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Minding the Hype: Mindfulness in Organizations and Strategic Decision-Making

PhD dissertation

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Table of Contents

Summary in English ..... **iii**

Dansk resumé ..... **vii**

Introduction **1**

Research questions and overall contribution 4

Mindfulness in organizational studies: from cessation of suffering to increased performance 5

Minding the Hype: Mindfulness as a cure-all for our era 8

Research design and methodological approach **11**

Answering the call for empirical research 11

Overview of methodological approaches 12

Brief description of paper one 13

Brief description of paper two 14

Brief description of paper three 16

The overall approach and mixed research 17

Triangulation and further advantages of mixed research 18

Development, complementarity and initiation 20

Paper one: A discussion of mindfulness in relation to organizations and individuals in organizational settings **23**

Paper two: The Impact of Mindfulness Training on Performance in a Strategic Decision-Making Task: Evidence from an Experimental Study **89**

Paper three: Why do some participants train a lot and some participants train a little? **109**

Discussion **161**

Scope of the contribution 161

Discussion of paper two 163

The apparently contrasting results of papers two and three 171

Implications of findings across the individual, group, and organizational level 173

Limitations 175

Suggestions for future research 176

References **181**

Declaration of co-authors **189**

Summary in English

The present dissertation contains three papers, each investigating the topic of mindfulness in organization using different perspectives and methodologies. The study of mindfulness in organizations was first introduced by Weick, Sutcliffe, and Obstfeld (1999), has since yielded novel insights (for a recent review, see Sutcliffe, Vogus, & Dane, 2016), and has been suggested to improve task- and decision-making performance, especially in complex and dynamic environments. However, in spite of the promise that mindfulness holds for organizations, the concept of mindfulness has often been treated as a conceptual black box in research at the organizational level (e.g. Hutzschenreuter, Kleindienst, & Schmitt, 2014). There has not yet emerged a consensus on a definition of organizational level mindfulness, and as such, there is a lack of a coherent conceptualization and operationalization (Sutcliffe et al., 2016). Recently, as a result of the secularization and commercialization of mindfulness, it has been criticized for straying from its roots and being hyped, sometimes labeled McMindfulness (Van Dam et al., 2018). Thus, there is a need for additional research in order to ensure that mindfulness in organizational studies is rigorously conceptualized and operationalized, and that it does not loose legitimacy by becoming indistinct or difficult to measure through conflation with skills (Brown, Ryan, & Creswell, 2007) or hype (Van Dam et al., 2018). The present dissertation approaches the topic through a systematic review in paper one, and subsequently applies mixed research methods in papers two and three, in order to work with one of the central topics that emerged in paper one:

The first paper systematically reviews collective mindfulness in organizational studies. The paper summarizes what we have learned so far and identifies two distinct streams in the literature, highlighting consistencies and contradictions in each and makes suggestions as to what is needed for a more useful and coherent concept of mindfulness in organizations. Seven distinct categories of research on mindfulness in organizations emerged from the analysis (decision-making, strategy, ethics & sustainability, etc.), and suggestions were made on how to promote research and practice

within the categories. A core contribution is the rethinking of the relationship between mindfulness and routine, suggesting that it is orthogonal rather than 1-dimensional and elaborating on the consequences. The analysis shows an urgent need for developing core parts of mindfulness in organizations, as well as a need for empirical work on and across the individual, group and organizational level.

The second paper focuses on a research question emerging from paper one. I investigate the effect of mindfulness training duration on strategic decision-making by asking: *How does the duration of a mindfulness training influence individual- and group performance on a strategic decision-making task?* Through an experiment with 332 participants, the paper aims to expand on recent findings that training mindfulness should improve individual and group task performance under certain circumstances (for recent reviews, see Good et al., 2016; Sutcliffe et al., 2016), as well as a positive association between mindfulness practice duration and training outcomes (Parsons, Crane, Parsons, Fjorback, & Kuyken, 2017). Surprisingly, the study finds that, at the group level, a longer mindfulness training duration has a negative association with performance on the given task. That a longer mindfulness training can have a detrimental impact on task performance is unexpected, calls for further research to explore generalizability, and has important implications for research and practice, which has mostly focused on the beneficial effects of mindfulness.

The third paper uses interviews to explore 22 participants' experience of completing seven days of mindfulness training by asking: *1) Why do some people benefit more (than others) from mindfulness training? 2) Why do some participants train as recommended – or more – while some train less during a mindfulness training?* This area of research has received limited attention, especially in non-clinical populations that are compensated for participation. Six primary themes emerged from the analysis: Experience, Deviance, Motivation and Meaning, Liminal states, External Structure, and pre-existing Knowledge and Experience with mindfulness. The first three themes are concerned with what happened during the training, and the final three themes are

concerned with what is given before the training starts. For example, the analysis suggests that experiencing discomfort during training without being able to identify the cause can create a negative association to training frequency and training outcome. Another suggestion is that becoming sufficiently relaxed to be able to fall asleep can have a positive association to training frequency while falling asleep can have a negative association to training outcomes. These suggestions can assist teachers and researchers who want to understand how to adapt training programs and research designs to non-clinical contexts such as organizations. In summary, the study provides understanding of how physical surroundings, subjective personal and social factors motivate and support participants' training, as well as factors that can impede the training.

Finally, the dissertation details the scope of the contribution, presents points of consilience and makes future research suggestions. To name a suggestion, the surprising negative association between the longer mindfulness training and decision-making performance in the second paper can be explained with the findings in the third paper. The third paper reports that the training was generally perceived as relaxing, which when combined with work of Chajut and Algom (2003), who state that a certain amount of task-related stress can improve task performance, could explain that the relaxation reduced the positive task-related stress, which in turn reduced the task performance.

Dansk resumé

Denne afhandling indeholder tre studier, der hver især undersøger emnet mindfulness i organisationer fra et forskelligt perspektiv og med en distinkt metode. Mindfulness i organisationer som emne blev først introduceret af Weick et al. (1999), og har siden ydet interessante indsigter (for et nyere review, se Sutcliffe et al., 2016), og det er blevet foreslået at mindfulness kan forbedre opgave- beslutningstagnings- performance, især i komplekse og dynamiske sammenhænge. På trods af det potentiale som mindfulness repræsenterer for virksomheder, er begrebet mindfulness ofte blevet behandlet som en konceptuel "Black Box" i forskning på organisationsniveau (fx Hutzschenreuter, Kleindienst, & Schmitt, 2014). Der er endnu ikke opnået enighed om en definition af mindfulness på organisatorisk plan, og som sådan mangler der en sammenhængende konceptualisering og operationalisering (Sutcliffe, Vogus & Dane, 2016). Endvidere er det i den igangværende sekularisering og kommercialisering af fænomenet blevet kritiseret for at fjerne sig fra sine rødder og at være "hypet", og har undertiden fået en label "McMindfulness" (Van Dam et al., 2018). Der er således behov for mere forskning for at sikre, at mindfulness i organisationsstudier opnår en grundig konceptualisering og operationalisering, og at mindfulness ikke mister legitimiteten ved at blive konceptuelt utydelig eller svær at måle gennem sammenblanding med f.eks. færdigheder (Brown, Ryan, & Creswell, 2007) eller hype (Van Dam et al., 2018). Den foreliggende afhandling nærmer sig emnet gennem en systematisk gennemgang i studie 1 og anvender derefter mixed research metoder i andet og tredje studie for at kunne arbejde med et af de centrale emner, der fremkom i første studie.

Det første studie gennemgår systematisk emnet kollektiv mindfulness i organisatoriske studier. Det opsummerer det, vi har lært hidtil og identificerer to strømninger i litteraturen, fremhæver deri sammenhænge og modsætninger og kortlægger, hvad der skal gøres fremover. Syv forskellige kategorier af forskning om mindfulness i organisationer fremkom af analysen (beslutningstagning, strategi, etik og bæredygtighed mv.), og et centralt bidrag var at identificere nye forslag til at

fremme forskning og praksis inden for hver af kategorierne. Et kernebidrag er gentænkningen af forholdet mellem mindfulness og rutine, der udmunder i et forslag om at relationen er ortogonal snarere end endimensionel, og uddybning af konsekvenserne deraf. Analysen viser desuden et presserende behov for konceptuel omarbejdning, konsolidering og udvikling, samt et behov for empirisk arbejde indenfor og på tværs af individuel, gruppe- og organisations-niveau.

Det andet studie fokuserer på et af forskningsforslagene, der fremkom i første studie. Her undersøger jeg effekten af mindfulness trænings varighed på strategisk beslutningstagning ved at spørge: *Hvordan påvirker varigheden af en mindfulness træning performance i en strategisk beslutningstagningsopgave på individuel- og gruppeniveau?* Gennem et eksperiment med 332 deltagere har studiet til formål at bygge videre på de seneste videnskabelige resultater og idéer, der siger, at det at træne mindfulness skulle forbedre performance i visse opgaver på individuelt og gruppe- niveau, under visse omstændigheder (for nyere anmeldelser, se Good et al., 2016; Sutcliffe et al., 2016), samt en påvist positiv sammenhæng mellem træningsvarighed og træningsresultater (Parsons, Crane, Parsons, Fjorback, & Kuyken, 2017). Overraskende nok finder studiet frem til, at varigheden af mindfulness træningen på gruppeniveau har en negativ association til performance på den givne opgave. Det er således uventet, at en længere mindfulness træning kan have en skadelig indvirkning på performance på gruppeniveau, og det opfordrer til yderligere forskning for at undersøge resultatets generaliserbarhed og har vigtige implikationer for forskning og praksis, der hovedsagelig har fokuseret på de gavnlige virkninger af mindfulness.

Det tredje studie bruger interviews til at udforske 22 deltageres erfaring med at gennemføre syv dages mindfulness-træning, ved at spørge: *1) Hvorfor får nogle mennesker mere gavn (end andre) fra mindfulness-træning? 2) Hvorfor trener nogle deltagere som anbefalet - eller mere - mens nogle trener mindre under en mindfulness træning?* Dette forskningsområde har fået begrænset opmærksomhed, især indenfor ikke-kliniske populationer, der samtidig kompenseres for

deltagelse, hvilket typisk er tilfældet i organisationer. Seks primære temaer fremkom af analysen: Erfaring, Afvigelse, Motivation og Mening, Grænsetilstande, Ekstern Struktur, samt Forudgående Viden og Erfaring med Mindfulness. De tre første temaer beskæftiger sig med, hvad der skete under træningen, og de sidste tre temaer beskæftiger sig med, hvad der er sket og eksisterer før træningen starter. For eksempel antyder analysen, at det at opleve ubehag under træningen uden at kunne identificere årsagen kan resultere i en negativ relation til træningsfrekvens og træningsresultat. Et andet forslag er, at det blive tilstrækkeligt afslappet til at være i stand til at falde i søvn, kan skabe en positiv relation til træningsfrekvensen, mens det at falde i søvn, kan skabe en negativ relation til træningsresultater. Disse forslag kan hjælpe lærere og forskere, der ønsker at forstå, hvordan man tilpasser træningsprogrammer og forskningsdesign til ikke-kliniske sammenhænge som organisationer. Sammenfattende giver undersøgelsen forståelse for, hvordan fysiske omgivelser, samt subjektive personlige og sociale faktorer motiverer og støtter deltagernes træning, samt indsigt i faktorer der kan hæmme træningen.

Til slut beskriver afhandlingen omfanget af bidraget, præsenterer ”points of consilience” og fremsætter forslag til fremtidig forskning. For at nævne et forslag, kan den overraskende negative sammenhæng mellem den længere mindfulness træning og beslutningsprocessen i det andet studie muligvis forklares med resultaterne fra det tredje studie. Det tredje studie rapporterer, at træningen generelt blev oplevet som afslappende. Dette i kombination med Chajut og Algoms arbejde (2003), som siger, at en vis mængde opgaverelateret stress kan forbedre performance på opgaveløsning, kunne forklare, at den givne afslapning reducerede den positive opgaverelaterede stress, som igen reducerede performance på opgaveløsning.

Introduction

Can being mindful influence how we make our decisions? And can mindfulness influence decision-making in organizations? The origins of mindfulness can be traced back to ancient Buddhism (Dane, 2011). It was secularized and applied in psychology and medicine by Western researchers such as Langer (1989) and Kabat-Zinn (1990). The subsequent development of, and research into, mindfulness programs has led to increasing acceptance of mindfulness in western science, business and politics. Some of the largest, most profitable and well-known companies in the world, such as Google, have started in-company initiatives to further mindfulness, suggesting that it can increase productivity, innovation and wellbeing in the workplace (Tan, 2012). In recent decades, commercial interest has increased to a point where mindfulness training has become a billion-dollar industry (Wieczner, 2016). While it is important to remain critical of the quality and costs of mindfulness training (Dam et al., 2018), there is increasing consensus within the organizational literature that "mindfulness is neither mysterious nor mystical, but rather can be reliably and validly measured, [and] linked to an array of individual and organizational outcomes" (Sutcliffe et al., 2016).

Mindfulness training has been demonstrated to reduce stress, anxiety, depression and other pathological conditions in individuals (for meta-analyses, see Keng, Smoski, & Robins, 2011; Khoury, Sharma, Rush, & Fournier, 2015). More recently, there have been suggestions that mindfulness training might also improve decision-making, enhance performance and carry other benefits relevant to an organizational studies (see Sutcliffe et al., 2016 for an organizational level review). Regarding the relation between mindfulness and organizational outcomes such as decision-making and performance, the literature highlights that a key to understanding this relation is that mindfulness deals with individuals' fundamental capacities of consciousness such as attention and awareness (Brown et al., 2007). More recent reviews specifically suggest that

mindfulness training leads to improved attention (stability, control, and efficiency) and awareness, which can lead to lead to enhanced performance in certain situations (for reviews, see Good et al., 2016; Tang, Hölzel, & Posner, 2015).

Mindfulness was initially developed and applied in organizational studies by researchers such as Weick et al. (1999), who investigated the concept in relation to High Reliability Organizations (HROs). Subsequently it was applied in related fields by researchers such as Rerup (2005) and (Levinthal & Rerup, 2006) who bridged the concept into entrepreneurship and organizational learning respectively. More recently, researchers have examined the relation between mindfulness and decision-making as well as job- and task-performance in individuals and groups. For example, Kirk et al. (2016) find evidence for a positive association between mindfulness training and cooperative decision-making, Dane and Brummel (2014) find support for a positive relationship between workplace mindfulness and job performance, and Yu and Zellmer-Bruhn (2018) find that mindfulness has positive effects for team functioning. While the field of mindfulness is conceptually rich and holds promise at the organizational level, calls have been made to identify and integrate the somewhat incoherent ideas and concepts into a more coherent whole, as well as further investigate the relationship between mindfulness' and relevant organizational factors such as decision-making and performance (e.g. Sutcliffe et al., 2016).

Thus, in order to address the conceptual challenges of the field (a lack of overview of – and consensus on – the different mindfulness concepts and specifically a lack of conceptual coherency at the collective mindfulness level), the first paper of the present dissertation systematically reviews mindfulness in relation to organizations and individuals in organizations. It provides guidance on what has been learned so far, outlines crucial findings and what remains to be done.

One consequence of the review was that the present author judged that it was not realistic nor constructive to continue studying the field of collective / organizational mindfulness at that point

in time, and that it would thus be more constructive, suitable and feasible to switch to studying strategic decision-making at the individual and group level of analysis. This is because – as you will see in the first paper – that from the outset, strategy and decision-making has been suggested as one of the more promising fields of study (e.g. Fiol & O'Connor, 2003; Weick et al., 1999).

Thus, the second paper proceeded to work with mindfulness and strategic decision-making at the level of individuals and groups. The individual and group level was chosen because mindfulness research at that level has reached a degree of conceptually maturity that makes it feasible to work with in contrast to the organizational level. Further, because the surprising results of the second paper merit further research, I chose to interview the participants in the experiment. The collected data set was subjected to a thematic analysis with a theoretical and sematic approach (Braun & Clarke, 2006), which resulted in the third paper.

It could have also been suitable to conduct e.g. further experiments to investigate the underlying causality of the results of the second paper, but because there was only the one chance to interview the participants, since with time they would forget their experience, I chose to proceed in this direction. The third paper provides us with data and insight on the lived experience of individuals that are compensated for participating in a mindfulness training and solving a task. These insights may turn out to be a valuable, novel and important source of information for organizational decision-makers that are considering investing in training their employees in mindfulness, as well as a next step for researchers seeking to understand how mindfulness affects decision-making and employees.

Accordingly, the three papers included in the present dissertation (i) reviews mindfulness in organizational studies, (ii) investigates the relationship between mindfulness training and strategic decision-making, and (iii) explores aspects of the 'lived experience' of the mindfulness training. In the context of decision-making, the concept of mindfulness is typically positioned together with

perspectives that acknowledge the limitations of e.g. mind, space and time, such as bounded rationality (e.g. March & Simon, 1958).

The remaining part of this section introduces the research questions and overall contribution of the present dissertation. Then the theoretical positioning is presented, followed by the research design and methodological approach. Finally, an overview of the papers is presented as an introduction to the three papers.

Research questions and overall contribution

Due to the nature of the following research questions, the papers in the present dissertation use different methods to shed light on how mindfulness manifests at different levels of organization.

In the first paper, I *systematically review collective mindfulness in organizational studies, aiming to summarize what we have learned so far, highlighting consistencies and contradictions, and mapping out what remains to be done*.

In the second paper, focusing on a future research suggestion emerging from paper one, I investigate the effect of mindfulness training duration on strategic decision-making: *How does the duration of a mindfulness training influence individual- and group performance on a strategic decision-making task?*

In the third paper, I explore participants' experience of completing 7 days of mindfulness training by interviewing participants from the experimental study in paper two: *1) Why do some people benefit more than others from mindfulness training? 2) Why do some participants train as recommended – or more – while some train less during a mindfulness training?*

To summarize the difference in perspective of the three papers, the first paper is at the level of organization while the latter two are at the level of group and individual. The first addresses a gap in the organizational literature (systematic review), the second investigates a causal relation (using

experimental methodology), and the third seeks to deepen our understanding of participants' lived experience (using semi-structured interviews).

The three different research designs and methodological approaches are described in the section "Research design and methodological approach". While leaving the specific contributions to each paper, I would like to point out that overall the dissertation contributes to existing knowledge by first, creating an overview of the field and second, by developing and working empirically with the subject of mindfulness in organizational studies, which until recently was dominated by conceptual work[1].

The following sections outline how mindfulness was introduced into western science and business, as well as try to explain some of the reasons for the popular "hype". Thus, while each paper provides its own motivation, the following sections argue more broadly for why research into secular mindfulness in business is flourishing and relevant to pursue.

Mindfulness in organizational studies: from cessation of suffering to increased performance

Mindfulness in its original form is the seventh practice of the Noble Eightfold Path of Buddhism, which is a set of practices that have the goal of cessation of suffering (suffering is translated from the Pali word "dukkha"). That suffering can cease is the fourth of the Four Noble Truths, which express the basic philosophy of Buddhism. Thus, Mindfulness has been a core practice of Buddhist monastic life for around 2500 years (Rahula, 1974). Some authors leave the work dukkha untranslated, since the English word "suffering" does not completely cover what is meant with dukkha ("dukkha" is also the first of the Four Noble Truths that suffering exists). In addition

[1] In contrast, the fields of medicine and psychology have experienced an increase in empirical research on mindfulness for over two decades (Tang et al., 2015).

to covering the common sense of the word suffering, according to Rahula, dukkha also “includes deeper ideas such as 'imperfection', 'impermanence', 'emptiness', 'insubstantiality'” (p. 17).

One of the first western scientists who earnestly studied eastern philosophy of consciousness and practices was the widely known psychologist William James, who in the early 1900s proposed that Buddhist thought would have a great influence on western psychology (Epstein, 2013). However, at the time, Freud’s psychology won widespread recognition and application, and Buddhist psychology did not. At least, not until the 1970s, where Buddhist practices started to slowly be introduced into the mainstream of psychology and medicine. In the 1970s and -80s, Jon Kabat-Zinn developed a stress reduction program, which was eventually to win renown and take form as the 8-week Mindfulness-Based Stress Reduction program (MBSR). MBSR, along with a few others mindfulness programs, such as Mindfulness-Based Cognitive Therapy (MBCT), are now being widely researched and have been shown to lead to improvements in mental and physical health (Khoury et al., 2015; Kuyken et al., 2016).

In parallel to mindfulness in psychology and medicine, a less-known and less widely researched concept of mindfulness was developed by Ellen Langer (1989) from Harvard University. Initially, Langer studied mindlessness and became somewhat famous for her story telling talent and original approach to experimental studies. Thus, Langer studied mindfulness as a contrast to mindlessness, which she had studied previously, and originally did not show interest in the concept that originated from Buddhism. Perhaps because Langer’s research also bridged into work psychology, the first research on mindfulness in organizational studies referenced Langer’s work (e.g.Rerup, 2005; Weick et al., 1999), and not that of Kabat-Zinn (1990)[2]. Later work by Weick (Weick &

[2] Reference paper 1 of this dissertation for a discussion of the problems related to Weick and colleagues referencing Langer’s approach and for the reasons why researchers have subsequently sought other sources.

Sutcliffe, 2006) as well as other researchers started referencing Kabat-Zinn as well as Brown and Ryan (2003) (for a bibliographical illustration, see figure 1 in paper 1).

The present dissertation works with the three coexisting concepts of mindfulness that have become common in the literature (Good et al., 2016; Sutcliffe et al., 2016): trait mindfulness, state mindfulness and mindfulness training. Trait mindfulness (also known as dispositional mindfulness) reflects the notion that each individual has a stable, enduring, and measurable level of trait mindfulness (for operationalizations, see the Five Factor Mindfulness Questionnaire of Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; the Mindful Attention Awareness ScaleBrown & Ryan, 2003). While it is possible to increase trait mindfulness, it typically takes a longer period of training (thousands of hours of training according to Goleman & Davidson, 2017). State mindfulness is a concept describing that the mindfulness of each individual can also be influenced and fluctuate for shorter periods, for example by events and moods, or mindfulness training (for an example of a brief, 10 minute training influencing state mindfulness, see Cleirigh & Greaney, 2015). Mindfulness training, also called deliberate (intentional) mindfulness, includes various practices of focused attention (e.g. on breathing, or a real or imaginary object) and open monitoring of sensory stimuli. These practices are at the core of current, standardized mindfulness training programs, such as the 8-week MBSR/MBCT programs (Good et al., 2016).

Thus, theory suggests that training mindfulness can heighten state mindfulness, and that a longer period of training can increase trait mindfulness. Recent evidence suggests that individual trajectories of change may vary, but this has yet to be investigated (Kiken, Garland, Bluth, Palsson, & Gaylord, 2015). While the first paper refers to the mindfulness concepts and operationalizations used by authors in specific studies, with trait mindfulness being the most frequent, papers two and three investigate the effects of mindfulness training (for a more extensive

discussion of the interrelationship between mindfulness state, trait and practice, please see Jamieson & Tuckey, 2017).

In recent years, researchers in behavioral economics and organizational studies started to become interested in the benefits of mindfulness (Dane, 2011; Dane & Brummel, 2014; Kirk et al., 2016), and in parallel mindfulness entered the mainstream of business, with companies such as Google marketing it as enhancing productivity, creativity and well-being (Tan, 2012). Research on workplace psychology also started to find interest in the benefits of training mindfulness and not just as a treatment for pathology. Several benefits of training mindfulness have been suggested (for reviews, see Good et al., 2016; Sutcliffe et al., 2016), and one context that has frequently been suggested to benefit from mindfulness training and higher trait mindfulness is decision-making in unpredictable, ambiguous, complex, dynamic environments (e.g. Rerup, 2005; Weick et al., 1999), such as strategic decision-making (for elaboration, see paper 2).

In summary, the idea of introducing mindfulness into organizational studies is relatively recent. When comparing to the field of psychology, however, the mindfulness trainings, programs and apps developed for organizations have received much less scientific attention than MBSR and MBCT. Therefore, little is known about the efficacy of mindfulness in organizations.

Minding the Hype: Mindfulness as a cure-all for our era

In order to gain a competitive advantage and achieve superior performance, companies strive for the right resources and capabilities (Wernerfelt, 2013). Mindfulness has garnered interest as a possible means to increasing productivity and performance (for a review, see Sutcliffe et al., 2016). In this section, I argue how this is in part due to the interest of the popular press as well as advances in science and practice. In the press, mindfulness is sometimes presented as a cure-all for what currently ails our society and a booster of performance, enabling workers and managers to make the right decisions while fluently navigate the complexity and dynamism of the age of

globalization and the internet (Van Dam et al., 2018). In the scientific literature on mindfulness, the claims are less bold. However, mindfulness has been shown to lead to improvements in mental and physical health (Khoury et al., 2015; Kuyken et al., 2016) as well as suggested to lead to improved decision-making and performance (Good et al., 2016). In April 2015, the systematic search conducted for the first paper in this dissertation yielded 220 total articles from Academic Journals in business. Presently, three and a half years later, the same search yields more than double the amount: 563 articles on mindfulness in business.

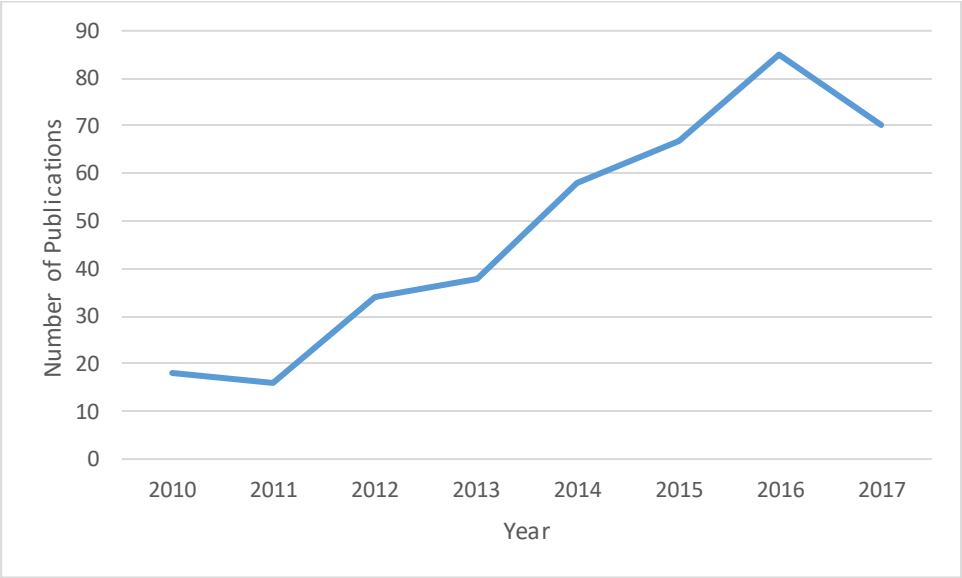


Figure 1. Number of publications per year in peer-reviewed, academic journals in business (EBSCO, 2018b), which include the word "mindfulness" in the abstract (EBSCO, 2018a)

While stress reduction and mental health is not a central topic of the present dissertation, in the following I argue that these factors are part of the reason for the interest in and proliferation of mindfulness, which makes it relevant. I argue that the increased interest in the topic is due to its unique position in Western society, where the search for increased performance is ongoing and stress is rising in the work place. In addition to work-content and -contextual factors that can lead to stress, modern sources of stress include the infamous information overload (e.g. the internet, faster innovation, interacting with a greater diversity of people) and pressure to perform. Pressure to perform can be related to e.g. the increased need for specialization, the changing nature of

work, more efficient markets, competition in a globalized work force, and that people have access to and compare ourselves to higher standards. As early as 2007, the World Health Organization concluded that "Work-related stress is an issue of growing concern in developing countries due to processes of globalization and the changing nature of work" (Houtman, Jettinghof, & Cedillo, 2007). Thus, while a short period of work-related stress may lead to a temporary increase in individual performance, as jobs get increasingly stressful, long term productivity and performance tend to decrease (O'Driscoll & Brough, 2010). Perhaps therefore, mindfulness seems uniquely positioned in the search for increasing organizational performance, since it promises to reduce stress and increase performance. The economic part of the argument can naturally be negated if the benefits of mindfulness are outweighed by the costs, a topic that is yet to be thoroughly investigated (see paper one for a discussion and future research suggestions).

It is striking that while mindfulness programs in psychology and medicine such as MBSR have been demonstrated to "reduce symptoms and improve quality of life across a broad range of stress-related conditions" (Creswell, 2017, p. 498), no similar performance- or business-related programs have been developed or researched to an equivalent degree. Therefore, the present dissertation takes initial steps in advancing our understanding of the performance-related and organizational dimension of mindfulness, as well as mindfulness training in a simulated organizational context.

In summary, the present dissertation aims to contribute with empirical evidence regarding the suggested promise of mindfulness in organizations, as well as provide a deeper understanding of how participants experience such a training and achieve outcomes, which can serve as a guide for researchers, teachers and practitioners. In order to achieve this aim, a mixed research approach (also called a mixed methods research approach, see Johnson, Onwuegbuzie, & Turner, 2007) was chosen, which is addressed in the following section.

Research design and methodological approach

This section provides an overview of the research design of this dissertation by briefly introducing the methods and data for the three different papers and arguing for the overall approach. Further, for each of the three papers, this section argues briefly for the motivation for the chosen approach as well as outlining contributions. A detailed description of the design, analysis and statistical procedures is left to the respective papers. The subsequent sections argue for the mixed research approach taken in the present dissertation, as well as providing an overview of the mixed research approach.

Answering the call for empirical research

Ever since the introduction of mindfulness to organization studies, calls have been made for more conceptual work at the organizational level as well as more empirical research of better quality. In particular, calls have been made for more in-depth qualitative research as well as rigorous quantitative research using adequate controls, randomization and size (Good et al., 2016; Sutcliffe et al., 2016; Weick & Sutcliffe, 2006). Recent empirical studies mostly focus on qualitative work using interviews and case studies (e.g. Fyke & Buzzanell, 2013; Wolf, Beck, & Pahlke, 2012) and relatively few, simple quantitative studies using survey data or laboratory experiments (e.g. Dane & Brummel, 2014; Laureiro-Martinez, 2014). This is in contrast to research on mindfulness in mental health, which has seen a dramatic increase in randomized controlled trials (Creswell, 2017). Thus, one of the aims of the present dissertation is to answer the calls for more empirical research on mindfulness in organizations.

While mindfulness in organizations is an overarching topic in all three papers included in the present dissertation, they address three different research questions, at three analytical levels, using three different methodologies, and focusing on overlapping areas of mindfulness in organizations. Therefore, they embody different contributions to the existing knowledge and

literature, and each approach has the potential for investigating or exploring aspects of mindfulness in organizations. While the contribution of the present dissertation spans levels (see the discussion for information on scope and implications), each paper has its respective focus, which will be explained in the following sections.

Overview of methodological approaches

The present dissertation uses three different methodological approaches, which include both quantitative and qualitative methodology (see Table 1). This answers the call for more empirical work in the field of mindfulness in organizational studies, which is necessary if the field is to develop, gain legitimacy and not rely on the promises and goodwill of non-scientific publications (Van Dam et al., 2018). Applying a mixed research approach emerged as a suitable and feasible way of addressing the research questions. The following sections provide an overview and brief description of the three papers contained in the present dissertation, followed by a description of the overall approach to mixed research, reflections on triangulation as well as the advantages of mixed research in the present case.

