

Masteruppsats

Masterprogram Hälsa och Livsstil 120 hp



Effects of a Mobile Phone-based Mindfulness Intervention for Teachers, and how Mindfulness Trait Correlates with Stress, Wellbeing, Burnout, and Compassion

Hälsa och Livsstil 30 hp

2020-06-01

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**Effects of a Mobile Phone-based
Mindfulness Intervention for Teachers,
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Subject: Health and Lifestyle
Credits: 30 credits
City and date: Halmstad 2020-06-01

Titel	Effekter av en Mobil-baserad Mindfulness Intervention för Lärare och hur Dispositionell Mindfulness Korrelerar med Stress, Välmående, Utbrändhet och Medkänsla
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Tid	HT 2019-VT 2020
Sidantal	65
Nyckelord	Lärare, Medkänsla, Mobil-baserad mindfulness intervention, Stress, Utbrändhet, Välmående

Sammanfattning

Syftet med denna studie var att undersöka effekterna av mindfulness på stress, välmående, medkänsla och utbrändhet, genom en mobil-baserad mindfulness intervention på lärare.

Metod: 55 lärare från privat och statligt ägda skolor rekryterades, från förskola, grundskola, gymnasieskola, samt vuxenutbildning. 25 lärare genomförde före- och eftertest (mindfulness, $N = 20$, relaxation, $N = 5$). Då bortfallet i kontrollgruppen skapade för lågt antal deltagare, analyserades enbart mindfulnessgruppen. Interventionen innefattade tio sessioner av tio minuter guidad mindfulness meditation vid en tid och plats mest passande för läraren.

Resultat: Resultatet visade att mindfulnessgruppen signifikant förbättrade mindfulness och välmående. Stress och arbetsrelaterad stress minskade signifikant i mindfulnessgruppen. En trend upptäcktes även i ökad medkänsla. Utbrändhet visade inga signifikanta skillnader mellan före- och eftertestet. Hög dispositionell mindfulness korrelerade positivt med medkänsla och välmående, varav negativt med stress och utbrändhet.

Slutsatser: Denna mobilbaserade mindfulness intervention, visade signifikanta effekter på ett flertal hälsoutfall på lärare. Fynden i denna studie indikerar att dispositionell mindfulness kan förklara förbättringarna i hälsa. I linje med vad tidigare studier föreslår, argumenterar denna studie för behovet av att adressera den lärarspecifika kontexten för att förbättra efterlevnad och förebygga bortfall vid digitala interventioner som denna.

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Introduction

Stress is associated with seven of the ten biggest causes of death, globally, whereof cardiovascular disease is the leading, for both men and women (Quick et al., 2003). As a considerably amount of our time is spent working, the factors that impact health in the work-environment is of great importance for our health both short term and across our lifespan. Occupational stress is associated with a 50 % increased risk of coronary artery disease (Kivimäki et al., 2006; Sara et al., 2018) and weight gain (Klingberg et al., 2019). Furthermore, according to The Swedish insurance agency, Försäkringskassan (2016), stress reactions and adjustment disorders are the most increasing causes of sick leave in Sweden, as between 2010 and 2015, these causes increased from 31 000 to 68 000 cases yearly. Thus, stress presents urgent issues to the modern workforce. Teachers do not represent an exception to this health issue, in fact, poor teacher wellbeing is a problem needing immediate attention as teaching is overall considered as a highly stressful occupation (Embse et al., 2019; Herman et al., 2018; Newberry & Allsop, 2017). The Swedish union of teachers (Lärarförbundet, 2017) describes that 38 % of teachers struggle to fulfill workload demands within the given working hours. In addition, a survey consisting of 3500 members of National of Schoolmasters Union of Women Teachers in United Kingdom find that wellbeing suffers by their occupation, whereas two thirds of respondents has considered leaving the teacher profession in the last 12 months (Precey, 2015). Furthermore, 83 % of respondents report experiencing work-related stress and 67 % state negative effects on mental or physical health by the teaching job.

The current study investigates effects of a brief mobile phone-based mindfulness intervention for teachers in compulsory school and upper secondary school, mainly from two reasons. Firstly, that incorporating mindfulness training into workers lifestyles (Bartlett et al., 2019), and specifically teachers (Klingbeil & Renshaw, 2018; Schussler et al., 2018; Zarate et al., 2019) has evidence to suggest alleviation of negative health, such as stress, and burnout, as well as promotion of positive health outcomes, such as wellbeing, and compassion. All these outcomes have been seen as issues in the teaching profession, that if improved, could additionally promote professional efficacy (Roeser et al., 2013). Secondly, with reasons of the current teacher situation, with stress and low control of work-load (Mack et al., 2019), the current intervention further investigate the feasibility of implementing mindfulness training through a smartphone-application, which present additional opportunities, compared to traditional mindfulness training in-person, in terms of flexibility, accessibility, and at a low cost (Bostock et al., 2019; Champion et al., 2018; Laurie & Blandford, 2016). The mindfulness construct is most commonly referred to as being in the present moment with attention, intention, and awareness with a non-judgemental loving attitude (Kabat-Zinn, 1994; Shapiro et al., 2006), where mindful practice (mindfulness meditation in the present thesis) is the process, striving to cultivate a mindful skillset referred to as mindfulness trait (Shapiro & Carlson, 2009).

There are three main teacher concerns found in literature, that intertwine with each other, that argues for health promoting interventions. Firstly, teacher's overall health as described. This involves physical, psychological, social, and emotional health. Zarate et al. (2019) describes that teacher emotional wellbeing and emotional exhaustion are multifaceted terms, including burnout, stress and work-related satisfaction, which all are directly or indirectly addressed in this thesis. Secondly, the ramifications of teacher's poor wellbeing in relation to their students. Teachers' health and wellbeing which are invaluable in of itself, further enable professional efficacy. This is indicated by previous studies that show that the degree of teacher stress and emotional exhaustion is negatively associated with student outcomes (Arens & Morin, 2016; Klusmann et al., 2016; Shen et al., 2015). Wolf et al. (2015) further describes that burnout is associated with lower quality of performance and classroom instruction. Furthermore, teacher stress is further associated with poorer classroom climate, as well as unsatisfactory student achievement and behavior (Wolf et al., 2015). In addition, reduced capacity to engage and teach effectively is correlated with burnout (Roeser et al., 2013). Thus, striving for teacher wellbeing is of paramount importance for teachers themselves and for the benefit of students. The third concern is teacher staff shortage and turnover. The implications of health issues in the teacher profession extends further than the current national and international situation, as future issues are generated by teacher turnover. Mack et al. (2019) describe in a cross-sectional study with 2588 teachers from Texas, USA, that low mental quality of life and high levels of stress are associated with intention to leave teaching. Further examples are low organizational commitment and low control of the workload (Mack et al., 2019). However, according to previous studies, teacher retention can be reinforced by developing job satisfaction (Ingersoll, 2001; Skaalvik & Skaalvik, 2011; Tran & Le, 2015). Mack et al. (2019) further suggest that decreasing stress is one way that may help reduce attrition and turnover for teachers. Teacher staff shortage and loss of valuable human capital due to teacher turnover is an imminent threat in most western countries (Ashiedu & Scott-Ladd, 2012; Garcia & Weiss, 2019). The same problem exists in Sweden, where the Swedish agency of statistics, Statistiska centralbyrån (2017b)

predicts a deficiency of over 50 000 teachers in compulsory school by year 2035. Swedish employers reporting teacher deficiency is highest in elementary school (Statistiska centralbyrån, 2017a). Furthermore, a study in the US by Ingersoll, Merrill, Stuckey and Collins (2018) found that more than 44 % of new teachers in public and private schools leave teaching within five years. Kidger et al. (2016) describe that common reasons of poor teacher wellbeing are associated with work-dissatisfaction, work-related stress, not feeling able to talk to a colleague when feeling down, as well as changes in government decisions. Therefore, implementing health promoting interventions is needed to reverse teachers' trajectory of turnover (Garcia & Weiss, 2019) and poor wellbeing (Kidger et al., 2016).

Theoretical Framework

Definition of Health

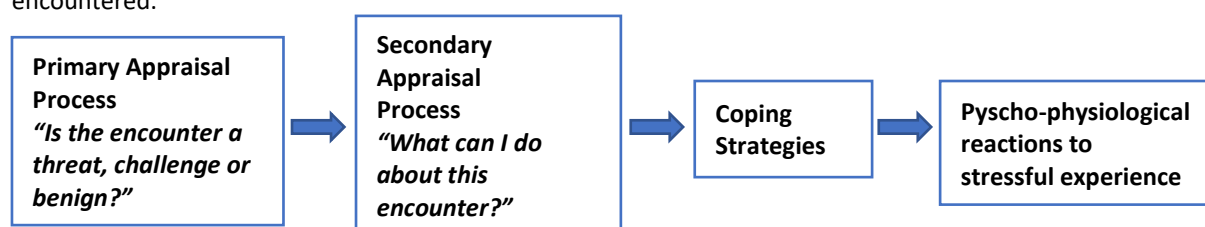
This master thesis takes a health perspective beyond absence of disease or illness, as described 1946, in the International Health Conference by the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2020). Thus, this master thesis does not investigate health outcomes or effects according the dichotomy healthy or sick. Additionally, the population of this thesis is not clinical with a set of disease(s). Rather, the effects of the tested variable mindfulness are investigated in relation to wellbeing, feelings and reactions to stress overall and in the present work-environment, burnout and compassion. Adopting this perspective facilitates the understanding of teacher's wellbeing and challenges in terms of health. Additionally, this perspective creates possibilities to counteract poor health and promote positive wellbeing, rather than neglecting health problems among teachers, only with the argument of absence of diagnosed disease, illness or infirmity.

Aristotle made a distinction between health and wellbeing, as he referred health to biological functioning and wellbeing as *eudaimonia*, which can be translated as flourishing, being happy, blessed and prosper (Kenny, 1992). Thus, this thesis assume there is more to life than to only be alive, without disease or infirmity, hence in Aristotle terms, not only health, but also wellbeing is considered, and therefore the absence of wellbeing or at least, when there is potential a large room for wellbeing to be improved, this calls for action. Aristotle further described that health (biological function) and wealth were merely instrumental goods to pursue the ultimate human goal, wellbeing. The current thesis highlights a problematic teacher situation in which negative health trends calls for health promoting intervention. However, it is further of importance to nuance the picture of teaching in compulsory school and upper secondary school, by lifting why teachers are teachers. Teacher's occupational pride, wellbeing in Aristotle's terms is also prevalent as self-realization and serving a high purpose, in helping students. This is further emphasized in a doctoral thesis (Nilsson, 2017), that illuminates the salutogenic resources in teachers' everyday life. Nilsson propose a counter pole, to the overwhelming negative aspects of teaching often unfairly imaged in media and literature. Studies have shown that most teachers have a positive feeling, going to work (Lärarnas Riksförbund, 2011). Hence, it is important to highlight that positive aspects of teacher wellbeing exist in order to promote pride in teaching occupation, and reinforcing teacher retention (Nilsson, 2017). Moreover, measures in the current thesis involves positive aspects of health in terms of compassion to self and others, and positive wellbeing. In fact, items in the wellbeing questionnaire includes both hedonic (subjective wellbeing, gaining pleasure and avoiding pain), and eudaimonic principles, which entails self-realization and fulfilling one's true and inner capacity (Ryan & Deci, 2001), that Aristotle advocates. A more recent example of how this wellbeing can be achieved is phrased by Robert Bellah (1994) that calls for a need of mindfulness and attention in helping professions, as he asserts, as we devote our full attention to our life projects, we are increasing the potential of our own development. As such, the hypothesis that mindfulness can improve teachers' wellbeing, while delivering a smartphone intervention, where the body of evidence has some promise, but nevertheless thin, is a stance as well as an ethical prerequisite for conducting this thesis. Accordingly, to the ethical principle of benefit (or producing valuable knowledge about how to benefit), while preventing harm (Hermerén, 1994; Vetenskapsrådet, 2017).

The Transactional Model of Stress

Originators of the transactional model of stress (Lazarus & Folkman, 1984) has focused their research on the individual's personal resources to cope with stress. Lazarus and Folkman describe stress as a person-situation interaction, where the stress outcome is determined by the individual's appraisal of the current situation and the perceived resources possessed, to cope with the situation (see Figure 1). Lazarus (1991) further divides the stress process into two stages, primary and secondary appraisal. Primary appraisal refers to the individual's evaluation of the posing threat, as the secondary appraisal involves the individual's perceived options and resources to cope with the situation. These two stages determine the individual's stress response or absence of. Lazarus and Folkman (1984) further suggest that different individuals can create different appraisal in an identical situation, as well as individual appraisal can be changed. That assumption is a prerequisite while conducting a health promoting mindfulness intervention striving to alleviate stress. Stress coping is a central term in this strive for health promotion. The transactional model of stress defines coping as the cognitive and behavioral efforts to master, reduce or tolerate specific stressors, hence coping strategies are the intermediate process between external stressful situations and health outcome (Lazarus & Folkman, 1984). With this theoretical perspective in mind, the hypotheses that mindfulness in a brief intervention conducting ten minutes of mindfulness meditation per day for ten days creates effects on wellbeing, stress, burnout and compassion was formed. Aligned with previous research, finding it possible to enhance individual's mindfulness trait as well as promising literature on positive health effects from mindfulness (Hwang et al., 2017; Roeser et al., 2013; Zarate et al., 2019). Furthermore, when comparing effects of stress intervention for teachers, a systematic review (Embse et al., 2019) suggests mindfulness, along with behavioral, and cognitive-behavioral interventions as the most effective strategy to deal with teacher stress.

Figure 1. Lazarus and Folkman's (1984) basic model for stress and coping processes when a stressor is encountered.



