should obviously aim for best practice in this regard, like the use of randomised controlled trials (RCTs) with adequate sample sizes. (In fact, the existing literature is already quite good in this respect, with 12 of the 17 intervention trials analysed here employing an RCT design.) In addition, researchers might also consider broadening their assessment repertoire, not only analysing deficit-based mental health outcomes (e.g., anxiety, stress), but also more positive wellbeing-related outcomes, such as engagement (Schaufeli & Bakker, 2003). In this way, over time, we may be able to build up an even clearer understanding of the potential value of mindfulness for educators.

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Supplementary table 1

QATQS scoring assessment of intervention studies

Authors	Selection bias	Design	Cofounders	blinding	Data collection	Attrition	Global
Baccarani et al. (2013)	3	2	3	3	2	1	3
Beshai et al. (2015)	1	1	1	2	1	1	1
Flook et al. (2013)	1	1	1	3	1	1	1
Franco et al. (2010)	2	2	2	2	1	3	2
Frank, Riebel, et al. (2015)	3	2	2	3	1	3	3
Gold et al. (2010)	3	2	3	3	2	2	3
Harris et al. (2015)	2	2	2	2	1	1	2
Hue and Lau (2015)	3	3	3	3	1	3	3
Jennings et al. (2011)	3	3	3	3	1	2	3
Jennings et al. (2013)	1	2	2	2	1	2	2
Klatt et al. (2009)	2	2	3	3	1	1	2
Malarkey et al. (2013)	2	2	3	2	1	1	2
Poulin et al. (2008)	1	2	1	1	1	3	2
Ramsey and Jones (2015)	2	2	1	2	1	1	2
Roeser et al. (2013)	1	1	2	2	1	2	2
Schussler et al. (2015)	Q	Q	Q	Q	Q	Q	Q
Taylor et al. (2015)	1	1	2	2	1	2	2

Note. Q = qualitative study