Table 1. Overview of Methods, Data and Primary Results of the Three Papers

Title	Method	Sample	Main Argument	Results
Paper one: A discussion of mindfulness in relation to organizations and individuals in organizational settings	Systematic Review (data for meta-analysis lacking) Explorative, inductive, theory elaboration	94 articles	The concept of Mindfulness on the organizational level is unclear / often treated as a black box, and an overview as well as well as a coherent concept is needed for future operationalization and to avoid the concept becoming useless	Provides guidance on what we have learned so far, outlines crucial findings and contradictions, and derives what remains to be done
Paper two: The Impact of Mindfulness Training on Performance in a Strategic	Lab Experiment w. training duration condition Confirmative, deductive, theory testing	332 participants	A mindfulness training with a longer duration will lead to better strategic decision-making in groups and individuals than a shorter mindfulness training	A longer mindfulness training leads to worse strategic decision-making in groups (no significant difference found for individuals)

Decision-Making Task: Evidence from an Experimental Study				
Paper three: Why do some participants train a lot and some participants train a little?	Interviews (1 hour, semi-structured) Explorative, inductive, theory elaboration	22 interviews w. participants from paper two	We need a deeper understanding of the lived experience of mindfulness training participants in order to understand their training decisions, behaviors and outcomes. Specifically relevant is the question of why some people train more while others train less (?), since it is hypothesized to be associated with training outcomes	Six primary themes emerged: 1) Training Experience, 2) Deviance, 3) Motivation and Meaning, 4) Liminal States, 5) External Structure and 6) pre-existing Knowledge and Experience. The themes offer lenses to understanding why and how practitioners make training decisions, enact behaviors and achieve outcomes

Brief description of paper one

Title: A discussion of mindfulness in relation to organizations and individuals in organizational settings.

Authors: Thomas Hessellund Nielsen, PhD Fellow at The Department of Management; Ingo Kleindienst, Associate Professor at The Department of Management (all from Aarhus University).

Target: Long Range Planning.

Status: Presented at EGOS (Nielsen & Kleindienst, 2016), ready for submission.

The first paper is a systematic review, which primarily takes the literature on mindfulness in organizational studies as its data, and secondarily relevant sources from other literatures (e.g. psychology and medicine). It summarizes what we have learned so far and identifies two distinct streams in the literature, highlighting consistencies and contradictions in each and makes suggestions as to what is needed for a more useful and coherent concept of mindfulness in

organizations. It was shown that while the field is conceptually rich, it is also diverse and lacks a coherent organizational level concept of mindfulness. Further, suggestions were developed for future research in each of the seven central categories that emerged as part of the systematic review: (1) decision-making, (2) leadership & change, (3) strategy, (4) ethics & sustainability, (5) human resource management, (6) costs, and (7) miscellaneous. A further contribution is the rethinking of the relationship between mindfulness and routine, suggesting that it is orthogonal rather than 1-dimensional and elaborating on the consequences. The review shows an urgent need for developing core parts of mindfulness in organizations, as well as a need for empirical work on and across the individual, group and organizational level.

Brief description of paper two

Title: The Impact of Mindfulness Training on Performance in a Strategic Decision-Making Task: Evidence from an Experimental Study.

Authors: Thomas Hessellund Nielsen, PhD Fellow at The Department of Management; Martin Petri Bagger, Assistant Professor at The Department of Economics and Business Economics; Panagiotis Mitkidis, Associate Professor at The Department of Management and The Interacting Minds Centre; Christine Parsons, Associate Professor at The Interacting Minds Centre (all from Aarhus University).

Target: Quarterly Journal of Experimental Psychology (QJoEP).

Status: Presented at the authors third year presentation at the Department of Management in June 2018. The article was submitted to QJoEP in April 2019.

The second paper focuses on a research question emerging from paper one. Thus, the second paper is an experimental study on how the duration of a mindfulness training (short and long) influences strategic decision-making in individuals and groups. “Mindfulness training” in the present case

should be understood as stand-alone mindfulness exercises (SAMs), which have been shown to be effective even outside of larger, widely-researched frameworks such as MBSR or MBCT (Blanck et al., 2018). Through an experiment with 332 participants, the paper aims to expand on recent findings. First, that training mindfulness should improve individual and group task performance under certain circumstances (for recent reviews, see Good et al., 2016; Sutcliffe et al., 2016), and second, the positive association between mindfulness practice duration and training outcomes (for a recent meta-analysis, see Parsons et al., 2017). The study was preregistered at the Open Science Framework (Nielsen, Bagger, Mitkidis, & Parsons, 2017). While it would also be interesting to study mindfulness training and strategic decision-making directly in organizations, the experimental setting was seen as sensible a first step, since it would allow us to control for many "real world" variables that would inevitably confound the results. Surprisingly, the study finds that, 1) a longer mindfulness training duration has a negative association with decision-making performance at the group level, and that 2) a facet of trait mindfulness ("Acting with Awareness", see Baer et al., 2006) also had a negative association with decision-making performance. The finding is limited to the given task as well as the group level, and thus we suggest that future research should investigate the boundary conditions of the finding. Consequently, support was not found for the hypotheses[3] predicting a better performance for a longer duration of mindfulness training, which is unexpected when comparing to recent research demonstrating that a brief mindfulness intervention can lead to superior performance on a group decision-making task (e.g. Cleirigh & Greaney, 2015). These results are relevant for both researchers, teachers, practitioners, as well as organizations. New light is shed on this topic, which merits more research, and adds support to the suggestion of Sutcliffe et al. (2016) that mindfulness is a more social construct than its name, mechanisms and measurement implies.

[3] For an overview of the four hypotheses, please reference paper two in the present dissertation.

Note: Paper two was submitted as a research note and thus has a limit of 20 pages. Therefore, a special section, "Discussion of paper two", has been added to the discussion of the dissertation, to focus on the aspects that did not fit the 20 pages.

Brief description of paper three

Title: Why do some participants train a lot and some participants train a little?

Author: Thomas Hessellund Nielsen, PhD Fellow at the Department of Management, Aarhus University.

Target: Mindfulness (the journal).

Status: In preparation for submission.

A combination of the counterintuitive results from paper two, and a gap in the literature concerning the lived experience and outcomes of participants in mindfulness trainings led to the idea for the third paper. This area of research has received limited attention, especially in non-clinical populations that are compensated for participation. As noted by Cook and Reichardt (1979), it is natural to take a more exploratory approach when faced with surprising results from a confirmatory study, in order to probe the data and determine its meaning and truthfulness. The third paper uses interviews to explore 22 participants' experience of completing seven days of SAMs (mindfulness training). Six primary themes emerged from the analysis: Experience, Deviance, Motivation and Meaning, Liminal states, External Structure, and pre-existing Knowledge and Experience with mindfulness. The first three themes are concerned with what happened during the training, and the final three themes are concerned with what is given before the training starts. For example, the analysis suggests that experiencing discomfort during training without being able to identify the cause can create a negative association to training frequency and training outcome. These suggestions can assist teachers and researchers who want to understand

how to adapt training programs and research designs to non-clinical contexts such as organizations. In summary, the study provides understanding of how physical surroundings, subjective personal and social factors motivate and support participants' training, as well as factors that can impede the training.

The overall approach and mixed research

Thus, three different approaches are used in addressing the three research questions presented in the present dissertation. None of the three approaches has a dominant placing in the present dissertation, which on the overall level takes an inclusive, pragmatist stance to the mixed research paradigm and respects the wisdom of each of the chosen approaches. Furthermore, the mixed research relationship between the three papers can be described with the following five attributes, which are listed here and subsequently illustrated and explained. First, each paper studies the topic of Mindfulness ("methodological triangulation", see Johnson et al., 2007). Second, paper two and paper three study overlapping research areas and the same sample with quantitative and qualitative perspectives respectively, which enables a degree of data triangulation. Third, the results from paper one inform the research design of paper two, and the results from paper two inform the research design in paper three, ("development", see Greene, Caracelli, & Graham, 1989). Fourth, papers two and three seek to elaborate or illustrate the results from the respective previous papers ("complementarity", see Greene et al., 1989). Fifth, the apparent contradictions discovered in the interaction between papers two and three lead to rethinking the research designs and new research questions ("initiation", see Greene et al., 1989).

While each of the three papers adheres to its own respective research paradigm, the present dissertation affords equal status to each paper, taking the pure mixed methods approach as defined by Johnson et al. (2007). Figure 2 displays the relationships between the three papers and the dissertation, which shows the "mixing stages" (Theme 2, Johnson et al., 2007, p. 122) where in the

overall design that the actual mixed research is carried out. The following section explains the first and second point discussed above, which includes the advantages of mixed research and triangulation that are relevant for the present dissertation. The section after that explains points three-five, which includes how the dissertation developed, how the papers complement each other and how this led to the initiation of new ideas.

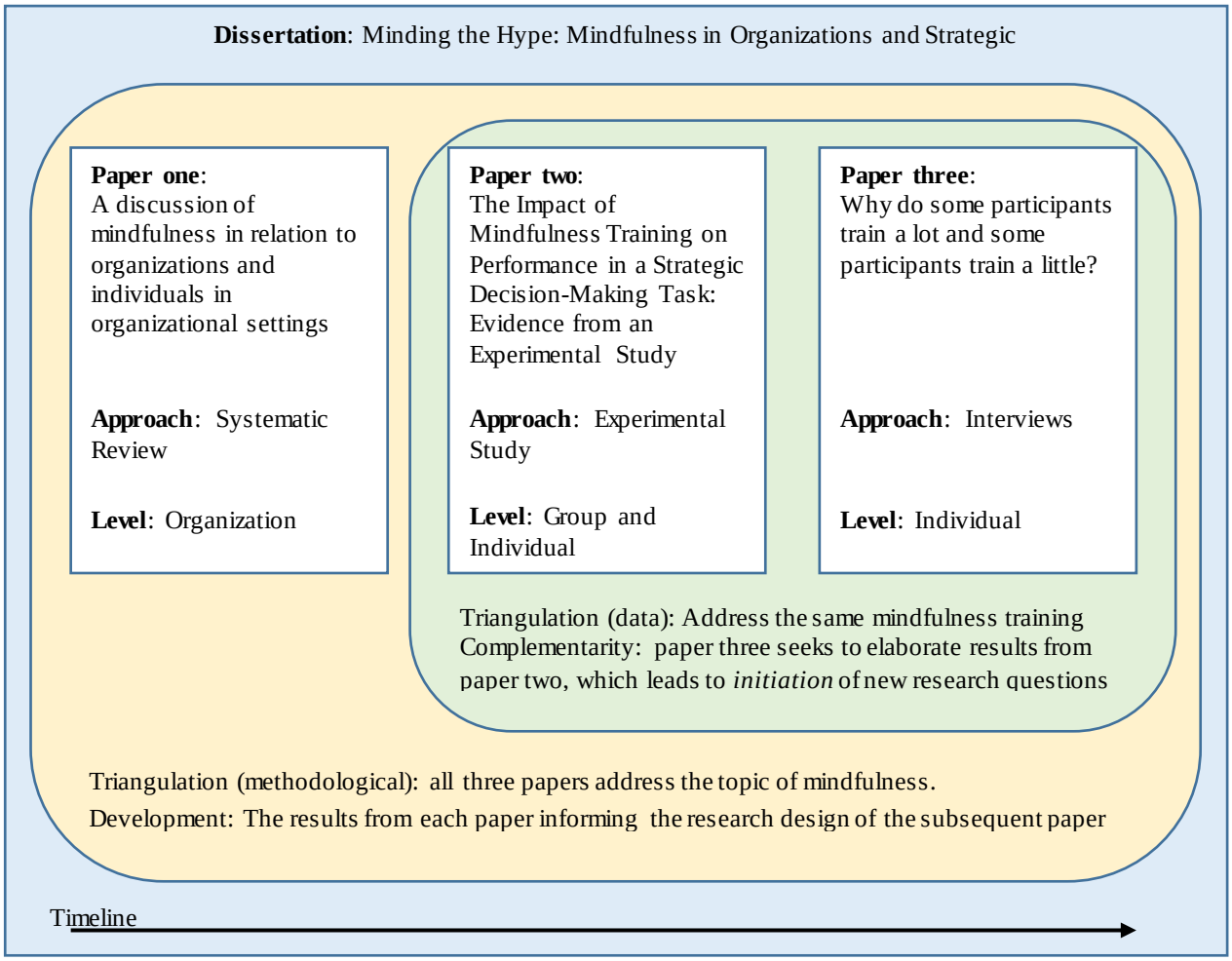


Figure 2. Overview of the dissertation and its elements of mixed research.

Triangulation and further advantages of mixed research

The two areas of triangulation that are most important for the present research are sequential methodological triangulation and data triangulation (for elaboration and an overview of areas of triangulation, see Johnson et al., 2007). First, methodological triangulation involves the use of

multiple methods to study a research problem or phenomenon. Applied correctly, it has been found to be beneficial in providing confirmation of findings, increased validity, richer and thicker data, and enhanced understanding of studied phenomena. The three papers offer methodological triangulation in studying the phenomenon of mindfulness and mindfulness training, though with different approaches, at different levels of analysis (organization, group, and individual). The methodological triangulation is limited due to the variety in research questions, which was designed at the cost of going deeper into the more concrete research questions of papers two and three. In the subsequent section, the aforementioned advantages will be explained in more detail and the joint contribution of papers two and three will be clarified in a way that was out of scope of the individual paper.

Second, the present dissertation applies data triangulation in papers two and three. This is based on the overlap of both of them studying (without being restricted to) the effects of mindfulness training at the individual level. Thus, the data from paper three is not merely further research about the same topic; it is additional, qualitatively different data, which was generated from a subsample of the participants from paper two.

Hence, while acknowledging the limits to the scope of triangulation between the three papers, there are still important, intersecting points of interest, especially regarding papers two and three. I argue that the present mixed research offers at least two advantages when compared with a (hypothetical, non-existent) single-method approach: the mixed research approach can a) lead to thicker, richer data and b) uncover interesting contradictions (for a deeper theoretical discussion of these and related advantages, see Jick, 1979). Regarding a), thicker and richer data, following up the experimental study with qualitative interviews was a possibility to deepen our understanding of the mindfulness training. This was needed because our understanding of mindfulness, mindfulness trainings and specifically their outcomes had been challenged by the surprising

results of the experimental study in paper two. While qualitative studies do not allow causal inference, the rich data that was collected as part of paper three provided insight into the experiences of the participants, which gave us some clues as to the results from paper two (see below). As suggested by Sieber (1973), the quantitative data from the second paper helped identify representative sample members and outlying cases in the third paper. It did this by informing the research design about the range and variety in the data, which also gave confidence in identifying the saturation point and assurance in assessing the generalizability of the results. Regarding b), uncovering interesting contradictions, the data from the interviews showed some similarity, but perhaps more interestingly, a great variety in the experience and outcomes of the participants. The analysis suggested that this variety in outcomes and experience seemed to depend on a range of subjective and objective, as well as cultural and social factors from the past, present and expected future of the individual participant. Hence, because a central part of the purpose of an experiment is to control for confounding factors, it was surprising that the analysis in the third paper shows us that a great range of factors seem to influence the training, which raises the suspicion that either the type- or design of the training was not suitable for the given purpose.

This was contrary to our expectations and raised new questions, which is one of the reasons for combining quantitative and qualitative research identified by Rossman and Wilson (1985): that it can lead to new ways of thinking and new research questions, which was also the case here.

Development, complementarity and initiation

This section describes and explains how the dissertation developed, how the papers complement each other, and how this led to the initiation of new ideas.

As noted previously, rather than following the original PhD project design, which included three studies on organizational level mindfulness, the plan for the present dissertation shifted to a developmental approach. This was done due to the surprising finding in paper one that the concept

of mindfulness in organizations has a degree of incoherency and lacks useful operationalization (see also Sutcliffe et al., 2016), which has led many authors to treat the organizational level concept of mindfulness as a black box (e.g. Hutzschenreuter et al., 2014). Thus, after completing the first paper and recognizing the infeasibility of the original plan, the focus of the dissertation switched to the individual and group level, since this seemed a more promising, suitable and feasible avenue of research. This resulted in the choice of a "developmental" approach, which seeks to use the results from one study (with a given method) to assist in the development of subsequent studies (with one or more alternative methods). The meaning of the term development is broad enough to include informing the design, execution, as well as measurement decisions in the subsequent study, and the rationale of this approach is to increase the validity of the results by capitalizing on the strengths of the various methods (Greene et al., 1989). Thus, paper two was informed by the results from paper one, which suggested that mindfulness in the context of behavioral strategy and strategic decision-making would be a promising area of research. Paper one further suggested various approaches – such as experiments – to studying the suggested decision-making and performance-enhancing effects of mindfulness. Paper three was in several ways directly informed by paper two. Two examples of how paper three was developed from paper two: First, the research questions and the questionnaire in paper three were informed by the results from paper two, in that the results from paper two sparked curiosity as to the experience, behavior, and decisions of the participants. Second, the participants in paper three were previous participants in the experimental study from paper two.

The design of paper three also incorporates the mixed research concept of "complementarity", meaning that paper three seeks to elaborate and clarify the results from paper two (Greene et al., 1989). The concept of complementarity capitalizes on the method strengths of the experimental study as well as the interview study, and it serves to counteract the inherent biases of the respectively quantitative and qualitative methods, while increasing the interpretability and

meaningfulness of the results. In addition to these advantages, the apparent contradictions discovered in the interaction between papers two and three lead to the rethinking of the research designs and the emerging of new research questions ("initiation", see Greene et al., 1989). These apparently contrasting results and suggestions for future research are addressed in the discussion.

Paper one: A discussion of mindfulness in relation to organizations and individuals in organizational settings

Thomas Hessellund Nielsen, Ingo Kleindienst

Abstract

We review the literature on organizational mindfulness. We critically examine the progress the field of research has made, focusing on three questions, namely (i) what is mindfulness?, (ii) why is mindfulness important?, and (iii) how is mindfulness related to organizational concepts? Overall, we find the field to be immature. On the positive side, the field is both conceptually and empirically rich, providing deep and broad examples of how mindfulness may contribute in a range of situations, professions, and types of organization. On the negative side, we find the field to be conceptually underdeveloped and –probably due to the lack of conceptual clarity –at times contradictory. We also note a lack of critical discourse of the concept that yields the danger of rendering the entire concept less useful than it could be. We provide future research suggestions aimed at addressing shortcomings that we identify and at helping further develop the field.

Keywords: mindfulness, literature review, organizational level

Introduction

Are we mindful of the concept of mindfulness in organizational studies? Mindfulness is originally an individual level concept whose origins can be traced back to ancient Buddhism (Dane 2011), which deals with individuals' fundamental capacities of consciousness such as attention and awareness (Brown, Ryan, & Creswell 2007b). Originally, mindfulness was applied in organizational research by scholars such as Weick, Sutcliffe, and Obstfeld (1999), Rerup (2005), Weick and Sutcliffe (2006), and Levinthal and Rerup (2006). Since then, the field has flourished, and recently reviews have been published that work to consolidate the field (e.g. Lomas et al., 2017; Sutcliffe et al., 2016). At the organizational level, mindfulness is typically discussed in the context of learning and is presented as an antipode to mindless, routine-driven behavior. As such, the application of mindfulness to the study of organizations is expected to yield novel insights. However, while challenging in itself, the application of the mindfulness concept is complicated by the fact that no agreement has yet been reached regarding its definition and conceptualization.

More insight into mindfulness on an organizational level is important from both a research and managerial perspective. However, the concept's proliferation fosters a complexity in which it seems easy to get lost, entailing the danger to render the concept useless (Weick & Sutcliffe 2006). Indeed, the popularity of the mindfulness concept has now reached a stage at which critical articles appear, criticizing various aspects of the concept's current conceptualization, application, and popularization (e.g. Kristensen, 2018; Purser & Milillo, 2015). In light of this, the present literature review aims at providing guidance on what we have learned so far, outlining crucial findings and contradictions, and deriving what remains to be done.

Domain of the review and methodology

The *domain* of the present literature review is *research exploring the concept of mindfulness on an organizational level*. However, given the origin of the concept, we will refer to research on the individual level whenever needed.

We applied a systematic database-based approach for identifying the relevant body of literature, as has been done in prior literature reviews (see, for example, Brozovic 2016; Laaksonen & Peltoniemi 2016). We followed the reasoning of Hutzschenreuter and Kleindienst (2006) and focused on peer-reviewed academic journals arguing that the work appearing in these journals can be considered validated knowledge having the most impact in the field. In particular, we conducted a systematic database search within the Business Source Complete database. We searched for the keyword 'mindfulness' in the abstracts. The search was conducted in January 2019 and the last year included was 2018. We decided perform the database search without journal restriction, aiming to avoid missing potentially relevant articles due to a narrowly ex-ante defined journal list. The keyword search initially yielded 563 potentially relevant articles. We read the abstracts of this initial set of articles to ensure substantive relevance of each article for the review. During this first step, we eliminated 470 articles that did not fit the domain of our review (Laaksonen & Peltoniemi 2016). Thereafter, we screened the reference sections of the remaining articles to identify articles that the database search had not returned, but that were repeatedly referenced. Our final sample encompasses 94 articles. The distribution of the publications according to journals can be seen in Table 1.

Table 1. Distribution of organizational mindfulness publications according to journals

Journal	Number of publications
Journal of Business Research	6
Management Learning	5
MIS Quarterly	4
Organization Science	3
Academy of Management Learning & Education	2

Journal	Number of publications
Human Relations	2
Human Systems Management	2
Journal of Change Management	3
Journal of Business Ethics	2
Journal of Management, Spirituality & Religion	2
Journal of Managerial Psychology	2
Journal of Occupational Health Psychology	2
Management Decision	2
Occupational Health	2
Strategic HR Review	2
Academy of Management Executive	1
Academy of Management Journal	1
Academy of Management Review	1
Accident Analysis & Prevention	1
Annual Review of Organizational Psychology and Organizational Behavior	1
Asia Pacific Journal of Human Resources	1
Canadian Journal of Behavioural Science	1
Career Development International	1
Career Development Quarterly	1
Construction Management & Economics	1
Ecological Economics	1
Emergence: Complexity & Organization	1
European Journal of Information Systems	1
European Journal of Training & Development	1
European Journal of Work & Organizational Psychology	1
Industrial Marketing Management	1
Information & Organization	1
Information & Management	1
Information & Software Technology	1
Information Systems Journal	1
Information Systems Research	1
Interbeing	1
International Journal of Business Insights & Transformation	1
International Journal of Employment Studies	1
International Journal of Human Resource Management	1
International Public Management Journal	1
Journal of Applied Behavioral Science	1
Journal of Brand Management	1

Journal	Number of publications
Journal of Business Communication	1
Journal of Counseling & Development	1
Journal of Database Management	1
Journal of Global Business & Technology	1
Journal of Information Technology (Palgrave Macmillan)	1
Journal of International Technology & Information Management	1
Journal of Management	1
Journal of Management Development	1
Journal of Management Education	1
Journal of Management Inquiry	1
Journal of Operations Management	1
Journal of Organizational Behavior	1
Journal of Risk Research	1
Journal of Strategic Marketing	1
Journal of Workplace Behavioral Health	1
Loss Prevention Bulletin	1
Management Communication Quarterly	1
OD Practitioner	1
Organization Development Journal	1
Organization Studies	1
Reflections	1
Research in Organizational Behavior	1
Scandinavian Journal of Management	1
Strategic Management Journal	1
TQM Journal	1

The table shows that the articles included in the present review have been published in a variety of academic journals with differing topics such as learning & education, IT, HR, change management, ethics, quality management, etc. There does not seem to be a dominant topic. Below we provide a simpler categorization, a grouping of the articles, which emerged based on the analysis of keywords and topics that were identified in the articles.

Development of the Reviewing Framework

We decided to review the literature along Whetten's (1989) core questions of any theory. Accordingly, we ask: *What is mindfulness? Why is mindfulness important?*, and *How is mindfulness related to other concepts?* However, we found that the questions *where, when, and for whom?*, the "temporal and contextual factors" that "set the boundaries of generalizability" (Whetten 1989, p. 492), were largely left unanswered. We have adressed them implicitly where possible. Each of the three questions outlined above are treated in a separate section directly followed by the corresponding future research suggestions.

Prior to assessing the body of literature identified, and in order to address the question "How is mindfulness related to other organizational concepts?" we carefully analyzed the specific research questions of the articles. Reading the articles enabled us to identify keywords and major topics, which turned out to overlap in overarching categories. Thus, in this iterative process, we grouped the articles into the following categories: (1) decision-making, (2) leadership & change, (3) strategy, (4) ethics & sustainability, (5) human resource management, (6) costs, and (7) miscellaneous. The final category, "miscellaneous", contains various topics that did not fit into the major categories. Thus, each article is present in at least one category, but may be present in more categories.

In Table 2, we provide more information on each of the categories.

Table 2. Descriptive information on the categories

Category***	Number of articles**	Empirical	Conceptual	First article to include topic (except Weick et al. 1999)	Langer	Weick	Brown	Kabat-Zinn
Decision-making	26	12	19	*2003, Fiol and O'Connor	19	20	5	3
Leadership & Change;	32	16	19	*2003, Fiol and O'Connor	15	19	11	8
Strategy	24	11	16	*2004, Swanson and Ramiller; Thomas, Schermerhorn and Dienhart	13	20	8	6

Ethics & sustainability	6	5	3	2004, Thomas, Schermerhorn and Dienhart	1	3	2	0
HRM	13	10	4	2009, Kasser and Sheldon	2	4	6	3
Costs	7	2	5	*2004, Swanson and Ramiller	5	6	1	1
Miscellaneous	29	13	16	-	13	17	13	10

* Weick et al. (1999) also wrote on this topic

** The fields represent: the number of articles within category, number of empirical articles within category, number of conceptual articles within category, first article within category that was not Weick et al. (1999), number of articles within category building on Langer (1989), Weick et al. (1999), Brown and Ryan (2003) or Kabat-Zinn (1990)

*** Some articles occur in multiple categories. For more information see tables 4-10.

Finally, because a number of recent reviews have pursued aims similar to those of the present review (Dernbecher & Beck, 2017; Donald et al., 2018; Hanley, Abell, Osborn, Roehrig, & Canto, 2016; Jamieson & Tuckey, 2017; Lomas et al., 2017; Sutcliffe et al., 2016; Vu, Wolfgramm, & Spiller, 2018), there is a need to position and clarify the present contribution accordingly. Overall, the present review differs in three ways: methodologically, it is a comprehensive, systematic review of mindfulness in the organizational literature, it provides a unique analysis of how mindfulness is related to other organizational concepts, and it discusses a novel way of understanding the relationship between mindfulness and routine.

The review of Dernbecher & Beck works to derive a high-level "information system" mindfulness theory, which describes how mindfulness interacts with information systems, and suggests future research suggestions in this area. While the present review also includes articles that treat information systems, they are not found to constitute a major category like "Decision-making" or "Strategy" (the publications on "information systems" are grouped in the category "Miscellaneous"). For example, the highly cited MIS Quarterly publication of Swanson and Ramiller (2004) includes the topic of information systems, but it also becomes relevant because it

concerns organizations (and related bandwagon behavior regarding IT innovation) and mindfulness.

Two reviews are focused on mental health specifically, and they look at mindfulness at the individual level related to health and pathology (Hanley et al., 2016; Jamieson & Tuckey, 2017). Health and pathology have relevance for organizational studies; however, this review in its nature is more focused on organizational factors such as decision-making, strategy, and leadership (see below). In their systematic review and meta-analysis, Lomas et al. (2017) are also concerned with psychological and health-related issues and also include job performance. However, since they only include job performance when it is relevant for understanding the relation between mindfulness and well-being, there is no significant overlap with the present review.

Further, calls have been made to reintegrate aspects of Buddhism into secular, western mindfulness. The review of Vu et al. (2018) introduces Eastern Buddhist principles of non-attachment, practiced through the key concept of Skillful Means, developing a "Five-Fold Framework" and highlighting practical implications to management learning. In the discussion, the present review acknowledges the critique of western, secular mindfulness, yet since it does not have any influence in the majority of the identified publications, and it is a topic of Vu and colleagues (see also Kristensen, 2018; Purser & Milillo, 2015) we chose not to extensively discuss the topic of Buddhism.

Finally, Sutcliffe et al. (2016) conducted a cross-level review (individual, collective, and organizational levels) of mindfulness in organizations, which looks at two bodies of research in organizational behavior and organizational psychology, namely the one treating individual mindfulness and the one treating collective mindfulness. They focus on what mindfulness is, why it is important, how it works and can be measured, as well as its consequences and antecedents. Their results and those of the present paper complement each other in several ways. While the

overarching aims are similar, the purpose of the present review is to do a more comprehensive and systematic review on mindfulness within the organizational literature. For example, the categorization of how mindfulness has been studied in relation to organizational concepts (table 2), and the bibliographical analysis and subsequent discussion (figure 1 as well as table 3) provide unique analyses across the literature of mindfulness in organizations. Further, in the section "*How is mindfulness related to other concepts?*", the structure of the present review follows seven emergent categories, and provide more details on the relationship between mindfulness and organizational outcomes, which complements as well as expands the scope of Sutcliffe and colleagues.

What is mindfulness?

The need to define and delimit the concept of mindfulness originates in its proliferation. Before its introduction to the organizational literature, the concept of mindfulness was mainly treated as a concept at the individual level (e.g. Kabat-Zinn, 1990; Langer, 1989), and thus the present section will start there, subsequently moving to the organizational level in order to achieve its purpose. Driven by its recent popularity, the concept of mindfulness has increasingly become an object of scientific investigation in the Western world. However, as Hayes and Plumb (2007) have pointed out: This popularity is likely to have a downside. There is a substantial risk that a reader –even an academic one –will refer to the popular, diffuse, and inflated conceptualization of the term (Brown et al. 2007b; Hanley, Abell, Osborn, Roehrig, & Canto 2016). As a result, we see the risk that this nascent scientific concept starts integrating non-scientific attributes of the popular concept, which at least to some extent seems to be subject to *'magical thinking'*. While this may make the concept more salable, it is unsuitable for scientific investigation. As such, we believe that it is time to consolidate and discern the core concept from the mindfulness-skills, -concerns, -antecedents, and other factors that have been added ever since the groundbreaking contribution of Langer (1989).

The literature on individual level mindfulness uses the concept in three related yet distinct ways: (1) trait (or dispositional) mindfulness, (2) state mindfulness, and (3) mindfulness practices (Hanley et al. 2016). The organizational level mindfulness literature, however, typically builds upon variations of individual trait and dispositional mindfulness (i.e. Brown & Ryan 2003; Langer 1989) as will be illustrated below.

Simply put, *trait mindfulness* refers to an enduring level of mindfulness of a person –or in this case adapted[4] to the organizational level. Conversely, *state mindfulness* refers to a temporarily increased or decreased level of mindfulness (typically as a reaction to practice or other circumstances). *Mindfulness practices*, finally, are typically meant to achieve states of mindfulness or raise mindfulness over a period through training mindfulness techniques (Body Scans, Guided or Silent Meditation, Yoga, etc.). For example, while training mindfulness for as little as 10 or 15 minutes has been shown to increase state mindfulness, it typically takes hundreds or thousands of hours of practice to increase the more enduring trait mindfulness (for a review, see Goleman & Davidson, 2017). For an elaborate discussion on these three types of mindfulness, as well as a review of mindfulness interventions in the workplace (interventions typically involve training mindfulness), please see the review of Jamieson and Tuckey (2017). They also note that the literature does not exhibit a consensus on what mindfulness is, and note that perhaps therefore some intervention studies do not even try to define it (they count nine intervention studies, or 22.5 % of their sample, that do not).