Intention-Attention-Attitude (IAA) Model and Monitor-Acceptance-Theory (MAT)

Hypotheses of the mechanisms involved in mindfulness practice and mindfulness trait are many. It is suggested that exposure or willingness to experience difficult emotions, awareness and observation of these emotions allow dis-identification and enhanced regulation of difficult emotions (Hülshager et al., 2013; Shapiro et al., 2006). Another is that awareness of bodily sensations, thoughts, and self-compassion help people to deal with stress (Alberts & Hülshager, 2015). Shapiro and colleagues (2006) suggest a model explaining effects of mindfulness, that entails *intention*, *attention*, and *attitude* (IAA). The authors describe that through the cyclical process of these three components, a new perspective emerges, termed *reperceiving*. Commonly used terms in mindfulness literature, similar to reperceiving are decentering, distancing and diffusion, all referring to a dis-engagement from the observed content, hence, a shift in one's relationships to thoughts and emotions, viewing content objectively. Neurological research (Grecucci et al., 2015) indicate that the stance of intimate distancing is a unique effect from mindfulness in enabling emotion regulation. Moreover, emotional regulation has been negatively associated with stress, depression, and anxiety in teachers (Mérida-López et al., 2017). This may indicate why teachers improve their health outcomes from MBI, as stress is alleviated through improved emotion regulation and distancing from thoughts and experiences. Consequently, this can partly explain reductions in burnout, as burnout is considered as a product of extreme stress over longer periods of time without sufficient recovery (Hagaman & Casey, 2017; Maslach et al., 2001). The monitor and acceptance theory (MAT) described by Lindsay and Creswell (2017) support the IAA-model by also emphasizing the need of an accepting, and non-judgemental attitude while observing or experiencing internal and external content. The MAT-model suggests that affect related to experienced content is intensified by high attention monitoring, both positive and negative. However, attention monitoring accompanied by acceptance, is suggested leading to disengagement from affective stimuli. Thus, non-judgemental acceptance of the observed content

(experiences, thoughts) is a central mechanism for mindfulness to succeed in promoting health. Therefore, integration of loving, compassionate and accepting attitude should be explicit in mindfulness practice, as argued by Shapiro et al. (2006).

Positivistic and Empiristic Philosophy of Science in Psychology

Positivistic view of epistemology asserts that things can be objectively certain, and it is proven by empirical findings, from what we experience through our senses (Allwood & Erikson, 2017). Psychology research today is dominated by retrieving empiric data about the phenomenon, which is often collected through self-reported questionnaires (Lundh & Nilsson, 2018). So does this thesis, that investigates in at least some sense, an objective reality as in the positivistic presumption. However, there is probably hard to find scientists or philosophers today, who completely support the positivistic thinking, such as all knowledge should be retrieved objectively with no need of subjective knowledge, understanding or interpretation (Lundh & Nilsson, 2018). As pure empiricism, that assume all knowledge to be based upon objective empiricism, and not on religious, philosophical or theoretical tools. Researchers today has concluded that cultural, demographic, theoretical, and philosophical tools are hard to ignore, hence they create a more holistic and more truthful way of seeing the world in the sense that additional, relevant factors is taken into account that may affect the complicated relationship between cause and effect. However, pure empiricism and positivism from its origins, and its follower logical positivism has nevertheless influenced what is referred to as the philosophy of science within psychology today (Lundh & Nilsson, 2018). Empiricism has the strength in itself to test hypothesis by experience. Weaknesses, or pitfalls are for example risks of making influencing factors to a studied phenomenon invisible by solely focus on empiric evidence, without discussing the problematic validity (Lundh & Nilsson, 2018). For example, generalizing empiric results to all teachers is problematic, hence different school levels, geographic placement of school institutions, cultural differences or social norms may also have influence on teacher's work-environment, pre-requisites, and consequently may impact how teachers respond to the studied treatment (mindfulness), and therefore complicates interpretation and replication of the results. However, in being transparent in methodological procedure, striving for researcher awareness of presumptions, and critically discussing the empiric findings with problematic eyes, will strengthen the scientific rigor. Empiricism claim that knowledge is testable by experience, through observation or experiment, hence what is not possible to observe is not knowledge (Benton & Craib, 2011). Consequently, this thesis is striving to strengthen (from an empiristic viewpoint) the scientific quality by presenting previous empiric evidence, producing new empiric evidence, and through a dialogue, support or reject assumptions of reality. One of the clear distinctions between empiricism in its early stages is that now most researcher is taking help from theories, conducting a more deductive approach, while still the inductive empirical data is central. For example, this thesis is using models to help explain the mechanism behind the positive effects of mindfulness on different health outcomes (Shapiro et al., 2006).

Method

Research Design

The current study aimed to conduct a 2x2 mixed factor experimental design. However, as dropouts in control group led to an inadequate sample for analyses, the study design transformed into a one-group pretest-posttest design. Scores from self-report questionnaires of trait mindfulness, stress, teacher-specific stress, wellbeing, compassion, and burnout was measured at both pre- and post-test. The post-test was scheduled with schools 14 days after pre-test. However, as some schools asked for additional time to complete the treatment, the meeting was postponed or assessed digitally, when every teacher individually was finished with the treatment.

Mindfulness Treatment

The intervention group performed ten minutes guided mindfulness meditation per day for ten days, through a smartphone-app called Headspace. The ten sessions involved an introductory course to mindfulness called "Basics 1", free of charge. The former Buddhist monk, Andy Puddicombe is the creator and default narrator of the sessions. The audio content is supplemented with educational videos and animations. It introduces key principles of mindfulness and how to apply mindfulness in daily life, using techniques such as body scanning, noting and breath awareness (Champion et al., 2018).

Ethical Considerations

The ethical considerations were approved by the local ethics committee, reference number: UI2020_130. The current thesis main considerations were made according to the ethical principles from Vetenskapsrådet (2017), The Declaration of Helsinki, from The World Medical Association (WMA; 2013), and the General Data Protection Regulation (GDPR). According to these guidelines, measures were taken to only collect personal data that had relevance in the research problem, minimize collection of sensitive information and constantly work to protect the integrity of the individual. From the precaution taken to protect the individual's integrity and confidentiality as described the considerations was approved by the local ethics committee, reference number: UI2020_130. According to GDPR (Datainspektionen, 2020) it is forbidden to collect data on individual's health without consent on specific and informed purposes. Hence consent forms were distributed to responsible principals (Appendix 1) at every school respectively, and every teacher (Appendix 2) invited to the study. The consent form was given after an information letter, one for principals (Appendix 3), and one specific for teachers (Appendix 4) that comprised of information on the research problem, aim, and what participation included accordingly to the declaration of Helsinki (WMA, 2013).

A research paper can be of low ethical quality by flaws in the scientific procedures (Vetenskapsrådet, 2017). For example, tampering or manipulating of data, inadequate conclusions drawn by inadequate methods or using established methods in a wrong way. Thus, in that case, the opportunity that is given upon a research project, that a meaningful purpose is investigated and enhances human understanding of a phenomenon, while minimizing harm to participants, is gone, wasted, and possibly even harmful to individuals directly and to the public resources at the researchers disposal given in confidence. Therefore, this thesis used established, validated measurements and aimed to rigorously follow the instructions from the creator and its revised translations. Additionally, permissions to use the measurements, were given from the creators.

All data were collected through self-reported questionnaires in paper or digital form. No recordings were made during the data collection phase. Data was documented and stored locked away (paper forms) where only the researcher had access, whereas the digital data were kept on a password secure location, with researcher access only, all according the GDPR guidelines (Datainspektionen, 2020). In according to Halmstad University policy, the data and list of ID-codes will be destroyed once the thesis is passed.

Discussion

Discussion of Results in Relation to Theoretical Framework

Findings from the current study, that the mindfulness-based intervention (MBI) showed significant improvements in mindfulness trait, stress, work-related stress, and wellbeing, may be explained by the transactional model of stress (Lazarus & Folkman, 1984). As Lazarus and Folkman suggest that stress outcome is generated from the individual's perception of the situation in relation to perceived resources to cope, mindfulness may create a new perspective, that works in two ways. Firstly, a change of perspective in the process of assessing the situation, for example a student vs teacher conflict, or workload piling up on the teacher's desk. Secondly, the next component in the model, that is, the teachers' perception of resources at their disposal. The personal resource in this case can be referred to mindfulness trait, that through *reperceiving* as a mechanism (Shapiro et al., 2006) can explain alleviation of stress levels, and promotion of wellbeing and compassion. According to MAT-model (Lindsay & Creswell, 2017), the current study indicates that attention monitoring in the ten mindfulness meditation sessions were accompanied by a non-judgemental and accepting attitude, since improved health outcomes were reported in wellbeing, compassion, and stress, including teacher-specific stress. An empiric explanation while examining effects of mindfulness on teachers specifically is described by Roeser et al. (2013), that three mechanisms that may be involved in mindfulness alleviating stress in teachers. Firstly, awareness of the origin of stress generating information valuable to reduce stress. Secondly, awareness of physical sensations, associated with being stressed out. Lastly, mindfulness develops strategies for coping with stress, for example taking a break and breathing deeply prior to a challenging task.

Methodological Discussion

The validity risk of using guided meditation as well as measuring teacher-specific stress with Teacher Stress Inventory (MICHAEL J. Fimian, 1984) in English was estimated as low, as the teacher population in Sweden has gone through English education at compulsory school level or above. Treatment validity is strengthened through app guidance in person or by email to participants. There is evidence to suggest that the amount of

support provided can improve adherence. Adherence itself is a strong predictor of mindfulness intervention outcomes, in particular in non-clinical populations (DiMatteo et al., 2002; Flett et al., 2019; Parsons et al., 2017). Additionally, the effects of the treatment suggest a low risk of not performing treatment as intended, e.g., not understanding meditation guidance in English or technical navigation or bug issues with the app. This mobile phone-based MBI shows that it could serve as an alternative to traditional meditation in person for teachers to implement into their lifestyle, by providing flexibility and accessibility to practice mindfulness at a low cost, consequently promoting health. However, dropout rates were high, and it is not clear exactly why, although stress, and lack of time is prominent when teachers are stating reasons in the present study, as well as in previous (Carmody & Baer, 2009; Mack et al., 2019). More research is needed to further explore the impact and feasibility of digital MBI. Future studies should also consider the teacher-specific context and consequently deliver MBI, that facilitate teacher participation and adapt to teacher needs and preferences. In a meta-analysis of interventions effectiveness aimed at reducing teacher burnout, Iancu et al. (2018) further argues that causes of stress and burnout may extend further than what is being addressed by MBI, as they overall demonstrate small effect sizes. In this vein, the use of a teacher-specific stress measure (Fimian, 1984) is a strength in the current study, as it captures concerns specific to the teacher's work context.

The use of validated instruments can be regarded as a strength in the current study. However, the majority use of self-reported questionnaires in measuring mindfulness, as used in the present thesis, has been criticized for risks of interpretation and understanding items differently depending on meditation experience (Grossman, 2008; Grossman & Dam, 2011). Grossman and van Dam further illuminate that there are many different kinds of mindfulness measures and subscales, hence complicates the comparison between other studies. This should be noted when discussing other studies effects, compared to the current. For example, the measurement in the current study the 29-item Five Facet Mindfulness Questionnaire (Lilja et al., 2011) involves acting with awareness, observing, describing, acting with awareness, non-judging of experience, and nonreactivity to inner experience. Whereas another commonly used measurement Mindful Attention Awareness Scale (Brown & Ryan, 2003), primarily focus on observing and attending to the present-moment thoughts and experiences as in the FFMQ-scale, however not in the same extent in regards to attitude of non-judgment, curiosity, and acceptance (Wong et al., 2018). The importance of incorporating a non-judgemental and accepting attitude is discussed further in the manuscript, as two models explaining mindfulness mechanisms argue for this component being key to generate positive health outcomes (Lindsay & Creswell, 2017; Shapiro et al., 2006).

No negative effects in health outcomes were observed on a group level. However, Britton (2019) argues for illuminating treatment effects in MBI (both positive and negative) on individual level, that mostly is neglected. Although, interpretation of treatment effects is not statistically meaningful on an individual level, it is nevertheless meaningful from an ethical standpoint, to address potential harm from the treatment. One out of 25 participants reported a noticeable negative effect from intervention, decreasing positive wellbeing with 10 points in the Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS), with score range of 7-49. However, the score at pre-test were at maximum, and mindfulness trait were unchanged from pre- to post test, suggesting that cultivation of mindfulness was not to blame, rather other unknown factors may have influenced this particular decrease in wellbeing. Overall, health outcomes were unchanged or improved on an individual level.

Implications

Nutritional diet, physical exercise and prevention of smoking and alcohol consumption is commonly addressed in the discourse of health- and lifestyle-interaction. However, a central challenge today, and for the foreseeable future seems to be stress related health issues, in particular in the teaching occupation. Incorporating mindfulness into teacher's lifestyles, can posit many benefits in this area as indicated by the current study and previous research, along with wellbeing, compassion and professional efficacy, that implicate both teacher and student health, wellbeing, and performance. The current study indicates that cultivation of mindfulness trait can be a useful tool to alleviate stress levels, as well as promote compassion and wellbeing. However, schools should always consider the root causes of stress when implementing stress interventions. By illuminating context-specific needs, researchers and other stakeholders, who are looking for health promoting strategies are able to pinpoint the most effective strategies with more precision, as well as to increase adherence, that is described as a central key for success in MBI (Parsons et al., 2017). Nevertheless, an MBI like the present, requires minimal resource investment from school executives and teachers. Additionally, as previous studies in the field, show no firm evidence of individual harm, the present MBI or variants of it can be argued that schools should consider this approach as a potential tool in the battle against harmful teacher stress, and to promote positive wellbeing. Moreover, further research is needed, contributing to the understanding of designing MBI

in the most effective way possible for teachers, while considering teachers different work-environment respectively.

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Effects of a Mobile Phone-based Mindfulness Intervention for Teachers, and how Mindfulness Trait Correlates with Stress, Wellbeing, Burnout, and Compassion

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Abstract

Objectives The aim of the study was to examine effects of mindfulness on stress, wellbeing, compassion and burnout, conducting a brief mobile phone-based mindfulness intervention on teachers.

Methods Fifty-five teachers from private and public schools, including pre-school, elementary school, middle school, secondary- and upper secondary school and adult education school was recruited. 25 teachers completed pre- and post-test (mindfulness, $N=20$, relaxation, $N=5$). High dropouts in control led to exclusion of this group in pre- to posttest analysis. The mindfulness treatment comprised of ten minutes of mindfulness meditation for ten sessions at a time and place convenient to the teacher.

Results Findings showed that the mindfulness group significantly improved mindfulness trait, and wellbeing, a trend of increased compassion was also found. Overall stress, and teacher-specific stress decreased significantly in the mindfulness group. Burnout showed no significant differences. Correlation tests including all teachers at pre-test showed that high mindfulness trait was associated with higher compassion, wellbeing, and lower levels of stress and burnout. At post-test, high mindfulness trait was associated with higher compassion, wellbeing, and lower levels of burnout and stress, however, not teacher-specific stress. Increases in mindfulness trait from pre- to posttest was related to improvements in all five health outcomes.