Since the related individual level concepts of mindfulness –*state* and *practice* –are hardly referred to in the organizational literature (for notable exceptions, see Baccarani, Mascherpa, & Minozzo 2013; Bazarko, Cate, Azocar, & Kreitzer 2013), they will not be treated subsequently (for further

[4] We chose the word "adapted" carefully in this case, since we have not found an adequate or complete translation of mindfulness from the individual- to the organizational level seems to have occurred.

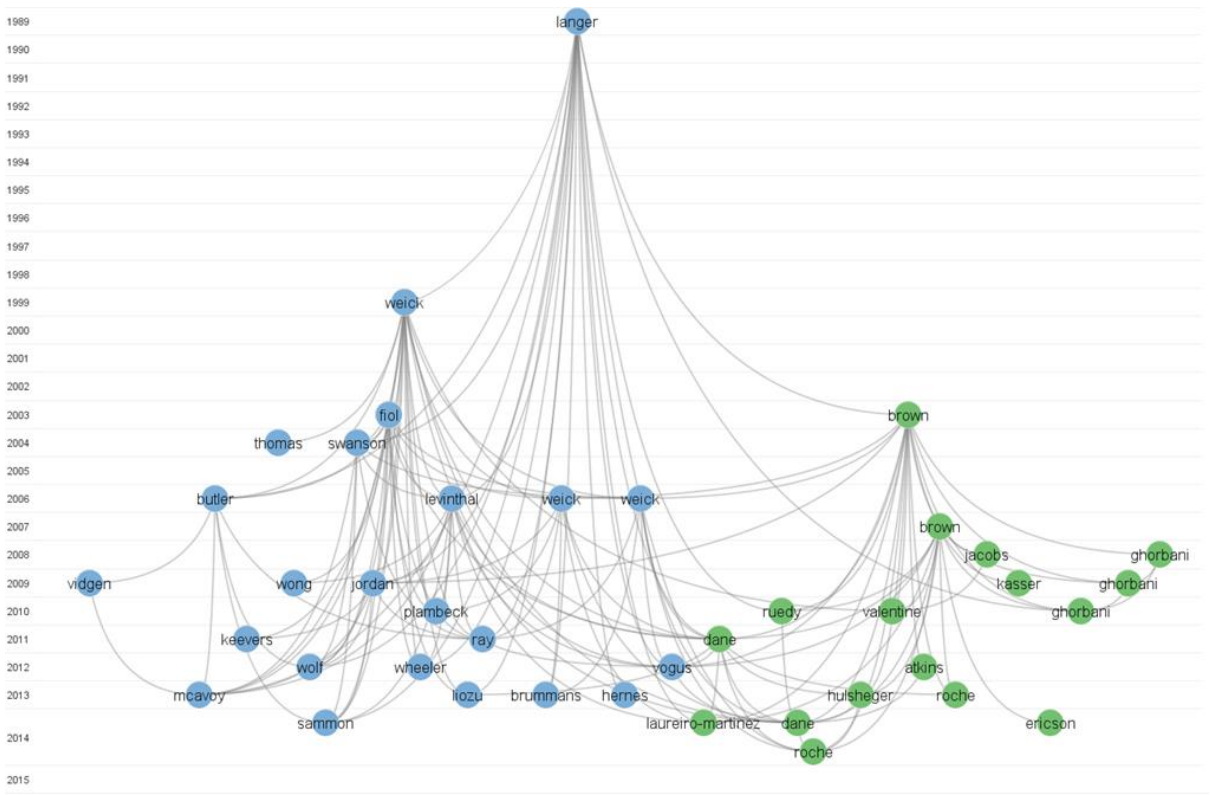
information, please also see the review of Hanley et al. 2016). Here it is worth noting, that the individual level trait theory resides in the psychological domain of personality in contrast to the domains of e.g. intelligence and ability. While the concept of traits has proven to be of enduring quality and usefulness, psychological research has fielded some critique regarding the limits to its explanatory utility, such as the risk "that is presents a static picture of the individual and 'washes out' as residuals potentially interesting and significant data" (Allport 1937; as cited in Pervin 1994, p. 111). This risk translates to the organizational level. If the concept of mindfulness were indeed considered a static trait of an organization, this would almost make the study of mindfulness obsolete. However, in summarizing the above, we find that while organizational mindfulness is often treated as a relatively stable collective trait, there is broad consensus that it may be subject to change over longer periods. Such change may be due to, for example, intentional strategic investments in enhancing the level of collective mindfulness (Weick et al. 1999) or what Fiol and O'Connor (2003) call the "natural progression" towards mindlessness.

More recently, authors have built on the view of organizational mindfulness as a trait, for example suggesting that "organizational mindfulness is a function of social practices, both action and communication" (Sutcliffe et al., 2016). Such an expanded definition, while still lacking operationalization, helps us understand the difference between individuals being mindful in organizations, and the evolving concept of organizational mindfulness. Accordingly, in the following, we use the term "organizational mindfulness" as defined by authors in the literature (below we present the concept's development over time). Whereas "mindfulness in organizations" is used as a broader concept, containing the different uses of mindfulness at the organizational level, which contains, but is not limited to, organizational mindfulness.

This brings us to the two roots of research on mindfulness in the organizational literature. The first is the pioneering work on collective mindfulness (later to be referenced as the organizational

mindfulness of Weick et al. 1999), which referred to and built upon Langer's (1989) original concept on the individual level. Recently Langer's work has increasingly been criticized for not separating mindfulness from skills that follow from mindfulness (Brown, Ryan, & Creswell 2007a) and for defining mindfulness in part by its opposite, that is, mindlessness. Brown and colleagues suggest that Langer's individual mindfulness is insufficiently distinguished from related states such as flow or heightened attention –perhaps because these are, using Langer's definition, also "not mindless". Together, this has made it difficult to conceptualize and operationalize Langer's mindfulness concept (for a recent discussion, see Sutcliffe et al., 2016). At the same time, the concept of Brown and Ryan (2003) has become more widely accepted in the organizational literature. This is illustrated in Figure 1, which shows a cluster analysis of some of the most cited articles included in this review (for an account of the cluster analysis technique, see van Eck & Waltman 2014). Figure 1 shows how the articles are connected by citations over time and how the ideas of Langer (1989) and Weick et al. (on the left side, 1999) and Brown and Ryan (on the right side, 2003) have propagated. Furthermore, it shows that later publications by Weick and colleagues (see e.g. Weick & Putnam 2006, p. 283; Weick & Sutcliffe 2006, p. 522) have moved closer to the concept of Brown and Ryan (2003) as well as what they term "Eastern notions of mindfulness" (Weick & Sutcliffe 2006, p. 522). We note that the present review only found two articles from the past four years building on the collective mindfulness of Weick and colleagues (Hales & Chakravorty, 2016; Ogliastri & Zúñiga, 2016).

Figure 1. The two main clusters of organizational mindfulness



* Langer (1989) is blue like Weick et al. (1999), because they base their concept of mindfulness on Langer. As mentioned, Brown and Ryan (2003) do not.

** Each node represents a publication; each line a reference; and the left column displays the year of publication

*** Several nodes were left out in order to increase clarity. This did not alter the clusters. For detailed information on each article contained in the present review, please reference tables 4-10.

Thus, to understand "What is mindfulness?" in today's organizational studies, it is important to see that the scientific conversation seems to be moving towards a consensus on and momentum around the type of individual mindfulness in organizations based on e.g. Brown and Ryan (2003), while not pursuing the organizational mindfulness of Weick et al. (1999). We speculate that this – at least in part - is due to the lack of congruent concept as well as the lack of operationalization.

The theoretical foundations for individual mindfulness of Brown and Ryan (2003) are elaborated in Brown et al. (2007b) and Brown et al. (2007a), where the authors propose that mindfulness is a "quality of consciousness" and attempt to detail the discrete nature of the topic. However, Brown et al. (2007b) have been criticized for a lack of clear discrimination between attention and

awareness, although mindfulness involves both of these concepts. To show the difference, (Kahneman 2011) suggests that individuals typically lose touch with the wider field of awareness due to conditioning to automatically focusing in on certain arising objects of attention. As a result, such individuals may experience problems, such as become stuck in attachment and aversion (to the given object of attention, which can be e.g. a feeling, sensation or thought, Weick & Sutcliffe, 2006), thus becoming subject to mind wandering and various psychological defenses (Good et al., 2015). Accordingly, the typical, conditioned and, thus, less than totally mindful consciousness is characteristically *either* employing a wide awareness of the field of consciousness – without focusing on specific objects of attention – *or* picking a narrow focus on an object of attention. A high level of mindfulness, however, indicates the freedom to focus on various objects of attention *without* losing a relaxed, wide awareness of the field of consciousness.

Weick et al. (1999) introduced the concept of collective mindfulness to the organizational literature. According to Weick and colleagues, collective mindfulness is crucial in successful high reliability organizations (HROs) such as flight control towers and nuclear power plants. This is because in successful HROs, employees and teams are able to focus on and deal with known cues without losing touch with surprises and accidents arising in the field of awareness. Since this kind of crisis management is seen to be more relevant than ever (Buchanan & Denyer 2013), this could seem to reflect an urgency of further research into organizational mindfulness. As our review revealed, to date the majority of contributions to organizational mindfulness draw on the reasoning introduced by Weick et al. (1999) and Langer (1989). However, while there have only been a few publications on organizational mindfulness in recent years, the broader topic of mindfulness in organizations seems to be flourishing.

In order to create an overview and show how mindfulness in the organizational literature has developed conceptually we compiled Table 3, which describes 12 of the most cited articles that

have become central to the field. Table 3 traces the terms *collective mindfulness* (Weick et al. 1999) and *organizational mindfulness* (Fiol & O'Connor 2003) chronologically. It shows when they were first used and to some degree how the concepts have been applied, argued for and against, as well as and added to in different fields ever since. Subsequently, we discuss the different contributions and elaborate on their differences and similarities.

Table 3. Examples of central articles on mindfulness in organizational studies (1999-present)

Author(s)	Contribution to & influence
Weick et al. (1999)	State that successful HROs embody processes of mindfulness and thus merit closer attention; attribute part of the success of high reliability organizations to mindfulness; suggest how collective mindfulness leads to reliability and suppresses inertia; suggest how mindlessness in a HRO setting can lead to disaster; suggest 5 concerns that lead to collective mindfulness; suggest a future research agenda to explore the role of mindfulness in other types of organizations; recognize that collective mindfulness is complex and rare.
Fiol and O'Connor (2003)	Adopt concerns of HROs that lead to collective mindfulness into organizational literature; however, use mindfulness not on the collective, but individual (leader / decision-maker characteristic) level; specifically criticize the following concerns "Preoccupation with Failure" and "Underspecification of Structures"; explore the role of mindfulness on decision-making, decision makers and bias (bandwagons); suggest that mindfulness allows "leaders to resist bandwagon pressures" (p. 59); propose that "the benefits of mindfulness include (1) expanded scanning, (2) context-relevant interpretation of internal and external conditions, and (3) discriminating decisions vis-d-vis bandwagons" (p. 67); while Weick et al. (1999) spoke of "collective mindfulness", Fiol and O'Connor introduced the term "organizational mindfulness" as a future research suggestion;
Vogus and Welbourne (2003)	Expands on the concept of Weick et al. (1999) to include reliability-seeking organizations; argues that "mindfulness occurs as a byproduct of a set of human resource (HR) practices that help an organization remain vigilant and flexible" (p.

Author(s)	Contribution to & influence
	878); argue that mindfulness enhances a firm's ability to innovate (based on Langer (1989)), which is seen as part of the "capability to stay ahead of competitors and technological obsolescence" (p. 878); argue that "the value of mindfulness increases to the extent that an organization faces a tightly coupled and interactively complex environment" and suggest that "the benefits of mindfulness and its constituent processes are largely contingent upon a firm being an HRO or reliability seeking" (p. 881) due to the costs; reframes the "concerns of HROs" that together induce mindfulness (Weick et al. 1999, p. 37) to "processes of collective mindfulness"; do not measure the processes of collective mindfulness in the empirical work.
Swanson and Ramiller (2004)	Introduce "mindful innovation with IT"; suggest that mindfulness can lead to more fruitful organizational transformation and competitive advantage, while admitting that mindlessness may be more cost-efficient under certain conditions; suggest that bandwagon behavior in adopting innovations may be related to mindlessness; suggest that "organizational mindfulness", based on Weick et al. (1999), is more than the "minds of participating individuals through a process of heedful interrelating".
Rerup (2005)	Combines the literatures of habitual entrepreneurship, organizational learning and mindfulness to build an argument that mindfulness "enables entrepreneurs to minimize errors, remain vigilant, and respond effectively to unexpected events"; speculates about how mindfulness and mindlessness may hurt / harm the venture of the habitual entrepreneur, depending on the characteristics of the situation e.g. industry and technology; suggests that the short-term costs of mindfulness are often outweighed by the long-term benefits in the context of habitual entrepreneurship.
Levinthal and Rerup (2006)	Attempt to connect the literatures of organizational mindfulness and routine; connect conscious processes to mindfulness and automatic processes to less-mindful behavior; use the term "less-mindful" rather than "mindless", which has

Author(s)	Contribution to & influence
	been the norm until this point; suggest that "the enactment of neither mindful nor routinized behavior is possible without the other; highlight a set of interrelationships between mindful and less-mindful behavior; state that "Mindfulness requires two basic elements: attentiveness to one's context and the capacity to respond to unanticipated cues or signals from one's context", which Weick and Sutcliffe (2006) call an "enriched version" of Langer's (1989) mindfulness.
Weick and Sutcliffe (2006)	Introduce inspiration from "Eastern thought", primarily Buddhism, into the Western version of mindfulness as developed by Langer (1989) at the individual level and Weick et al. (1999) as well as Levinthal and Rerup (2006) at the collective and organizational level; refrain from using the adjectives "organizational" or "collective" to designate the type of mindfulness; in the presented view, encoding becomes less central, and other activities come into focus, such as "altering the codes, differentiating the codes, introspecting the coding process itself, and, most of all, reducing the overall dependence on coding and codes"; emphasize a shift from clinging to concepts to letting go as a beginning of wisdom; suggest a shift from the contrast between mindful and less-mindful to a contrast between conceptual and less conceptual; suggest that when people move away from conceptuality and encoding, outcomes are affected more by the quality than by the quantity of attention; suggest taking a closer look at whether what Levinthal and Rerup (2006) present as distinct phenomena (routine and mindfulness) is actually a continuum; suggest that the definition of mindfulness made by Brown and Ryan (2003) is more compatible with the idea of a continuum; again referencing Levinthal and Rerup (2006) on the topic of costs of mindfulness, propose that it is "too early to talk about costs" since "we can't say more about costs and consequences until we get the concepts straightened out" (p. 523).

Author(s)	Contribution to & influence
Butler and Gray (2006)	Examine the concept of mindfulness as a theoretical foundation for explaining efforts to achieve individual and organizational reliability in the face of complex technologies and surprising environments; contrast routine-based reliability with mindfulness-based reliability; suggest that outsourcing (e.g. in the spirit of cost reduction) may result in a loss of collective mindfulness, which could mean losing a core aspect of the ability of organizations to function reliably over the long term; suggest that "while software that is easy to use increases users' efficiency, it also increases their vulnerability to change or failure because it makes task execution more automatic", apparently implying that the task at hand and the mindfulness of the individual is somehow connected; state that they have demonstrated "that mindfulness is a useful lens for illuminating under-researched aspects of phenomena that are central to the management and use of information systems in organizations.
Dane (2011)	Attempts to show whether mindfulness relates to task performance in organizational and occupational settings; treats mindfulness at the individual level; attempts to show what mindfulness is and what it is not and identify the unique nature of the concept; lends support to the argument that especially "individuals with task expertise should strive to focus their attention mindfully when engaged in a dynamic environment", since this can prove efficacious; conversely suggests that "mindfulness may be a hindrance in a static task environment or when individuals lack task expertise"; makes a point of stating that mindfulness does not deterministically entail forgetting about the past or the future.
Gärtner (2011)	Uses mindfulness to contribute to explaining some of the micro-foundations of dynamic capabilities; argues that "mindfulness should neither be understood as an attribute of an entity nor be simply contrasted with routine"; furthermore argues that mindfulness should "be depicted as a medium and outcome of social practices which involves enacting power and drawing pre-reflectively on a

Author(s)	Contribution to & influence
	background that is built up by routines"; argues that "mindfulness is the only way to overcome cognitive distortions or inertia and enact changed or new ways of behavior"; criticizes the hitherto positive view of mindfulness presented by Weick and others and consequently suggests that an "emphasis on positive effects [of mindfulness] neglects opportunistic behavior and issues of power" and that there may be "unintended consequences of the principles for mindful organizing"; criticizes the tendency of Weick and others to present mindfulness and routines as opposing each other.
Dane and Brummel (2014)	Examine workplace mindfulness: "the degree to which individuals are mindful in their work setting"; hypothesize that, in a dynamic work environment, workplace mindfulness is positively related to job performance and negatively related to turnover intention; find "support for a positive relationship between workplace mindfulness and job performance that holds even when accounting for all three work engagement dimensions" (vigor, dedication, and absorption); also "find support for a negative relationship between workplace mindfulness and turnover intention, though this relationship becomes insignificant when accounting for the dimensions of work engagement"
Good et al. (2015)	Review mindfulness within organizational science, though primarily on the individual level (e.g. does not reference Weick et al. 1999); suggest a framework that "identifies how mindfulness influences attention, with downstream effects on functional domains of cognition, emotion, behavior, and physiology"; suggest that "these domains impact key workplace outcomes, including performance, relationships, and well-being"

After Weick et al. (1999), the subsequent five contributions up to and including Levinthal and Rerup (2006) build directly on the "collective mindfulness" concept of Weick and colleagues. In addition, Fiol and O'Connor (2003) are the first in the organizational literature to identify mindfulness as a decision-maker characteristic, discussing how mindfulness influences decision-

making "in the face of bandwagons". Regarding the "collective mindfulness" of Weick and colleagues, they disagree on two issues. For example, arguing that in the case when mindlessness is already the norm in an organization, then "underspecified structures"- one of the five concerns suggested to lead to mindfulness - can actually lead to further mindlessness (Fiol & O'Connor, 2003, p. 65). From this point in the literature, the five concerns leading to mindfulness suggested by Weick and colleagues have been developed, criticized, and in some cases added to (Hales & Chakravorty, 2016) or reframed (see paragraph on Vogus and Welbourne (2003) below). Recently, some have referred to the five processes as Mindful Organizing (Vogus and Rerup, 2018). However, we failed to identify a convergence of the concept of collective mindfulness (for a recent discussion, see Sutcliffe et al., 2016) much less a consensus on operationalization.

One example of an unresolved point of divergence in the concept of collective mindfulness is the work of Vogus and Welbourne (2003). They reframed the "five concerns of HROs" leading to collective mindfulness of Weick and colleagues to "processes of collective mindfulness". From this point, some contributions treated the concerns as (part of) the collective / organizational mindfulness concept (e.g. "attributes of mindfulness", Swanson & Ramiller, 2004).

While previous contributions also point to the (generally unknown) costs of collective mindfulness, Rerup (2005) is the first to actively discuss the potential costs and downsides of the five concerns leading to collective mindfulness, thereby exploring the boundary conditions of the concepts usefulness. For example suggesting that "commitment to resilience can damage opportunity discovery and opportunity exploitation if all events are seen as unexpected and important" (Rerup, 2005, p. 462). This is a relevant point for the topic of entrepreneurship that Rerup bridges to, but it also extends the concepts usefulness to e.g. innovation and the strategic dilemma of exploration and exploitation. Bridging the concept to routine and organizational learning, Levinthal and Rerup (2006) make a further important reframing of mindfulness, namely

referring to the antithesis of mindfulness as "less-mindful" instead of mindlessness, which they believe carries a more pejorative connotation. They suggest that in some cases the less-mindful act or decision can lead to superior outcomes, which is not reflected in the use of the concept mindlessness.

Shifting from mindful and less-mindful to the contrast of conceptual and less conceptual, Weick and Sutcliffe (2006) bridge to Brown and Ryan (2003), embrace concepts of eastern philosophy, and consequently start to doubt the duality of mindfulness and routine. They point to the importance of consolidating the literature on mindfulness in organizations, suggesting that in order to truly understand the costs and benefits of mindfulness, there is a need to get the "concepts straightened out" first (Weick & Sutcliffe, 2006, p. 523).

More recently, authors have begun looking at the direct effects of individual trait mindfulness on organizational constructs such as task- (Dane, 2011) and job-performance (Dane & Brummel, 2014). They argue that mindfulness widens attentional breadth and increases the capacity to attend to intuitions, which can result in higher task- and job-performance in some circumstances, especially for task-related experts working in dynamic environments where it is crucial not to miss important environmental cues. Alternatively, they propose that task novices in static environment might not benefit, or even be adversely influenced, from higher trait mindfulness. Subsequently testing these claims in a dynamic service industry context, support is found for a positive relationship between workplace mindfulness and job performance (Dane & Brummel, 2014). Further, Gärtner (2011) bridges to the literature on dynamic capabilities, building arguments that the above mentioned aspects of mindfulness help to sense opportunities and threats, and seize opportunities by counteracting the drivers of cognitive distortions and inertia, and finally, enhancing the capability of reconfiguring assets to maintain competitiveness.

Thus, while progress has obviously been made on our understanding mindfulness in organizations, the original work on collective mindfulness of Weick et al. (1999) has been criticized for entailing conceptual incongruences (for early examples, see Fiol & O'Connor, 2003) and a lack of useful operationalization. During the present review process, we noted an example of an incongruence not mentioned or resolved in the literature, namely that Weick et al. (1999: 37) propose that one concern leading to mindfulness is *'preoccupation with failure'*, while Langer (1989) explicitly states that such a concern leads to mindlessness. Moreover, following in the tradition of Langer (1989), Weick et al. (1999: 37) introduce various mindfulness skills to the concept of collective mindfulness such as *'capacity for action'*. This is subject to some dispute, as Brown et al. (2007a) criticize this as an example of concept inflation that can now be found in the literature, while Sutcliffe et al. (2016) accept the skills as part of the concept. Kolb (2014: 351) and Yeganeh and Kolb (2009) take their critique a step further and refer to this tendency as a distinct mindfulness research stream, which they label *'socio-cognitive mindfulness'*.

A stream of research has begun to question the wisdom of the current secularized conceptualization of mindfulness. Pointing to the concept's origins, this research argues that the literature would benefit from reconnecting it with its Buddhist roots, emphasizing the benefits of, for example, the non-conceptual and ethical aspects (see, for example, Good et al. 2015; Purser & Milillo 2015; Weick & Sutcliffe 2006).

Finally, we were unable to identify a comprehensive and/or adequate theoretical reasoning detailing how the individual level concept translates to the collective level concept. Given the 'age' of the field, we find this both surprising and alarming. At the same time, several scholars have called for a more rigorous approach and greater nuance in the conceptualization (Weick & Sutcliffe 2006), highlighting the danger of stretching the concept too far without a sound foundation. We speculate that it is because of these inherent foundational shortcomings that the

concept of mindfulness has not always been applied in coherent ways and with mixed success in prior organizational research.

Nonetheless, one point of agreement in the literature is that –similar to trait mindfulness, which may vary over longer periods of time for individuals –organizational mindfulness may also vary over time, organizational units, and hierarchies (e.g. Levinthal & Rerup 2006: 56). Indeed, research has shown that it is possible to affect organizational mindfulness through organizational structure, culture, and individual level mindfulness (Ray, Baker, & Plowman 2011; Vogus & Sutcliffe 2012). We believe this provides a hint to possible avenues of research and elaborate more in the future research suggestions.

Future Research Suggestions

Organizational mindfulness – a composition model. With the work of Weick et al. (1999), mindfulness has become a multi-level construct, meaning that is includes and spans traits and skills from the individual to the organizational level. Thus, if we are to develop our understanding of what mindfulness is, according to Chan (1998) it is therefore important to specify an *'adequate composition model'*. Indeed, for the field of organizational mindfulness this seems to be critical if there is ever to develop a consensus on the organizational level concept and how it relates to the individual level concept. However, to the best of our knowledge, prior research has not addressed this issue.

Mindfulness-related issues such as the burden of disease, conflict resolution, and strategy have clear individual as well as organizational implications. We believe that research could greatly benefit from a more rigorous, multi-level approach. However, which type of composition model to choose naturally depends on how organizational mindfulness is conceptualized. Though there seems to be a consensus that organizational mindfulness is more than just additive (for additive composition models, see for example Chan 1998: 236 - 237). This means that it is argued to be

more than just the sum of individuals' mindfulness (for example, Butler & Gray 2006:216; Gärtner 2011; Jordan, Messner, & Becker 2009; Vidgen & Xiaofeng 2009: 370).

Interestingly, however, we have neither found any undisputable evidence supporting this claim (nor the opposite), nor much guidance regarding the adequate composition model. Obviously, such guidance requires research exploring in which situations it is more important to have a few or certain individuals – for example, top management –with a high level of mindfulness (no composition model), when the sum of all individuals' mindfulness is relevant (additive model), when a homogenous group is relevant (dispersion model), when the change in the level of mindfulness in the individual, group, and/or organization is relevant (process model), etc. (see Chan 1998 for a discussion of the different models). A composition model could also include "temporal and contextual factors" and, by that, the "who, where, when", of Whetten's (1989, p. 492) building blocks of theory development, which we have found to be largely missing in the literature.

Predicting and diagnosing. Based on the present review, we believe that the field of organizational mindfulness needs more research involving both predictive and explorative models. For future applications, it would be of great benefit to predict the effects of mindfulness training in various contexts, in order to be able to prescribe what is needed (e.g. the magnitude and type of intervention) in a situation where more mindfulness is required.

Thus, predictive modeling using mindfulness data is appropriate when, for example, estimating the *amount* of interventions that are required to achieve a desired level of mindfulness. Such information is essential for organizations aiming to put organizational mindfulness to use, in order to calculate the costs and benefits of an intervention or e.g. the maintenance of a "higher" level of mindfulness. While there have been some advances in the area of mental health (e.g. adaptations of MBSR), such issues have hardly been addressed in the organizational literature. However, we

believe that the field would greatly benefit from such research, since how shall a decision-maker ever be able to assess and justify investments in mindfulness interventions, if there is no possibility to estimate the cost-benefit relation?

Likewise, we argue that more research on exploratory modeling of mindfulness data is necessary to understand *which* interventions are most appropriate to reach a desired level of organizational mindfulness in various contexts. For example, in a given context, it is important to know if interventions targeting an increase in individual mindfulness is more effective as opposed to those targeting mindfulness at the level of organizational culture and/or structure, or vice versa? Though some research exists on individual mindfulness interventions, we have not found empirical research that addresses this issue at the organizational level (for notable conceptual exceptions, see for example Vogus & Welbourne 2003; Weick et al. 1999).

Mindfulness practice. While mindfulness training and practice have not yet received a significant role in the organizational literature, it is a well-recognized aspect of mindfulness in related fields such as psychology and medicine. Training can increase and maintain the level of mindfulness in an organization, but the short, medium and long-term effects of training mindfulness at the organizational have not yet been identified to the same degree as the individual level (e.g. Goleman & Davidson, 2017). We therefore urge future research to address questions such as: What happens in organizations that embrace mindfulness as a practice? Psychology and medicine have found evidence of a number of benefits of various mindfulness practices (for example, Brown et al. 2007b).

Originally, the practice of mindfulness was designed to start noticing, then exploring, and finally let go of objects of identification. This would gradually allow the practitioner to experience freedom from taken-for-granted concepts (e.g. Weick & Sutcliffe 2006) and thus “suffering”, allowing the practitioner to navigate daily life in a way that is more aligned with reality rather than

outdated concepts of reality. This was believed to lead to more compassion in the individual, and indeed, a recent review has found that mindfulness practice leads to more prosocial behavior, which is an important organizational factor (Donald et al., 2018). Thus, in order to understand mindfulness at the organizational level, we encourage further research into which organizational factors are influenced, and how they are influenced, by training mindfulness.

Why is mindfulness important?

The literature we identified put forth different arguments as to why and in which context mindfulness is important in organizations. Langer (1989) did much to answer these questions, though focusing on the individual level and at times –as noted above –succumbing to concept inflation. More recent contributions note that the flexible, non-conceptual awareness of mindfulness can bring about novel insights and perspectives (Brown et al. 2007b), which are essential to creativity and innovation (Weick 2005; Weick & Putnam 2006). Such capabilities can be considered essential for competing, surviving, and thriving in a globalized economy. Specifically, these capabilities are part of, for example, "a disposition that shapes their [firms] capacity for learning and adapting" (Swanson & Ramiller 2004: 570) or "processes that counteract inertia" instead of "mindlessness coupled with thoughtless action that makes it difficult to cope with a continuous open-ended stream of surprises and non-routine events" (Weick & Putnam 2006; Weick et al. 1999, p. 34). Furthermore, the nonjudgmental aspects of mindfulness such as an "empirical stance toward reality" and "present-oriented consciousness" (Brown et al. 2007b, pp. 213-214), can help explain how mindfulness can be positively associated to informational issues such as information processing, knowledge-transfer and learning (Hutzschenreuter, Kleindienst, & Schmitt 2014), and decision-making, while at the same time being negatively associated with bias (i.e. Fiol & O'Connor 2003; Hafenbrack, Kinias, & Barsade 2014).

Future Research Suggestions

The interaction of skills and experience with mindfulness. One of the reasons mindfulness in organizations is important to study is because of its interaction with skills and experience that influence performance, such as attention, cooperation, and prosocial behavior (for reviews, see Donald et al., 2018; Good et al., 2016). At the level of the individual in an organization, mindfulness can complement some skills and experience with the potential of making them more useful, just like an upgrade to the operating system of a computer, which facilitates data processing. Thus, as noted above, we speculate that less-mindful employees could e.g. have difficulties attaining and displaying the sufficient openness to change, capacity for learning and adapting, as well as creative ability that is needed to align to a new situation. To extend the example to the level of organization, a highly exploitative or specialized, yet less mindful organization, may lack the dynamic capabilities needed in order to avoid stagnation and attain a renewed competitive advantage in a changing market and industry (for a review of dynamic capabilities, which also links to relevant topics such as ambidexterity and microfoundations, see Vogel & Güttel 2013).

On the other hand, the organizational mindfulness literature acknowledges that certain skills are needed to sustain and enhance mindfulness. Thus, profiting from mindfulness is related to the existence and development of another, distinct set of skills (Levinthal & Rerup 2006; Weick et al. 1999). The literature suggests that mindfulness becomes more useful with certain issues such as decision-making, learning, as well as handling unexpected events when coupled with the aforementioned mindfulness-related skills. Thus, we suggest that the field of organizational mindfulness could benefit from research that explores how a higher level of mindfulness and mindfulness-related skills interact to create intended- and unintended results. This could be related to how Good et al. (2015) attempted to model how mindfulness influences a range of individual level functional domains, in order to show how mindfulness influences certain generic workplace outcomes. In this context, future research should explore questions such as: Which organizational

techniques and capabilities benefit the most from organizational mindfulness? What experience do employees need to have in order to leverage organizational mindfulness at various levels? Which antecedents to organizational mindfulness are the most influential and relevant? Such research could merit from a focus on a clear separation of mindfulness and mindfulness skills, in order to reduce the conflation that has been pointed out by Brown et al. (2007a).

Going towards mindlessness. Studying mindfulness is also important because a low or decreasing mindfulness can have an adverse effect performance for example through poor decision-making. Fiol and O'Connor (2003: 67) propose that for organizational decision-makers there is a *'natural progression'* towards mindlessness. This is because, for example, conforming (in their case through less-mindful bandwagon behavior) entails less hard work and risk, than mindfully doing something innovative and contrary to what other firms are doing. Therefore, we suggest that if a company is facing a situation that requires mindful decision-making, it can be important to maintain or increase the level of mindfulness in an organization, since a declining level of mindfulness can have associated costs. Thus, we suggest that it would be beneficial to conduct further research into the circumstances of the "natural progression" towards mindlessness in organizations, since it can have a profound impact on e.g. decision-making and organizational dilemmas such as bandwagon behavior that are central to an organizations performance. This would further help clarify the costs and benefits of letting the level of mindfulness decrease, or alternatively maintaining or increasing it. While Langer (1989) has done much to explain the costs of mindlessness on the individual level, there has not been much research on the benefits and costs of declining mindfulness on the organizational level. The existing literature merely makes some assumptions about the costs, such as Weick et al. (1999: 32) suggesting that certain costly 'near catastrophes' (Three Mile Island accident) and 'catastrophic failures', (Challenger disaster) could have been averted. In short, the costs and benefits involved in a decline in mindfulness – depending on the organization's ex-ante mindfulness level –have not been rigorously studied nor

have they been compared to investments in cultivating or stimulating organizational mindfulness. We suggest that a first step could be to measure the tendency for organizations to progress towards mindlessness in order to understand the significance of the phenomenon.

The burden of disease. Pathology is hardly treated in the literature on mindfulness in organizations (for an exception and a brief mention of the topic, see Dane 2011). Yet, issues of health and well-being impact organizations as well as the local and global economy. One example is the review on "employee well-being and the HRM–organizational performance relationship" of Van De Voorde, Paauwe, and Van Veldhoven (2012), suggesting that employee well-being "in terms of happiness and relationship is congruent with organizational performance (mutual gains perspective)". Thus, we suggest that mindfulness has gained relevance in this field, since it has been shown to have a negative effect on stress and anxiety levels as well as a range of other disorders of the body and mind such as depression, and various psychosomatic disorders (Brown et al. 2007b). An example of the impact of mental health on productivity can be found in lost productive time (LPT) due to depression in the US workforce is provided by Stewart, Ricci, Chee, Hahn, and Morganstein (2003, p. 3135): "workers with depression reported more LPT than those without depression (mean, 5.6 hours/week versus an expected 1.5 hours/week)". In light of this, we suggest to investigate further the effects of organizational mindfulness on employees' health, sick leave, and other relevant factors that have profound impacts on organizational performance. Considering the aforementioned costs of mindfulness, a part of such research should naturally consider the possibility that other interventions are more beneficial, or even that it may be most effective to simply accept anxiety, stress, and pain as a given in human existence.

How is mindfulness related to organizational concepts?

In the following, we address how mindfulness is related to various other organizational concepts. Because most of the identified articles investigated the influence of mindfulness on the identified

organizational concepts, this has become the main topic of the following section. This is in contrast to, for example, Weick et al. (1999), who focused on the concerns that lead to mindfulness in organizations. To derive a suitable review-framework, we carefully analyzed the specific research questions of the articles. In an iterative process (for an elaboration, see the section on "Development of the Reviewing Framework"), we grouped the articles into the following seven categories: (1) decision-making, (2) leadership & change, (3) strategy, (4) ethics & sustainability, (5) human resource management, (6) costs, and (7) miscellaneous. In tables 4-10 in the following pages, we provide detailed information on the articles contained in the respective categories.

Table 4. Articles in the category of decision-making

Author(s)	Year	Empirical	Conceptual	Referenced the below authors				Method	Sample	Description	Measure of mindfulness	Trait mindfulness	Other mindfulness
				Langer	Weick	Brown	Kabat-Zinn						
Butler, B. S. and Gray, P. H.	2006		x	x	x							x	
Eastburn, R. W. and Jr. Boland, R. J.	2015	x		x	x			Semi-structured interviews (approx. 90 minutes each)	23 senior banking executives from different community banking institutions located in the S.E. USA.	The focus is on understanding the context, process and patterns of decisions that resulted in surprise outcomes for bankers, in order to understand the outcome of the 2008–2009 Financial Crisis (and the role of mindfulness in that situation).	Unclear. Looked at the 5 concerns of Weick et al. (1999) using qualitative interviews	x	
Fiol, C. M. and O'Connor, E. J.	2003		x	x	x							x	
Hernes, T. and Irgens, E. J.	2013		x	x	x							x	
Jordan, S., Messner, M. and Becker, A.	2009		x	x	x	x							x
Keevers, L. and Treleaven, L.	2011	x		x	x			Action Research	Women and children at The West Street Centre, Australia	Attempts to illustrate how mindfulness & multiple forms of reflexive practice affect e.g. learning	Used observation as a technique to identify mindfulness based on the concepts of e.g. Weick (2006)	x	x
Kleiner, A. R. T.	2013		x									x	x
Krieger, J. L.	2005	x		x	x			Lab-Experiment	Dyads of captain and first officer (n=10; voluntary sample of aviation students)	Observes dyads attempting to solve a crisis situation	Used observation to identify instances of "shared mindfulness" (novel concept). Stated that "data were collected via the Personal Outlook Scale, developed by Langer and her colleagues (personal communication, November 4, 2002)"		x
Laureiro-Martinez, D.	2014	x			x	x		Lab-Experiment w. cognitive test	Graduate students of management and economics of innovation (n=98)	Examines the cognitive and behavioral foundations of decision making at the individual level	Measured individual level "cognitive control capabilities" and linked these to mindfulness	x	
Levinthal, D. and Rerup, C.	2006		x	x	x							x	

Liozu, S. M. and Hinterhuber, A.	2013	x		x	x			Survey (online)	CEOs (n=358) of industrial firms, from "all continents"	Assesses pricing championing behaviors in CEOs	Measured organizational mindfulness using a twelve item scale adapted from existing measures (Knight, 2004) and conceptual definitions in the literature (Dane, 2011; Weick & Sutcliffe, 2007)	x	
Liozu, S. M., Hinterhuber, A., Perelli, S. and Boland, R.	2012	x		x	x			Interviews (Semi-structured)	Managers (n=44) of small to medium size US industrial firms	Finds characteristics that are common to the firms who successfully implement value-based pricing	Unclear if (organizational) mindfulness is measured at any point.	x	
Plambeck, N. and Weber, K.	2010	x			x			Survey (mail)	German CEOs (n=220)	Examines organizational factors that influence the propensity of organizational leaders to evaluate a new strategic issue ambivalently	No, measures the related concept of ambivalence	x	
Poston, R. S. and Kettinger, W. J.	2014	x		x	x			Case studies	U.S headquartered companies (n=5), uses cross case analysis	Examines new IT introduction and the role of mindfulness in companies not using experiments to implement social media	Used observation as a technique to identify mindfulness based on the concepts of e.g. Weick et al. (1999)		x
Ramsey, C.	2014	x		x	x	x	x	Complete Participation	Single study; 30-month period	Uses case to illustrate "a scholarship of practice"	No, looks at three domains of attention which are then partly related to mindfulness		x
Ray, J. L., Baker, L. T. and Plowman, D. A.	2011	x		x	x			Survey (online)	"Top-level administrators in AACSB-accredited colleges of business during the year 2004" (n=310)	Examines "organizational mindfulness in U.S. business schools and provide[s] evidence of the five dimensions of organizational mindfulness articulated by Weick and Sutcliffe (2001)"	Measured organizational mindfulness with an adaptation of 43-items of Weick and Sutcliffe (2001)	x	
Rerup, C.	2005		x	x	x							x	x
Seiling, J. and Hinrichs, G.	2005		x		x							x	x
Swanson, E. B. and Ramiller, N. C.	2004		x	x	x							x	
Vidgen, R. and Xiaofeng, W.	2009	x	x					Case study	Two different software development teams; one from a large IT company, and one from a small software house	Identifies enablers and inhibitors of agility and the emergent capabilities of agile teams	Unclear if (organizational) mindfulness is measured at any point. It seems that mindfulness is only applied conceptually	x	
Weick, K. E.	2005		x	x	x							x	
Weick, K. E. and Sutcliffe, K. M.	2006		x	x	x	x	x					x	x

Weick, K. E., Sutcliffe, K. M. and Obstfeld, D.	1999		x	x								x	
Wolf, M., Beck, R. and Pahlke, I.	2012	x						Field study	Senior Anglo-Saxon IT decision makers (n=302)	Compares the effects of mimetic pressure and environmental turbulence in more and less mindful firms	Operationalized organizational mindfulness based on wordings by Weick and Sutcliffe (2001) and Knight (2004)	x	
Yeganeh, B. and Kolb, D.	2009		x	x		x	x				No	x	x

Table 5. Articles in the category of leadership

Author	Year	Empirical	Conceptual	Referenced the below authors				Method	Sample	Description	Measure of mindfulness	Trait mindfulness	Other mindfulness
				Langer	Weick	Brown	Kabat-Zinn						
Altizer, C.	2017		x			x						x	x
Avey, J. B., Wernsing, T. S. and Luthans, F.	2008	x		x	x	x	x	Survey (online)	Employees (n=132), various organizations, various job categories	"Examined the role of mindfulness in the impact of psychological capital and emotions on attitudes and behaviors"	Measured individual level mindfulness using the instrument developed by Brown and Ryan (2003)	x	x
Brummans, B. H. J. M., Hwang, J. M. and Cheong, P. H.	2013	x		x	x			Interview (semi-structured) and observation	Directors or senior managers (n=10) who hold leadership positions in a Buddhist organization	Examined specific behaviors of people that hold leadership positions in a Buddhist organization	Unclear. It looks like the authors simply assume that the senior managers they are interviewing and observing are mindful	x	x
Butler, B. S. and Gray, P. H.	2006		x	x	x							x	
Carleton, E. L.; Barling, J. and Trivisonno, M.	2018	x		x		x	x	Online survey	Multisource data from 183 leader-follower dyads (Recruited through panel services)	Investigating the relationship between leaders' trait mindfulness, transformational leadership, leaders' positive affect and leadership self-efficacy	Trait mindfulness was assessed using Brown and Ryan's (2003) 15-item Mindful Attention and Awareness Scale (MAAS)	x	
Charoensuk-mongkol, P.	2017	x				x	x	Survey	141 full-time employees of a subsidiary of a Japanese multinational	Investigating the role of mindfulness as a personal characteristic that might be associated with lower resistance to change during post-merger integration	Mindfulness was measured by using the mindfulness attention and awareness scale developed by Brown and Ryan (2003)	x	x

									bank in Bangkok, Thailand				
Chesley, J. and Wylson, A.	2016	x				x		Surveys and interviews	19 experienced leaders of transformational organizational change	Exploring the impact mindfulness may have on managing ambiguity	Mindfulness was measured by using the Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006)	x	
Cseh, M., Davis, E. B. and Khilji, S. E.	2013	x						Interview	Global leaders (n=24), various organizations, line function	Explored the requirements of leading in a global environment as perceived by the leaders	Unclear. It looks like mindfulness is only treated as part of another concept		x
Dhiman, S.	2009		x		x		x					x	x
Fiol, C. M. and O'Connor, E. J.	2003		x	x	x							x	
Fyke, J. P. and Buzzanell, P. M.	2013	x						Case study	Small management consulting firm, southwestern U.S.	"Explored best practices for e.g. cultivating mindfulness and developing ethical leaders"	Unclear. It looks like mindfulness is only treated conceptually	x	x
Gondo, M., Patterson, K. D. W. and Palacios, S. T.	2013		x		x	x						x	
Gärtner, C.	2011		x		x							x	x
Gärtner, C.	2013		x	x	x	x	x					x	x
Hales, D. N., Kroes, J., Chen, Y. and Kang, K. W.	2012	x			x			Case study, Action Research	A large regional hospital, eastern U.S.	Exploratory study; measured the cost of implementing mindfulness	Did not measure mindfulness directly, but the effects of attempting to implement a mindfulness program inspired by Weick and Sutcliffe (2006)	x	x
Hede, A.	2010		x	x		x	x					x	
Keevers, L. and Treleaven, L.	2011	x		x	x			Action Research, (multiple interpretive methods)	Women and children at The West Street Centre, Australia	Attempted to illustrate how mindfulness & multiple forms of reflexive practice affect e.g. learning	Used observation to identify mindfulness based on the concepts of e.g. Weick (2006)	x	x
Khan , S. A., Lederer, A. L. and Mirchandani, D. A.	2013	x		x	x			Survey (online)	CEOs (n=47), different for-profit organizations, Midwestern U.S. state	Examined the impact of top management support for information systems (IS) on collective mindfulness, and that of collective mindfulness on IS performance	The authors developed and applied a measure of "top management" level items based on the definitions from Swanson and Ramiller (2004) - untested conceptual work		x
Khorsandi, J. and Aven, T.	2014		x		x							x	

King, E. and Haar, J.	2017	x			x		Survey	84 leaders from a global engineering firm based in Australia (due to an existing relationship with the first author)	Exploring the relation between mindfulness and leadership self-mastery and leadership organizational-transformation	Mindfulness was measured using the 5-item MAAS (Brown and Ryan, 2003)	x	
Kroon, B., Van Woerkom, M. and Menting, C.	2017	x			x		Online Survey	382 employees working in diverse sectors in the Netherlands	Investigating to what extent mindfulness can function as a substitute for transformational leadership	Mindfulness was measured with the Mindfulness Attention Awareness Scale (Brown and Ryan, 2003)	x	
Liozu, S. M., Hinterhuber, A., Perelli, S. and Boland, R.	2012	x	x	x			Interviews (Semi-structured)	Managers (n=44) of small to medium size US industrial firms	Looked for "key characteristics" that are common to firms who successfully implement value-based pricing	Organizational mindfulness was measured using scale adapted from existing measures and definitions (Knight, 2004; Dane, 2011; Weick & Sutcliffe, 2007)	x	
Plambeck, N. and Weber, K.	2010	x		x			Survey (mail)	German CEOs (n=220)	Examined organizational factors that influence the propensity of organizational leaders to evaluate a new strategic issue ambivalently	No, measures the related concept of ambivalence	x	x
Ray, J. L., Baker, L. T. and Plowman, D. A.	2011	x	x	x			Survey (online)	"Top-level administrators in AACSB-accredited colleges of business during the year 2004" (n=310)	Examined "organizational mindfulness in U.S. business schools and provide[s] evidence of the five dimensions of organizational mindfulness articulated by Weick and Sutcliffe (2001)"	Measured organizational mindfulness with an adaptation of 43-items of Weick and Sutcliffe (2001)	x	x
Sen, A.	2010		x			x					x	x
Swanson, E. B. and Ramiller, N. C.	2004		x	x	x						x	
Thomas, T., Schermerhorn Jr, J. R. and Dienhart, J. W.	2004		x		x						x	
Vogus, T. J. and Sutcliffe, K. M.	2012		x	x	x	x					x	
Weick, K. E. and Putnam, T.	2006		x	x	x		x				x	x
Weick, K. E., Sutcliffe, K. M. and Obstfeld, D.	1999		x	x							x	

Wolf, M., Beck, R. and Pahlke, I.	2012	x	x		Field study	Senior Anglo-Saxon IT decision makers (n=302)	Compared the effects of mimetic pressure and environmental turbulence in more and less mindful firms	Operationalized organizational mindfulness based on wordings by Weick and Sutcliffe (2001) and Knight (2004)	x	

Table 6. Articles in the category of strategy

Author	Year	Empirical	Conceptual	Referenced the below authors				Method	Sample	Description	Measure of mindfulness	Trait mindfulness	Other mindfulness
				Langer	Weick	Brown	Kabat-Zinn						
Butler, B. S. and Gray, P. H.	2006		x	x	x							x	
Dane, E.	2011		x		x	x	x					x	
Dane, E. and Brummel, B. J.	2014	x			x	x		Survey	Service workers (servers, n=98) and managers (n=18), restaurant industry, southwest U.S.	Examines workplace mindfulness and its relations to job performance and turnover intention	Measured individual level mindfulness using a subset of items from the Mindful Attention Awareness Scale (MAAS, Brown and Ryan, 2003) plus customized items	x	
Gärtner, C.	2013		x	x	x	x	x					x	x
Hutzschenreuter, T., Kleindienst, I. and Schmitt, M.	2014	x		x	x	x	x	Secondary data	Large, publicly disclosed acquisitions (n=65) made by US manufacturing and mining firms between January 1, 1980 and December 31, 2003 Data acquisition: deals database of Thomson ONE Banker, the Worldscope database of Thomson Financial, and data on market returns from Thomson ONE Banker Analytics	Studies the impact of acquisition experience from prior acquisitions on the performance of subsequent ones	No, black box	x	
Jacobs , S. J. and Blustein, D. L.	2008		x			x	x						x
Joyner, P. and Lardner, R.	2008		x		x							x	

Khan, S. A., Lederer, A. L. and Mirchandani, D. A.	2013	x		x	x			Survey (online)	CEOs (n=47), different for-profit organizations, Midwestern U.S. state	Examines the impact of top management support for information systems (IS) on collective mindfulness, and that of collective mindfulness on IS performance	The authors developed and applied a measure of "top management" level items based on the definitions from Swanson and Ramiller (2004) - untested conceptual work (untested) focusing on	x
Khorsandi, J. and Aven, T.	2014		x		x							x
Laureiro-Martinez, D.	2014	x			x	x		Lab-Experiment w. cognitive test	Graduate students of management and economics of innovation (n=98)	Examines the cognitive and behavioral foundations of decision making at the individual level	Measured individual level "cognitive control capabilities" and linked these to mindfulness	x
Levinthal, D. and Rerup, C.	2006		x	x	x							x
Liozu, S. M. and Hinterhuber, A.	2013	x		x	x			Survey (online)	CEOs of industrial firms, from "all continents" (n=358)	Assesses pricing championing behaviors in CEOs	Measured organizational mindfulness using a twelve item scale adapted from existing measures (Knight, 2004) and conceptual definitions in the literature (Dane, 2011; Weick & Sutcliffe, 2007)	x
Plambeck, N. and Weber, K.	2010	x			x			Survey (mail)	German CEOs (n=220)	Examines organizational factors that influence the propensity of organizational leaders to evaluate a new strategic issue ambivalently	No, measures the related concept of ambivalence	x
Ramsey, C.	2014	x		x	x	x	x	Complete Participation	Single study; 30-month period	Uses case to illustrate "a scholarship of practice"	No, looks at three domains of attention which are then partly related to mindfulness	x
Speier, C., Whipple, J. M., Closs, D. J. and Voss, M. D.	2011	x			x			Field Study, Survey	Field Study: Large and small U.S. firms (n~25), food, pharmaceutical, and hazardous materials industries Survey: Supply chain and security managers (and higher ranked, n=199), U.S. food industry	Examine the threat of potential disruptions on supply chain processes and the role of top management mindfulness in this situation	Mindfulness was measured using three items that served as an indicator of the firm's interest in positioning security as a strategic priority ("senior management" level)	x
Swanson, E. B. and Ramiller, N. C.	2004		x	x	x							x
Thomas, T., Schermerhorn Jr,	2004		x		x							x

J. R. and Dienhart, J. W.													
Vogus, T. J. and Sutcliffe, K. M.	2012		x	x	x	x							x
Weick, K. E.	2005		x	x	x								x
Weick, K. E. and Putnam, T.	2006		x	x	x		x						x x
Weick, K. E., Sutcliffe, K. M. and Obstfeld, D.	1999		x	x									x
Wheeler, A. R., Halbesleben, J. R. B. and Harris, K. J.	2012	x		x	x			Survey (online)	Employees (n=871), hospital system spread across five hospitals and a corporate office, northeast United States	Examines the relationship between job-level HRM effectiveness, employee intent to turnover, and mindfulness	Measured "workarounds", which are posited to be related to mindfulness		x
Wolf, M., Beck, R. and Pahlke, I.	2012	x	x					Field study	Senior Anglo-Saxon IT decision makers (n=302)	Compares the effects of mimetic pressure and environmental turbulence in more and less mindful firms	Operationalized organizational mindfulness based on wordings by Weick and Sutcliffe (2001) and Knight (2004)		x

Table 7. Articles in the category of ethics & sustainability

Author	Year	Empirical	Conceptual	Referenced the below authors				Method	Sample	Description	Measure of mindfulness	Trait mindfulness	Other mindfulness
				Langer	Weick	Brown	Kabat-Zinn						
Fyke, J. P. and Buzzanell, P. M.	2013	x						Case study	Small management consulting firm, southwestern U.S.	Explored best practices for e.g. cultivating mindfulness and developing ethical leaders	Unclear. It looks like mindfulness is only treated conceptually	x	

Kasser, T. and Sheldon, K.	2009	x				x		Surveys (studies 3 & 4 of 4)	Studies 1&2 left out for brevity. Study 3: Knox College students in 2005 (n=106). Study 4: convenience sample found using college students to find non-student adults (n=145)	Proposed that businesses consider the possibility of 'time affluence' as an alternative model for improving employee well-being and ethical business practice	Used "a brief measure of mindfulness" in study 3. Used "a more complete measure of mindfulness" in study 4. Both measures were on the individual level (Brown and Ryan, 2003)	x	
Liozu, S. M., Hinterhuber, A., Perelli, S. and Boland, R.	2012	x		x	x			Interviews (Semi-structured)	Managers (n=44) of small to medium size US industrial firms	Finds characteristics that are common to the firms who successfully implement value-based pricing	Unclear if (organizational) mindfulness is measured at any point.	x	
Thomas, T., Schermerhorn Jr, J. R. and Dienhart, J. W.	2004		x		x							x	
Valentine, S., Godkin, L. and Varca, P.	2010	x			x			Survey (delivered or mailed)	Employees (n=781) working for an education-based regional health science institution, southwestern U. S.	Identified factors that might decrease role conflict, namely mindfulness and organizational ethics	Organizational mindfulness was assessed with an eight-item scale developed by Weick and Sutcliffe (2001)	x	
Wamsler, C. and Brink, E.	2018	x				x		Survey	217 households from Lomma, Sweden	Exploring the role of mindfulness in climate adaptation	Mindfulness was assessed by four questions, adapted from the Five-Facet Mindfulness Questionnaire (Baer et al., 2006)	x	x

Table 8. Articles in the category of HRM

Author	Year	Empirical	Conceptual	Referenced the below authors				Method	Sample	Description	Measure of mindfulness	Trait mindfulness	Other mindfulness
				Langer	Weick	Brown	Kabat-Zinn						
Altizer, C.	2017		X			x						x	x

Andrews, M. C., Kacmar, K. M. and Kacmar, C.	2014	x					x			Survey (online)	Undergraduate students (n=280) enrolled in a business course who could forward it (Snowball approach)	Explored the relationships between mindfulness, regulatory focus theory, job satisfaction and turnover intentions	Measured individual level mindfulness using "the five-item measure of mindfulness developed and validated by Zivnuska et al. (2013)"	x	
Baccarani, C., Mascherpa, V. and Minozzo, M.	2013	x							x	Case study with surveys and computerized test	Volunteers (n=20) from a Zen meditation course	Evaluated connections between the practice of mindfulness meditation and individual and organizational well-being (measuring before and after the course)	No, only attempted to measure the effects of an intervention. Measured well-being before and after as well as attentional abilities		x
Bashford, S.	2012		X											x	
Bazarko, D., Cate, R. A., Azocar, F. and Kreitzer, M. J.	2013	x							x	Case study with surveys	Nurses (n=36) employed within a large health care organization	Measured the impact on the health and well-being of the nurses of a modified Mindfulness-Based Stress Reduction program.	No, only attempted to measure the effects of an intervention. Measured other health parameters such as perceived stress, and physical and mental health: Before, after and 4 months later.		x
Brummans, B. H. J. M., Hwang, J. M. and Cheong, P. H.	2013	x		x	x					Interview (semi-structured) and observation	Directors or senior managers (n=10) who hold leadership positions in a Buddhist organization	Examined specific behaviors of people that hold leadership positions in a Buddhist organization	Unclear. It looks like the authors simply assume that the senior managers they are interviewing and observing are mindful	x	
Dane, E. and Brummel, B. J.	2014	x			x	x				Survey	Service workers (servers, n=98) and managers (n=18), restaurant industry, southwest U.S.	Examines workplace mindfulness and its relations to job performance and turnover intention	Measured individual level mindfulness using a subset of items from the Mindful Attention Awareness Scale (MAAS, Brown and Ryan, 2003) plus customized items	x	
Gärtner, C.	2011		X		x									x	
Karlin, D.	2018	x								Training with discussion elements	N unclear. Participants in a training delivered by a training consultancy specializing in mindfulness.	To evaluate the benefit of a daily or weekly mindfulness practice delivered by a training consultancy.	Unclear. Could be from discussion elements as part of a training.	x	x
Kasser, T. and Sheldon, K.	2009	x					x			Surveys (studies 3 & 4 of 4)	Studies 1&2 left out for brevity. Study 3: Knox College students in 2005 (n=106). Study 4: convenience sample found using college students to find non-student adults (n=145)	Proposed that businesses consider the possibility of 'time affluence' as an alternative model for improving employee well-being and ethical business practice	Used "a brief measure of mindfulness" in study 3. Used "a more complete measure of mindfulness" in study 4. Both measures were on the individual level (Brown and Ryan, 2003)	x	

King, E. and Haar, J.	2017	x				x	Survey	84 leaders from a global engineering firm based in Australia (due to an existing relationship with the first author)	Exploring the relation between mindfulness and leadership self-mastery and leadership organizational-transformation	Mindfulness was measured using the 5-item MAAS (Brown and Ryan, 2003)	x		
Petchsawang, P. and McLean, G. N.	2017	x					Survey	563 employees participated from four organizations that offered meditation courses and four that did not	Investigating the relationship between workplace spirituality, work engagement and mindfulness meditation	A few simple questions about having practiced mindfulness meditation in their organization or not	x		x
Vogus, T. J., & Welbourne, T. M.	2003	x		x	x		Secondary data	Small, young, and cash poor software firms (n=184) that conducted their IPO between 1993 & 1996 (data: prospectus filed with the Securities and Exchange Commission prior to the IPO)	Attempts to theoretically and empirically connect the literature on high-reliability organizations to reliability-seeking organizations	Did not measure collective mindfulness, but measured three HR practices that "generate innovation through the theorized processes of collective mindfulness"	x		
Wheeler, A. R., Halbesleben, J. R. B. and Harris, K. J.	2012	x		x	x		Survey (online)	Employees (n=871), hospital system spread across five hospitals and a corporate office, northeast United States	Examines the relationship between job-level HRM effectiveness, employee intent to turnover, and mindfulness	Measured "workarounds", which are posited to be related to mindfulness	x		

Table 9. Articles in the category of costs

				Referenced the below authors								
Author	**Year**	**Empirical**	**Concept.**	**Langer**	**Weick**	**Brown**	**Kabat-Zinn**	**Method**	**Sample**	**Description**	**Measure of mindfulness**	**Trait mindfulness**	**Other mindfulness**
Dane, E.	2011		x		x	x	x					x	
Hales, D. N., Kroes, J., Chen, Y. and Kang, K. W.	2012	x			x			Case study, Action Research	A large regional hospital, eastern U.S.	Exploratory study; measured the cost of implementing mindfulness	Did not measure mindfulness directly, but the effects of attempting to implement a mindfulness program inspired by Weick and Sutcliffe (2006)	x	

Levinthal, D. and Rerup, C.	2006		x	x	x							x
Poston, R. S. and Kettinger, W. J.	2014	x		x	x		Case studies	U.S headquartered companies (n=5), uses cross case analysis	Examines new IT introduction and the role of mindfulness in companies not using experiments to implement social media	Used observation as a technique to identify mindfulness based on the concepts of e.g. Weick et al. (1999)		x
Rerup, C.	2005		x	x	x							x
Swanson, E. B. and Ramiller, N. C.	2004		x	x	x							x
Vogus, T. J., & Welbourne, T. M.	2003	x		x	x		Secondary data	Small, young, and cash poor software firms (n=184) that conducted their IPO between 1993 & 1996 (data: prospectus filed with the Securities and Exchange Commission prior to the IPO)	Attempts to theoretically and empirically connect the literature on high-reliability organizations to reliability-seeking organizations	Did not measure collective mindfulness, but measured three HR practices that "generate innovation through the theorized processes of collective mindfulness"		x
Weick, K. E., Sutcliffe, K. M. and Obstfeld, D.	1999		x	x								x

Table 10. Articles in the category of miscellaneous

				Referenced the below authors								
Author	**Year**	**Empirical**	**Conceptual**	**Langer**	**Weick**	**Brown**	**Kabat-Zinn**	**Method**	**Sample**	**Description**	**Measure of mindfulness**	**Trait mindfulness**	**Other mindfulness**
Andrade, L., Plowman, D. A. and Duchon, D.	2008		x	x	x							x	
Barry, D. and Meisiek, S.	2010		x	x	x								x

Bennett, R.	2011	x			x	x		Survey (online)	UK brand managers (n=524). Source: a list-broking company, covering "a wide range of business sectors"	Examines the role of individual mindfulness in a brand manager's self-direction of his or her professional experience	12 items adapted mainly from the Freiburg Mindfulness Scale (Buchheld et al, 2001), the Kentucky Inventory of Mindfulness Skills (Baer et al, 2004) and Baer et al's (2006) 'inventory of inventories' of mindfulness questionnaire items	x	
Carlo, J. L., Lyytinen, K. and Boland, J. R. J.	2012	x			x			Interviews	Interviewees (n=48) from 16 different companies that were part of the project	Argue, based on a field study, that collective mindfulness is only possible through a dialectic process of collective minding	Unclear. Use grounded theory and draw on five concerns of Weick et al. (1999) to analyze data	x	
Gebauer , A.	2013		x	x	x								x
Hales, D. N., and Chakravorty, S.	2016	x	x		x			Case study	Direct participation and observation, review of log books, and interviews (quantity unknown)	The study attempts to demonstrate implementation of HRO in healthcare	No direct mindfulness measure found	x	
Hall, L.	2013		x				x					x	
Hafenbrack, A. C.	2017		x			x	x					x	x
Hanley, A., Abell, N., Osborn, D., Roehrig, A. and Canto, A.	2016		x*			x	x					x	x
Jamieson, S. and Tuckey, M.	2017		x*			x	x					x	x
Kristensen, M. L.	2018		x	x		x	x					x	
Lawrie, E. J., Tuckey, M. R. and Dollard, M. F.	2018	x				x		Surveys and diary (2 weeks)	57 employees primarily working in education, health care, and finance	Exploring daily psychological demands and job control as potential antecedents of daily mindfulness, and the moderating effect of psychosocial safety climate	Mindfulness was measured using Brown and Ryan's (2003) 15-item Mindful Attention Awareness Scale	x	x
Leung, M., Liang, Q. and Yu, J.	2016	x				x	x	Survey	90 construction workers in Hong Kong	Investigating and developing of a mindfulness– stress– performance model for construction workers	Measured mindfulness using their own combination of scales such as MAAS and FFMQ	x	
Liang, T. Y.	2004		x									x	x
Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., Hart, R. and	2017	x				x	x	Systematic review and Meta-analysis	35 articles. The literature search was performed using the MEDLINE and Scopus databases (Jan. 2016)	Investigate the relationship between mindfulness-based interventions in the workplace and wellbeing-related outcomes and other ourcomes such as job-performance	The meta-review included various mindfulness based interventions such as MBSR and non-MBSR interventions as well as various respective measures	x	x

Eiroa-Orosa, F. J.													
McAvoy, J., Nagle, T. and Sammon, D.	2013	x		x	x			Case study, variety of data gathering techniques	Exploratory research project at TexunaTech (40 employees), 7 month period for data gathering	Explores the use of mindfulness as a theoretical framework to examine ISD agility	Unclear. Use a "mindfulness theoretical lens" apparently based on Weick et al. (1999) to analyze the gathered data	x	
Mylett, T.	2010		x		x							x	
Ndubisi, N. O.	2012	x		x	x			Survey	Consumers of healthcare services in Malaysia (n=423)	Draws from mindfulness theory to examine the effects of service reliability, pre-emptive conflict handling, and customer orientation on customer satisfaction and loyalty in healthcare service delivery	Did not measure mindfulness	x	
Ogliastri, E. and Zúñiga, R.	2016		x		x							x	
Roche , M. and Haar, J. M.	2013	x				x	x	Survey	Managers from different organizations in New Zealand (n=386)	Examines the relationship between self-determination theory, three facilitators (incl. mindfulness), needs and organizational citizenship behavior	15 items of Brown and Ryan (2003)	x	
Sammon, D., Nagle, T. and McAvoy, J.	2014	x		x	x			Case study, variety of data gathering techniques	TexunaTech (40 employees), 7 month period for data gathering	Attempt to utilize the narrative network technique to visualize the ISD process as a live routine with the aim to detail the ideal and actual aspects of ISD. Incorporates organizational mindfulness to provide social analysis	Mindfulness measured using scale of Mu and Butler (2009)	x	
Sutcliffe, K. M., Vogus, T. J., and Dane, E.	2016		x*	x	x	x	x					x	x
Thow Yick, L.	2001		x									x	x
van Tonder, C. L. and Groenewald, J. P.	2011		x		x							x	
Vu, M., Wolfgramm, R. and Spiller, C.	2018		x*	x	x							x	x
Wamsler, C. and Brink, E.	2018	x				x		Survey	217 households from Lomma, Sweden	Exploring the role of mindfulness in climate adaptation	Mindfulness was assessed by four questions, adapted from the Five-Facet Mindfulness Questionnaire (Baer et al., 2006)	x	x
Wong, C. W. Y., Lai, K.-h. and Teo, T. S. H.	2009	x						Case study, variety of data	Yantian International Container Terminals Ltd.	Examines the institutional pressures faced by a container terminal; premised upon Institutional Theory	Unclear. Apparently draw on 5 concerns of Weick et al. (1999) yet do not cite the article or mention it.	x	

					gathering techniques		and the organizational mindfulness perspectives	Do not specify how data on mindfulness is collected	
Yu, L. and Zellmer-Bruhn, M.	2018	x	x	x	x	Survey	Study 1: 176 MBA students. Study 2: 224 individuals (44 teams). Study 3: 292 individuals (48 teams).	Examining "team mindfulness" (novel concept) as a safeguard against multilevel team conflict transformation processes	Team mindfulness was assessed with a scale developed for this purpose with inspiration from e.g. MAAS and FFMQ	x
Zhang, J. and Wu, C.	2014	x	x	x	x	Surveys & cognitive tests	Nuclear power plant control room operators (n=212) from two major nuclear energy corporations in mainland China	Investigates the influence of dispositional mindfulness on operators' safety behaviors and its boundary conditions	Chinese version of the 14-item Freiburg Mindfulness Inventory (FMI-14) originally developed by Walach et al. (2006) and validated in a Chinese context by Zhang et al. (2013)	x

The following sections aim to provide guidance on what we have learned so far, while outlining crucial findings and contradictions for each of the respective categories.