Conclusions This mobile phone-based mindfulness intervention showed significant improvements on several health outcomes on teachers. Findings indicate that mindfulness trait may explain the change in health outcomes. The current study argues for the need of considering teacher-specific context in digital interventions to improve adherence and preventing dropouts.

Key words burnout, compassion, smartphone mindfulness intervention, stress, teacher, wellbeing

Teacher stress has been reported frequently as an issue in recent research (Embse et al., 2019; Herman et al., 2018; Newberry & Allsop, 2017). Although there are many definitions of the term stress, the current thesis focus on the individuals' perceived stress levels, and not necessarily the origins of stress (stressors), although this is discussed in relation to the teaching profession. As described in the transactional model of stress by Lazarus and Folkman (1984), stress entails an interaction between the individual and the current situation, where the stress outcome is determined by the individual's appraisal of the current situation and the perceived ability to cope with the situation. Roeser et al. (2013) further explains that teachers are vulnerable to stress and job burnout as they engage in highly emotional and interactive situations.

Mindfulness is a promising tool to help promote wellbeing and alleviate negative health symptoms that exist in the teaching profession (Haydon et al., 2019; Morales, 2018; Roeser et al., 2013; Schussler et al., 2018; Wimmer et al., 2019). Mindfulness definitions are many, however perhaps the most well-known definition derives from the originator of the 8-week program *Mindfulness-based stress reduction*, Jon Kabat-Zinn (1994), “...paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (p. 4). Mindfulness is trained through various forms of meditation techniques, for example, when focusing on the breath, the mind can wander to other thoughts and feelings, then the meditator simply takes notice and gently let go of them, returning attention to the breath (Bishop et al., 2004).

Recent decades have produced empirical research incorporating Mindfulness-based interventions (MBI) or programs in mental health and medical settings, such as mindfulness-based cognitive therapy in preventing depression relapse (MBCT; Segal, Williams, & Teasdale, 2002), MBSR (Kabat-Zinn, 1990), dialectical behavior therapy (DBT; May et al., 2016), and acceptance and commitment therapy (ACT; Hayes et al., 2006). Furthermore,

MBI has increased in non-clinical settings, healthy adults- (Khoury et al., 2015) and in working populations (Bartlett et al., 2019), including teachers (Zarate et al., 2019). For example, in a North American study (Roeser et al., 2013), 87 % of elementary and secondary school teachers, found mindfulness training beneficial. Results showed enhancement of mindfulness trait, focused attention, working memory, occupational self-compassion, as well as reduced levels of occupational stress and burnout, compared to control group. Digital MBI are in its infant stages (Spijkerman et al., 2016), and mobile phone based MBI in particular (Plaza et al., 2013; Spadaro & Hunker, 2016), although there is some promising evidence produced recently (Champion et al., 2018; van Emmerik et al., 2018). The current study investigated the effects of a brief MBI for teachers in Swedish compulsory school and upper secondary school, through a popular mobile phone-based application called Headspace, providing guided mindfulness meditation.

Definition of Mindfulness

Mindfulness originates from Buddhist psychology 2500 years ago and can be translated as *awareness*, *attention* and *remembering* (Siegel, Germer, & Olendzki, 2009). Mindfulness is not considered as relaxation or mood management, rather a form of mental training to reduce vulnerability to states of mind that potentially could increase stress and emotional distress (Bishop et al., 2006). Martin (1997, p. 291) further describes mindfulness as *“a state of psychological freedom that occurs when attention remains quiet and limber, without attachment to any particular point of view”*. Mindfulness is not attempting to change notions, rather makes an effort to relate to them in a non-judgmental way, with curiosity and compassion (Shapiro et al., 2015).

Mindfulness is however, currently a concept under development, without a clear consensus on its scientific definition. As the mindfulness construct is extracted from Buddhist religion and culture to some extent “fit in” to the western society, mindfulness is splitted into different definitions. Grossman (2008) describes that difference on defining mindfulness is partly a cause of cultural, semantical as well as lack of meditation experience from the researcher. In addition, there is a debate whether mindfulness should be seen as a trait, ability or mechanism (Davidson, 2010). The current study view mindfulness as the MBI-programs such as MBSR, ACT, or MBCT, that mindfulness is a learnable skillset, hence by developing mindfulness trait, psychological symptoms can be lowered and health and well-being improved (Baer et al., 2006).

Meditation is a wide term that consists of complex emotional and attentional regulatory training, developed for several purposes, including cultivation of well-being and emotional balance (Lutz et al., 2009). Mindfulness meditation specifically focus on developing the “skillsets” of mindfulness, as described by the definition by Kabat-Zinn (1994), or developing a “state” if you will, characterized by consciousness, a nonjudgmental awareness and attentive focus on the present moment, including both inner and outer experiences (Brown, Ryan & Creswell, 2007). Shapiro and Carlson (2009) argue that mindfulness is both a process and an outcome concept, where mindful practice (eg. mindfulness meditation) is the process and the acquisition of skills of being mindful is the outcome, which can be referred to as mindfulness trait or dispositional mindfulness, often measured with self-reported questionnaires (Baer et al., 2006; Brown & Ryan, 2003).

Mindfulness as a Stress-Reducing Tool for Teachers

Teacher emotional wellbeing and emotional exhaustion are multifaceted terms, including burnout, stress and work-related satisfaction (Zarate et al., 2019), which are addressed in the current thesis in terms of stress, work-related stress, burnout and wellbeing. Occupational stress occurs when discrepancy exists between the demands of the workplace and the individual’s ability to manage and satisfy these demands (Tsutsumi et al., 2009). Stansfeld and Candy (2006) further describes that high demands in the workplace, low control and effort-reward imbalance are risk factors for mental and physical health issues.

A study examining teachers’ burnout from grade 4-9 in Sweden (Arvidsson et al., 2016), found that circa 15 % appear to be in an undesirable psychological state. Furthermore, an increase of burnout signs was associated with multiple occupational and life-style factors, that suggests interventions targeting different health factors for teachers are needed (Arvidsson et al., 2016). Herman et al. (2018) further suggest that interventions should not only consist of individual coping, that hence will neglect the social context affecting adaptation and coping. Thus, multifaceted knowledge is required to meet these challenges. However, addressing them all in one thesis is not feasible. Therefore, the individual’s ability to cope with occupational stress with mindfulness as a tool receives the attention in this thesis. In fact, examining effects of mobile phone-based mindfulness interventions may be a way to broaden the tools and alternatives to mindfulness training for teachers, as flexibility, low-cost and accessibility are a few examples of the pros, in digital MBI (Bostock et al., 2019; Champion et al., 2018; Laurie & Blandford, 2016).

The evidence-base in traditional in-person mindfulness training can be considered as substantial (Khouri et al., 2015), while online mindfulness practice has provided preliminary support in both clinical and non-clinical populations (Spijkerman et al., 2016). A systematic review of MBI for teachers including 29 studies (Klingbeil & Renshaw, 2018), showed improvements in mindfulness trait, psychological well-being and lower psychological distress. The review involved 1,493 teachers (grades pre-K through 12), with an intervention dose of $M = 24.421$ hours. 347 effect sizes were synthesized using meta-regression with robust variance estimation, that revealed medium effects on teacher outcomes ($g = .601$, $SE = .089$). None of the studies compared effects with other mindfulness programs or other evidence-based interventions, hence preventing conclusions of the value-added effects of the MBI (Klingbeil & Renshaw, 2018).

Another systematic review investigated interventions aimed at reducing teacher burnout, including 23 controlled trials (Iancu, Rusu, Măroiu, Păcurar, & Maricuțoiu, 2018). Six studies in elementary school, two for middle school, one in high school, one in higher education, and 12 mixed (i.e., teachers from different levels). Six approaches were investigated: mindfulness/meditation, cognitive behavioral therapy (CBT), psychoeducational, professional development, social support, and socio-emotional skills. In the three components of burnout: personal accomplishment, emotional exhaustion, and depersonalization (Maslach et al., 2001), two of them showed significant improvements in outcome from the MBI-studies ($n = 9$); emotional exhaustion ($d = 0.31$, $p < 0.01$), and personal accomplishment, $d = 0.28$, $p < 0.05$ (Iancu et al., 2018). Cognitive behavioral therapy was also significant in emotional exhaustion ($d = 0.20$, $p < 0.05$). In personal accomplishment, a significant improvement was also found in the social support approach ($d = 0.27$, $p < 0.05$). None of the approaches alleviated depersonalization symptoms in a significant way. Mindfulness approaches is in the front line when comparing effects, however, the authors emphasize that the overall small effect size suggest that causes of burnout extends further than addressed by the reviewed interventions. They further argue that future intervention should address teacher-specific stressors.

A recent systematic review of MBI on educators (Lomas et al., 2017), suggests that MBI research should broaden assessments to not only negative health (eg. anxiety, stress and burnout), but also positive health measures such as wellbeing and work-satisfaction to better understand the effects of MBI. Therefore, this thesis is measuring positive aspects of wellbeing of teachers.

Although MBI shows promising results on several health outcomes, a vast majority of the current body of evidence within the field of MBI are conducted as a mindfulness-based stress reduction (MBSR) program or other programs equivalent in duration and expected time input for participants (Klingbeil & Renshaw, 2018; Vibe et al., 2017; Zarate et al., 2019). MBSR originates from Kabat-Zinn (1994) who developed a western approach for mindfulness practice in clinical populations. MBSR is a group-based program, striving to improve health and management of stress and life challenges, through mental and physical exercises both formally and integrated in everyday life (Vibe et al., 2017). The participant is expected to spend over 30 hours in 8 weeks within these programs (Vibe et al., 2017). Consequently, this creates an issue of adherence and practical feasibility, especially as teachers describe low job control (Mack et al., 2019) and work-related stress (Roeser et al., 2013). In fact, Carmody and Baer (2009) describe that the time commitment required in the MBSR-program is a major reason for declining or cancelling participation. Therefore, other alternatives to MBI, that facilitates feasibility are needed, whereas digital mobile phone-based MBI can serve as an alternative. With this in mind, the current master thesis aims to contribute to the understanding of feasibility and effects of this type of intervention on teachers. This is attained by conducting a digital mobile phone-based MBI on teachers, measuring the effects on overall stress, wellbeing, compassion, burnout and work-related stress.

Mechanisms of Mindfulness

In pursuit of explaining the effects of mindfulness, Bishop et al. (2004) propose a model consisting of self-regulated attention, characterized by an open and accepting attitude. A further development is suggested by Shapiro et al. (2006) that describe a three-component model, *intention* (why one is practicing mindfulness), *attention*, and *attitude* (how we attend to the practice; IAA). These components are not occurring isolated from each other, rather it is a single cyclic process where these components act simultaneously, whereas mindfulness is defined as this moment-to-moment process (Shapiro et al., 2006). Intention stands for a conscious aim of why mindfulness practice is being done. The role of intention is further emphasized by Bishop et al. (2004) as they describe intention as crucial in mindfulness to understand the process as a whole, which the authors claim, unfortunately often is neglected in current definitions of mindfulness.

Attention is referred to as observing internal and external experience moment-to-moment (Shapiro et al., 2006), thus paying attention of our internal emotions, thoughts and external surroundings, such as smells, sounds and noise. Attention regulation is considered as one of the core components in mindfulness meditation (Brown & Ryan, 2003; Carmody, 2009; Hölzel et al., 2011; Lutz et al., 2008). The IAA model suggests that mindfulness

predicts sustained attention (the ability to attend to the task for long periods of time), the ability to shift focus between objects or mental sets, and inhibition of stimuli irrelevant for the current task, what Williams, Mathews, and MacLeod (1996) refers to as cognitive inhibition. Enhancement of these abilities is highly relevant to the teaching profession, as the work-environment sets demands on focusing on a single task as well as switching between several tasks, such as helping, instructing, explaining and solving curriculum or student problems. Despite the potential power of attention, which is further described as curative in and of itself in therapy practice (i.e. Gestalt therapy originator, Fritz Perls, 1969), it seemingly needs to be accompanied by the third component in the IAA-model, *attitude*, to generate positive mental and physical health benefits (Shapiro et al., 2006), at least in the presence of negative observations. The “preferable” attitude in this case, refers to acceptance in a non-judgemental way of what one internally, and externally observe (Shapiro et al., 2006). For example, if focused attention is accomplished on a difficult life-situation, a deceased spouse, divorce, or traumatic events from a veteran soldier, the absence of viewing these contents objectively, acceptably, as well as making a distinction between one’s thoughts and one’s identity create risks of deteriorating health in contrast to promoting health. Shapiro et al. (2006) explain that through these three components, a change in perspective emerges, what they refer to as *reperceiving*, which entails a shift in consciousness where subject becomes object. Bishop et al. (2004) suggest an attitudinal component in the operational definition of mindfulness, whereas curiosity, non-striving and acceptance are central mechanisms. Lindsay and Creswell (2017) further suggest in their model Monitoring, Acceptance, Theory (MAT), that the Acceptance component is a well needed companion to monitoring (observing), as acceptance creates a non-judging and objective view of thoughts and experiences, needed for health benefits, at least when experiences or thoughts are negative (eg. workload beyond control or student misbehavior). MAT posits that monitoring skills may intensify all experiences, positive, negative or neutral (Lindsay & Creswell, 2017). While associations has been found between monitoring and psychological distress, for example stress symptoms (Brown et al., 2015; Hamill et al., 2015), monitoring can also enhance positive experiences, as in a study where monitoring (Observing), independently from acceptance was positively associated with self-esteem and life-satisfaction among healthy students (Christopher & Gilbert, 2010), thus, positive health effects from monitoring independent from acceptance may be driven by taking notes of pleasant experiences in the present moment (Lindsay & Creswell, 2017). According to the MAT-model, monitoring the present moment may enhance the intensity of the experience, thus increasing affective reactivity. Moreover, an attitude of acceptance is a key regulation mechanism in order for mindfulness practice to generate positive effects on stress, social relationships and health (Lindsay & Creswell, 2017).

In summary, despite the hypothesis that attention and awareness generate objectivity to one’s thoughts or emotions that increase regulation and management of experiences (Brown & Ryan, 2003; Carmody, 2009; Hölzel et al., 2011; Lutz et al., 2008), the implications of focused attention in absence of a non-judging attitude in empirical studies (Brown et al., 2015; Hamill et al., 2015) indicate that focus on the non-judging, acceptable attitude may be crucial to increase chances of promoting health. As Shapiro et al. (2006) explains, making the attitudinal quality of attention explicit in a non-judgemental way, with kindness, curiosity and openness is essential.

In teaching, specifically, Roeser et al. (2013) describe three mechanisms of mindfulness that may be involved in health outcomes. Firstly, mindfulness develops awareness of the origin of stress, hence generating information valuable to reduce stress. Secondly, it develops awareness of physical sensations, associated with being stressed out. Lastly, mindfulness develops strategies for coping with stress, for example taking a break and breathing deeply prior to a challenging task. Mindfulness is further linked to enhancing skills in human interaction, such as, perspective taking, empathy, and compassion (Lutz, Slagter, et al., 2008; Singer & Lamm, 2009). In teaching, empathy and compassion are central to cultivate awareness of student academic and social-emotional needs (Hamre et al., 2008), thus, addressing student needs in a supportive way, rather than reactive and stress-inducing. In addition, emotional stress and emotional management are reported amongst teachers’ primary reasons of leaving teaching (Collie et al., 2012; Montgomery & Rupp, 2005). This argues for implementation of mindfulness for teachers, as evidence show improved emotional regulation (Schussler et al., 2018; Wimmer et al., 2019). Moreover, Guidetti et al. (2019) investigated mechanisms that can explain the correlation between high mindfulness trait and wellbeing in a teacher sample, in primary, middle, and secondary school ($N = 605$). The authors concluded that mindfulness trait acted as a protective factor against negative stress appraisal encountered in work-context. Additionally, Guidetti and colleagues support the *IAA-model* (Shapiro et al., 2006), when suggesting that the re-perceiving process, enables a less negative perception of potential threatening stressful stimuli, as well as adopting a more meaningful perspective of the teaching profession.

Mindfulness and Compassion

Whereas empathy can be defined as perceiving and understanding the feelings and needs of others, compassion is a relatively new scientific construct and has proven challenging to define (Goetz et al., 2010). One definition describe compassion as a feeling of concern for another person's suffering, accompanied with a desire to alleviate that suffering through action (Goetz et al., 2010). Hence, compassion can be useful for teachers when helping and solving student problems. It has been suggested that by increasing teacher compassion in social and school-environment will generate positive effect student-teacher relationship (Çalisoglu, 2018), hence building a foundation that may evoke positive interactions, consequently facilitating learning environment. Fortunately, and as justification of conducting intervention for promoting compassion, it is possible to improve an individual's compassion, since evidence suggest that compassion is a trainable skill (Lutz, Brefczynski-Lewis, et al., 2008). Moreover, previous research indicate that mindfulness is associated with compassion through awareness of self and others (Pace et al., 2009; Tirch, 2010). In a project, involving urban teachers (Maley, 2018), PowerPoint presentations explaining concepts of mindfulness and compassion fatigue, mindfulness exercises, and a mindfulness web portal was used to promote health and investigate feasibility. Results showed that teacher's knowledge about mindfulness and compassion fatigue concepts increased, as well as how to get into a mindfulness state. In a doctoral thesis conducted in American middle school, focus groups and interview revealed that the increased awareness (from mindfulness practice) generated a greater sense of empathy and compassion which further promoted the expression of a mindful response (Morales, 2018). Roeser et al. (2013) further found that compassion on teachers was improved significantly compared to control group, while conducting an MBSR-program. Janssen et al. (2018) further showed increased self-compassion in a systematic review of mindfulness effects on occupational mental health. The review specifically showed four studies that reported increases in self-compassion in MBI compared to control group.

Mindfulness, Stress, and Burnout

Prolonged stress in extreme form may lead to burnout (Maslach et al., 1996). Burnout, which is specific to work context, is broadly defined by the three components earlier described, exhaustion, cynicism toward the job, and decreased professional efficacy (Maslach et al., 2001). These components play a central role in the high attrition rates of educators (Hagaman & Casey, 2017). According to a systematic review (Khoury et al., 2013), mindfulness based therapy is an effective treatment for a variety of psychological problems, and is especially effective for reducing anxiety, depression, and stress. Mindfulness showed moderate effects from pre- to post tests, however, no significant differences were found compared with traditional cognitive or behavioral therapies or pharmacological treatments.

A systematic review of stress interventions for teachers in grades K-12 (Embse et al., 2019) suggest that MBI along with behavioral, and cognitive-behavioral interventions are the most effective established strategies for alleviating negative teacher stress. In another review including 19-studies of MBI in working adults (Virgili, 2015), mindfulness reduced psychological distress compared to inactive controls, with medium-to large mean effect sizes. The authors emphasize that, although promising findings of MBI evoked from the review, there is no firm evidence to suggest that MBI is more effective than other stress management approaches in the workplace.

MBI shows promising results in decreasing stress and burnout. A systematic review investigating effects of mindfulness on job burnout by Luken and Sammons (2016) demonstrate strong evidence for mindfulness to reduce job burnout among health care providers and educators, where six out of 8 studies reported significant decreases in job burnout after mindfulness practice. In recent reviews investigating stress, burnout and wellbeing of teachers, the effect sizes ranges from low to large, most commonly a small effect size, mindfulness is indicated to reduce teacher burnout (Embse et al., 2019; Iancu et al., 2018; Zarate et al., 2019). Cultivation of mindfulness trait as a mechanism for health outcomes is supported by studies investigating associations between mindfulness trait and health measures. Moreover, a systematic review in the workplace shows that trait mindfulness correlates with lower levels of burnout symptoms, perceived life stress, negative emotions, anxiety, and depression (Mesmer-Magnus et al., 2017). Mindfulness trait positively correlated with confidence, job confidence, job performance and interpersonal relations. In addition, , in a 8-week, 42 hours mindfulness training for teachers (Flook et al., 2013), the amount of change in mindfulness trait (FFMQ total) was correlated with lower psychological and burnout symptoms, higher attention, improved ability to recognize emotions of others, and greater sensitivity to compassionate phrases in a behavioral test.

A systematic review on the effects of mindfulness training for teachers (Zarate et al., 2019), including 18 studies, involving 1001 teachers (approximately 80 % general education, 20 % special education), indicates

large effects on perceived mindfulness, moderate effects for lowering stress levels and anxiety, and small effects on diminishing feelings of depression and burnout. Contrary results were also found across the studies. While Jennings, Snowberg, Coccia, and Greenberg's study (2011) did not report significant improvements in teacher burnout and teaching efficacy of the in-service teachers before and after the mindfulness-based intervention, Jennings et al. (2013) documented significant effects on these areas ($d = 0.40$ for teacher burnout and $d = 0.60$ for teaching efficacy) assessed against in-service teachers who did not learn mindfulness. Both studies, however, reported reductions in teacher stress-related time urgency ($d = 0.24$; $d = 0.42$). The firm evidence that mindfulness trait correlate with several positive health outcomes, both in life and professional specifically (Mesmer-Magnus et al., 2017) may indicate that MBI not showing significant effects on alleviating burnout, should increase duration or frequency to reach higher levels of dispositional mindfulness. Exactly how much mindfulness is needed to detect effect is yet to be determined (Carmody & Baer, 2009). Moreover, Iancu et al. (2018) argues that small effect sizes suggest that causes of burnout extend further than addressed by the reviewed interventions.

Mindfulness and Wellbeing

In a review by Lomas et al. (2017), including 19 papers implementing mindfulness for 1981 teachers, showed significant improvements in wellbeing, and satisfaction in five out of six studies. A broader view of wellbeing, consisting of four perspectives on wellbeing: hedonic, eudaimonic, quality of life, and wellness (Cooke et al., 2016), showed significant improvements in 12 out of 14 studies. However, the authors describe an inconsistency of the quality of the reviewed studies and urge for more rigorous randomized controlled trials. Another systematic review by Hwang et al. (2017) involved 16 studies on MBI for teachers published up to 2015. 10 of these studies were quantitative studies and 6 were qualitative where separate analysis was conducted respectively. The quantitative studies showed reduction of stress, burnout, depression and anxiety. The qualitative analysis revealed that enhanced stress coping was associated with increased teacher attunement to students, understanding of the social dynamics and how the student perceives the teacher. Furthermore, the teachers compassion and kindness to themselves and others increased. Additionally, self-awareness, social awareness and self-management were enhanced, thus potentially boosting the teacher's health through improved relations and job performance (Hwang et al., 2017). Majority of studies consists of 8-11-week intervention, ranging from 4-5 weeks and 3 years. Despite differences in content and duration, results were similar, hence more research is needed to determine design and duration for optimal effectiveness of MBI for teachers. Janssen et al. (2018) found in a systematic review of Mindfulness-based stress reduction (MBSR) for employees, whereas five studies were conducted on teachers, that MBSR may help to improve employees' psychological functioning. However, no firm conclusions can be drawn about the effects of specific mindfulness programs for different groups and/or under specific conditions.

Evidence Base of Mobile Phone MBI

Research on mobile phone-based interventions is lacking (Plaza et al., 2013; Spadaro & Hunker, 2016). However, studies are increasing in popularity. A three weeks long study with 69 participants using Headspace, used behavioral tests (giving up seats to others) to measure compassion (Lim et al., 2015). The results reveal significant improvement of compassion in the Headspace group, where 37 % gave up their seat, compared to the control group (14 %). Mobile phone-based MBI have further shown promising results in reducing stress (Donovan et al., 2016; Flett et al., 2020; James, 2016; van Emmerik et al., 2018; Zollars et al., 2019), depressive symptoms (Howells et al., 2016; van Emmerik et al., 2018), emotional regulatory difficulties (James, 2016), job strain (Bostock & Steptoe, 2013) and increasing positive affect (Howells et al., 2016) and general wellbeing (van Emmerik et al., 2017; Bostock & Steptoe, 2013; Zollars et al., 2019).

The Current Study

The mobile phone MBI in this thesis is focusing on developing mindfulness in the moment as well as giving advice on how to use mindfulness in daily life outside of the meditation practice itself (Champion et al., 2018). Therefore, the current intervention can be regarded as a strategy to develop a mindfulness trait for teachers to better cope with challenges in the present work-environment.

The aim of the current study was to investigate effects in stress, teacher-specific stress, wellbeing, compassion, and burnout, by conducting a mobile phone MBI. There are three central arguments for conducting this study. Firstly, previous studies show the need for health promoting intervention for teachers, as teachers report stress (Precey, 2015), burnout (Iancu et al., 2018), low control of work-load and intentions to quit (Mack et al., 2019). Secondly, by improving teacher wellbeing, society has a lot to gain, as wellbeing correlates with professional efficacy and consequently affects student outcomes. This is argued by previous

studies showing that teacher stress and emotional exhaustion is negatively associated with student outcomes (Arens & Morin, 2016; Klusmann et al., 2016; Shen et al., 2015). Wolf et al. (2015) further describes that burnout is associated with lower quality of performance and classroom instruction. Teacher stress is further associated with poorer classroom climate, as well as unsatisfactory student achievement and behavior (Wolf et al., 2015). In addition, reduced capacity to engage and teach effectively is correlated with burnout (Roeser et al., 2013). Hamre et al. (2008) further explains that empathy and compassion are central to promote awareness of student academic and social-emotional needs. Thus, striving for teacher wellbeing is of paramount importance for teachers themselves and for the benefit of students. The third argument asserts that mindfulness is a promising tool for reducing negative health symptoms and increase positive wellbeing as earlier described (e.g., Vibe et al., 2017; Zarate et al., 2019), and specifically digital MBI (Spijkerman et al., 2016), and more specifically smartphone MBI (Champion et al., 2018; Economides et al., 2018; Flett et al., 2020). However, more research is needed to investigate the effectiveness and feasibility of Smartphone MBI. At the time of writing, no study has yet investigated the effects of a Headspace MBI for compulsory school and upper secondary school teachers on the current outcome measures.

Method

Research Design

While the initial aim was to conduct repeated measures ANOVA (2x2), high dropouts in the control condition led to an insufficient sample size, therefore, including this condition in analyses of pre- to post-test could not be justified. Hence, analyses were only conducted within the mindfulness group, a one-group pretest-posttest design. Identical self-report questionnaires of trait mindfulness, stress, teacher stress, wellbeing, compassion, and burnout were measured at pre- and post-test.

Participants

A convenience choice was made to select the participants in this study. Participants were represented in 13 different schools, whereas 11 in public sector and 2 in private. Elementary school, middle-school, secondary school (all referred to as compulsory school in table 1), upper secondary school, adult education school, and pre-school were represented. A power analysis was conducted, using G*Power 3.1. (Faul et al., 2007), to determine adequate number of participants. A total of 34 was required, using a significance level of .05, when anticipating a small sized effect ($d = 0.25$), for conducting repeated measures ANOVA with two groups.

Procedure

A total of 50 schools, and their principals in an area of Southern Sweden were contacted to recruit teachers. Collection of data were performed in person at the teacher's workplace handing out consent forms, and if signed, the questionnaires, all in paper form, taking from 10-20 minutes to answer. The researcher remained in the school after data collection, to answer questions, and guide participants how to use the Headspace app. Digital consent and questionnaires were provided if the school principal found it preferable. Digital instructions to the app was send by email to all participants. In addition, a strong emphasis was made to teachers in person, as well as in the information letter (Appendix 4), on contacting researcher or supervisors when having questions or opinions about the study as well as Halmstad University or Datainspektionen, in ethical matters. Recruitment and data collection took place from January-March and consisted of three phases. Pre-test, post-test, and a second post-test performed by the control-wait list condition (excluded from the analysis) who also completed the intervention treatment (Figure 1). To control the participants compliance of the mindfulness meditation sessions, participants were asked to show their progress in the app in person, at the post-test or send the researcher a screen shot of their completed sessions, available in the Headspace app.