Decision-making (table 4). Weick et al. (1999: 61) conclude, "mindfulness, with its rich awareness of discriminatory detail, enables people to manage juxtapositions of events they have never seen before." This implies that higher trait mindfulness leads to reliable decision-making in less than ideal learning conditions, while less mindfulness can lead to narrow focus and habitual decision-making. Eastburn and Jr.Boland (2015) extends this idea, suggesting that a lack of mindfulness in parts of the banking sector could explain some of the catastrophic outcome of the 2008–2009 Financial Crisis. However, several authors have criticized Weick and colleagues. Fiol and O'Connor (2003), for example, argue that a 'preoccupation with failure' as suggested by Weick et al. (1999) may generate avoidance strategies, increasing rather than reducing mindlessness, ultimately leading to learned helplessness – all of which is likely to negatively affect organizational decision-making.

Rather than linking mindfulness directly to decision-making, some research has focused on the moderating effect that mindfulness as a decision-maker trait may have on biases. The core argument provided is that the perceptual accuacy and flexibility of awareness –which according to Brown et al. (2007b) are inherent to mindfulness –increases decision-making effectiveness by reducing the negative effects of biases (Fiol & O'Connor 2003; Gärtner 2011, 2013).

One example is the bandwagon effect (Fiol & O'Connor 2003) and the associated mimetic pressure (Wolf, Beck, & Pahlke 2012: 213) that "might negatively affect the realization of business value" (Fiol & O'Connor 2003; Wolf et al. 2012). With regard to the bandwagon effect, authors argue that the discriminatory power of more mindful decision-making will allow for a greater freedom to choose higher-value alternatives rather than mindlessly following the majority, reasoning that "everyone is doing it" (Swanson & Ramiller 2004, p. 564). Support for this line of

reasoning comes from a review of strategy processes by Hutzschenreuter and Kleindienst (2006) showing that decision-makers' personal and cognitive traits exert a substantial influence on the decision and, thus, strategy process.

Leadership & change (table 5). Swanson and Ramiller (2004) highlight the relevance of mindfulness for leaders, arguing that it enhances "the recognition of organizational circumstances demanding an innovative response, while also fostering effectiveness in executing the response itself." Recent research finds that for leaders, mindfulness predicts leadership self-mastery (King & Haar, 2017), has a negative association to resistance to organizational change (Charoensukmongkol, 2017), and it helps change leaders deal constructively with ambiguity (Chesley & Wylson, 2016). Fiol and O'Connor (2003) and later Gärtner (2011) argue that mindfulness leads to better scanning, interpretation, and the ability to hold multiple perspectives, which is highly relevant given that "perceptual accuracy maximizes the effectiveness of ensuing behaviors". Furthermore, Linnenluecke (2015) suggests that mindfulness may facilitate organizational change and contribute to resilience in management.

Brown et al. (2007b: 212-214) provide a conceptual overview of how a higher degree of mindfulness enables leaders to be aware of the dynamic situation including themselves and their surroundings, ultimately yielding more well informed decisions. Furthermore, Fiol and O'Connor (2003, p. 66) establish a bridge to research on decision structures, arguing that employees will "resist the adoption and use of appropriate decision structures if mindlessness is the norm", thereby criticizing the opposing view of Weick et al. (1999). Further research on decision structures proposes that collective mindfulness is not simply the result of mindful leaders and that decision-making authority needs to be distributed to enable the organizations to make mindful decisions (Butler & Gray 2006). This corresponds to Weick et al. (1999) finding that distributed leadership can be more efficient to handle unexpected events. More specifically, mindfulness has

been identified as an enabler of the "collaborated distribution" form of distributed leadership (Fitzsimons, James, & Denyer 2011).

Strategy (table 6). Mindfulness is said to influence a wide variety of strategic issues, yet the exact relationships are yet to be explored (Dane 2011; Dane & Brummel 2014; Gärtner 2011, 2013). Swanson and Ramiller (2004), for example, highlight how and when mindfulness can lead to more fruitful organizational transformation and competitive advantage. Hutzschenreuter et al. (2014), in turn, relate a lack of mindfulness to the risk of acquisition failure. However, though organizational mindfulness is their core argument, they –just as many others– treat mindfulness as a black box. This reflects the problems of measuring and evaluating organizational level mindfulness –in particular retrospectively.

The organizational mindfulness literature typically equates mindfulness with explorative behavior and routine (=less mindfulness) as exploitative behavior (e.g. Butler & Gray 2006). However, some scholars such as Weick and Sutcliffe (2006) question whether such a dichotomy exists. Similarly, Sammon, Nagle, and McAvoy (2014) – in a three-year case study – challenge this dichotomy. They apply a narrative network analysis to understand how the execution of routines can be contextually more or less mindful, and find evidence suggesting that the right organizational environment is essential to promoting and maintaining mindfulness. Perhaps even more important, their research provides an example of a practical approach to the organizational mindfulness field, which is in dire need of more research on methods that show how mindfulness affects the performance of both routine and non-routine behavior (Levinthal & Rerup 2006; Weick & Sutcliffe 2006).

More recently, attempts have been made to differentiate mindfulness on the strategic level from other levels of organization. Building on Ray et al. (2011), Vogus and Sutcliffe (2012) suggest that 'organizational mindfulness' results from top-down processes at the strategic level, while

‘mindful organizing’ occurs bottom-up at the operational level. This perspective, though in its infancy seems promising since the creation, observation, and handling of objects of mindfulness is typically quite varied depending on the role and function of individual managers and employees (Ray et al. 2011).

Ethics & sustainability (table 7). Ruedy and Schweitzer (2010: 73) argue for and find a relationship between mindfulness and ethical decision-making. Their argument is that mindfulness can lead to a reduction in incidences of unethical behavior that is driven by unconscious bias and self-serving cognition. The argument is based on that bias is “exacerbated by a lack of attention and awareness”. Recent research suggests that this is the case, finding that individual mindfulness coincides with higher motivation to take climate adaptation actions, especially actions that support pro-environmental behavior (Wamsler & Brink, 2018).

Further research on ethical behavior suggests that the self-regulatory aspect of mindfulness may cause more ethical-conscious behavior, with implications for leadership, role-modeling, and organizational culture (Thomas, Schermerhorn Jr, & Dienhart 2004). Similarly, mindfulness has been related to ecological values (Brown & Kasser 2005). However, some authors warn of a potentially unethical “dark side” of mindfulness, drawing on examples of mindfulness programs at Google, Monsanto, and the US marines. For example, Purser and Milillo (2015, p. 3) warn against reducing mindfulness to a secular “self-help technique that is easily misappropriated for reproducing corporate and institutional power, employee pacification, and maintenance of toxic organizational cultures”. They reason that ethical behavior does not automatically follow the type of mindfulness as described in organizational mindfulness literature. As such, they question the results of Valentine, Godkin, and Varca (2010), who found evidence that perceived corporate ethical values was associated with increased mindfulness (though with a lack of clarity as to causality).

HRM (table 8). In their widely cited study, Vogus and Welbourne (2003) argue that mindfulness can occur as a result of specific HR practices, thereby also enhancing a firm's ability to innovate. This represents one of the few non-HRO alternatives / additions to the HRO factors that lead to organizational mindfulness as proposed by Weick et al. (1999). Exploring the relationship between mindfulness and employee turnover, Dane and Brummel (2014) as well as Andrews, Kacmar, and Kacmar (2014) find mindfulness to be a predictor of turnover intention. In support of this, research has found mindfulness to be related to job satisfaction (Andrews et al., 2014) and job performance (Dane & Brummel 2014; Wheeler, Halbesleben, & Harris 2012). According to Judge and Bono (2001) some traits that are among the best predictors for job performance and job satisfaction are self-esteem, generalized self-efficacy, locus of control, and emotional stability. Hence, these should be added to any future research on the uniqueness of the mindfulness concept. Kasser and Sheldon (2009) find support for their hypothesis that mindfulness has a positive mediating effect on the relationship between time affluence and well-being as part of an argument for a better balance between time affluence and material affluence in organizations. Recent research extends findings from psychology (for recent review, see e.g. Good et al., 2016; Hanley et al., 2016) and focuses on the positive relation between mindfulness and work engagement (Petchsawang & McLean, 2017), wellbeing and the negative relation to e.g. stress, anxiety, and suggests that a potential negative aspect of mindfulness could be disengagement (Altizer, 2017; Karlin, 2018).

Costs (table 9). In introducing the concept of the costs of mindlessness, Langer (1989: 45-61) vividly illustrates the opportunities and strengths of a more mindful approach. To date, the tendency has been to focus primarily on the potential value-creating aspects of mindfulness, a common trend when new perspectives are introduced in science (Rerup 2005; Vogus & Welbourne 2003). As a result, only few articles explore the costs of mindfulness, leading to

various calls for balanced theory of mindfulness (i.e. Butler & Gray 2006; Fiol & O'Connor 2003; Hales, Kroes, Chen, & Kang 2012; Rerup 2005; Vogus & Welbourne 2003)

However, there seems to be some agreement on the fact that introducing, cultivating, and applying mindfulness in organizations –no matter how it is done and what value it may create over time – will incur costs; which raises the question of opportunity costs (Levinthal & Rerup 2006; Swanson & Ramiller 2004). Although there is no question that the costs of mindfulness are an important topic to consider, Weick and Sutcliffe (2006) suggest that it may be too early to answer questions of costs and opportunity costs. Their core argument being, that the concept of organizational mindfulness has still not been "straightened out".

Nonetheless, ever since Weick and Sutcliffe (2001) suggested that mindlessness can be cost-efficient –for example in the context of routines –there have been contributions developing the idea of when mindfulness is worth investing in depending on the dynamic or static nature of the task and context. Rerup (2005) posits that the bottom line effect of mindfulness depends upon the organization's environment being stable or dynamic. Support for this reasoning is provided by the broadly cited conceptual paper by Dane (2011), who argues that while the costs of mindfulness may outweigh the benefits of being mindful in stable environments, the benefits will outweigh the costs in dynamic environments.

To date, the literature falls short to provide a detailed account on what the costs of reaching and maintaining mindfulness are. In addition, while Langer (1989) originally provided plenty of studies about the costs of mindlessness –or lowering the level of mindfulness –this stream of research has unfortunately not been continued on the organizational level.

Miscellaneous (table 10). There are 29 articles in this review that do not naturally fall into one of the 6 categories described above. The mentioned articles are found within diverse fields such as information technology (Carlo, Lyytinen, & Boland 2012; Curtis, Dennis, & McNamara, 2017;

Dernbecher & Beck, 2017; McAvoy, Nagle, & Sammon 2013; Sammon et al. 2014; Wong, Lai, & Teo 2009), negotiation (Andrade, Plowman, & Duchon 2008; Ndubisi 2012; Yu & Zellmer-Bruhn, 2018), work arts (Barry & Meisiek 2010), and others (Hafenbrack, 2017; Hales & Chakravorty, 2016; Kristensen, 2018; Lawrie, Tuckey, & Dollard, 2018; Leung, Liang, & Yu, 2016). The recent reviews that were discussed in the section "*Development of the Reviewing Framework*", after table 2, are also included in this section (Hanley et al., 2016; Jamieson & Tuckey, 2017; Lomas et al., 2017; Sutcliffe et al., 2016; Vu et al., 2018). The scope of topics discussed can be interpreted as a pointer to the concepts relevance. Conversely, it may also indicate a lack of specificity.

Future Research Suggestions

The influence of mindfulness across the organization. This review finds that the way mindfulness affects organizational concepts is dependent on temporal and contextual factors such as culture, structure, function, even hierarchical level, etc. Thus, we suggest more research into understanding the benefits of mindfulness at different hierarchical levels, in different professions, business units and other relevant organizational units. For example, according to Fiol and O'Connor (2003: 66), we should expect mindful senior decision-makers to have a different kind of impact on the organization than mindful production employees. In support of this, it has been suggested that, for example, strategizing can reap benefits from a wider awareness –which allows for better identification of threats and opportunities. Conversely, the level of operations and production may benefit from a more mindful approach to learning. As an example of an organization where it seems natural to cultivate mindfulness, Ray et al. (2011) argue that mindfulness is most important to top administrators in business schools, because they are the first to spot 'ugly surprises'. The suggested research could assist in the prioritization of whether to invest in sustaining, increasing, or even decreasing the level of mindfulness either within the entire organization or only partially,

for specific functions or hierarchical groups, etc. However, this would require a well-defined concept of mindfulness on the group and organizational level, as Fiol and O'Connor (2003) suggest.

To further this avenue of research, we believe that it is relevant to explore questions such as: Do certain professions such as e.g. HR-professionals, accountants, or lawyers gain more from a higher level of mindfulness than others? Furthermore, what would the benefits to the organization be from a higher level of mindfulness in either of these groups? In which situations is it relevant to invest either in mindfulness across the organization, or in specific groups, or hierarchical levels – or not at all? Finally, are some benefits of organizational mindfulness universal, not relying on profession, hierarchy and other situational characteristics?

Routine and non-routine behavior. Research on mindfulness may also be interesting in relation to *dual process theory* (Kahneman 2011), since the level of mindfulness may have an effect on the 'choice' between the two kinds of thinking (e.g. Dong & Brunel 2006). Mindfulness does not provide the omniscience needed for rational choice nor special techniques to make the 'right choice'; it gives a degree of awareness of the available information (and that it is only information, *not* truth), of the interpretation of the information, and of the creation of the argument, which leads to a choice.

Thus, contrary to what the popular literature may argue, mindfulness does not provide 'the right' skills or techniques for making choices. It gives awareness of the process – whether intuitive or elaborate. Therefore, we may ask: Does the choice of intuitive process versus elaborate process change with the level of mindfulness as suggested by Dong and Brunel (2006)? Would more mindful senior decision makers, middle managers, and employees tend to choose the intuitive or the elaborate route more frequently in a given situation? Is this contingent on whether the choice is perceived as simple or complex, novel or as part of a fixed routine –and if so, how? What is the

influence on costs (short and long term)? Studying these questions would give more insight into how different levels of mindfulness influences decision-making at different levels of organization and ultimately how these choices influence performance.

The dark side of mindfulness. The fact that mindfulness is mostly seen as something positive in both the popular and scientific literature has raised critique. To reach a more balanced perspective on mindfulness we highlight the need to explore the direct costs as well as unanticipated (negative) consequences of organizational mindfulness. For example, is it possible that the introduction of mindfulness at the organizational level and the associated interventions can be used as a new way of pacifying and controlling the work force – just like 'positive' interventions and approaches such as job-enrichment and democratic leadership have been criticized of doing (Morgan 2007)? We found no evidence of such an instrumental use of mindfulness; however, we believe that it is important for the further development of the field to also follow up on the idea that mindfulness can be used for negative and unethical purposes.

Another aspect of the dark side of mindfulness is the risk of unanticipated consequences of introducing and cultivating organizational mindfulness. Here we find a few contributions, such as Dane (2011, p. 9), suggesting that in certain situations mindfulness may be unintentionally detrimental to task performance. Thus, we posit that a research agenda into the dark side of mindfulness is a promising avenue to explore. Doing so will not only increase our understanding of mindfulness but could also provide increased legitimacy to the field. Seeing the dark side of how mindfulness can potentially be used could be a way of helping practitioners to more consciously and conscientiously work with implementing organizational mindfulness in practice.

Discussion

This review set out to provide guidance on what we have learned so far, while outlining crucial findings and contradictions in the literature on organizational mindfulness. Furthermore, in the

sections with future research suggestions we have derived suggestions that we believe are worthwhile considering to further advance the field.

In this closing discussion we assess our findings and focus on the question of how the streams of knowledge on organizational mindfulness converge or diverge: Where do we find consilience in the literature? That is, do the various arguments and the evidence of the literature converge into strong conclusions? And where does it deviate? The following sections discuss issues central to the field of organizational mindfulness.

Static versus dynamic task environments. This review finds that there is a broad consensus that a high level of mindfulness is associated with performance in dynamic task environments and collective, complex problem solving such as strategic decision making in multinational corporations (i.e. Dane 2011; Vogus & Welbourne 2003). The enhanced awareness *and* attention of mindfulness can be of benefit in non-routine contexts where the ability to spot and deal with cues that appear outside the known categories is essential. Surprisingly, there is less agreement as to whether less or more organizational mindfulness is beneficial in static task environments e.g. where routine behavior is required. Whether mindfulness correlates with i.e. learning and performance in a routine context is unclear.

We suggest that this lack of clarity may be due to a misleading relationship attributed to the concept of routinization and mindfulness. Extant research has tended to collapse mindlessness with routine and mindfulness with non-routine into a single continuum. In contrast, we argue that the degree of routinization and the degree of mindfulness may in fact be *orthogonal*. We find support for this idea in Brown and Lewis (2011, p. 874) suggesting that important elements of mindfulness underlie routinized behavior and that routines may be worked at and change over time. Furthermore, the findings of Dane (2013) suggest that "in some contexts automaticity girds, rather than erodes, attentional breadth", complementing the findings of Levinthal and Rerup

(2006), meaning that automaticity is not necessarily associated with and does not lead to mindlessness. Furthermore, Cohen (2007) aligns with Weick and Sutcliffe (2006) in suggesting that the concept of routine may have been stretched too thin. As such, Cohen suggests it might be time to modify the terminology of routine to signify that what is meant is typically not i.e. rigid or mindless.

Thus, in Figure 2, we argue that the relationship between mindfulness and routine is orthogonal. Each of the boxes in Figure 2 indicates that there may be more or less of a fit, depending on e.g. temporal and contextual factors. For example, in the box where routine meets a higher level of mindfulness, it is suggested that there may be extra attentional capacity for i.e. learning and improvements.

Figure 2. The proposed orthogonal relationship between mindfulness and routine

		Degree of routinization	
		Routine	Non-Routine
Organizational degree of Mindfulness	More Mindful	Extra attentional capacity for i.e. learning and improvements (fit)	Higher chance of a healthy organization of and response to the field of experience (fit)
	Less Mindful	Little or no extra attentional capacity for other activities than the task at hand (fit)	Risk succumbing to bias, distraction, high emotional reactivity, etc. (misfit)

Learning and adaptation. As of today, there is no evidence to counter what the organizational learning literature has stated since originally introduced by Weick et al. (1999): That organizational mindfulness has a positive influence on learning, adaptation, and counteracting inertia, while having a negative association with bias. However, we find that there is still ample room for more empirical work to support and explore these ideas. One possible avenue of research could be how mindfulness affects the impact of learning at critical moments in time, such as indicated by Berends and Antonacopoulou (2014) in their review on time and organizational

learning. However, given the lack of critical reflection in dealing with the concept of organizational mindfulness, it is not clear whether the lack of any counter-evidence results from an overly positive perspective on organizational mindfulness or from a 'true' lack of evidence.

The influence of context on organizational mindfulness. While there is strong agreement that the level of mindfulness on the organizational level may vary over time and be influenced by different circumstances (i.e. historical developments, current situation, plans for the future), there is little or no agreement as to what such circumstances might be at a more abstract level, or how they interact. Since Weick et al. (1999) proposed five concerns that lead to mindfulness in HROs and Vogus and Welbourne (2003) proposed that mindfulness occurs as a byproduct of a set of human resource practices, there has been no broad, concerted effort to integrate these ideas into a coherent whole, which could also include other areas of organization and organizing.

Usefulness of the concept of mindfulness in the organizational literature. Over the last two decades, many authors have claimed that organizational mindfulness is an important new concept, which promises to yield many important insights. And while finding the existing organizational literature on mindfulness useful, this review finds that this promise is largely yet to be fulfilled. Why is this so? One reason, we believe, is the broad tendency to base articles on concepts of mindfulness, which apparently suffer from incongruent conflation with other concepts, skills, antecedents, etc. This conflation risks leading to problems with construct validity – and usefulness – in organizational settings. Indeed, related concepts such as managerial discretion (Keegan & Kabanoff 2008) and attention (Ocasio 1997) in organization theory have received limited empirical research attention because they are relatively hard to measure. We believe that for mindfulness to avoid this trap and establish itself in organizational research and become relevant to practice, as it has in e.g. the field of psychology, a clearer concept is needed which builds on a more discrete and measurable individual concept such as that of Brown et al. (2007b).

We conclude the discussion with a warning to this growing field. Many concepts, such as leadership and entrepreneurship have gone through various phases of scientific emergence and development, often being influenced by popular trends outside of academia. The leadership field went from finding the traits and styles of the successful leader to discussing situational, functional and various types of leadership, without ever reaching a consensus about what leadership is; effectively making it immeasurable and mythic. There are certain other pitfalls when researching "the entrepreneurial organization", "the networked organization" or in this case, what would be "the mindful organization", which often constitute more of a selling point for consultants than a research topic for scientists. Thus, these ideas remain somewhat isolated from the remaining body of research. We call for the field of organizational mindfulness to avoid these mistakes from the outset.

Conclusion

This review has illustrated that the field of research on organizational mindfulness is fragmented and contains some contradiction. Yet, we also find it to be rich conceptually and empirically providing deep and broad examples of how mindfulness can contribute in a range of situations, professions, and types of organization. Furthermore, the ever-increasing number of publications on organizational mindfulness reflects that while this research field does not exactly resemble a well-ordered garden there is plenty of life flowing through it. Authors keep contributing and connecting to new topics – recent examples are ethics and sustainability - perhaps due to the popularity of the mindfulness and because it can act as a facilitator or catalyst in many areas.

Yet the concept of organizational mindfulness remains less than adequate, less than complete. If the field is to develop a higher degree of consilience and integrate the knowledge and energy represented in the ongoing flow of contributions, there is a need to change the conversation to rework the foundation to be strong enough to hold. Thus, we believe that the next big step in the

field of organizational mindfulness is to be found in rethinking the core concept and establishing a parsimonious yet adequate operationalization. A high tower needs a strong foundation. Having drawn together the contributions to the field of organizational mindfulness, it is our hope that we as a field will be able to take up the challenges laid out and move forward on a slightly more complete, more adequate foundation and fulfill the promise of this burgeoning field.

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Paper two: The Impact of Mindfulness Training on Performance in a Strategic Decision-Making Task: Evidence from an Experimental Study

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Abstract

Research on mindfulness and decision-making suggests that mindfulness improves decision-making. Yet, there has been little empirical work to support this claim. In an experimental study, we analyze the association between strategic decision-making and mindfulness training duration at the individual and group levels. We find a negative association between a longer mindfulness training and strategic decision-making at the group level, but not at the individual level. Self-report data is used to measure trait neuroticism and trait mindfulness, and we find a negative association between a facet of trait mindfulness and strategic decision-making at the group level. Implications are explored. Our study provides insights to teachers and top-level decision-makers seeking to improve strategic decision-making as well as answering calls to increase our understanding of mindfulness in organizations.

Keywords: Strategic Decision-Making, Performance, Mindfulness, Experimental Study, Neuroticism

INTRODUCTION

How does varying the duration (1 or 7 days) of a mindfulness training influence individual- and group performance on a strategic decision-making task? Given that increasing the quality of strategic decisions can lead to enhanced firm performance, improving strategic decision-making has been widely researched since the 1970s and 1980s (Burgelman et al., 2018; Eisenhardt & Zbaracki, 1992; Hambrick & Mason, 1984). A subfield of this research called the "upper echelons model" contends that the performance of an organization is, to a high degree, a reflection of its top managers, and a part of this field focuses on the cognitive style and capabilities of the top decision makers. Such cognitive capabilities and traits may include awareness, attention, perception, and more recently mindfulness (e.g. Fiol & O'Connor, 2003; Gärtner, 2011), which have been suggested to partially predict strategic choices and performance levels. Companies are still actively seeking interventions and ways to exploit this potential, have become aware of the purported benefits of mindfulness, and implement trainings at different scales (e.g. Google's "Search Inside Yourself" and General Mill's "Institute for Mindful Leadership". Commercial interest has increased to a point where mindfulness meditation has become a billion-dollar industry (Wieczner, 2016). However, the literature on mindfulness in organizations is in its infancy and many questions about the costs and benefits remain open.

Despite the commercial interest and the suggestion that mindfulness should improve attention and thereby decision-making (Good et al., 2016), only a few studies have empirically investigated the relation between mindfulness and decision-making in organizational contexts. These studies focus on factors such as routinization propensity (Laureiro-Martinez, 2014), and economic decision-making (Kirk et al., 2016). More specifically, to the knowledge of the authors of the

present paper, no studies have been done in strategic decision-making. As such, the application of mindfulness to the study of strategic decision-making is expected to yield novel insights. In this paper, we examine the relation between mindfulness training and strategic decision-making, employing experimental methodology to isolate and investigate the effects at the individual and group level.

THEORY AND HYPOTHESES

Being nonjudgmentally aware of the present moment (Kabat-Zinn, 1994) is becoming a widely accepted brief definition of mindfulness. It deals with individuals' fundamental capacities of consciousness (Brown et al., 2007) and can be traced back to ancient Buddhism (Dane, 2011). While there is some discussion regarding the definition of mindfulness, as is the case with other complex constructs like intelligence and wisdom, there is a consensus that attention and awareness are central aspects of mindfulness (Van Dam et al., 2018), which mindfulness training has been shown to improve (Good et al., 2016).

Strategic decision-making shapes the course of a firm and deals with strategic issues, which are often complex, ambiguous, novel and ill defined (Ansoff, 1980; Eisenhardt & Zbaracki, 1992). Circumstances are often stressful, uncertain and unexpected. In other words: "strategic decisions do not come preformulated" (Dutton, Fahey, & Narayanan, 1983, p. 308) and involve significant investments since they are related to the core of the organization.

On the strategic level of the firm, mindfulness has been suggested to be related positively to a number of factors, such as innovation, competitive advantage and performance (Swanson & Ramiller, 2004), high reliability, responding to unexpected events, avoiding inertia (Rerup, 2005; Weick et al., 1999) and reducing bias (Fiol & O'Connor, 2003) while remaining vigilant and flexible (Vogus & Welbourne, 2003). Further, it has been suggested that mindfulness is most useful in dynamic, complex environments (Dane, 2011; Vogus & Welbourne, 2003). Gärtner (2011) uses mindfulness to explain some of the micro-foundations of dynamic capabilities,

building on previous research to argue for mindfulness as a way to overcome cognitive distortions or inertia and enact change and new behaviors.

Mindfulness has been theorized to affect decision-making, performance and relationships primarily through its positive association to attention. Specifically, training mindfulness has been shown to improve stability, control, and efficiency of attention (for a review, see Good et al., 2016). The mind tends to wander half of the waking hours, yet mindfulness *stabilizes* attention in the present. Mindfulness supports attentional *control*, which helps more effective identification and disengagement from distractions in order to direct attention more appropriately according to the situation. Attentional *efficiency*, the economic use of cognitive resources, is also supported by mindfulness, which means efficient detection and processing of stimuli in a task environment.

Further, more mindfulness training (Cebolla et al., 2017; Goleman & Davidson, 2017) as well as completion of formal home practice is positively associated with treatment outcomes (Parsons et al., 2017). Cebolla and colleagues as well as Parsons and colleagues focus on specific training programs, such as the 8-week Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) programs, which start with a week of daily exercises that are similar to the ones applied in the present experimental study. The mindfulness training in the present study consists of stand-alone mindfulness exercises (SAMs), which have been shown to be effective even outside of larger, widely-researched frameworks such as MBSR or MBCT (Blanck et al., 2018). In the context of organizations, recent studies have demonstrated a positive relationship between mindfulness and job performance (Dane & Brummel, 2014; King & Haar, 2017), cooperative decision-making (Kirk et al., 2016), insight problem solving (Ostafin & Kassman, 2012) and prosocial behavior (for a meta-analysis, see Donald et al., 2018).

Original work by Kahneman (1973) as well as more recent contributions (Daniella Laureiro-Martínez & Brusoni, 2018; Laureiro-Martinez, 2014) show that decision-making depends on factors such as attentional stability, control, and efficiency that can be improved by training

mindfulness (for a review on the latter, see Good et al., 2016). Thus, when compared to a shorter training, we argue that a longer mindfulness training should increase attentional stability, control, and efficiency, which in turn should lead to higher decision-making performance (see figure 1 for an overview of all four hypotheses).

Hypothesis 1: Giving a long mindfulness training will enhance the decision-making performance of the individual compared to a short mindfulness training.