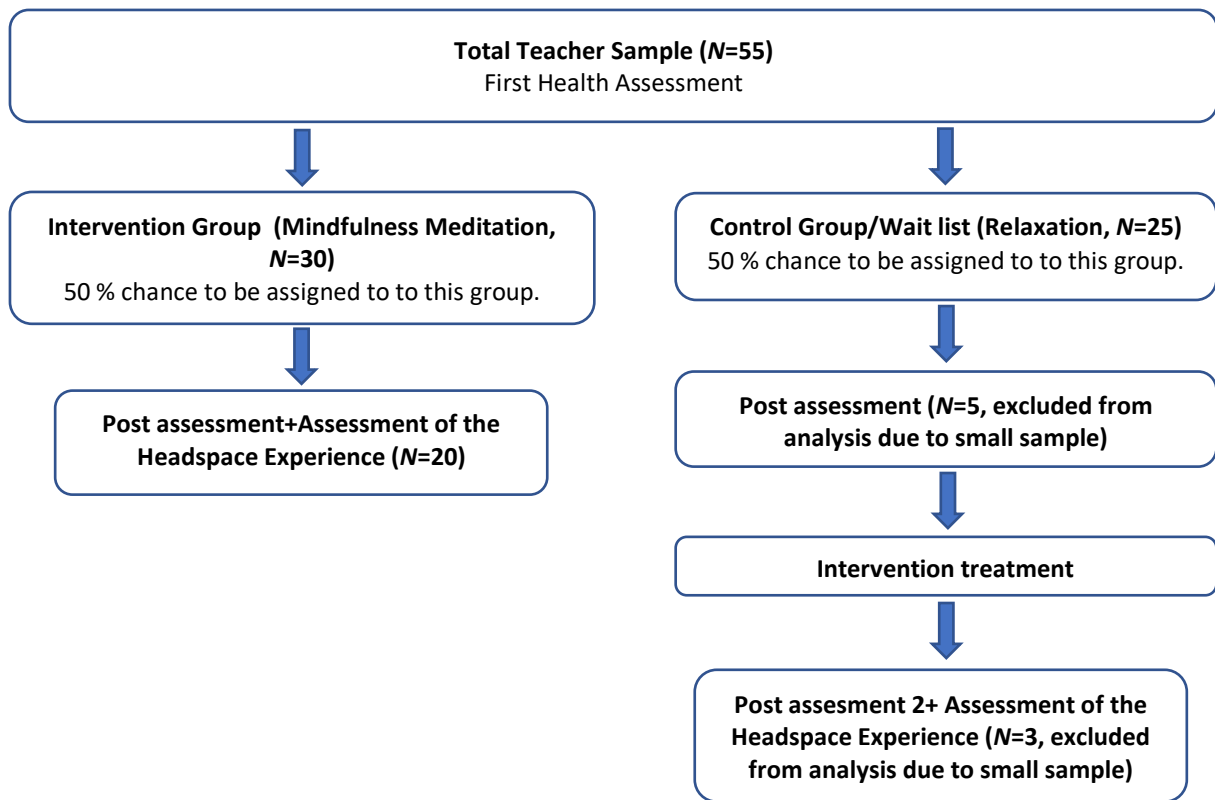


Figure 1. Participant flow diagram

Intervention and Control Group

Participants could be allocated to either the intervention group or the control group (Figure 1). A block randomization (Kim & Shin, 2014) was utilized for within schools to represent same schools in both treatment conditions, to avoid outcomes caused by different workplace environment. The intervention group performed ten sessions of ten minutes guided mindfulness meditation, free of charge. Post-test meetings in schools were scheduled 14 days after pre-test, however, this timetable was postponed if the school requested more time to complete the ten sessions, hence every participant contacted the researcher at completion to receive post-test by email.

Participants were recommended to perform mindfulness meditation at a time and place convenient to the teacher without outer distractions, at work, or outside of work. In a systematic review assessing mindfulness apps on iPhone by Mani et al. (2015), Headspace was ranked highest overall, while assessing engagement, functionality, aesthetics, information, and satisfaction. The ten sessions called "Basics 1" is an introduction course to mindfulness, free of charge, available on Android, iOS, and the Headspace website. Andy Puddicombe, a former Buddhist monk, is the creator and default narrator of the mindfulness meditations. The audio content in the meditation course is supplemented with educational videos and animations. The course introduces key principles of mindfulness and how to apply mindfulness in daily life, using techniques such as body scanning, noting and breath awareness (Champion et al., 2018). The course further focus on non-judgement of thoughts, and practice attention in varied orientations, inward and outward, fixed and moving environmental focus, and narrow and diffuse attention (Flett et al., 2018).

Measures

The current study used retrospective self-reported measures of how the teachers perceive and cope with every day-life, and specifically in the teaching profession, in terms of mindfulness, stress, burnout, wellbeing, and compassion. Reliability tests showed adequate to good internal consistency in all six scales, Cronbach's alpha ranging from 0.6-0.9. An alpha of 0.6-0.7 is generally considered as acceptable, and 0.8 or higher very good level of reliability, although alphas higher than 0.95 may be an indication of redundancy (Hulin et al., 2001). Additionally, demography, and meditation experience were collected (see Table 1), from background questions at pre-test (Appendix 6). Headspace experience was assessed post-intervention (Appendix 7).

Five Facet Mindfulness Questionnaire (FFMQ). Mindfulness trait was assessed using the validated 29-item Swedish version of Five-Facet Mindfulness Questionnaire (Lilja et al., 2011; Appendix 8), a shorter version of the original created by Baer et al. (2006). The FFMQ measures five aspects of mindfulness. These are (1) observing, (2) describing, (3) acting with awareness, (4) non-judging of experience, and (5) nonreactivity to inner experience, where high scores indicate a high level of mindfulness trait. The Swedish FFMQ has shown good psychometric properties, (Cronbach's alpha = .75 to .85 within subscales; Lilja et al. 2011), similar to the original version, ranging from .75 to .91 (Baer et al., 2006). A reliability test of total FFMQ showed .81 at pre-test, and .84 at post-test. Facet scores and total FFMQ-score were computed by summing the individual item scores. Range of scores is 7–35 for observe, 5–25 for acting with awareness, and non-judge, 6–30 for describe, and non-react, 29–145 for FFMQ total scale.

Perceived Stress Scale 10 (PSS10). The Perceived Stress Scale (PSS; Cohen et al., 1983) is originally a 14-item Likert 5-point scale that asks individuals to rate themselves on stress-related questions, ranging from "never to very often". The current study used a Swedish translation (Appendix 9) of a shorter version, PSS 10, a 10-item scale validated and translated by Maria and Steven Nordin (Nordin & Nordin, 2013), showing good internal reliability (Cronbach's alpha .84). The current study reported Cronbach's alpha of .87 at pre-test, and .81 at post-test. PSS10 ranges from 0–4 on individual items and 0–40 in total score where higher scores indicate high levels of stress, hence positively phrased question are reversed in score (e.g., 4 reversed to 0).

Teacher Stress Inventory (TSI). Work-related stress was assessed with a questionnaire specific to the teacher profession, Teacher stress inventory (TSI), developed by Michael Fimian (1984). TSI was the only measurement that was not translated into Swedish, due to non-existence of a validated version in Swedish, equivalent to the original. TSI has shown good internal consistency in validation studies (Fimian, 1986; Fimian, 1988). Pre- and post-test showed good internal consistency (Cronbach's alpha = .91, and .95). TSI score are Likert-scale 1-5, where high scores indicate high levels of teacher stress. Subscale scores are computed by averaging the within item-scores. Total TSI-score are computed by averaging all subscale mean scores. Hence, 1 is minimum, and 5 is maximum score for subscales, and total TSI. The current study uses six of the total ten subscales (Appendix 10), including *time management, work-related stressors, emotional manifestations, cardiovascular manifestations, fatigue manifestations, and gastronomical manifestations*. *Professional distress, discipline and motivation, professional investment, and behavioral manifestations* were excluded by the lack of relevance in the current study, and to limit administration time for participants.

Professional Quality of Life (PROQOL). PROQOL was introduced by Charles Figley in 1988 (Stamm, 2010). The 5th version was used in its Swedish translation (Gerge, 2011; Appendix 11), to assess burnout and compassion (Secondary Traumatic Stress was excluded from the scale due to lack of relevance to the present study). Subscales show good internal reliability at Cronbach's alpha .75 for burnout, and .81 for compassion (Gerge, 2011), similar as the current study, burnout ($\alpha = .78$ at pre-test, $\alpha = .86$ at post-test), and compassion, $\alpha = .93$, and .90. The original phrasing of questions can be replaced in specific words marked in the PROQOL administration guide (Stamm, 2010), e.g., "I like my work as a [helper]" where the current study replaced "helper" with "teacher". The ten items are positively phrased for compassion, and ranges from 1-5 (1=Never 2=Rarely 3=Sometimes 4=Often 5=Very Often), thus total score range is 10-50. Higher score equals higher compassion. Ranges are identical in burnout scale, however, scores from positively phrased questions are reversed, hence high scores indicate high level of burnout.

Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS). To measure wellbeing, the participants answered the Short Warwick Edinburgh Mental Wellbeing Scale (SWEMWBS), translated into Swedish (Appendix 12). The measurement was developed 2006 by the National Health Service of Scotland, University of Warwick and University of Edinburgh (Tennant et al., 2007). The Swedish version showed adequate internal consistency and reliability ($\alpha = .86$) in a validity study in Norway and Sweden (Haver et al., 2015). The current study reported Cronbach's alpha at .83 for pre-test, and .61 at post-test. SWEMWBS is comprised by positively phrased items relating to different aspects of positive mental health (Tennant et al. 2007). SWEMWBS is a 7-item scale, scored by summing responses to each item on a 1- 5 Likert scale. However, in the short version the raw total scale score is transformed to a more adequate score, by a metric conversion table, suggested and provided by Stewart-Brown et al. (Stewart-Brown et al., 2009) to facilitate comparisons of other studies (see Appendix 13).

Statistical Analyses

Data analysis was conducted using the IBM Statistical Package for the Social Sciences (SPSS 25). Descriptive statistics were conducted at pre- and posttest to capture participant characteristics. Paired sample t-tests were performed to reveal within group differences from pre- to post-test. For testing correlation between variables, Pearson's correlation tests were conducted. In cases where Pearson's assumptions were not met, (e.g, non-normal distribution) correlation was analyzed by Spearman rho.

Ethical Considerations

The current thesis main considerations were made according to the ethical principles from Vetenskapsrådet (2017), The Declaration of Helsinki, from The World Medical Association (2013), and the General Data Protection Regulation (GDPR). Informed consent was obtained from all participating teachers and responsible school principals. Prior to retrieving consent, information letter was given in person or by email, to inform principals, and teachers respectively of the purpose of the study, and how data is collected, documented, and disseminated. That is, with confidentiality, voluntariness, enablement of participant withdrawal at any time during study without consequence and limiting collection of information to scientific purposes and use only. Procedure was approved by The Local Ethics Board, Reference Number: UI2020_130.

Results

Attrition

Figure 1 displays the participation throughout the study. 55 participants completed the pre-test. 55 % dropped out, resulting in 25 participants completing both pre-test and post-test, ($n=20$ for the mindfulness group, $n=5$ for the relaxation group). Noticeable is that dropouts in control (excluded from the analyses) were more prevalent (80.00 %) compared to intervention group (30.33 %). In addition, two more dropouts were observed at the post 2-test, resulting in $n = 3$, who completed both treatments (excluded from the analyses). When comparing participants who completed pre- and post-test with dropouts, an independent t-test revealed that weekly working hours were significantly higher among dropped out teachers, $p = .042$. Completion group ($N = 22$), mean and standard deviation (36.36, 5.64), dropouts ($N = 20$), $M = 40.28$, $SD = 6.43$.

Table 1 Demographics of participants in mindfulness group at pre-test and post test

	Pre-test			Post-test		
<i>N</i>	30			20		
Male <i>N</i>	9 (30.0 %)			5 (25.0 %)		
Age <i>M</i> (SD)	46.86 (8.78)			47.50 (9.49)		
Pre-school/Compulsory school <i>N</i>	18 (60.0%)			15 (75.0 %)		
Upper secondary school <i>N</i>	11 (36.7%)			5 (25.0 %)		
Adult education	1 (3.3%)					
Teacher graduation <i>N</i> (%)	Yes 24 (80.0)	No 2 (6.70)	Ongoing 4 (13.30)	Yes 16 (80.0)	No 2 (10.0)	Ongoing 2 (10.0)
Work h/week (SD)	38.54 (6.25)			37.17 (6.01)		
Teacher years (SD)	16.92 (8.07)			18.25 (8.73)		
Prior Meditation <i>N</i> (%)	10 (33.3)			6 (30.0)		
Exp. Meditation, <i>N</i> (%)	Small 7 (23.30)	Moderate 1 (3.30)	Great 3 (10.00)	Small 4 (20.00)	Great 2 (10.00)	
Prior use Headspace <i>N</i> (%)	1 (3.3)			1 (5.0)		
Prior use other apps <i>N</i> (%)	7 (23.3)			5 (25.0)		
Exp. Yoga/Tai-Chi/ Qui-gong/Pilates/Body Balance <i>N</i> (%)	15 (50.0)			6 (30.0)		
Training years <i>M</i> (SD)	4.59 (6.43)			5.62 (7.62)		
Training now <i>N</i> (%)	7 (23.3)			Yes 5 (25.0)	Weekly (SD) 3.23 (2.32)	
	Treatment sessions <i>M</i> (SD)			9.75 (1.11)		
	Treatment minutes (SD)			94.25 (15.49)		
	Treatment period, days (SD)			27.10 (15.96)		

“Training years”, and “Training now” refers to training similar to meditation (e.g. Yoga, Tai-Chi) pre-study.

Differences from Baseline to Post-test within Mindfulness Group

Paired sample t-tests were conducted on each outcome variable to analyze differences from pre- to post-test. Cohen (1988) suggests that effect size $d = 0.2$ should be considered a small effect size, 0.5 represents a medium effect size and 0.8 a large effect size. Cohen further suggests that if two groups' means do not differ by 0.2 standard deviations or more, the difference is trivial, even if it is statistically significant. Table 2 displays results in all outcome variables. Significant higher scores in FFMQ-total was reported from pre-post-test in the mindfulness group, $t(19) = 2.413$, $p = .026$, $d = .54$ (medium sized effect). A trend in increasing compassion was found within the PROQOL measure in the mindfulness group, however slightly outside significance ($p = .051$), however it represented around a medium sized effect, $d = .48$. Analysis of the converted SWEMWBS revealed significant increases in wellbeing in the mindfulness group, $t(19) = 2.161$, $p = .044$, $d = .72$. In addition, stress in the PSS10 was significantly reduced in the mindfulness group, $t(19) = -3.702$, $p = .002$, and represented a large effect size, $d = .82$. Similar findings were made regarding work-related stress from the total TSI-score, where a significant reduction was observed ($t(19) = -2.810$, $p = .011$), with a medium-sized effect, $d = 0.63$. Although the mindfulness group just failed to reach significance in awareness ($p = .058$), and nonreactivity ($p = .090$), the intervention failed to report any significant changes within FFMQ subscales. TSI subscales, however, revealed significant decrease in time management stress in mindfulness group, $t(19) = -2.095$, $p < .050$, around a medium sized effect, $d = .47$, and in emotional manifestations, $t(19) = -3.026$, $p = .007$, presenting a medium-

sized effect, $d = 0.68$. The remaining TSI subscales: work-related stressors, fatigue manifestations, cardiovascular manifestations, and gastronomical manifestations showed non-significant differences from pre- to post-test.

Table 2 Pre-test and post-test mean comparison for all outcome measures. t -values, effect sizes, and p -values from paired sample t -tests.

Variables	Intervention ($N=20$)	t (df)	d	p
Pre FFMQ (SD)	90.73 (12.00)			
Post FFMQ (SD)	95.90 (11.78)	2.41 (19)	0.54	0.03 *
Pre PROQOL Compassion (SD)	37.00 (6.79)			
Post PROQOL Compassion (SD)	38.50 (5.97)	2.08 (19)	0.48	0.05
Pre PROQOL Burnout (SD)	23.25 (5.85)			
Post PROQOL Burnout (SD)	21.70 (6.86)	-1.67 (19)	0.37	0.11
Pre Wellbeing (SD)	24.05 (4.15)			
Post Wellbeing (SD)	26.25 (3.29)	2.17 (19)	0.72	0.04*
Pre TSI (SD)	2.84 (0.73)			
Post TSI (SD)	2.56 (0.79)	-2.81 (19)	0.63	0.01*
Pre PSS10 (SD)	17.30 (6.87)			
Post PSS10 (SD)	14.23 (6.02)	-3.70 (19)	0.82	<0.001*
FFMQ Subscales: Pre Observe (SD)	22.05 (5.38)			
Post Observe (SD)	23.15 (4.12)	1.32 (19)	0.29	0.20
Pre Non-reactivity (SD)	18.48 (3.37)			
Post Non-reactivity (SD)	19.50 (2.44)	1.79 (19)	0.40	0.09
Pre Awareness (SD)	15.25 (3.19)			
Post Awareness (SD)	16.30 (3.40)	2.02 (19)	0.45	0.06
Pre Describing (SD)	19.00 (2.66)			
Post Describing (SD)	19.40 (2.39)	1.02 (19)	0.23	0.32
Pre Non-judging (SD)	15.10 (2.69)			
Post Non-judging (SD)	16.15 (3.87)	1.20 (19)	0.40	0.24
TSI Subscales: Pre Time Management (SD)	3.22 (0.76)			
Post Time management (SD)	2.98 (0.78)	-2.10 (19)	0.47	<0.05*
Pre Work-related (SD)	3.27 (0.89)			
Post Work-related (SD)	3.08 (0.95)	-1.71 (19)	0.38	0.10
Pre Emotional (SD)	2.97 (1.10)			
Post Emotional (SD)	2.42 (0.85)	-3.03 (19)	0.68	0.01*
Pre Fatigue (SD)	2.58 (0.90)			

Post Fatigue (SD)	2.52 (0.89)	-0.66 (19)	0.15	0.52
Pre Cardiovascular (SD)	2.65 (1.14)			
Post Cardiovascular (SD)	2.35 (.94)	-1.36 (19)	0.30	0.19
Pre Gastronomical (SD)	2.35 (1.34)			
Post Gastronomical (SD)	2.38 (1.40)	1.00 (19)	0.22	0.33

*=significant ($p < .05$). Range of scores is 7–35 for observe, 5–25 for acting with awareness, and non-judge, 6–30 for describe, and non-react, 29–145 for FFMQ total scale. Compassion and burnout score (PROQOL) ranges from 10–50. The score of TSI and its subscales presented in this table are means of mean score ranging from 1–5, where total TSI-score is calculated from the mean of the six subscales' means; time-management, work-related stressors, emotional manifestations, fatigue manifestations, cardiovascular manifestations, gastronomical manifestations. PSS10 ranges from 0–40, and wellbeing ranges from 7–35.

Correlations Between Mindfulness and Health Measures

Cohen's (1988) guidelines, for interpreting correlation coefficient Pearson's r and Spearman's ρ is stated as 0.10 for small, 0.30 for medium, and 0.50 for large magnitude. Analyses of Pearson's correlation, with total sample ($N=54$) at pre-test showed that mindfulness trait was correlated with four of the five desirable health outcomes. The exception was teacher-specific stress, that showed no significant correlation with mindfulness, $p = .174$, with a small negative correlation, $r = -.19$. Significant negative correlations were found in stress, $r(52) = -.40$, 95 % CI = [-.606, -.153] $p = .002$, and burnout, $r(52) = -.33$, CI = [-0.552, -0.072], $p = .014$. Moreover, positive correlations were found between mindfulness and compassion, $r(52) = .43$, 95 % CI = [0.186, 0.627], $p = .002$, as well as between mindfulness and wellbeing, $r(52) = .412$, CI = [0.162, 0.612] $p = .002$.

Similar findings were made at post-test within the intervention group ($N=20$). Mindfulness was positively correlated with compassion, $r(18) = .59$, $p = .006$. and negatively correlated with overall stress, $r(18) = -.59$, $p = .006$. No significant correlation could be found in teacher stress, $r(18) = -.19$, $p = .427$. Burnout and wellbeing did not meet the assumption of a normal distribution, hence Spearman's ρ were conducted (Field, 2017). Burnout showed negative association with mindfulness, $r_s(18) = -.58$, $p = .006$. Wellbeing was positively correlated with mindfulness trait, $r_s(18) = .60$, $p = .005$. Within FFMQ subscales, higher scores in describing correlated with higher compassion, $r(18) = .72$, $p < .001$, lower teacher stress, $r(18) = -.45$, $p = .044$, and lower overall stress, $r(18) = -.67$, $p = .001$. In addition, lower burnout-score correlated with higher score in describing, $r_s(18) = -.67$, $p = .001$, while wellbeing-score tend to be higher among those who reported high describing-score, $r_s(18) = .68$, $p = .001$. Another FFMQ-subscale, observing, showed a significant positive correlation with wellbeing, $r_s(18) = .51$, $p = .023$. Mindfulness trait was further associated with lower stress in the time management subscale in TSI, $r(18) = -.54$, $p = .013$. Days to complete the intervention varied from 10–68 days ($M=27.1$, $SD=15.96$). However, no significant correlation of FMMQ could be detected when analyzing the treatment period.

Correlations Between Change Scores

When analyzing mean score differences from pre- to post test, increases in FFMQ-total score was negatively correlated with change scores in PSS10, $r(18) = -.64$, $p = .003$, TSI, $r(18) = -.45$, $p = .047$, and burnout, $r(18) = -.49$, $p = .027$. FFMQ change score showed positively correlation with increased compassion, $r(18) = .48$, $p = .030$, and increased wellbeing, $r(18) = .57$, $p = .008$. Changes in FFMQ-total score was further significantly correlated with increased score in all five FFMQ subscales, hence, supporting the instrument validity, with the assumption that all subscales are measuring a common construct (mindfulness).

Discussion

In line with previous research, mindfulness intervention showed significant improvements in four outcomes, stress, teacher-specific stress, mindfulness trait, and wellbeing. Additionally, a trend was found in compassion that just failed significance ($p = .051$), however it represented around a medium sized effect ($d = .47$). No significant change was found in burnout from pre- to post test. As described, mindfulness approaches has presented both improvements and non-significant effects in previous studies aimed to reduce burnout (Iancu et al., 2018). An explanation can be that mindfulness trait do not compensate for all dimensions of burnout, for example lack of job resources, that probably need to be addressed in context-specific and multi-faceted approaches. Guidetti et al. (2019) argue that, while mindfulness trait protects against negative stress appraisal, their study also show that mindfulness does not moderate meaningfulness of work, hence, mindfulness trait as a personal resource may not compensate for low levels of meaningful work and lack of valuable job resources.

Effects and Feasibility of the Current Intervention

It should be noted that health outcomes are significantly different from pre- to post-test despite the relatively long completion period $M = 27.19$ days, $SD = 15.96$, which is equivalent to 2-3 ten minutes sessions per week. This can be compared to the smartphone MBI on healthy adults by Champion et al (2018) that showed similar effects, where satisfaction of life increased, and perceived stress decreased from baseline to post-test after ten days of Headspace, where healthy adults completed ten minutes sessions 6.21 times on average ($SD = 2.65$), hence double the weekly dose compared to the current study. This can be put in contrast to typically recommendations in face-to face mindfulness in depression treatment, 45 minutes of practice, six time per week (Segal et al., 2018). Segal et al. further argue that for optimal effectiveness, regular practice is considered as a key component in cultivating mindfulness trait. Parsons et al. (2017) additionally describes in a systematic review that adherence to the given mindfulness practice is correlated with intervention outcomes ($k = 28$, $r = 0.264$, $p < .001$). This concludes that mobile phone MBI are in the moment just scratching on the surface on the potential benefits it may bring. Nevertheless, it should be noted that the current study showed challenges in feasibility in terms of the high dropout rates. An explanation may be the problematic teacher situation, described in the introduction. For example, stress (Embse et al., 2019; Herman et al., 2018), and insufficient work hours compared to workload (Mack et al., 2019). In fact, those who stated reasons for dropping out, all described that insufficient time along with stress as primary obstacles. The possibility of not enjoying the app treatment or experiencing negative effects must also be considered. Britton (2019) argues that, as MBI often fail to address dropouts and discuss its health outcomes and follow up measures, it is of importance to consider that this group may have experienced negative effects. However, it is suffice to say that all participants had some kind of interest in mindfulness practice when signing up. Moreover, dropouts were not reporting starting any sessions, this applied in both conditions. After being allocated to mindfulness or relaxation, the dropout rates were noticeably higher in relaxation group (80.0 %), in contrast to mindfulness (30.3 %), similar to average MBI dropout in patient populations (29 %) described by Nam and Toneatto (2016). Thus, active control group treatments need to be viable, user-friendly, possess an attractive design to promote adherence, and prevent dropouts. Adherence and completion should be considered as central in conducting this kind of intervention in a stressful occupation as teaching. Moreover, observed adherence (Flett et al., 2019) in the current study is high in sessions and minutes completed, but low in terms of days required for completion. In this vein, strengths (accessibility, low cost, flexibility) should be weighed against the challenges in adherence and feasibility in Smartphone MBI. Self-guided digital MBI present only modest effects in meta analytic reviews (Plaza et al., 2013; Spijkerman et al., 2016), and one explanation may be low adherence (Cuijpers et al., 2011; Parsons et al., 2017).

Explaining Effects

Findings from the current study, revealing significant improvements in mindfulness trait, stress, work-related stress and wellbeing, is in line with Guidetti et al. (2019) suggesting that mindfulness act as protection against negative appraisal. This may be explained by teacher's adoption of a change in perception of stressful situations as supported by Folkman and Lazarus' (1984) transactional model of stress. Change of perspective as a mindfulness mechanism is further in line with *reperceiving* in the IAA-model (Shapiro et al., 2006), a change in perspective that creates decentering, where distance occur between thoughts and experience, and the individual, hence a more objective stance of viewing reality. The IAA-model and MAT-model (Lindsay & Creswell, 2017), both emphasize the need for acceptance of what is being experienced through the attention and awareness practice that is trained from mindfulness meditation. Lindsay and Creswell (2017) further illuminate that practicing mindfulness enhance experiences and thoughts, consequently, this can lead to enhancement of both negative and positive content within the individual. As the current Headspace intervention produced positive health outcomes, IAA and MAT-model suggest that a non-judgemental attitude in form of acceptance and distancing to one's thoughts and experiences were adopted in the current MBI. This explanation can further be supported in the notion of teacher's work-related challenges, such as low control of work-load (Mack et al., 2019), work-dissatisfaction, and work-related stress, (Kidger et al., 2016), that hence could have produced opposite results without an accepting, non-judging and self-compassionate attitude, as the MAT- and IAA-models suggest (Lindsay & Creswell, 2017; Shapiro et al., 2006).

How Mindfulness Trait Correlates with Health Outcomes

Correlation tests show that mindfulness trait is associated with four of the five health outcomes (TSI being the exception) at pre-test, when analyzing all teachers. When testing for pre- post mean score differences, however, increases in FFMQ-total score was correlated with change in all five health outcomes (in the desirable direction). This is in line with previous research indicating that dispositional mindfulness correlates with a range

of positive states of health (Baer et al., 2006; Flook et al., 2013; Guidetti et al., 2019; Mesmer-Magnus et al., 2017). Although increases in mindfulness trait was associated with lowering TSI ($p = .047$), the correlation overall between these variables were non-consistent. This may be explained by what is earlier described in reducing burnout, that context-specific needs and job resources require attention.

Limitations, Methodological Issues, and Directions for Future Research

There are some limitations in the current study to consider. For example, an overall small sample size, high dropout rate, in particular in the control condition. Consequently, absence of an active control group adequate for analysis, controlling for changes in mere time, as well as distinguishing the unique effects from mindfulness. The absence of an active control group is described as a common limitation in mindfulness and meditation research (Baer et al., 2006; Davidson & Kaszniak, 2015; Goldberg et al., 2017). Hence, the methodological limitations cause for not drawing firm conclusions of these results. The small sample size further makes it difficult to generalize the result to give an adequate representation of the effects of this kind of intervention and in particular on the teacher population. Furthermore, it should always be noted and reflected upon that data is generated from voluntary participants and may differ from the true teacher population characteristics and consequently may not be representative. Another risk of bias, always present when self-reporting health, is reporting what is socially preferable (Krumpal, 2013), e.g., high coping ability, or job satisfaction, in particular if managing principals can access the results. That the researcher sporadically has worked as a substitute teacher at the respondent's workplace should also be noted, although no close or dependent relationship is acknowledged. Moreover, the social desirability bias was minimized by placing teachers separately at the data collection, that ensured individual privacy, that answers were not revealed to colleagues and managers. In addition, all results are published on a group level, ensuring confidentiality, and minimizing risk of bias.