Individual scores on the given task (see Method section) has previously been found to be a strong predictor of subsequent group performance (Yetton & Bottger, 1982). Thus, when disregarding any effects that mindfulness is expected to have on dimensions of cooperation in groups, such as trust and utilization of mental models (see Hypothesis 3); we expect a longer mindfulness training to have an effect on the group score through the individual performance on the decision-making task. Consequently, if we find support for hypothesis 1, then we should also find that groups assigned to the longer training should perform better than groups assigned to the shorter training. We therefore hypothesize:

Hypothesis 2: The cumulative effect of a longer mindfulness training on the individual level (see Hypothesis 1) leads to an improved performance of the subsequent group, when compared to the groups assigned to a shorter training.

More accurate attentional processing has been suggested to enhance performance for groups (Hodgins & Adair, 2010), and the vividness and wide attentional breadth of mindfulness has been characterized as “pivotal” (Sutcliffe et al., 2016). In addition, the self-regulation, and particularly emotion-regulation, have been suggested to have positive association to performance in groups (Sutcliffe et al., 2016). Further, Good et al. (2016) speculate that mindfulness training would lead to better utilization of shared mental models, and it has been shown to lead to higher levels of prosocial behavior (Donald et al., 2018), which should lead to enhanced strategic decision-making performance at the group level.

Hypothesis 3: Groups given a longer mindfulness training perform better when compared to groups given a shorter mindfulness training

Studying traits' moderating effect on mindfulness extends the search for situations and populations within which mindfulness has significant effects (i.e. Arch & Craske, 2010; Ridderinkhof, Bruin, Brummelman, & Bögels, 2017), e.g. helping to identify the organizational situations, levels and units where mindfulness carries benefits. One such example is trait Neuroticism, which consists of components such as anxiety and vulnerability to stress. In the following, we suggest that trait Neuroticism should have a moderating effect on mindfulness trainings' association to decision-making performance (Hypothesis 1 and 3, see figure 1). There is no consensus as to the association of neuroticism with decision-making performance (Rothmann & Coetzer, 2003), however, previous research has found neuroticism to be negatively correlated with mindfulness (Iani, Lauriola, Cafaro, & Didonna, 2017). It has thus been suggested that a high score on neuroticism signifies more potential to benefit – or "room for improvement" – from training mindfulness (Giluk, 2009). Thus, the higher the participant scores on trait Neuroticism, the larger the effect of mindfulness training should be on decision-making performance:

Hypothesis 4: The beneficial effects of mindfulness training on decision-making performance will be greater for people that score high on trait neuroticism, when compared to people that score low on trait neuroticism.

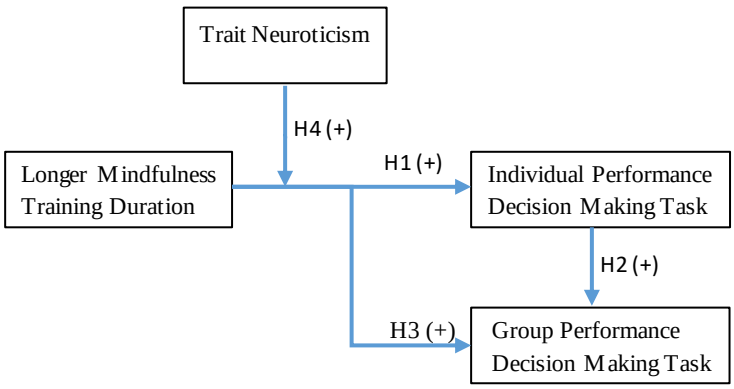

FIGURE 1. Model of hypotheses

METHOD

A 2x2 mixed within-between-subjects design was applied. The within-subjects variable was 'individual' and 'triad'. The between-subjects variable was Training Duration, either a 'short' 1-day mindfulness training or a 'long' 7-day mindfulness training. "Mindfulness training" in the present case should be understood as stand-alone mindfulness exercises (SAMs), which have been shown to be effective even outside of larger, widely-researched frameworks such as MBSR or MBCT (Blanck et al., 2018). The daily training consisted of a 30-minute Body Scan meditation, which was guided by a voice recording. The recording was by Mark Williams, obtained from the Oxford Mindfulness Centre digital platform on August 4th, 2017 (Williams, 2017). During a Body Scan, the participant focuses attention sequentially on parts of the body, noticing whatever sensations may be present in each area without judging or reacting. The Body Scan was chosen because it is a fundamental training component in many mindfulness interventions, and is also introduced in the first week of widely implemented 8-week MBSR and MBCT programs (Fjorback, Arendt, Ørnbøl, Fink, & Walach, 2011).

During initial data collection and prior to any human observation of the data, this study was preregistered at the Open Science Framework [reference removed during blinded review]. The stopping rule was set at 300 participants and 150 per condition.

Participants

All 332 participants were recruited from a University participant pool. They received financial compensation ($ 26.50 – $ 53 depending on the assigned condition). The only eligibility requirement was to fluently read and speak English. Participants were informed of the type of training and task, and advised not to participate if they were currently experiencing a serious mental health issue. The study was approved by the local internal ethics committee. All participants provided written, informed consent.

We chose triadic groups, since they are big enough to have strategic group characteristics such as majority influence (e.g. Baker & Petty, 1994). Of the 372 participants that initially signed up, 40 participants did not complete the study, which was either due to cancellation (20) or not showing up (20). This resulted in triadic groups and dyadic groups (Table 1). However, no significant difference in the scores between the triads and dyads was found ($p = 0.181$, $R^2 = 0.01$). Table 1 shows how the randomization led to an unequal number of groups in the two training conditions. The experiment ran from October to December 2017.

TABLE 1. Group distribution across factors

	Dyad	Triad	Sum
1-day training	17	39	56
7-day training	23	45	68
Sum	40	84	124

We measured compliance with the at-home training (using the same online procedure as Hobson, Gino, Norton, & Inzlicht, 2017), which showed that 61.3 % of the participants assigned to the 7-day training completed all at-home training sessions, while 30.9 % completed 5-6 days of training and 7.7 % completed 4 days or less (mean = 5.35; SD = 1.06). The sample size was based on a priori power calculation using G*Power 3.1.9.2 (Analysis of Variance [ANOVA] fixed effects, special, main effects and interactions; power = .95; $\alpha = .05$; effect size $f = 0.30$; number of groups = 2). Furthermore, we used data from the body of literature on groups solving the given task to

estimate the effect size and an alpha of .05 was assumed. In this case, the recommended size for a calculation of the difference of two independent means was between 7 and 60 per condition. Based on these calculations and the available resources the total sample size was set to 100 groups (300 individuals).

Self-Report Measures

Basic demographic information regarding age, gender, and employment was collected through an online form (administered via Qualtrics). The mean participant age was 24.4 years (SD = 4.50; age range: 18–63). The sample included 60.2 % females and 82.8 % university students. They were mostly reported being naïve to mindfulness training.

A core characteristic of trait mindfulness, namely "open or receptive awareness and attention," was measured using the fifteen-item Mindfulness Attention and Awareness Scale (MAAS; α = 0.85; range = 1–6; Brown & Ryan, 2003, p. 822). Five factors of trait mindfulness were measured using the fifteen-item Five Facet Mindfulness Questionnaire (FFMQ-15; range = 1–5; Baer et al., 2008). The short form of the FFMQ was used for brevity, includes the same five facets as the long form, and has been found to be an adequate alternative measure (Gu et al., 2016). Each of the five subscales consisted of three items (Observe α = 0.52, Describe α = 0.77; Act with awareness α = 0.78; Non-judgmental α = 0.78; Non-Reactive α = 0.58). Trait neuroticism was measured using the Neuroticism dimension from the Big Five Inventory (BFI; α = 0.84; range = 1–5; John & Srivastava, 1999). All three were collected through an online form (administered via Qualtrics) that participants completed at home before the training started (see Table 2).

TABLE 2. Descriptive statistics per condition

	1-day training (151 participants)		7-day training (181 participants)	
	M	Std. dev.	M	Std. dev.
MAAS	3.65	0.69	3.71	0.81
FFMQ Observe	3.09	0.80	3.28	0.74
FFMQ Describe	3.21	0.92	3.15	0.92
FFMQ Act with A.	3.21	0.84	3.31	0.80
FFMQ Non-Judg.	3.29	0.92	3.25	0.96
FFMQ Non-Reac.	2.71	0.64	2.87	0.73

Neuroticism	3.07	0.81	3.02	0.86

Note: MAAS = The fifteen-item Mindfulness Attention and Awareness Scale (α = 0.85; range = 1–6; Brown & Ryan, 2003), FFMQ = The fifteen-item Five Facet Mindfulness Questionnaire (range = 1–5; Baer et al., 2008), Neuroticism = The dimension of Neuroticism from the Big Five Inventory (α = 0.84; range = 1–5; John & Srivastava, 1999)

Task

Participants completed the classical decision-making task, the NASA Moon Survival Problem (Hall & Watson, 1970). First participants completed the task individually and then subsequently in a group, which mimicked the strategy process in firms (Hutzschenreuter & Kleindienst, 2006) and allowed us to test the performance of individuals and groups in a within-subjects design. The task consists of a brief problem description, where participants have to prioritize 15 remaining undamaged pieces of equipment after an emergency landing 200 miles from their base and that their survival depends on this. The 15 items were provided in a random order and were interconnected. Performance is an inverse function of the unit-weighted sums of the difference between the ranks assigned by participants and the "expert" ranks as determined by the Crew Equipment Research Unit at NASA. The result obtained is an error score and an objective measure of task performance.

Experimental procedure

Participants were randomly assigned (using a coin toss) to either the 1-day or the 7-day condition. They were asked to fill out the baseline with trait markers (see Table 2). The participants assigned to the 7-day condition were sent a daily e-mail for 6 days leading up to the lab session. The daily e-mail served as a reminder and contained a link to a survey with a few instructions and a recording of the guided Body Scan. If the participant ended the guided Body Scan early, they were prompted to indicate why. The daily e-mail also contained the opportunity to read a FAQ, which contained detailed guidance on the training.

Participants assigned to the 1-day condition were sent an e-mail with an invitation to the lab session a week later. The lab session was identical for both conditions. It took place in a quiet

laboratory setting, where participants were given a brief introduction (in a triad – or a dyad if there was a cancellation or no-show). They were then guided to separated booths with PCs where they completed the Body Scan and the NASA moon survival problem individually. Subsequently the participants were guided to a semi-circular table with a PC and a large, wall-mounted screen where they completed the moon survival problem collectively.

RESULTS

At baseline, there were no differences between the two training groups in age, gender, employment, education, trait neuroticism, or trait mindfulness (all p-values > 0.1). As expected, groups performed better than individuals did ($t = 7.2669$, $p < 0.01$), which is in line with previous research using the NASA task.

Effects of mindfulness training duration on individual decision-making performance

No evidence was found for a difference between participants' in the 7-day and 1-day mindfulness training conditions on the individual performance, $F(1, 329) = 0.06$, $p = 0.81$, $R^2 = 0.00$ (Hypothesis 1). We did not test whether the results from the individual level extend to the group level (Hypothesis 2), since we did not find a difference at the individual level.

Effects of mindfulness training duration on group decision-making performance

Performance scores for all participants on the individual and group condition, across training conditions are presented in Table 3.

TABLE 3. Mean performance of individuals and groups across training conditions and total sample

	1-day training		7-day training		All participants	
	M	SD	M	SD	M	SD
Individual	44.44	10.72	44.59	11.34	44.52	11.04
Group	35.11	8.88	38.12	10.17	36.76	9.69

Note: The outcome variable, performance, is an error score; a lower score is a better result

We found no evidence for the groups in the 7-day training performing better on the NASA task than those in the 1-day training (as specified in Hypotheses 3). In contrast, the groups in the 7-day training condition performed worse than the groups in the 1-day condition. This finding was in the

opposite direction to our hypothesis. To explore this further, using linear regression, we modelled how trait mindfulness (MAAS, FFMQ) and trait neuroticism were associated with performance on the NASA task (Table 4). Individual task performance was added to the model, since it predicted group task scores as expected (model 1). Results from the linear model showed that the calculated group mean of the FFMQ facet of "Act with Awareness" had a negative influence on performance (Model 3). Neither neuroticism nor the remaining four factors from the FFMQ, nor the MAAS were found to have a significant association with group performance on the NASA task.

TABLE 4. Linear model regression of relevant variables associated with performance

Outcome variable: Performance on the NASA task			
Variable	Model 1	Model 2	Model 3
Intercept	-2.11	-0.78	-6.72
	(5.11)	(5.08)	(5.62)
Mean of Individual Scores	0.88***	0.88***	0.83***
	(0.11)	(0.11)	(0.11)
1-day Condition		-3.06*	-3.39*
		(1.42)	(1.40)
Mean Act with Awareness			3.12*
			(1.36)
F	58.91***	32.67***	24.29***
df	1	2	3
Observations (groups)	124	124	124
Log-likelihood	-432.59	-430.24	-427.60
BIC	879.64	879.78	879.30
AIC	871.18	868.50	865.20
Adjusted R^2	0.32	0.34	0.36

Each cell shows the coefficient estimate, with the standard error below in parentheses.
'.' Significant at the 10% level; * significant at the 5% level; ** significant at the 1% level; *** significant at the 0.1% level.
The group score is an error score, so a lower score equals better performance.
BIC: Bayesian information criterion. AIC: Akaike information criterion.

Model 3 shows a strong association between the variable Mean of Individual Scores and the group performance, with the mean individual score accounting for a large part of the variation in the group performance. The variables of '1-day Condition' and 'Mean Act with Awareness' each explain 2% of the variance in the group performance, which could seem small. We argue, however, that due to the size of the coefficients, the variables are relevant in magnitude for group performance.

Moderation by neurotic traits

No evidence was found for an association between participants' trait neuroticism scores and performance, $F(1, 329) = 2.28$, $p = 0.13$, $R^2 = 0.00$, nor group performance, $F(1, 122) = 0.28$, $p = 0.60$, $R^2 = 0.00$. Further, we analyzed interactions between the conditions and trait neuroticism on performance, but we did not find evidence for a moderating effect of trait neuroticism on mindfulness training duration's association with performance. Thus, we did not find evidence to support Hypothesis 4.

Robustness check

The group analyses was repeated with exclusion of the 14 groups in the 7-day training condition that had participants with less than 4 days of completed mindfulness training. We found the same pattern of results as for the full set of 124 groups.

DISCUSSION

We examined whether a longer mindfulness training would lead to improved performance on a decision-making task, when comparing to a shorter training. Unexpectedly, we did not find evidence for a positive association between the longer training and performance at the individual level, nor at the group level. Rather, at the group level, the analysis showed that the longer training had a negative association with decision-making performance, when compared to the shorter training. In addition, groups' mean scores on the FFMQ subscale of Acting with Awareness was inversely associated with group decision-making performance. Our two key were findings were therefore that both longer mindfulness training and higher baseline scores on Acting with Awareness was associated with poorer group performance.

While groups performed better than individuals did, we note that the mean improvement was not as large as in previous research using the NASA task. The mean improvement from the individual to group condition in the present experiment was 9.33 points for the 1-day training and 6.47 points for the 7-day condition. In the original experiments, the corresponding improvement

was 39.30 – 25.94 = 13.36 points (Hall & Watson, 1970), and for Yetton and Bottger (1982) it was 12.5 points. Hence, if we imagine that the previous research is a "no mindfulness training" control condition, we would see that the participants in the present experiment performed worse than a hypothetical "no mindfulness training" control condition. If this were the case, it could indicate that more mindfulness training equals worse performance on the NASA task at the group level (at least up until seven days).

Theoretical implications

What may explain our finding that the 7-day mindfulness training is inversely associated with performance at the group level when compared with the 1-day training? We suggest that the increased "other" orientation, typical of mindfulness training, might interfere with decision making (Good et al., 2016, p. 128). For example, Ridderinkhof et al. (2017) registered that mindfulness can improve cognitive empathy, and a positive association between mindfulness and prosocial behavior has been shown (for a meta-analysis, see Donald et al., 2018). We thus speculate that it may have been a shift in participants' focus from the task itself to the relational context in a group setting, which led to a poorer performance.

A second suggested explanation of why the 7-day mindfulness training is inversely associated with performance at the group level builds on the negative association between Acting with Awareness and group decision-making performance. Cebolla et al. (2017) found that minutes of focused attention meditation practice predicts Acting with Awareness. Simply put, if the longer mindfulness training in the present experiment lead to an improvement in participants' Acting with Awareness scores, then this should lead to decreased group performance. Regrettably, we did not control for such an improvement.

What may explain our finding that the facet of Acting with Awareness is inversely associated with group decision-making performance on the NASA task? Acting with awareness has been described as "attending to one's activities of the moment and can be contrasted with behaving

mechanically while attention is focused elsewhere" (Baer et al., 2008, p. 330). It has been suggested that Acting with Awareness represents the subscale of the FFMQ that is most likely to be positively associated with performance (Good et al., 2016; Schmertz, Anderson, & Robins, 2009; Thompson, Kaufman, Petrillo, Glass, & Arnkoff, 2011). Therefore, the present finding that Acting with Awareness is inversely associated with group decision-making performance seems counterintuitive.

One possible explanation is that higher scores on Acting with Awareness could be associated with a tendency to allocate cognitive resources primarily to the task, and disregard realizing the resources and creative potential available in groups. Thus neglecting the group could lead to reduced performance, since the development of trust, shared mental models and shared meaning is essential to realize the advantages of decision-making in groups (Good et al., 2016; Thomas & McDaniel, 1990). This could also explain why group performance improved less relative to individual performance when compared to previous studies.

It is surprising that we did not find evidence for an association between individual decision-making performance and mindfulness training duration, since it runs contrary to current theorizing and evidence from other studies (Good et al., 2016). We can only speculate that either mindfulness training duration does not have the predicted effect on the individual level, or that it was lacking in some aspect. Perhaps it was too simple a training paradigm, missing elements of MBSR such as the teacher, being part of a group, or more time to train.

FUTURE RESEARCH, STRENGTHS AND LIMITATIONS

Further research is needed in order to identify the situations, populations and boundary conditions within which the findings of this study are significant. For example, are the findings limited to *strategic* decision-making, or do they extend to other types of decision-making? Is it possible to replicate the findings in the field? Are the findings relevant for larger groups, or just dyads and triads? What happens to performance if the training is extended to 8 weeks, as is the case for

MBSR and MBCT? Dane (2011) suggests that mindfulness inhibits task performance when one is a task novice, so perhaps with 8 weeks of training, the relationship between mindfulness training duration and performance changes.

The study had a number of limitations. The experimenters were not blind to condition assignment, but the participants were uninformed about the aim of the study. Moreover, without a control condition, it is not possible to see if the two conditions performed better or worse than a hypothetical group with no mindfulness training. The external validity of the study is limited, since the lab does not adequately represent real world strategic decision-making context, content or process, and the long-term outcome is known to depend on much more than the original decision (e.g. Hutzschenreuter & Kleindienst, 2006). We note that the two of the five subscales of the FFMQ-15 had weak reliability (Observe $\alpha = 0.52$; Non-Reactive $\alpha = 0.58$). Thus, the 39-item FFMQ might be preferable in future studies.

Further, we acknowledge the limits of the NASA task as an imitation of a strategic decision-making scenario. It was chosen as a "good enough" fit for our criteria of having an objective measure of performance, fitting a 1-hour time constraint, and being as similar to a strategic decision-making task as possible. We argue that it imitates strategic decision-making scenarios where organizations have to "keep or dump" assets, such as when organizations pursue strategies of focus or retrenchment (Morrow Jr., Johnson, & Busenitz, 2004). While acknowledging a large difference in scope, the NASA task and the mentioned strategic scenarios are typically complex, ambiguous, novel, and initially ill defined.

The study had certain strengths: The experimental study was single blinded, preregistered, and adequately powered. Only one type of training is administered (the Body Scan), which makes it easy to pinpoint the training duration as the cause of the findings. In contrast, it has been difficult to pinpoint the causes of outcomes that occur in MBSR and MBCT programs, because they include multiple stimuli. Finally, the NASA task is an objective measure of task performance, and

it is worth noting that Yetton and Bottger (1982) found only trivial differences in individual performance across managerial and student populations.

CONCLUSION

Our hypotheses aimed at exploring the potential benefits of mindfulness training on strategic decision-making. Contrary to our expectations, the present findings suggest a situation where mindfulness training should be administered with care, which addresses the call of Van Dam et al. (2018) to further understanding of surprising and adverse effects of mindfulness training. Further, it provides an original answer to the call of Kirk et al. (2016) to clarify which aspects of mindfulness are important in modulating cooperative decision-making, suggesting that a higher level of Acting with Awareness is detrimental in the circumstances given in the present experimental study. The present findings shed light on an aspect of mindfulness that has been underexplored, yet potentially has wide-reaching theoretical and practical implications. Thus, we suggest that future mindfulness trainings and interventions should be planned and administered in a way that includes the awareness of potential adverse consequences. Our findings contribute to integrating mindfulness into a richer characterization of decision-making at the strategic level and in top management teams (Laureiro-Martinez, 2014; Levinthal & Rerup, 2006; Weick & Sutcliffe, 2006).

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Paper three: Why do some participants train a lot and some participants train a little?

Thomas Hessellund Nielsen

Abstract

There has been little empirical work to investigate the factors that lead participants in mindfulness training courses to practice as recommended. Furthermore, there is limited understanding of the factors that lead participants' to benefit more or less from the training. This knowledge is of importance to mindfulness teachers and practitioners, who seek to support their students in mindfulness courses, I decided to conduct an interview study to explore twenty-two participants' experiences of 7-days of mindfulness training. Six primary themes emerged from the thematic analysis: Experience, Deviance, Motivation and Meaning, Liminal states, External Structure, and pre-existing Knowledge and Experience with mindfulness. The themes shed light on factors of importance from before the training starts as well as relevant factors occurring during the training, and how these influence training frequencies and outcomes. The results can assist teachers and researchers who want to understand how to adapt training programs and research designs to non-clinical contexts such as organizations.

Keywords: Mindfulness, Training Outcome, Training Experience, Interview, Thematic Analysis

INTRODUCTION

Why do some participants train as recommended – or more – while some train less during a mindfulness-training program? Why do some people benefit from mindfulness training while others do not? Starting and completing a daily mindfulness training, even if for a shorter period of 7 days, whether it is intended to improve performance, health, or another goal, can be difficult. There may be circumstances, such as temporary unemployment or vacation, which make it easier e.g. to accommodate changes in daily behavior. However, practitioners starting a training are typically faced by the difficulties of accommodating novel, recurring, and potentially habit-breaking behavior (for a review, see Polivy & Herman, 2002) in their lives. Uncovering and understanding the factors that lead to different participants training as recommended or less (e.g. context, subjective, objective, compliance, engagement) is of importance to mindfulness teachers and practitioners, who seek to understand how to attain the maximum benefits of the training.

Mindfulness-based interventions for mental health (Creswell, 2017) and the workplace (Janssen, Heerkens, Kuijer, Heijden, & Engels, 2018) have increased in frequency ever since the launch of Mindfulness-Based Stress Reduction (MBSR) in 1980. Perhaps the most notable interventions, MBSR and Mindfulness-Based Cognitive Therapy (MBCT) both incorporate training as a major component, and some of this training is administered as homework, with the type of homework changing weekly for various purposes (for an explanation, see Parsons et al., 2017). The first week of homework for these two programs include a daily Body Scans exercise. Other, sometimes less standardized, interventions similarly incorporate components of mindfulness training such as Body Scans, guided meditation, and yoga exercises (for a recent example, see Tunney, Cooney, Coyle, & O'Reilly, 2017). Mindfulness training assignments at home require e.g. compliance and engagement from participants.

Focusing on mindfulness training assignments at home, little research has been conducted on why some people train a lot and some people train a little, or conversely interrupt or skip training. Thus, little is known regarding compliance, engagement, practice patterns (intentionality and behavior) and experiences of participants assigned to train mindfulness at home. Some studies have begun to study the relationship between practice frequency and duration and treatment outcomes, which suggest that participants experience enhanced treatment outcomes if they practice a minimum of times per week (e.g. 4 times a week or more, according to Crane et al., 2014; Perich, Manicavasagar, Mitchell, & Ball, 2013). Further, a recent meta-analysis has shown that training duration is associated with training outcomes (Parsons et al., 2017). As the relation between training frequency, duration and outcomes becomes clearer, it is necessary to deepen our understanding of the qualitative nature of this relation. Thus, the research questions stated at the beginning of the introduction can be investigated from several angles[5].

The aim of this study is to explore participant's experiences of a 7-day mindfulness training (delivered online). This research was conducted in extension of an experiment on the effect of mindfulness training on strategic decision-making (Nielsen et al., 2017). Since participants in the 7-day training were compensated for their time, and the task given at the end of the training simulated an organizational context, the findings of the present study have relevance for the organizational context and are discussed as such (typically at the end of each section).

The current work can be considered as an important extension to two recent systematic reviews. These reviews (including meta-analytic work, Lloyd, White, Eames, & Crane, 2018; Parsons et al., 2017) investigated the extent to which participants report completing assigned home practices in standard form, as well as the relation between completion of formal practice and treatment outcomes. The present work aims to deepen our understanding of participants' experience of one

[5] This is elaborated in the section on data collection and the semi-structured questionnaire.

core practice in MBSR/MBCT- the Body Scan. For example, I focus on possible explanation for why participants in the training had a relatively high training completion rate (74.7 %), which could be of interest in an organizational context.

Furthermore, while recent reviews offer some speculation about unintended consequences of mindfulness training, they typically do not report any empirical evidence that helps us understand the phenomenon (e.g. Good et al., 2016; Sutcliffe et al., 2016). The present review delves into subjective experiences of participants, which are often overlooked in quantitative studies, and additionally reports examples of unintended consequences and their effects on training completion rates and training outcomes. I speculate that understanding how unintended consequences occur and what they entail may be of assistance in deepening understanding of the (magnitude of) effects of mindfulness training interventions.

METHOD

Research Design Overview

The present study was an exploration of participants' experiences of a 7-day mindfulness training. Each of the seven consecutive days the participants completed a 30-minute Body Scan meditation, which was guided by an audio recording from Mark Williams, obtained from the Oxford Mindfulness Centre digital platform on August 4th, 2017 (Williams, 2017). The mindfulness training was administered as part of an experimental study (Nielsen et al., 2017).

Participants

Twenty-two adults participated in this study, of which 70 % were female and seventeen full-time university students, one unemployed, and four were full-time employees. The mean participant age was 26.6 years (SD = 6.50; age range: 19-45). Participants were invited to take part in the interviews if they had previous been assigned to the 7-day mindfulness training condition of a

previous experimental study (Nielsen et al., 2017). Fourteen of the twenty-two participants (63.6 %) completed all seven training sessions, which is comparable to 61 % in the original experimental study.

The principal investigator (PI) of this study was also the PI of the original experimental study. Regarding the topic of participants-researcher relationships, since all communication with participants was conducted by research assistants, the PI did not develop any relationship with participants prior to the present study.

Recruitment

All 22 participants were recruited from the pool of 181 participants from the original experimental study, who were all invited to participate via e-mail. Thirty-seven participants registered for participation and saturation was reached at around the twentieth interview (Fusch & Ness, 2015). Two interviews were added in order to confirm saturation, which was slightly more than expected. I had expected that conditions for saturation would be met somewhere between the fifteenth and twentieth participant. The expectation was based on two premises, that the sample universe was clearly defined, meaning that participants were relatively homogenous in their experience of taking part in the 7-day mindfulness training, coupled with the relatively narrow scope of the research questions (Guest, Bunce, & Johnson, 2006). Further, the data from the original training enabled the verification that the sample included participants that were representative of the original experiment regarding the condition, demographics, and training completion rate. Subsequently, the study was closed for further registration, effectively blocking any further participants from signing up. The main eligibility requirement was to have participated in the 7-day mindfulness training of the original experimental study. While there were no defined exclusion criteria, recent training participants were preferred. Thus, participants that had recently participated in the training were invited to participate in an interview first, because they

remembered most details about the training. Participants were informed of the type and duration of the interview (one hour). The study was approved by the local internal ethics committee and all participants provided written, informed consent. Participants received compensation for their time (USD 20).

Recruitment and interviews were initiated in December 2017 and ended in February 2018. Interviews took place in a meeting room.

The original experimental study had one eligibility requirement, which was to fluently read and speak English. Participants were recruited from a University participant pool. They received financial compensation (USD 53).

Data Collection

Interviews were chosen as the method of data collection since the objective of the study is to deepen understanding of the individual lived experience, perceptions and choices during a mindfulness training. All interviews were conducted by the author of this paper. The interviews were audio-recorded and transcribed fully before coding. A data collection protocol was developed and as a result of pilot interviews the duration of the interview was set to one hour (range = 20-68 minutes; M = 51.6 minutes; SD = 13.1 minutes). In order to get a complete view of the lived experience of the mindfulness training each participant completed, the interview protocol was inspired by the dimensions of the two-by-two quadrant model of Wilber (2000). This means that the questionnaire aimed to cover subjective and objective aspects of the individual (interior experience and observable behavior / aspects) as well as contextual and collective aspects of being (cultural, systemic)[6]. Further, aligning with the explorative nature of the study, the interviews were semi-structured in order to encourage openness and allow for unexpected findings, while

[6] The questionnaire is available and can be requested

obtaining retrospective accounts by the people experiencing the phenomenon of theoretical interest (e.g. the long mindfulness training and solving a task as individual and part of a group etc.). The interview opened with a few questions to uncover if the participants had previous experiences with mindfulness and similar practices, subsequently exploring the lived experience of the training, opening up with the invitation: What did you do on the first day of training? Further probes were used including: Did you develop a routine over the week? What was it? How did it work out? What did you do on the day you missed? What did you do on the last day of training before the lab? What did you do on the day of training in the lab? Was it different to the first / last day before the lab? Finally, the interview concluded with questions about the task as well as what the participant did after the training (if they continued, looked up the topic, talked to others, did anything change, etc.). Semi-structured interviews were chosen because they can provide sufficient direction and consistency (aligning with the research questions) across interviews while allowing the freedom and flexibility to explore the individual experience, also allowing the participant to provide information perceived as important, which would otherwise not have surfaced (Gioia, Corley, & Hamilton, 2013). The consistency and direction help to identify the saturation point as well as providing rich data sufficiently structured for a rigorous analysis across interviews (Guest et al., 2006).

Data Analysis

Thematic analysis was used to identify themes in the interview data. A 'theoretical' semantic approach was considered appropriate due to the well-defined scope and specificity of the research- and interview questions (Braun & Clarke, 2006). This means that the data was already to some extent organized due to the semi-structured questionnaire, but that themes emerged from inductive coding. The compare-and-contrast approach to extract observable differences and similarities between the samples (e.g. those that train as prescribed versus those that train less) requires

extensive note taking (Boyatzis, 1998) and therefore NVivo 11 was used to assist in organizing and storing the thematic analysis.

An early coding frame was produced based on initial coding. Subsequently, initial results and coding frame were presented at a paper development workshop and the resulting discussion led to the development of a revised coding frame (new codes as well as changed and merged codes). The revised coding frame was then applied to the entire data set.

Figures of the themes and codes were then merged to a single graphic model (Figure 1) to highlight areas of difference and similarity in participant's experience of mindfulness training.

RESULTS

The thematic map (Figure 1) illustrates the themes (dark blue) that emerged from the qualitative analysis. It also contains the subthemes (light green and light blue) that make up the primary themes.