Bostock et al. (2019) emphasize the need for studies investigating mindfulness via mobile app's impact of long-term psychological and physical health, as well as comparing it to traditional in-person mindfulness meditation. Although, there is some preliminary evidence to support the preference of smartphone compared to traditional mindfulness meditation in person. A Headspace MBI (Morrison Wylde et al., 2017) for novice pediatric nurses ($N = 95$) show significantly higher score in "acting with awareness" and "non-reactivity to inner experience" compared to traditional mindfulness training. The intervention further showed marginally more compassion satisfaction, and slightly less burnout. In addition, the smartphone group had lower risk of compassion fatigue, but only in participants with sub-clinical posttraumatic symptoms. The authors conclude that the potential in smartphone MBI is promising, however, the study indicated that it fits best in non-clinical populations. Thus, a downside with this kind of treatment is its absence of immediate interaction and adaptation of treatment in the moment, that traditional mindfulness practice can provide, and may be of higher importance as stress and traumatic condition in an individual are worsen. Hence, for non-clinical working population, this MBI-strategy has promise. However, as Bostock et al. (2019) describe, more research is needed to compare the effects of different approaches in mindfulness, as well as other stress management strategies. Moreover, as Mani et al. (2015) reviewed mindfulness apps, many apps claimed to be mindfulness apps, but most of them were not, only 4 % of 700 apps provided mindfulness training and education. Mani and colleagues further argue for the need of a "gold standard" defining how mindfulness is best conceptualized and practiced in smartphone practice, as well as comparing the efficacy of these apps. For teachers specifically, research in smartphone MBI is in its infancy (Champion et al., 2018; Yang et al., 2018). As such, the current study provides some preliminary support to the potential benefits of this strategy in mindfulness trait, stress, work-related stress, wellbeing, and compassion, although the absence of control group is a major limitation regarding drawing conclusions of the unique effects from the intervention. Lim, Condon and DeSteno (2015) further argues for the accessibility of expert mediation guidance from mobile based technology at low cost, as a great facilitator to engage interested individuals, and consequently, promote health. However, as the current study show, it may not be preferable or feasible to a big proportion of the teacher population. As such, smartphone MBI in solitude cannot solve all health issues in the teacher force, rather it should be seen as one of the ways, that can recruit teachers interested in this kind of mindfulness practice. Moreover, as suggested by Herman et al. (2018), multifaceted approaches, considering the specific social context at teacher's workplace is necessary to reverse the trajectory of poor wellbeing in teachers. Further research is warranted to understand effects of mobile phone-based MBI and how to best implement them in a feasible and practical way, while using active controls and larger teacher sample.

Conclusions

Mindfulness trait, wellbeing, stress, teacher-specific stress, and compassion can be improved by a Smartphone MBI like the present. Non-significant change in burnout suggest the need for addressing additional factors specific to teacher's workplace. Teachers with high mindfulness trait tend to have higher compassion, and wellbeing, lower burnout symptoms and stress, but not teacher-specific stress. However, increases in mindfulness from pre- to posttest correlates with increases in all health outcomes, including teacher-specific stress. Caution for drawing any firm conclusions should be made, as there was no control group, controlling for changes in mere time or distinctions of unique effects of the intervention. At the time of writing, this is the first mobile phone based MBI for teachers, on these outcome measures. More research is needed to further understand the effects, and how to best implement smartphone MBI in a feasible and practical way. It has also been suggested that mobile phone-based MBI should be compared to traditional mindfulness meditation in person (Bostock et al., 2019), as well as comparing the efficacy of available mindfulness meditation apps (Mani et al., 2015). Future studies should include larger sample sizes, involve an active control group condition, and take rigorous consideration to teacher's context to improve adherence and prevent dropouts. The current MBI indicate improvements in health outcomes of teachers that consequently can lead to professional efficacy and hence, improve student outcome. However, the present study along with the current research base is too thin to adequately conclude strong evidence in the field of smartphone MBI on teachers. Nevertheless, this kind of approach can be considered by teachers and school executives, as there is potentially a lot to gain at a low cost.

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Appendixes

Appendix 1. Written informed consent from school principals

Jag har tagit del av informationen om studien "Effekter av mindfulness genom en mobilbaserad app för lärare på upplevd stress, arbetsrelaterad stress, välmående, utbrändhet och medkänsla".

Jag har också tagit del av informationen att deltagandet är frivilligt och att läraren kan avbryta när som helst utan att ange någon orsak eller att det får några konsekvenser för behandlingen av läraren.

Jag samtycker härmed att min verksamhet deltar i denna forskningsstudie.

Ort, datum

Namnunderskrift

Namnförtydligande

Mail för att mottaga länk till material för mindfulness/avslappning

Härmed intygar jag att jag informerat om studien "Effekter av mindfulness genom en mobilbaserad app för lärare på upplevd stress, arbetsrelaterad stress, välmående, utbrändhet och medkänsla".

Ort, datum

Underskrift

Appendix 2. Written informed consent teachers

Jag har tagit del av informationen om studien "Effekter av mindfulness genom en mobilbaserad app för lärare på upplevd stress, arbetsrelaterad stress, välmående, utbrändhet och medkänsla".

Jag har också tagit del av informationen att deltagandet är frivilligt och att jag kan avbryta när som helst utan att ange någon orsak eller att det får några konsekvenser för min behandling.

Jag samtycker härmed att medverka i denna forskningsstudie.

Ort, datum

Namnunderskrift

Namnförtydligande

Mail för att mottaga länk till material för mindfulness/avslappning

Härmed intygar jag att jag informerat om studien "Effekter av mindfulness genom en mobilbaserad app för lärare på upplevd stress, arbetsrelaterad stress, välmående, utbrändhet och medkänsla".

Ort, datum

Underskrift

Consent form at digital data collection

Samtyckesblankett

Jag har läst och förstått vad studien handlar om och vad mitt deltagande innebär

☐ Ja

Jag är medveten om att datamaterialet endast nyttjas i utbildningssyfte, ej kommersiellt

☐ Ja

Jag är medveten om att datamaterialet behandlas konfidentiellt (ingen kan identifiera vad just du har svarat och inga namn eller personer kommer att pekas ut på något sätt)

☐ Ja

Jag är medveten om att deltagande i studien är frivillig och att jag kan avbryta mitt deltagande under studiens gång utan konsekvens och utan att behöva berätta anledning

☐ Ja

Mail för att mottaga länk till material för mindfulness/avslappning

Ditt svar

Appendix 3. Information letter to school principals

Förfrågan om att få genomföra studien "Effects of a mobile phone-based mindfulness intervention for teachers on perceived stress, work-related stress, well-being, burnout and compassion"

Du och din skola är inbjudna till en hälsofrämjande mindfulness intervention!

Med bakgrund av negativ stress och vikten av att behålla personal inom läraryrket, kan hälsofrämjande insatser vara en viktig pusselbit för att möta dagens arbetsmiljöutmaningar.

Vill du och din skola utforska möjligheterna för en förbättrad hälsa, minskad stress och hållbar prestation för lärarna genom att delta i en hälsofrämjande interventionsstudie med mindfulness meditation?

Interventionen är en del av min masteruppsats i hälsa och livsstil på högskolan i Halmstad. Syftet med studien är att undersöka effekterna av en kortare digital mindfulness-intervention, som praktiskt kan passa in bättre under lärares redan upptagna arbetsschema i jämförelse med den vanligaste mindfulness-insatsen "Mindfulness based stress reduction".

Deltagande innefattar kostnadsfri mindfulness meditation genom en användarvänlig app (Headspace), 10 minuter per dag under 10 dagar, vid ett tillfälle som passar läraren. Jag informerar om åtkomst och användning av Headspace före intervention. Före och efter mätning genomförs via frågeformulär på plats på skolan.

Etiska ställningstaganden kommer att vidtas enligt Vetenskapsrådets och Helsingforsdeklarationens riktlinjer kring samtycke, frivillighet, information, konfidentialitet och nyttjande av data. Både för individen och för skolan. Mer detaljerad information om detta finns i bifogat informationsbrev för studiedeltagarna.

Jag föreslår att jag kommer förbi skolan under ett av era ordinarie möten för lärararbetslag, alternativt efter mötet, presenterar mig själv och projektet, samt delar ut information och enkäter. Enkäten beräknas ta cirka 10 minuter att fylla i. Eller om det skulle passa er på annat vis bättre, där så många lärare som möjligt kan samlas samtidigt. Finns projektor i lokalen så är det bonus. Alla lärare kan delta i studien, behörig eller obehörig, heltid eller deltidarbete.

Om ni vill förkorta infon till lärarna (förslag till utskick):

Hej! Du som arbetar som lärare är inbjuden till ett hälsofrämjande forskningsprojekt!

Vill du ta chansen att främja din hälsa och förebygga ohälsa genom mindfulness meditation via en app (Headspace)?

Deltagande innebär kostnadsfri mindfulness meditation genom en användarvänlig app (Headspace), 10 minuter per dag under 10 dagar, vid ett tillfälle som passar dig.

Mer detaljerad information om studien hittar du i bifogat informationsbrev. Skicka ett mail till Robin, så snart som möjligt för att delta.

Hoppas ni tar chansen att vara med!

Tacksam för svar,

Med vänliga hälsningar,

Robin Andersson
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Appendix 4. Information letter study participant

Förfrågan om deltagande i studien "Effekter av mindfulness genom en mobilbaserad app för lärare på upplevd stress, arbetsrelaterad stress, välmående, utbrändhet och medkänsla".

Bakgrund och syfte

Du är viktig! Du som lärare formar förutsättningarna för framtiden. Hälsa på arbetsplatsen är avgörande för ett långsiktigt och hållbart arbetsliv, inte minst inom läraryrket. Därav denna hälsofrämjande interventionsstudie med mindfulness via digital plattform som verktyg.

Mindfulness innebär kortfattat att man befinner sig i nuet, med ett medvetet fokus, samt accepterar inkommande tankar utan att döma.

Syftet med studien är att undersöka effekterna av en kortare digital mindfulness-intervention, som praktiskt kan passa in bättre under lärares redan upptagna arbetsschema i jämförelse med den vanligaste mindfulness-insatsen "Mindfulness based stress reduction".

Hur går studien till?

Om du väljer att delta kommer du att slumpmässigt delas in i antingen en mindfulness meditationsgrupp eller en väntlista/kontrollgrupp med avslappning. Båda grupper genomför respektive aktivitet, *10 minuter per dag under 10 dagar*. Efter interventionens slut får även kontrollgruppen genomgå interventionen. Du tilldelas grupp och material som behövs via mail strax efter första enkäten är besvarad.

Mindfulness sker utan kostnad där du får använda en mindfulness-app (Headspace), 10 minuter per dag under 10 dagar. Mindfulness-meditationen är guidad på engelska och kräver endast tillgång till internet, appbutik (App Store eller Google Play) via smartphone eller åtkomst till Headspace hemsida via dator eller surfplatta. Före och efter intervention, besvaras en enkät om välmående, medkänsla, arbetsrelaterad hälsa och mindfulness. Enkäten beräknas ta ca 10 minuter att fylla i.

Jag rekommenderar att du väljer en plats där du inte kan bli störd av yttre distraktioner när du utför meditationen. Välj ett tillfälle som passar i just din vardag.

Det bästa är att göra meditationen varje dag, skulle du dock missa en dag, är det bara att fortsätta där du slutade nästa dag. Jag ser helst att de 10 sessionerna genomförs inom 2 veckor, för att interventionen ska få en chans att se effekt. Om 14 dagar återkommer jag för att göra efter-mätning. Om du vill kan du kontakta mig efter studien för att få tillgång till ditt resultat och se om mindfulness har signifikant effekt på dig.

Dina uppgifter är skyddade

- Dina enkätsvar kommer att behandlas konfidentiellt. Dina svar och resultat kommer att behandlas så att inte obehöriga kan ta del av dem.
- Dina enkätsvar kommer inte att användas till något annat än statistiska analyser i vetenskapligt syfte.
- Resultatet kommer att redovisas på gruppnivå så att inga enskilda resultat kan härledas.
- Ansvarig för dina personuppgifter är forskningshuvudman Högskolan i Halmstad. Enligt EU:s dataskyddsförordning har du rätt att kostnadsfritt få ta del av de uppgifter om dig som hanteras i studien. Du har även rätt att begära att få personuppgifter rättade eller raderade, att få behandlingen av uppgifterna begränsade, invända mot behandlingen av dina personuppgifter, samt inge klagomål till Högskolan i Halmstad eller Datainspektionen (www.datainspektionen.se). Du kan läsa mer om hur Högskolan behandlar dina personuppgifter på Högskolan i Halmstads webbplats <https://www.hh.se/om-webbplatsen/behandling-av-personuppgifter.html> Om du har frågor kan du även kontakta Högskolan i Halmstads Dataskyddsombud på dataskydd@hh.se eller telefon 035-16 73 73.
- Du skall inte skriva ditt namn på enkäten. Materialet kommer på så vis att behandlas anonymt eftersom ingen kommer att kunna koppla dina svar och resultat till Dig.
- Du kommer att få ett kodnummer att skriva på enkäten. Detta behövs för att det ska vara möjligt att kunna koppla ihop dina enkätsvar med motsvarande enkätsvar vid det andra mättillfället. Listan med kodnummer kommer att förstöras när väl uppgifterna är inlagda i statistikprogrammet.

Frivillighet

Ditt deltagande i studien är frivillig, du har även rätt att avbryta ditt deltagande när som helst utan att redogöra anledning genom att kontakta mig.

Försäkring

Deltagare i forskningsstudie vid Högskolan i Halmstad är försäkrade via kammarkollegiet.

Vid frågor, funderingar, synpunkter om studien, tveka inte att kontakta mig,

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Appendix 6. Background questions.

Bakgrundsfrågor
<p>Kön</p> <p><input type="radio"/> Man</p> <p><input type="radio"/> Kvinna</p> <p><input type="radio"/> Annat</p>
<p>Ålder</p> <p>Ditt svar _____</p>
<p>Lärare i årskurs (er)</p> <p>Ditt svar _____</p>
<p>Har du tagit lärarexamen?</p> <p><input type="radio"/> Ja</p> <p><input type="radio"/> Min lärarutbildning är pågående</p> <p><input type="radio"/> Har ej startat lärarutbildning</p>
<p>Hur många timmar arbetar du vanligtvis varje vecka?</p> <p>Ditt svar _____</p>
<p>Hur länge har du arbetat som lärare? (år/mån)</p> <p>Ditt svar _____</p>
<p>Har du tidigare erfarenhet av meditation?</p> <p><input type="radio"/> Ja</p> <p><input type="radio"/> Nej</p>
<p>Om Ja, hur stor erfarenhet bedömer du att du har av meditation?</p> <p><input type="radio"/> Liten</p> <p><input type="radio"/> Viss</p> <p><input type="radio"/> Stor</p>
<p>Har du använt dig av Headspace tidigare, eller andra mindfulnessappar?</p> <p><input type="radio"/> Ja</p> <p><input type="radio"/> Nej</p> <p><input type="radio"/> Nej, men andra mindfulness eller meditationsappar</p>

Om andra appar använts, i så fall vilka?