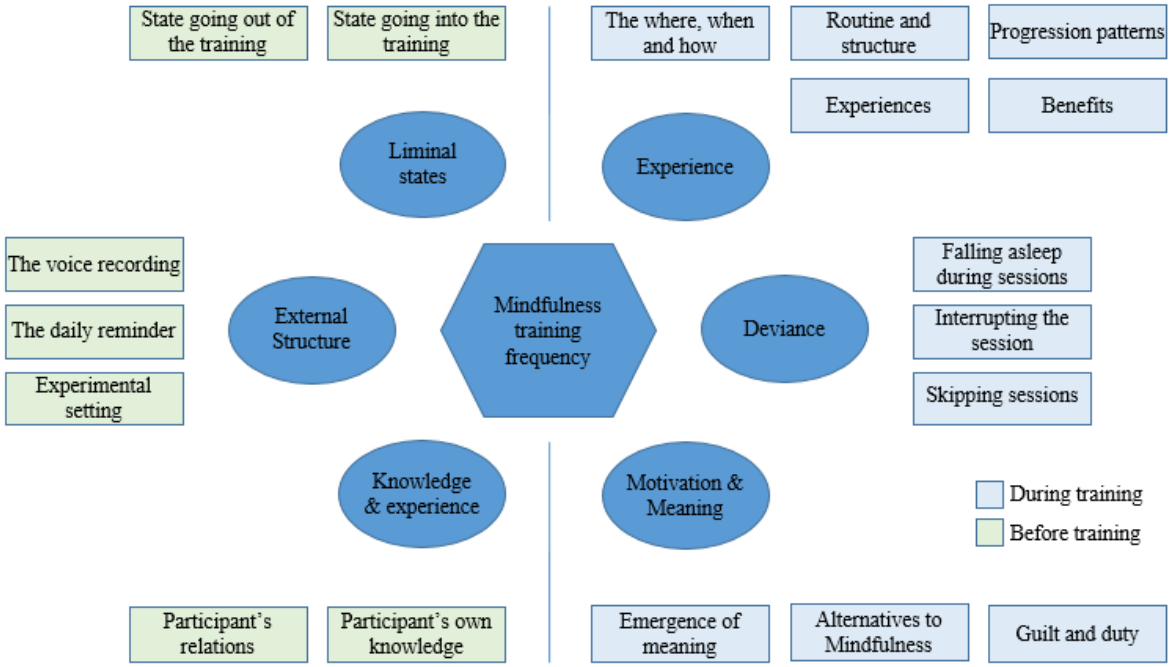

Figure 1 Themes and subthemes representing antecedents to, and participant's experience, interaction with, and outcomes of a mindfulness training

Six primary themes emerged from the analysis of the interview data: Experience, Deviance, Motivation and Meaning, Liminal states, External Structure, and pre-existing Knowledge and Experience with mindfulness. The light green subthemes are concerned with what is given before the training starts: What has happened before the training and how the training is designed, and how this could influence the training. The light blue subthemes are concerned with what happened during the training, such as participants' experience, positive outcomes, decisions, behaviors, and how they made sense of the training. Outcomes are defined broadly, as results of the mindfulness training that are reported to be of benefit by the individual participant. This distinction emerged more clearly during the analysis, showing that what happened before *and* during the training is important for participants' practice decisions and behavior, and can result in participants training a lot or a little.

Each of the themes and its subthemes offer experiences and insights that can be helpful for trainers and practitioners, and they are relevant for an organization that offers mindfulness trainings (to

employees and/or clients). Further, the themes on the left of figure 1, which offer examples of participants' lived experiences and insights related to antecedents- and the external structure of the training, are especially valuable for the planning of mindfulness trainings in order to maximize outcomes according to estimated costs and benefits. The themes on the right side of figure 1 offer examples of motivational factors, experiences and deviant behavior that are related to the inner world of the participants and their experience of participating in the training. These could be especially helpful for the person organizing and leading the training, helping the person to understand the ongoing process such as changes in motivation, as well as the various experiences and deviant behavior of participants. These are cues, which can help the trainer and trainee navigate the training process and achieve the desired outcomes. The content of themes are also relevant for measuring outcomes of a training as well as its evaluation.

The results section is organized thematically and presented in a reflexive first-person style as described by Levitt et al. (2018), detailing the ways in which results and considerations for the field emerged. Thus, each of the six following sections of the result section contain and analyze a theme and its subthemes, and gives a thorough introduction to the theme and its connection to the research questions.

In order to maintain transparency and methodological integrity it is made overt at which points the approach to the inquiry may have unintentionally influenced the data collection and analysis (Levitt et al., 2018), which means the following sections with include reflections on unexpected or surprising results.

External structure

We are shaped by objects and structures that surround us, as we in turn shape them. Thus, since the training was a part of an experiment, the design of the experiment was expected to have an

effect on participants training decisions and behaviors. The following subsections outline the perceived influence of the voice recording and daily reminder used as part of the experiment, as well as the influence of other parts of the experimental design on the training.

Voice recording

Participants described like and dislike regarding the voice recording. A central issue was that the voice recording was the same every day. Some participants enjoyed the repetitiveness, which helped them feel safe during the training:

Max: "If you were familiar with the things you are listening to, it's the same like having a favorite songs you know what to expect right so you just enjoy it a little bit more."

However, confronted with the repetitive nature of the training, some participants became annoyed and found it difficult to concentrate on the training:

Ursula: "I think, maybe I [would have] liked it the best if it was novel, I think I would tend to agree with my friend who said it got a bit tiresome to listen to the same recording. […] But maybe it would be okay if it was the same voice so I would have some kind of familiarity, but would be different progress?"

Karl: "Progressively I got to enjoy them [the Body Scans] a little bit less. […] I was able to preempt everything that the voice was going to say to me, because I remembered it quite well. So I kept having these distracting thoughts like: this is the part where he tells me about honoring this particular part of my body. The first [Body Scan] there were better elements of novelty that really worked for me."

This like / dislike of the repetitiveness influenced the training experience of some practitioners, which is discussed in the section on 'Experience'. Participants also talked about likes and dislikes regarding the accent, pitch of the voice and his use of pauses. They either enjoyed the voice, did not enjoy the voice, or did not notice a like or dislike. In summary, the variety in opinion on the recording seems to have implications for the process and outcome of a training. As Karl reported,

if he is constantly thinking about what the orator will say next, then he is not focused on the recording itself.

A voice recording is the typical mode of delivery of meditation practice guides, and these are often the same guides throughout an MBCT/MBSR programme. The disadvantages are that if the participant dislikes the voice or the repetitiveness, this can become an obstacle. Thus, an organization providing a mindfulness training may want to resolve this issue either by indulging the participants' dislike, for example by offering Body Scans with different trainers (voice recordings) or offering daily or weekly sessions with a live trainer to overcome the repetitiveness and allow the participant to discuss the obstacles with the trainer or other participants. This will naturally incur costs, which will have to be weighed against the benefits. Conversely, the participants' frustration or boredom may be managed up front by explaining the rationale to participants, that e.g. the voice recording is analogous to a piece of gym equipment (like a kettlebell or rower). The important thing is to do the exercise, not whether or not the participant likes the gym equipment (given that it is good enough), and that frustration is ok especially as part of the (learning) experience.

Daily reminder

Participants received a daily reminder regarding Body Scan via e-mail. The reminder was part of the experimental setting, an attempt to maximize the accumulated training of the individuals, groups and condition as a whole, in order to get valid data. Every participants reported satisfaction about receiving the daily reminder, with just one exception, Wanda, who reported a not having an opinion. Responses typically varied from the simple "I found it helpful" to more nuanced statements:

Max: "It was a help […] especially the first one" (Max speculated that he might not have started doing it by himself if he had not received the reminder)

Ursula: “I received it around five so I could do it that night” (Ursula used the daily reminder to structure her training)

Asked about not having an opinion about the daily reminder, Wanda replied:

Interviewer: “Did they [daily reminders] make you think about training, or did you just delete them quickly or…? (laughing)”. Wanda: “Oh yeah, [she thought] I have to do that, but... not today! (laughing)” (Wanda had decided to avoid the training because of discomfort)

To the principal investigator, who was concerned about the risk of participants reacting to the daily e-mails (e.g. annoyance, compliance, or defiance), the primarily constructive reception came as a surprise. That the participants found reminders helpful might be relevant information for trainers, scientists and other training coordinators that are interested in managing information overload and helping practitioners maximize their training outcome. I speculate that the participants positive perception and use of the daily reminder could be part of the explanation of the relatively high training completion rate of 74.4 % (compared to the pooled estimate of 64 % as calculated in Parsons et al., 2017).

However, since the study was not done in a true organizational context, it may be worth considering whether a daily reminder would be received as well by employee participants in a given organization that wants to offer mindfulness trainings. If participants are already e.g. experiencing information overload it is worth considering alternatives, such as making the reminders optional (either an opt-in or opt-out procedure) or providing them in another form in order not to aggravate the problem or incur resistance, which could adversely affect the outcome of the training or indirectly incur additional costs.

Experimental setting

This section explores how being in an experimental setting influenced the participants’ experience of the training. Participants signed up for an experiment, which included a mindfulness training

and resulted in compensation for their time. Thus, some of the insights gained here are arguably relevant for other contexts that include participation and compensation, such as employment. Upon signing up to the original experiment, participants were told that they would need to do "homework" daily, but not that the homework was a daily Body Scan. Participants in the present study generally expressed that they felt curious, interested, and relieved when they later learned that they would be doing daily Body Scans as part of the experiment and not e.g. solving equations or difficult tasks (except for Wanda, who did not like paying attention to her body). While some participants reported perceiving the training as part obligation (participants had different reasons for signing up for the experiment), some of them framed it in a positive way. Bernard reflected that it was a good thing to be "forced" to complete a mindfulness training, which he had been curious about for a while; otherwise, he might not have undertaken the training. Karl reported seeing the experimental setting as an incentive to try mindfulness, but also reflected about the aspect of duty as opposed to wanting to do something (in this case the training):

Karl: "I spoke to my mom about it afterwards and she's also into that kind of thing. I told her that one of the things that bothered me a little bit was trying to find the time in the day to be able to do the practice you know. And that it's always going to feel like a little bit of an imposition as opposed to "I really feel like doing this right now" and she said yeah that's basically one of the reasons why she hasn't been able to do it consistently herself. It's just… You need this sort of discipline to set aside the time that you're going to do it in."

These statements regarding the experimental setting, as well as participants' experience with the other training design elements (the voice recording and the daily reminders to train) show that the external setting had an impact on how participants planned, behaved and experienced the training. To understand why this is important, it is illustrative to compare the present training to the standard 8-week MBSR program, which is more comprehensive and has been developed for over 3 decades. While both include one week of daily Body Scans, the MBSR program starts with a more comprehensive introduction in a group of participants and follows up with weekly group

meetings that always include training with a teacher. These meetings also have the purpose of giving the opportunity to address issues encountered during the training, such as comfort, safety, likes and dislikes. In the present 7-day training, there was only a limited introduction sent via e-mail and no teacher to assist in identifying and addressing difficulties and anomalies. Therefore, with the limited guidance, participants were left to develop their own opinions on the training to a larger degree (for further elaboration, see the section on 'Motivation and Meaning'). This means that what is considered an opportunity for learning in MBSR, e.g. confronting likes / dislikes, was in many cases not actuated in the present 7-day training unless the participant was somehow able seize the opportunity without assistance. For example, why did Karl have distracting thoughts about the voice recording during Body Scans? While this is not known, it is conceivable that this unanswered question represents a missed opportunity for learning and that it acted as a hindrance to his training, which could have been addressed with a different training design. Thus, it becomes apparent that training design elements such as trainer availability (as well as the three above-mentioned elements of the external structure of the training and potentially other elements) are important factors when weighing the potential costs and benefits of a training.

Further, it is reasonable to believe that the millions of people who do not attend e.g. an MBSR and MBCT program (Kachan et al., 2017), but consume mindfulness apps or online videos are typically also confronted with difficulties similar to those confronted by participants in the present study, since they do not receive personalized guidance as part of the training. Thus, the present findings describe participants' issues- and some creative solutions- that may arise when practicing at home without a teacher. For future research and practice, the findings may be helpful towards understanding why some participants train less than recommended, especially for trainings administered online or through apps.

For example, the present data illustrates how participants' experiences and opinions manifest in their mindfulness training as leading to e.g. immersion (e.g. Max and Sandra) or frustration (e.g. Ursula and Karl). It is also relevant input for designing mindfulness interventions in organizations, which includes evaluating the benefits and costs of teacher availability as well as other aspects of the training structure. While it is not possible to draw causal inferences, the directionality (or ambivalence) suggested in the data is summarized in table 1.

Table 1 Suggested association between training design component and training frequency and training outcome

Training design component	Training frequency	Training outcome
Repetitiveness of voice recording	Ambivalent association	Ambivalent association
Pitch, accent, use of pauses of the orator	Ambivalent association	Ambivalent association
Daily reminder	Positive association	Positive association
Obligation to train (experimental setting)	Ambivalent association	Ambivalent association

Table 1 should be understood as representing the data, which has severe limit to generalizability and predictive ability due to the qualitative nature of the research. The reported ambivalent associations mean that in those cases there are differing opinions in the sample and no obvious directionality. For example, regarding the obligation to train, several participants reported appreciating the training, but also relief when the obligation to train ended.

Thus, organizations will face training design issues such as making a given mindfulness training optional or mandatory. In the original experimental study as well as the present study, participants self-selected, and thus I speculate that the aforementioned "obligation to train" would be perceived as more of a negative factor for employee participants in a *mandatory* organizational mindfulness training. If this were the case, making the training mandatory might incur some resistance (as most change interventions do), which could lead to a loss of benefit.

The explorative nature of the present study allows such speculation and suggestions regarding training design but is limited in regards to explanatory power. In order to achieve more accurate

predictions of the outcomes of a mindfulness training (design), future research will have to investigate the relationships between costs, benefits, the situation, and the factors suggested in table 1. More accurate estimates would ideally provide a foundation that enables better comparisons between the (potential) costs and benefits of e.g. 8-week MBSR and MBCT programs, novel training designs, and more customized training modules in different situations (e.g. organizations aiming for performance-related outcomes). This could further dispel some of the "mystery" of mindfulness and provide further legitimacy for the field (for a critique, see Van Dam et al., 2018).

Knowledge and experience (prior)

The following section reports how past experience with and knowledge about mindfulness influenced the mindfulness training frequency and experience.

Participant's relations and reactions to the mindfulness training

Upon talking with social relations (e.g. family, friends, and colleagues) about the mindfulness training, participants received four different kinds of reactions. First, there was positive feedback from people who had experience with the training, like the parents of Ursula that had extensive practice experience, or the friend of Karl saying it was "fun" or the father of Karl, who is "totally into it". Second, there was pragmatic feedback from people who did not have prior experience, such as the boyfriend of Alina, who thought it might make sense from an "optimization perspective" and that she should "just get started and see if it has an effect", and the friends of Ursula, who are "are very open about this [mindfulness]". Third, there were neutral comments like Martina's husband, who just acknowledged her training without offering an opinion or the flat mates of Agnes whose reaction was "nothing special like, ah okay". Fourth was Marcus, who had never practiced mindfulness before, but liked the training so much he attempted to get his

colleagues and sister (who was giving birth soon and he believed needed to take a break once in a while) to start practicing mindfulness, so that they could also reap the same benefits he was getting. This behavior resulted in him being teased by his colleagues, though in a friendly manner. Thus, Marcus was the only participant who received something resembling negative feedback. Finally, a few participants did not talk with social relations about the training. Bernard reported being curious about the training and finding it relaxing ("yeah I think maybe I was surprised how relaxing it was") and enjoyable. However, he did not talk to anyone about it: "[the training] was not that big a thing for me so it was just something I did by myself".

At this point, it seems relevant to reflect critically upon the primarily positive reactions to the mindfulness training. Some participants mentioned that they could imagine facing negative opinions; however, only Marcus faced teasing after attempting to convince his colleagues to start training mindfulness. Why are there no critical reactions to the mindfulness training when even a few of the participants expressed skepticism? A reason could be participant bias, a well-known pitfall of especially qualitative research. However, since the participants generally did not seem to find it difficult to speak of difficult aspects of the training, participant bias does not seem to be a sufficient explanation in this case. An alternative explanation is that the participants were careful with whom they talked about the training. It is possible that the positive reactions, or lack of negative reactions, could either be attributed to the participants avoiding telling people they would expect negative reactions from, or that the people they told about the training for some reason avoided responding negatively. For now, uncovering this relationship is outside the scope of the present study and it is only possible to speculate.

In summary, participants with social relations that have expressed favorable opinions about mindfulness report going into the training with curiosity and interest. In contrast, participants that had not heard social relations express an opinion reported going into the training with an attitude

ranging from skeptical (e.g. Ferdinand) to curious (e.g. Max). Uncovering more about how a mindfulness training and its outcomes are influenced by participants' social relations expressing negative opinions about mindfulness will be up to future research, since no such instances occurred in the present research.

Participants' knowledge of, opinions on and experience with mindfulness

All of the participants had heard of mindfulness before. The depth of prior knowledge about mindfulness ranged from superficial to partial understanding. Participants with superficial knowledge reported: "hearing the word [mindfulness] but I couldn't associate it with anything" (Max) and "meh I have heard mindfulness but [...] I have not heard about Body Scan" (Agnes). Other participants reported having an active interest: "I've heard about it and read about it… I actually think it is very present in everything these days" (Sandra).

One participant reported having an experience based idea of what mindfulness training is:

Martina: "[Mindfulness is] this sort of muscle you have, where you're trying to learn to be in the present moment, and notice what's going on with yourself. Which is a struggle, for me, so it's something that I… I'll think of it and kind of come back to it here and there, but I'll definitely know… like Yoda in mindfulness (laughing)."

A few of the participants expressed skepticism, "At least I didn't believe before… now I started to like think about it… but I… yeah… I'm kind of skeptical about it" (Ferdinand). However, most participants had favorable opinions of mindfulness, ranging from the scientific "I think there are also … erm quite well documented scientific reasons for believing in these sort of things as well right" (Karl) to the experience based "it was really good […] I think it's a super helpful and important practice" (Martina).

Most had heard about or tried some kind of mindfulness related practice, such as training yoga or meditation at a fitness studio, or by downloading an app or watching videos online. Participants

reported experiences with the mindfulness training ranging from neutral to good, except Wanda, who previously had encountered it once at work, but had to leave the room due to discomfort: "Paying attention on each part of your body, I cannot do that. It is actually something I try to avoid. Because I have already had problems where I like pay too much attention like on my stomach region, and then I found out I had stomach pain but I did not have (laughing)."

In summary, there were no self-reported experts or advanced practitioners; knowledge of-, and experience with mindfulness was limited while most participants had favorable opinions. There does not seem to be a clear pattern regarding the prior knowledge and experience of individual participants and their training frequency. For example, Ferdinand, one of the few participant that expressed being skeptical at the outset completed each training and reported that he had benefited from the training. Conversely, the majority of the participants that skipped Body Scans during the training still reported favorable opinions about mindfulness training.

A notable exception was the case of Wanda, where her prior negative experience as well as anxiety-related discomfort with paying attention to her body directly conditioned her reaction, which was to skip four of the Body Scans and interrupt the three she did attempt. Looking at the case of Wanda, I speculate that in order for an organization to plan and execute a successful mindfulness training and avoid unintended consequences; it is necessary to have some understanding of how participants' characteristics and prior experiences may influence the training experience and outcomes. Thus, if a high training frequency is a goal, then future training designs may want to accommodate cases such as Wanda, for example by collecting relevant information on participants in advance and adapting the training accordingly. Conversely, the present findings do not indicate that e.g. providing additional information would increase participants' training frequency or improve training outcomes.

Liminal States

The following section reports how the physical and psychological state of participants entering the training influenced factors such as participants' experience and frequency of the training. Liminal refers to participants entering – crossing the threshold to – the training.

Participants' states and experiences at the start of the training

All participants completed their training in November and December 2017 during normal working weeks. Whatever participants were experiencing at the time would be their point of departure for the training, which led to variations in the experiences and outcomes of the training. Four patterns of experience were identified: good first experience and then decline, slow improvement, discomfort and avoidance, and mixed.

First, some participants reported having a (sometimes surprisingly) "good" experience during the first Body Scan. In some of these cases, the experience subsequently declined in quality for each Body Scan. Agnes reported being stressed all the time, having many things to do, but finding time for the Body Scan and that the first time she "experienced the most attention compared to all the other days". She enjoyed being guided, so that her "mind stays present". Later in the training, she would sometimes fall asleep for short periods, because she was tired due to working night shifts and because she had become familiar with the guided voice recording. She also noticed herself, during the Body Scans, beginning to make plans as she became increasingly familiar with the Body Scan.

Karl also enjoyed the first Body Scan and similar to Agnes, he became less focused over time with increasing familiarity with the Body Scan audio recording. He started having thoughts during the Body Scans that predicted what the audio recording would say next, which he reported distracted and annoyed him: "In the first [Body Scan] there were better elements of novelty that really worked for me". Like a few other participants, Karl went on to suggest that this might be a

problem many people experience and that it is part of the explanation for why some people prefer classes, where the routine changes every time.

Thus, a good first experience of the Body Scan can be followed by less intense experiences and in some cases a degree of frustration. Both Agnes and Karl attribute their declining experience to the repetitiveness of the audio recording, and it is worth noting that in mindfulness programs such experiences are typically viewed as possibilities for learning (for further elaboration see the discussion in the section on External structure).

Second, other participants reported that the experience got better with time, often reporting some nervousness during the first Body Scan and that they progressively enjoyed the Body Scans because of e.g. increasing familiarity with the guided Body Scan. For example, Bernard, who found the Body Scans surprisingly relaxing and noted that with time, "I started to enjoy that I should do it once a day". Max likened the Body Scan recording with listening to a favorite song, an experience that can get better over time. For him, the repetitiveness of the recording helped him deepen the experience and make it easier to complete the training:

Max: "It was easier the second or the third time, yeah, because you could after that remember what the order of checking was. […] It's the same like having a favorite song, you know what to expect, right, so you just enjoy it a little bit more."

Third, two participants reported having a bad first experience, which in both cases led to avoidance strategies that resulted in skipping and interrupting Body Scans. Wanda reported experiencing discomfort from paying attention to her own body, so when she realized that she was supposed to do Body Scans, she got anxious (remembering a previous bad experience), tried to complete the first one but eventually interrupted it. Alina was in a busy period of work with tight deadlines around the time she completed the training. In contrast to Wanda, she looked forward to the training, but she thought that 30 minutes a day sounded like a long time. She reported wanting

to be “a person that could easily sit down and meditate for half an hour […] but there was just the matter of that [long] duration [laughing]”. Further, her boyfriend encouraged her, and thought it was interesting from an “optimization perspective” and was curious to see if and how it worked. For Alina’s first Body Scan, she had placed a thin sleeping pad on the floor, which she thought was rather uncomfortable (later she would choose the couch or a bed). She did not do anything to make it more comfortable, and she chose to stay completely still for the entire 30 minutes. During the Body Scan, it became increasingly unpleasant. She also reported completing it straight after work, without having eaten anything, which made her irritable. As a result, she felt incompetent for not being able to do the Body Scan ‘right’, and had similar experiences during subsequent Body Scans, which led her to interrupting one and skipping two. As discussed in the section on ‘External structure’, perhaps the feeling of incompetence and subsequent negative experiences could have been avoided or mitigated, for example, if she had received the support of a teacher.

Fourth, some participants reported having a mixed experience of the Body Scans with no clear progression. This was in some cases attributed to external circumstances in the family or at work. Other participants reported experiencing e.g. bodily unrest or feelings of anxiety, which they reported did not have to do with their social life. Entering the training, Ursula reported feeling uncomfortable due to a feeling of unrest in her body, which was related to other issues than the mindfulness training. She was unsure of what exactly to expect from the training, but felt relieved when she experienced the Body Scan. She reported that “after ten minutes or so I felt it ease down so I became more relaxed in the situation” and she felt “able to be where I am right now because I’m not stressed about I have to do ‘this’ in order to progress.” Ursula reported having a similar experience of calming down about 10 minutes into each Body Scan, and did not experience any particular ascending or declining trend in experience or outcome of the training.

Other participants were impacted by events in their family and social life around the start of the training, which influenced the subsequent training experience to varying degrees. In one case, which involved the passing of a close relative, the participant chose to skip three days of the training, since there were many important things to take care of (the relative was in another country, a third of the way around the globe, so flights had to be arranged etc.). She still reported benefitting from the training, even though she fell asleep in two of the trainings:

Martina: "I didn't know she was going to die, but she was really sick already, so I thought she would live another year but it was a super stressful thing going on… And like I said, in my marriage there's a lot of stress right now. I actually think that's why I fall asleep whenever I do some sort of meditation or mindfulness. It is because I'm so much in my head that, I, it's a rare kind of relaxation for me, that sort of 'wow I'm like really in the present moment, I'm really focused', it's just not a kind of relaxation that I experience that often."

In other cases, which were not as extreme, the participants were able to use the training to their benefit. In her own words, Sandra had been "distracting myself a lot" any time she would have spare time, in order not to think about the troubles in her family. She reported that the Body Scan helped her relax, and that it gave her space to feel the sadness she "had been pushing away" and relate to herself, which was a partially unpleasant experience, but a good thing in the bigger picture. This also led to her downloading the online audio recording of the Body Scan, so she would be able to use it and benefit from it in a similar situation.

In summary, except for Alina and Wanda, participants generally enjoyed and benefitted from the first training experience. The type of benefit seems partially contingent on their state when entering the training, as in the case of Sandra, who felt relaxed due to the training and released suppressed sadness during her first Body Scan, which to her was a revelatory experience that led her to continue training even after the experiment was formally completed. The four patterns of experience indicate that the state going into the training is one of several factors that influence

participants' training experience, frequency, decisions or behavior. In the first and third case, participants experienced difficulties that were not addressed, which suggests that they benefitted less from the training, and in the third case, it led to a reduced training frequency. Again, I speculate that such problematic, unintended consequences of the training that were left unmanaged could possibly have been alleviated with a different training design that included e.g. more guidance.

Since it seems that participants' prior knowledge of and experience with mindfulness, as well as their initial experience can have some bearing on the outcomes of a training, it may be prudent to gather relevant participant information on these issues when planning a mindfulness training in an organization. This could or example help clarify participants' expectations - and in some cases accommodate or attempt to correct them - which could be worth considering, since expectations can have an impact on the training. Alternatively (or in addition), providing additional information on the purpose of the training and offering opportunities to discuss (unpleasant) experiences could also be a way to help participants who have difficulty understanding and coping with their training experiences, like Alina, who felt stuck due to her unrealistic expectations not being met.

Experience

During the training, the lived experience feeds into the overall experience and outcome of the training. Thus, the present section outlines participants' experiences and describes how they were interpreted and how they influenced the subsequent overall experience and perception of the mindfulness training, as well as training-related behavior and decisions. This includes elements such as perceived benefits of the training, choices about routine, and choices about where and when to train all influence the experience and outcome of the training.

Where, when and how participants train

The Body Scan instructions are to train while lying on a yoga mat or similar, which many participants did especially the first time. Participants also adapted as they saw fit or as necessitated by circumstances, such as using couches, beds, or sitting postures. One contrary example to this behavior is Alina, who during the first Body Scan Alina forced herself to stay still on the yoga mat, which she found uncomfortable. She subsequently speculated that this "forcing" herself, which did not live up to her self-image, set the scene for ensuing feelings of incompetence and failure. Other participants improvised freely when faced with not being able to complete a Body Scan as recommended. For example, one participant reported completing a Body Scan while sitting on a bus, and another completed one on the train. The audio file was played on laptops and mobile phones. Most participants chose loudspeakers and a few chose ear buds. Unexpectedly, some participants chose to share the trainings with their significant other:

Ursula: "I actually did it [the training] with my boyfriend a couple of times because he was in town […] but that worked fine I think, but it was of course because you have to be very focused (laughing) on yourself it's a bit weird being two."

Ferdinand: "It was kind of (funny)... at least for the first part. I think she could only managed until the right leg, and then she was just falling asleep."

In summary, participants mostly adhered to the guidelines, with some participants making minor adaptations in completing the Body Scans. A few of these participants expressed uncertainty as to whether it was "ok" that they had completed a Body Scan e.g. with a partner or on the train or lying on the bed (the latter is discouraged due to the risk of sleepiness). Two participants, Wanda and Alina, did not find a way to do the Body Scan that enabled them to accept their experienced frustration and discomfort or lower it to a level that was acceptable to them, which led to them skipping and interrupting several Body Scans. Alina suggested that if the Body Scan had been less than 30 minutes, it might have been easier for her, while Wanda suggested that it would have to be completely different (to the point of not being a Body Scan) for her to feel comfortable.

Routine – convenience and structure – actual and ideal circumstances

It was up to participants to decide when to do the Body Scan during the day. None of the participants decided to complete the body at a fixed time each day, but some participants ended up doing the Body Scan at roughly the same time during weekdays, which they reported was mostly due to the structure of their daily routine. Weekends would often disrupt this structure, since these days would look different relative to their daily routine of e.g. work or school.

It was registered electronically that most participants did the training sometime after coming home from work or school (one person was unemployed), in the time between the late afternoon and late night. About half of the participants noted that they would have ideally like to train in the morning, with some noting that that enabled them to carry the effects into the rest of the day:

Martina: "Ideally, I think I would do it in the morning because then I'm centered for the whole day or I've at least started off right. But the morning's such a crazy time and I often get to bed too late so, yeah, it often ends up being in the night that I'm sort of doing a spiritual practice or something as I'm going to sleep trying to sort of, calm my mind."

Alina: "The morning would have been the best time [for the Body Scan] since this is when I am most present […] it is really just a bad excuse to say you do not have time, because you could just go to work a bit later."

Ursula: "I think ideally I would do it before going to classes, in the morning. So I have the sensation throughout the day because sometimes it can be lost over the night."

Karl: "The first time I did the Body Scan was in the morning. I felt the effect for quite a while into the day… so I felt like it was almost a bit of a shame to do it so late that you know… I would be asleep."

A few participants tried training in the morning, yet the maximum amount of practices recorded before 10:00 am is two (for a single participant). Thus, while about half of the participants thought it would result in a better outcome to train in the morning, they did not do it. Others reported

preferring the evening for practical reasons. Max preferred training "in the evening time or late afternoon evening, yeah [...] well I think it's just my working habit you know. I don't have time for additional tasks [during the day]." Thus, the majority of the participants trained after work out of convenience:

Sandra: "It is easier to do when you are done with the day […] it is not because I think it would not work in the morning, it just has not fit in."

Agnes: "I think, if I hadn't been working maybe I would have said: okay I'm gonna do it every day at eight or in the morning, but I didn't because I was having so many different timetables." (Agnes attended University and worked night shifts in a warehouse)

Some participants reported that the training made them relaxed or slowed them down, which they saw as a good reason to train in the evening:

Max: "Yeah, that was the evening activity, yeah, because you know when it slows you down a little bit, sometimes you can't afford to be slowed down in the morning."

Karl: "[The training] normally put me in a very good kind of state to go sleep afterwards [laughing]. Not that I would always go to sleep straight afterwards but, you know, there's always that kind of relaxation that came with it."

For the one participant, Martina, who reported that she had actively wanted to create a routine, a close relative was hospitalized during the training. She commented: "It was like strange circumstances […] I intended to have a routine but I didn't (laughing)". Although she was looking forward to the training, the hospitalization led to overwhelming emotions, and set in motion planning and travel activities, which on several occasions disrupted the training. Martina commented that "I didn't wanna let you down [the experiment], I was like: okay I really have to help with this, and again, I know it's good for me". This is an example how the personal intentions and goals regarding the mindfulness training may be disrupted by unexpected events that are given a higher priority by the participant.