Ditt svar _____

Har du erfarenheter av träningsformer som t.ex. yoga, tai-chi eller qui-gong?

☐ Ja

☐ Nej

Om Ja, specificera vilken träningsform

Ditt svar _____

Praktiserar du denna träningsform för närvarande?

☐ Ja

☐ Nej

Om Ja, hur ofta praktiserar denna träningsform?(ggr./vecka)

Ditt svar _____

Hur länge har du praktiserat denna träningsform? (år/mån)

Ditt svar _____

Appendix 7. Questions after Headspace treatment

Enkätfrågor vid eftermätning

Masteruppsats (Hälsa och livsstil) om effekter av en mindfulness-intervention på lärare

Deltagarnummer

Ditt svar

Hur var det att använda Headspace appen? Hur enkel/användbar/trevlig att använda var den?

Ditt svar

Kommer du att använda Headspace eller annan mobilbaserad meditation igen? Nämn 3 orsaker till varför/varför inte?

Ditt svar

Genomförde du alla 10 sessioner mindfulness?

☐ Ja

☐ Nej, jag genomförde.....st sessioner

Appendix 8. FFMQ (Lilja et al. 2011).

Five Facet Mindfulness Questionnaire (FFMQ)

Instruktion: Skatta följande påståenden genom att ringa in den siffra som stämmer bäst överens med din egen uppfattning om hur det har varit för dig den senaste veckan.

	Påståendet stämmer				
	Aldrig/nästan aldrig	Sällan	Ibland	Ofta	Alltid
1. När jag går, lägger jag med avsikt märke till hur det känns att röra kroppen	1	2	3	4	5
2. Jag är bra på att hitta ord som beskriver mina känslor	1	2	3	4	5
3. Jag kritiserar mig själv för att ha känslor som är irrationella eller olämpliga	1	2	3	4	5
4. Jag lägger märke till mina känslor utan att behöva reagera på dem	1	2	3	4	5
5. När jag gör saker vandrar mina tankar iväg och jag blir lätt distraherad	1	2	3	4	5
6. När jag tar en dusch eller ett bad så är jag uppmärksam på upplevelsen av vatten på min kropp	1	2	3	4	5
7. Jag har lätt för att sätta ord på mina uppfattningar, åsikter och förväntningar	1	2	3	4	5
8. Jag är inte uppmärksam på vad jag gör, på grund av att jag dagdrömmer, oroar mig eller är distraherad på andra sätt	1	2	3	4	5
9. Jag kan iakttä mina känslor utan att bli uppslukad av dem	1	2	3	4	5
10. Jag säger till mig själv att jag inte borde känna som jag gör	1	2	3	4	5
11. Jag lägger märke till hur mat och dryck påverkar mina tankar, känslor och hur det känns i kroppen	1	2	3	4	5
12. Jag är uppmärksam på känslintryck, till exempel av vinden i mitt hår eller solen på mitt ansikte	1	2	3	4	5
13. Jag har problem med att hitta de rätta orden för att uttrycka mig om saker och ting	1	2	3	4	5
14. Jag gör bedömningar av om mina tankar är bra eller dåliga	1	2	3	4	5
15. Jag tycker det är svårt att hålla kvar min uppmärksamhet på det som händer i nuet	1	2	3	4	5
16. När jag har känslomässigt upprörande tankar eller inre bilder tar jag "ett steg tillbaka" och är medveten om tanken eller bilden utan att överväldigas av den	1	2	3	4	5
17. Jag är uppmärksam på ljud, som t ex klockors tickande, fågelkvitter och passerande bilar	1	2	3	4	5
18. När jag känner något i kroppen är det svårt för mig att beskriva det, eftersom jag inte kan hitta de rätta orden	1	2	3	4	5

	Aldrig/nästan aldrig	Sällan	Ibland	Ofta	Alltid
19. När jag har tankar eller inre bilder som får mig att må dåligt, blir jag lugn snart igen efteråt	1	2	3	4	5
20. Jag säger till mig själv att jag inte borde tänka som jag gör	1	2	3	4	5
21. Jag lägger märke till hur saker luktar och smakar	1	2	3	4	5
22. Även när jag är fruktansvärt upprörd kan jag hitta ett sätt att uttrycka det i ord	1	2	3	4	5
23. Jag hastar igenom aktiviteter utan att vara riktigt uppmärksam på dem	1	2	3	4	5
24. När jag har tankar eller inre bilder som får mig att känna mig illa till mods, kan jag lägga märke till dem utan att behöva göra något	1	2	3	4	5
25. Jag lägger märke till detaljer i konstverk och i naturen, som färger, former eller mönster av ljus och skugga	1	2	3	4	5
26. Det känns naturligt för mig att sätta ord på mina upplevelser	1	2	3	4	5
27. När jag har tankar eller inre bilder som jag mår dåligt av, noterar jag dem bara och släpper dem sedan	1	2	3	4	5
28. Jag kommer på mig själv med att göra saker utan att vara uppmärksam	1	2	3	4	5
29. Jag ogillar mig själv när jag har konstiga eller ologiska tankar	1	2	3	4	5

Appendix 9. PSS-10 (Nordin & Nordin, 2013).

Uppfattad stress-10
(Perceived stress Scale-10)

Frågorna i denna enkät handlar om dina känslor och tankar under den senaste månaden. Du skall fylla i hur ofta du har känt eller tänkt på ett visst sätt.

	Under den senaste månaden, hur ofta har du:	Aldrig	Nästan aldrig	Ibland	Ganska ofta	Väldigt ofta
1	varit upprörd över något som hände helt oväntat?	0	1	2	3	4
2	känt att du var oförmögen att kontrollera de viktiga sakerna i ditt liv?	0	1	2	3	4
3	känt dig nervös och "stressad"?	0	1	2	3	4
4	litat på din förmåga att hantera dina personliga problem?	0	1	2	3	4
5	känt att saker och ting har gått din väg?	0	1	2	3	4
6	känt att du inte kunnat hantera allt som du måste göra?	0	1	2	3	4
7	klarat av att kontrollera irritationsmoment i ditt liv?	0	1	2	3	4
8	känt att du haft kontroll?	0	1	2	3	4
9	varit arg över sådant som hänt och varit utanför din kontroll?	0	1	2	3	4
10	känt att svårigheter hopat sig så att du inte kunnat hantera dem?	0	1	2	3	4

TEACHER CONCERNS INVENTORY

The following are a number teacher concerns. Please identify those factors which cause you stress in your present position. Read each statement carefully and decide if you ever feel this way about your job. Then, indicate how strong the feeling is when you experience it by circling the appropriate rating on the 5-point scale. If you have not experienced this feeling, or if the item is inappropriate for your position, circle number 1 (no strength; not noticeable). The rating scale is shown at the top of each page.

Examples:

I feel insufficiently prepared for my job.

1 2 3 4 **5**

If you feel very strongly that you are insufficiently prepared for your job, you would circle number 5.

I feel that if I step back in either effort or commitment,
I may be seen as less competent.

1 2 3 4 5

If you never feel this way, and the feeling does not have noticeable strength, you would circle number 1.

	1	2	3	4	5	
HOW						
STRONG		no	mild	medium	great	major
?		strength;	strength;	strength;	strength;	strength;
		not	barely	moderately	very	extremely
		noticeable	noticeable	noticeable	noticeable	noticeable

TIME MANAGEMENT

1. I easily over-commit myself.	1	2	3	4	5
2. I become impatient if others do things too slowly	1	2	3	4	5
3. I have to try doing more than one thing at a time	1	2	3	4	5
4. I have little time to relax/enjoy the time of day.	1	2	3	4	5
5. I think about unrelated matters during conversations	1	2	3	4	5
6. I feel uncomfortable wasting time	1	2	3	4	5
7. There isn't enough time to get things done	1	2	3	4	5
8. I rush in my speech.	1	2	3	4	5

WORK-RELATED STRESSORS

9. There is little time to prepare for my lessons/responsibilities.	1	2	3	4	5
10. There is too much work to do.	1	2	3	4	5
11. The pace of the school day is too fast.	1	2	3	4	5

12. My caseload/class is too big.	1	2	3	4	5
-----------------------------------	---	---	---	---	---

13. My personal priorities are being shortchanged due to time demands.	1	2	3	4	5
--	---	---	---	---	---

14. There is too much administrative paperwork in my job.	1	2	3	4	5
---	---	---	---	---	---

EMOTIONAL MANIFESTATIONS

I respond to stress...

30. ...by feeling insecure	1	2	3	4	5
----------------------------	---	---	---	---	---

31. ...by feeling vulnerable	1	2	3	4	5
------------------------------	---	---	---	---	---

32. ...by feeling unable to cope.	1	2	3	4	5
-----------------------------------	---	---	---	---	---

33. ...by feeling depressed.	1	2	3	4	5
------------------------------	---	---	---	---	---

34. ...by feeling anxious.	1	2	3	4	5
----------------------------	---	---	---	---	---

FATIGUE MANIFESTATIONS

I respond to stress...

35. ...by sleeping more than usual.	1	2	3	4	5
-------------------------------------	---	---	---	---	---

36. ...by procrastinating	1	2	3	4	5
---------------------------	---	---	---	---	---

37. ...by becoming fatigued in a very short time.	1	2	3	4	5
---	---	---	---	---	---

38. ...with physical exhaustion.	1	2	3	4	5
----------------------------------	---	---	---	---	---

39. ...with physical weakness.	1	2	3	4	5
--------------------------------	---	---	---	---	---

CARDIOVASCULAR MANIFESTATIONS

I respond to stress...

40. ...with feelings of increased blood pressure.	1	2	3	4	5
---	---	---	---	---	---

41. ...with feeling of heart pounding or racing.	1	2	3	4	5
--	---	---	---	---	---

42. ...with rapid and/or shallow breath.	1	2	3	4	5
--	---	---	---	---	---

GASTRONOMICAL MANIFESTATIONS

I respond to stress...

43. ...with stomach pain of extended duration.	1	2	3	4	5
--	---	---	---	---	---

44. ...with stomach cramps.	1	2	3	4	5
-----------------------------	---	---	---	---	---

45. ...with stomach acid.	1	2	3	4	5
---------------------------	---	---	---	---	---

Appendix 11. PROFESSIONAL QUALITY OF LIFE SCALE (PROQOL; Gerge, 2011).

När du hjälper människor har du direktkontakt med deras liv. Som du kanske har märkt, kan din medkänsla för dem som du hjälper påverka dig både positivt och negativt. Nedan följer några frågor om dina erfarenheter, både positiva och de negativa, som lärare. Ta ställning till var och en av följande frågor om dig själv och din aktuella arbetssituation. Välj den siffra som stämmer bäst med hur ofta du upplevt dessa saker under de senaste 30 dagarna.

1 = Aldrig

2 = Sällan

3 = Ibland

4 = Ofta

5 = Mycket ofta

_____ 1. Jag är glad.

_____ 3. Jag känner glädje över att kunna hjälpa människor.

_____ 4. Jag känner samhörighet med andra.

_____ 6. Jag känner mig stärkt efter att ha arbetat med dem jag hjälper.

_____ 8. Jag är inte så produktiv på jobbet eftersom jag har svårt att sova på grund av de traumatiska upplevelser en av de personer som jag hjälper har haft.

_____ 10. Jag känner mig som fångad i en fälla i mitt arbete som lärare.

_____ 12. Jag gillar mitt arbete som lärare.

_____ 15. Jag har värderingar som ger mig kraft.

_____ 16. Jag är nöjd med hur jag kan hänga med i kunskapsutvecklingen inom mitt område.

_____ 17. Jag är den jag alltid velat vara.

_____ 18. Mitt arbete får mig att känna mig nöjd.

_____ 19. Jag känner mig sliten på grund av mitt arbete som lärare.

_____ 20. Jag känner mig nöjd och tänker med glädje på de jag hjälper, och hur jag kan hjälpa dem.

_____ 21. Jag känner mig överväldigad eftersom min arbetsbelastning verkar oöverskådlig.

_____ 22. Jag tror att jag kan göra en skillnad genom mitt arbete.

_____ 24. Jag är stolt över vad jag kan göra för att hjälpa.

_____ 26. Det känns som att jag "kört fast" pga. systemet.

_____ 27. Jag tänker att jag är en framgångsrik lärare.

_____ 29. Jag är en väldigt omtänksam person.

_____ 30. Jag är glad att jag har valt det här arbetet.

© B. Hudnall Stamm, 2009. Professionell livskvalitet: medkänslotillfredsställelse och empatiutmattningsversion 5 (ProQOL). Frågor om ställföreträdande traumatisering är borttagna.

Appendix 12 . Short Warwick Edinburgh Mental Well-Being Scale (SWEMWBS; Haver et al., 2015).

Nu får du några påståenden som rör hur nöjd du är med ditt liv (känslan av att må bra) under de senaste två veckorna. Ange ditt svar på en skala mellan 1-5, där 1 anger: "Väldigt lite" och 5 "Väldigt mycket".

	1 Väldigt lite	2	3	4	5 Väldigt mycket
1. Jag har känt mig optimistisk om framtiden					
2. Jag har känt att jag har gjort nytta					
3. Jag har känt mig avslappnad					
4. Jag har hanterat problemen på ett bra sätt					
5. Jag har tänkt klart					
6. Jag har känt mig nära andra människor					
7. Jag har själv kunnat bestämma saker					

Warwick-Edinburgh Mental Well-being Scale (WEMWBS) © NHS Health Scotland, University of Warwick and University of Edinburgh, 2006, all rights reserved.

Appendix 13. Raw score to metric score conversion table for SWEMWBS.

Raw Score	Metric Score
7	7.00
8	9.51
9	11.25
10	12.40
11	13.33
12	14.08
13	14.75
14	15.32
15	15.84
16	16.36
17	16.88
18	17.43
19	17.98
20	18.59
21	19.25
22	19.98
23	20.73
24	21.54
25	22.35
26	23.21
27	24.11
28	25.03
29	26.02
30	27.03
31	28.13
32	29.31
33	30.70
34	32.55
35	35.00

Stewart-Brown *et al.* *Health and Quality of Life Outcomes* 2009 **7**:15 doi:10.1186/1477-7525-7-15

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