The role of the daily reminder has already been explored as part of the External Structure, but what role did it play concerning routine? One participant, Ursula, reported using it to structure her training, while others noted that without it they might have forgotten to train. This leads to the question if the structure provided by the daily reminder kept the participants from making their own structure? Did it influence the participants to train more (or less)? It is difficult to answer these questions, since all of the participants were sent reminders. However, several participants voiced the opinion that having structures such as signing up, daily reminders, and completing a task at the end of the training assisted them in completing the training, which they might not otherwise have done as thoroughly. Thus, this may help explain why the completion rate in the present training is about 10 % higher than the calculated average of Parsons et al. (2017).

Perceived and speculated benefits of the mindfulness training

The participants reported that the benefits of the training that they perceived were mostly incremental (in contrast to long term). A few typical description of the perceived benefits:

Karl: "What I really enjoyed was that kind of bodily self-awareness and then… [I could] take [the bodily self-awareness] on into the day and it somehow improves my mood."

Sandra: "I think that from it [mindfulness] you get a little more relaxed and present; you are forced to be more present in yourself. […] I think it [the training] had the same value every time, or I think that I was forced to be with myself… and… the result of that was good every time I believe… I think I could kind of say to myself: it is good that you are doing this for yourself."

Ursula: "Feeling calm I think and not worrying too much about having to do the stuff I have to do, and more being at ease with that it would work out. Yeah, and if I don't make them it wouldn't even really matter."

Further, Ursula mentioned that the Body Scans reminded her of the breath work and posture exercises she had previously practiced as a singer, which would increase her training outcomes. Like Ursula, Martina was reminded of previous practice:

Martina: “Well, actually it did sort of make it salient in my mind that this is something that I want to get back to, so yesterday I actually did Headspace [an online platform that offers guided Mindfulness] again.”

Thus, while some participants enjoyed present-moment and short-term effects of the training, the participants generally did not report long-term changes. Participants were also asked to speculate about the benefits on a more performative level regarding solving a task individually and as a group. No participants thought it would be detrimental. Some participants did not think it had made a measurable difference and others speculated it had made a small to medium difference. A few participants suggested that the group might experience less conflict because of the mindfulness training. For example:

Sandra: “I thought that our group work went really well. I thought that if you are a little less relaxed [then conflict would more easily arise] […] so I think the days where you did not get that much sleep or are trying to put some things away [psychologically] then conflict arises more easily.”

She also suggested that mindfulness training might be especially useful for certain professions, and used an analogy from doctor-patient communication; just because a doctor is busy, she does not automatically have to express it through her actions and speech. Rather, being hurried and seeming busy typically results in consultations lasting longer than necessary, which would only cause her to get even busier. Sandra speculated that the calmness of being mindful could assist in “taking the time that is needed without taking more time than needed”, which should help groups work more efficiently.

Bernard commented that he thought it might help some people think more clearly.

Bernard: "People tend to use it in a positive way and think more clearly. I think it’s a good thing, but if they do it [think clearly] already it might not have an effect. [...] So… Yeah, it might help people to stay focused and concentrated. But not everyone.”

Ursula further suggested improvements in the group work:

Ursula: "I imagine that I was better at listening to the others during the group task, so maybe because I had heard their arguments out. I… I could change some things [open to change her own previous choices] and I was, very open to the fact that it could be altered from my own individual task."

In summary, perceived benefits were related to being present, relaxed, and more aware. Suggested performative benefits were related to clear thinking, less conflict, calmness while being busy, and better listening. Recent reviews report that many of these factors are positively related to various organizational outcomes, such as task-performance (Good et al., 2016; Sutcliffe et al., 2016).

Regarding the possibility of long-term changes, Agnes expressed a belief that if she were devoted and trained regularly she would expect lasting "beneficial change", which in her case could mean being more relaxed. This was echoed by Max, who expressed that while the training improved his mood short-term, he was unsure if it carried over into the next day, and that a more long-term effect would require more training. This is in line with Goleman and Davidson (2017), who report that long-term changes, such as altering traits, can take up to thousands of hours of practice. This is a relevant concern for organizations that wish to evaluate the costs and benefits of creating lasting change through mindfulness.

Participants' difficult experiences during the training

Out of 22 participants, 20 participants reported having mostly beneficial training experiences. They ranged from the participant who found the experience interesting and beneficial, but found that taking walks was better for his purposes, to the participant that found it so rewarding, that he reported wanting to continue the training and trying to convince friends, colleagues and family to try out mindfulness as well. The remaining two participants respectively 1) had previously had a very unpleasant experience with a Body Scan. She subsequently actively avoided the given

training (remember, she literally did not know what she signed up for) after trying it out once and still finding it unpleasant. She reported becoming worried and anxious and having unpleasant feelings and sensations when attending to her body during the Body Scan. 2) The participant Alina found the training interesting but reported finding it difficult and frustrating staying still for more than 15-20 minutes. She attributed the frustration to the training being different from her expectations. When asked about what her expectations were, and where she had them from, she realized that she was not sure, and started to reflect on the role that her expectations had played in her experience of the training:

Alina: "In my head, it was something that was supposed to be... pleasant I don't know, but that one was supposed to feel better [from doing the training]. But, I think it is very interesting with that... struggle, and yes- that it does not have to be a pleasant experience […] so maybe it is because I had the wrong idea about, what I was supposed to be doing."

Part of the frustration, according to Alina, was due to deeper conflicts in her self-perception, which were also exacerbated by her realizing that she let her self be distracted a lot, e.g. by checking her telephone a lot during the day, without really noticing. "I had thought about myself as a person that could focus, but obviously I could not". Finally, she reflected that perhaps with different expectations, she could have had a different experience.

While a majority of the participants reported that major benefits to them were relaxation and well-being, Sandra reported that her experiences with the mindfulness training were generally not pleasant, but she still found them rewarding in another sense.

Sandra: "[The experience of the training] was not like 'Oh, I'm just happy, totally happy after it [the training]' but I think it [her experience during the training] has got to do with the surrounding events. I think that the first day I had a few other things on my mind regarding my family and such. I think I had noticed that I had distracted myself a lot during those days, in a way that if I did not have anything to do, then at least I could just "activate" myself a little or something. Then, on the first day of the training, I could feel that, oh, it is not that often I am just lying and not thinking

of anything but how my arm feels. I got sad because something sad was happening to my family and so, I had to relate to that. Or rather, I had to relate to myself. Yeah, so in that case it [the training] somehow forced you, because I had pushed it away."

Sandra reported feeling more bodily relaxed after the Body Scans, and downloading the audio file in order to be able to use it again in similar circumstances because she thought it worked "really well".

In summary, the lived experience of the training and decisions made during the training can have profound effects on the experience of the training. Most participants experienced benefits such as increased presence and awareness as well as a relaxation and a clear mind. Two participants experienced discomfort and did not report benefitting from the training, with one participant experiencing discomfort, yet identifying and experiencing the underlying feeling of sadness, which led her to report having benefit from the training. These decisions and behaviors are illustrated in table 2, which suggests that the training frequency as well as training outcome is associated with participants' abilities to identify the cause of discomfort as well as experience or contain e.g. an underlying feeling.

Table 2 Suggested association between unpleasant training experiences and training frequency and outcome

Training experience	Training frequency	Training outcome
Experiencing discomfort, not able to identify cause (Alina)	Negative association	Negative association
Experiencing discomfort, able to identify cause and unable to contain the underlying emotion (Wanda)	Negative association	Negative association
Experiencing discomfort, able to identify cause and experience the underlying emotion (Sandra)	Positive association	Positive association

Furthermore, participants reported that their training decisions such as when to train influenced the type of the outcome. For example, Ferdinand, who trained before going to bed, and had experienced stress and insomnia, reported getting a good night's sleep, which was valuable to him.

Karl, who trained in the morning, experienced a positive, relaxed, yet heightened state of bodily awareness during his first day of practice.

When asked, most participants speculated that mindfulness training had a positive association to task performance, yet only a few participants were able to describe how mindfulness had actually influenced them during group work on a task. Finally, that the quality of the outcome changes with training decisions points to a possible need for a more stringent training design, if the goal is to promote certain performative outcomes (and not e.g. just better sleep).

The present section shows that participants' ability to navigate the training is important for the outcome, and that not all participants are equally able. Thus, a fundamental cost-benefit consideration for an organization offering a mindfulness training is how much support to offer participants during the training, in order to provide sufficient help for them to navigate it in a way that promotes the success of the training. Such a discussion could include elements such as the needs of the employee(s) and the organization, possible alternatives, as well as available resources. For example, should the training be exclusively offered online, which is typically cheaper, should the training include a weekly meeting with group discussion and a trainer like in the 8-week MBSR program, or should a hotline be available for personal counseling? Alternatively, in the case of senior decision-makers, their time may be sufficiently valuable to warrant a personal trainer.

Motivation and Meaning

This section addresses how participants perceive and make sense of the training. What do they perceive as the 'objective' reasons to practice mindfulness and why do they personally choose to do so. This section further reports how some participants, in lack of knowledge of mindfulness, invent their own reasons for practicing mindfulness. Since guilt and conscience emerged as a

theme during the interviews, the section explores the various ways in which participants coped with feelings of guilt or, in some cases, failed to do so.

Reasons and motivation for training, how it emerges and changes

The two factors of compensation and interest in experiments were reported as the main motivation to sign up to the experiment that included the present 7-day mindfulness training. However, participants still reported having varying degrees and types of motivation for doing the training (some emerged during the training), which is also expected to be the case in other contexts, such as employment in an organization that offers mindfulness trainings. The experimental setup in no way stated or implied that it would detract from the compensation or have other negative consequences if participants skipped or interrupted training, nor did any participants state that they feared this.

Reasons to complete the training. Participant's reasons to complete the training could be defined in two broad categories. The first category contained participants that wanted to benefit from the training[7], and the second category contained those that wanted to avoid missing a training, because they believed it might somehow be detrimental to the experimental context that included the training. The latter is explored in the subsequent section. Participants were in either group or both, such as Sandra, who completed the training "to get something out of it" and did not want to skip sessions because she did not want to inadvertently "mess up the experiment". How the participants expected to and perceived to benefit from the training differed between participants, and so did the degree to which they worried about the experiment.

Extrinsic motivation. Some participants also used the experimental structure as extrinsic motivation to train mindfulness. Agnes used an analogy from athletics to describe the mechanism

[7] See the section "Experience" for elaboration on benefits.

of how the external structure helped her do something, which she wanted to commit to but had difficulty doing without the feeling of obligation to others:

Agnes: "I used to do athletics and I was doing it three days a week and I didn't have any problem of going. Oh maybe I'm lazy, but okay, I have to go and then I had a lot of fun. Now that I'm not doing it anymore, it's very difficult for me to say, 'okay I'm gonna go running'. Because I don't have a specific structure. I don't have, like someone [e.g. teammates or group members] that is waiting for me, you know what I mean?"

Thus, the social obligation was an important motivator for Agnes to complete trainings that she believed were good for her. Agnes elaborated, calling it a "compromise", that if she made a plan when to go running (or in this case doing mindfulness), then she would get it done because then "you don't plan something else for that moment", which would interfere with the training. If she did not plan and have social obligations, she found that it was be too easy to find excuses to do something else in the given moment. Bernard, talking about why he completed all the trainings, reported a variation of this kind of motivation:

Bernard: "I did because I saw it more like an opportunity to try it [mindfulness] more than just something I should do so. […] Maybe I saw some videos or something where people seemed to be relaxed and confident… That was appealing for me."

Lack of motivation. Participants that did not complete all the trainings could typically still list reasons for training. For example, Alina had her own reasons to train, yet experienced lack of motivation to complete the mindfulness training:

Alina: "The reason that I would like to do things like that [e.g. mindfulness] is because I think a lot, meaning that I am in my head a lot. I worry about everything and I think it could be beneficial to try to tidy up all of that. But, it seems I did not want it enough [referencing her feeling of having failed in the training]. […] I find it interesting and I would like to be the kind of person who could just sit down and meditate for a half an hour."

Thus, while Alina reported finding the training interesting and expected it to be beneficial, she experienced some discomfort and had difficulty finding the time, and her expectation that she would feel good, relaxed and gain mental clarity did not come true. This led her to skip two Body Scans and interrupt one. She had previously downloaded a mindfulness app featuring ten- minute breathing exercises. However, after using it briefly, she "drifted away from it again".

Thus, in completing a training that they were compensated for doing, participants generally developed their own complementary reasons and motives to train. In some cases they were disrupted during the training due to external circumstances (e.g. Martina) or changed e.g. because the training was different than expected (e.g. Alina), which led to feelings of guilt, decreased training outcomes and training less than prescribed.

Guilt and duty

During the interviews, it emerged that feelings of duty and obligation as well as guilt played an important role in the participants' training behavior. Participants that reported feeling guilty because they skipped or interrupted training reported that they felt guilty towards the people behind the experiment or towards the other participants in the experiment. Guilt was expressed to varying degrees, as exemplified by Sandra and Alina in the following:

Sandra: "I think I used the training for myself. I think it helped me [to complete and enjoy the training] to think that now I am doing it for myself rather than doing it for others… but still, I did not feel guilty towards myself, the one time I aborted a Body Scan [but towards the experiment]."

Sandra speculated that she believed that if she had signed up for the training without being compensated for her time, or if she had paid for the training, then she would not have felt guilty. Another participant, Alina, reported that she did not complete the training in a way that conformed to her self-image and sense of duty:

Alina: "There was a day where I had started the recording, and then after about twenty minutes I just could not carry on and just let it run the last ten minutes [without her participation], which I felt crazy bad about. […] I do not know what it was, I just felt so uncomfortable. […] It was important, because now I had said yes to this [training], so there was not anything else I could do [implied: except continue doing the training]. […] I thought a lot about that I did not want to destroy the data [for the experiment]."

Thus, the difficulties with the training led Alina to skip and interrupt Body Scans, which led to strong feelings of guilt and rumination. Further, during the training, she had begun to notice the high frequency with which she was checking her mobile phone, which also did not conform to her self-image. She reported that these factors fed into each other, which resulted in additional worrying, frustration, and feelings of incompetence and guilt.

Navigating guilt. Other participants found ways to navigate the training and avoid guilt. For example Karl, who when realizing that he had forgotten the first day of practice, decided to practice twice on the second day and subsequently completed all seven Body Scans:

Karl: "I think there was probably like an overarching sense of duty. I study cognitive semiotics as well, so I appreciate these experiments. I didn't want to in any way, you know, confound your results or anything like that. So I felt like I should try to do it as consistently as everyone else was doing it. There was maybe a little bit of annoyance that I had missed the first day and I was going to have to do it twice in one day… but mostly I was looking forward to it. I mean, I thought that I would enjoy it anyway and I did."

Thus, Karl found a way to conform to his sense of duty and avoid feelings of guilt, in spite of feeling slightly annoyed about having to complete two Body Scans in one day. In contrast, in Martina's case of a close relative passing away unexpectedly, which demanded a lot of time, she decided to skip four trainings, which led to strong feelings of guilt.

Martina "I remember feeling really guilty (laughing) that I didn't do more, because I'm someone who follows through on things, and wants to do things well, and I try not to flake out on people. So I felt guilty, and my mind was very distracted with the family stuff."

In summary, emergent feelings of guilt were reported to influence the training frequency to varying degrees depending on the situation of the participant. Participants that deviated more generally felt more guilt (e.g. Alina and Martina), with the exception of Wanda. Further, the influence of guilt on training frequency seems to be strongly contingent on other factors, such as participants' sense of duty, as well as capacity and ability to generate creative strategies to avoid guilt. For example Karl managing to complete seven days of training in spite of missing his first day. In contrast, the resources that Martina spent on navigating the loss of a close relative did not leave her with enough capacity to complete the training in a way that aligned with her strong sense of duty and motivation.

Perceived alternatives to mindfulness

In some cases, participants' motivation to train was influenced by comparisons made to perceived alternatives, such as walking or running. This was especially the case when asked about whether they could imagine continuing training after the 7-day mindfulness training. The reported comparison give insight into how participants perceive mindfulness. One example is Bernard, who reported not wanting to continue doing Body Scans, but would resort to walking instead when he needed to relax:

Bernard: "I do some other things that make me feel relaxed and it's easy for me to stay focused on things so… if that was not the reason, I think this [mindfulness training] could have helped, but I do some things, for instance, I walk a lot outside so in nature which makes me feel relaxed. […] I'm used to not having too many things going on at the same time so that might be a reason why I didn't change anything in that direction."

Thus, Bernard reasons that for him walking in nature is a better means to achieve his goals of e.g. feeling relaxed, focused and dealing with "many things going on".

Physical training. Ferdinand compared Body Scans to yoga and his usual physical exercise:

Ferdinand: "I tried to go to yoga once but I didn't really enjoy it. I mean it wasn't bad but I'm just used to training. I took it [the Yoga session] more as a training and when I don't sweat I don't see the result and also I just thought... Honestly, I also don't really believe in mindfulness and stuff like this. At least I didn't believe before. Now I start to think about it... But I... Yeah … I'm kind of skeptical about it."

Ferdinand was initially not interested in training that did not produce visible results such as muscular hypertrophy, which to him was the primary goal of training. Later in the interview, Ferdinand stated that he has previously been diagnosed with stress, which included severe psychosomatic symptoms such as loss of speech (he still experienced some stress at the point of the interview) and has begun investigating mindfulness and other forms of stress reducing tools. Asked what changed his mind about mindfulness:

Ferdinand: "I think mostly it was just my ignorance because I didn't know much, and some stuff that I heard it said it's [mindfulness] gonna save you from everything and I was like 'yeah it's just bullshit probably' so that's why I didn't [believe in mindfulness]."

Doing nothing. Finally, Karl explained that he saw "doing nothing" as an alternative to mindfulness:

Karl: "I think this kind of training is something that suits me but that I've never felt a very strong need to do… Because I feel like I'm already quite good at… You know, I'm not the kind of person who feels like they have to maximize productivity all of the time. I'm really happy to not do anything for quite a long time and I feel like that's almost like a less stringent almost alternative practice to something like mindfulness or meditation. Just this idea that… You know, you can just allow yourself to not do anything and just be."

Thus, participants compared mindfulness to alternatives and made sense of the training in different ways. They evaluated the worth of mindfulness by its perceived capacity to provide as much or more benefit as their alternative(s) or provide novel benefit. For example, regarding novelty, Sandra stated that the value of the training did not come from replacing anything she did in her life, that it was something new. The participants suggested that if the perceived benefit of the

mindfulness training exceeded that of the alternative, then it would lead to them considering continuing the training in the future. Thus, this study offers a rare glimpse into how participants make sense of a mindfulness training with less guidance and where the purpose is not as explicit, as in the 8-week MBSR and MBCT programs. In the MBSR and MBCT programs, a part of which is conducted over several hours in groups with a teacher, they facilitate more official, concerted sensemaking, which has been speculated to have a profound impact on outcomes of Mindfulness Based Interventions (MBIs, Lloyd, White, Eames, & Crane, 2017).

As mentioned in the above section on how participants experienced and navigated the mindfulness training, it could also be prudent to consider providing more intensive or personal support in an organization that offers mindfulness trainings in the context of meaning, motivation and guilt. It is conceivable that the right support could help navigate meaning, motivation and guilt in a way that is conducive of the training as well as personal and organizational outcomes.

Deviance

This section addresses when and how participants skip, interrupt, or fall asleep during training, and how this influences training frequency and outcomes

Falling asleep during training

In spite of the voice recording suggesting ways to avoid falling asleep during training (e.g. opening your eyes or raising your lower arm to a vertical position), some participants fell asleep during Body Scans due to deep relaxation and tiredness. Most reported sleeping briefly, while a few would sleep for hours. It has been speculated that because sleep deprivation is a commonly occurring phenomenon (Owens, 2014), falling asleep briefly is a common experience especially during Body Scans, a somatic-oriented practice, which is typically done lying down. How often participants tend to fall asleep during practice or the typical duration of sleep does not seem to

have been documented in a systematic way, however, experienced teachers such as Jon Kabat-Zinn report that it is a common experience (Kabat-Zinn, 2018). Some participants remember the given advice when they get tired (e.g. "open your eyes"), such as Sandra, who reported that while she had to abort one Body Scan due to tiredness, usually she would follow the advice. "The recording says in the beginning, that if you are getting tired, then open your eyes, and that is what I did, and then it was fine." Others, like Ursula, Karl, or Agnes who worked night shifts, regularly fell asleep for brief periods. Martina, who reported never falling asleep or napping during the day, was surprised at the level of relaxation she achieved during the Body Scans, which sometimes led her to fall asleep. Agnes reported that she found it comfortable:

Agnes: "Sometimes I was very tired and, I remember that some of the times [Body Scans] I, I didn't fall asleep the whole time. But, you know, some moments during the practice. […] Yeah, it was comfortable."

The deep bodily relaxation that can follow from a Body Scan, which the body can interpret as a signal to go to sleep, can naturally lead to sleepiness and falling asleep. Table 3 shows suggested associations between falling asleep during training and training frequency and outcomes. In order to avoid ambivalence, falling asleep has been separated into two factors that do not overlap, but with the first "Becoming sufficiently relaxed to fall asleep" during training being a precondition for the second "Falling asleep during training". The data does not give a strong indication that it is a factor leading to participants to train more or less.

Table 3 Suggested association between sleep-related training experiences and training frequency and outcome

Training experience	Training frequency	Training outcome
Becoming sufficiently relaxed to fall asleep	Positive association	No association
Falling asleep during training	No association	Negative association

Since some participants saw it as a good thing that Body Scans would help them relax enough to fall asleep, it could be speculated to motivate some people to train more frequently. However, it

could be speculated to have an adverse effect on training outcomes, since it reduces the total training duration (minutes spent training while awake).

Interrupting training sessions

Three participants reported interrupting one or more training sessions. The most outstanding example is Wanda, who attempted to complete two Body Scans, both times letting the recording play to the end, but starting to ignore it at some point. After the second Body Scan, she also started ignoring the daily e-mail reminding her to practice. She stated that paying attention to her own body triggered her anxiety too much, which worsened the anxiety she was already struggling with on a daily basis (she was taking prescription medication for anxiety at the time). The second example is Alina, who reported starting to experience bodily restlessness and discomfort 15-20 minutes into each Body Scan, which triggered further thoughts and annoyance with the recording. During her second Body Scan, she decided to interrupt it with ten minutes remaining. Third was Sandra, who interrupted one Body Scan on a day she had postponed it until late at night.

Sandra: "I could not complete it [the given Body Scan]… I was tired. […] I tried skipping forward a bit, but that did not make sense, skipping like that. I had a guilty consciousness about that [not completing the training session]."

At the time, Sandra was working night shifts, which made her tired most of the time. Participants did not report any effects of skipping Body Scans on training frequency. However, as with falling asleep during training, it is possible that interrupting training would have a negative association to training outcomes due to a reduced total training duration. There are exceptions where it might be advisable to interrupt a Body Scan, for example, if it becomes too distressing to proceed, as was the case for Wanda. In such cases, it is typically recommended to e.g. seek help from a qualified teacher or discontinue the training.

Skipping training

Some trainings were simply forgotten, e.g. in the case of Martina: "I just forgot, honestly because if I had thought about it I would have put it on [the guided Body Scan audio recording] even if it was midnight". Others actively ignored training sessions, as in the case of Wanda, who wanted to avoid the anxiety that arose in her when she turned her attention to her body, an integral part of any Body Scan. Alina also skipped the two training sessions during the weekend:

Alina : "I was visiting at home with my parents, and there it is difficult for me to say: Ok, now I will just go into… [an adjacent room and do a Body Scan] […] because there are not any obvious places to do that… To just go close a door somewhere. It would be difficult for me to say, that now I just have to close this door [and complete a Body Scan]. And then it got quite late and I had to take the train home."

Asked why it would have been difficult to do, Alina said that the parents would not have found it strange, but that Alina would have found it strange, thinking "now that I was home I should focus on that. […] I think I make strange rules in my head." Alina also commented that she found it strange that it was easier for her to find time to practice during the week than on the weekend, when she had more time. Other participants made similar comments, noting that the typically familiar structure of the week would facilitate finding time, even though there was less time available than on the weekend, where there was more time but no familiar structure. In contrast, Ursula invited her boyfriend to join her in completing two Body Scans (she was visiting him in another city over the weekend).

Finally, skipping trainings can be a sensitive topic to breach during interviews with participants, since it can trigger e.g. feelings of guilt. As an example, according to the log, Max missed three trainings. At first, he seemed completely baffled and surprised at having missed training sessions. Subsequently, he offered various technical explanations about why the Body Scans had not been registered due to problems with his mobile phone. However, the explanations did not fit with log data or how the system worked. When asked about that, Max offered new explanations about

being busy working and perhaps falling asleep and finally offered to look in his diary and report what had happened. What he reported three days later via e-mail was polite yet a new explanation that did not make sense according to what was spoken about previously and subsequently the PI decided that continuing the query would be outside to scope of the study. Table 4 shows the distribution of participants by registered days of training in the present sample.

Table 4 Distribution of participants by registered days of training

Days of training	Participants
7 (all)	14
6	3
5	2
4	2
3	1
2 or less	0

The percentages of participants (e.g. 63.6 % completed all 7 days of training) are close to that the original sample (e.g. 61.3 % of participants in the long condition completed all 7 days of training). Participants that trained six days (and in one case five) typically noted that they forgot to train because it was a chaotic weekend, or purposefully skipped a training e.g. due to tiredness. Reasons for skipping two trainings or more (the equivalent of five completed trainings or less) were different, such as experiencing a personal crisis (Martina), experiencing the training or aspects of it as unpleasant (e.g. Alina and Wanda), or the case of Max, who offered inconsistent explanations for skipping trainings.

This could indicate that the phenomenon of skipping practice can be used as an indicator for various unusual phenomena. Unusual in this case could mean that something outside the norm has happened, which in turn could be signaling a problematic situation that may benefit from e.g. some kind of monitoring or intervention from the trainer, in order to avoid unwanted outcomes or improve the outcome of the training.

Table 4 includes trainings that were completed, which includes instances where the participant fell asleep. While it was not registered if a participant fell asleep, the data from the original experiment made it possible to identify instances where the participant spent more than 30 minutes on the Body Scan. When questioning the participants about this subject, they reported that it was either due to forgetting to check out of the application, or due to falling asleep. If instances of falling asleep (which is not uncommon) are exluded, then 11 out of 22 participants in the present study completed every Body Scan without falling asleep, while the remaining 11 participants either fell asleep during-, skipped, or interrupted a training at least once, as shown illustrated in figure 2.

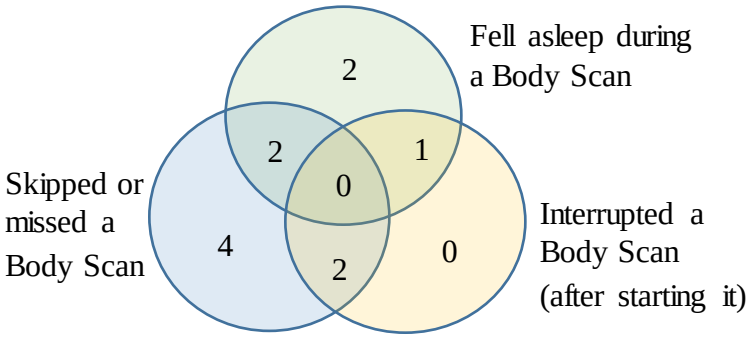

Figure 2 Mutually exclusive numerical representation of participants' deviant behavior: Skipping, falling asleep during, and interrupting a Body Scan

As previously noted, the training completion rate was 74.7 % of the assigned amount (or 115 out of 154 possible completed Body Scans across 22 participants). Could a training in an organizational environment be expected to have a similar completion rate as the present 7-day training? Participants self-selected and thus were all motivated to participate to some degree. Further, while the participants were compensated for their time in this study, which they reported as a motivational factor, some also reported participating because of reasons such as wanting to contribute to science. The latter motivating factor will not be in place in an organization, so

perhaps the completion rate should be expected to drop. Future research could investigate whether other motivating factors could be implemented in an organization in order to increase participation (and the related outcomes of participating).

DISCUSSION

Interestingly, several participants reported that taking part in the interviews that provided the data for this study had helped them make sense of some of their experiences during the training. Especially Alina, who had expressed a lot of inner conflict, was relieved to be able to talk about her experiences with someone that had a degree of knowledge of what she had gone through. She had expressed shame that she was not able to complete the training "correctly", which was dispelled during the interview, and she expressed a renewed interest in trying mindfulness again with updated expectations to the experience of e.g. doing Body Scans. Thus, while the MBSR and MBCT programs include teachers and weekly group meetings, many of the more accessible and widely used mindfulness solutions (e.g. available online) do not include human contact. Looking at the present study, this might mean that some users of such solutions are left with inner conflicts or other unintended consequences from the training. I suggest that his is an important ethical as well as ostensive and performative topic to address for researchers, teachers and practitioners, especially in trainings where there is no qualified teacher available for the participants. This is also relevant to consider in an organization, which in addition to the ethical considerations risk that their employees accumulate "unintended consequences" if the trainings are not organized properly, in this case meaning a sufficient amount of interactive support and debriefing.

A further interesting topic for discussion is how the results of the present paper compare with the other training literatures (e.g. physical exercise). However, since the analysis here is data-driven (Boyatzis, 1998) and quite extensive, I have chosen not to do a comparison for brevity and make it a potential topic of future research. The value of such a comparison is believed to be limited, since

in the present case participants received compensation, and the training was a thirty-minute daily guided Body Scan completed at home while lying down, which has benefits that are quite different from the typical benefits physical exercise (as pointed out by the participant Ferdinand). It might, however, be valuable to study and compare mindfulness training to other organizational training that have similar aims, in order to enable e.g. cost-benefit analysis, which has proven difficult to conduct due to a lack of knowledge (Sutcliffe et al., 2016).

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Our understanding of why some people train a little and some people train a lot during mindfulness training programs is at a nascent stage. I set out to deepen and develop an initial understanding of this area of the mindfulness literature, and in the present study present six themes that are important to understanding why and how practitioners make their training decisions and enact their training behaviors. This knowledge may in turn assist practitioners to adapt their behavior to the training volume and outcomes that they desire, and assist teachers in supporting their participants in this endeavor. In some cases, e.g. Wanda who experiences acute anxiety when attempting to complete a Body Scan, it is unrealistic to expect that the knowledge presented in the present format is enough to help her without e.g. the assistance of a teacher or therapist. However, knowing that cases like Wanda exist (or Martina who experienced losing a close relative during the training) may help researchers, training designers, and would-be teachers to understand what they will be confronting. In addition to a wider call for more research on the presented topics, I suggest that an important topic for future investigation is how the training design, especially when there is no dedicated teacher, can best accommodate practitioners such as Wanda and Martina.

The six themes that arose describe the lived world of the participants, and provide us with a patchwork of examples of lived experiences and outcomes of the given mindfulness training. Temporally, the themes can also be divided in past, present and future. First, the present study

looks at the factors that participants report had an influence on the training: previous experience and knowledge about mindfulness, relations and their opinion of and knowledge of the training, and the influence of the individual's state going into the training. Second, it investigates what happens during the training: participants' experience with the training, changing opinions of the training, compliance with and deviance from the training. Further, how these factors feed back into the training, and in turn influence training frequency and outcome. Third, it gives insight into what happens at the end of and after the training: perceived outcomes, and the individual's state going out of the training. The study also looks at the interaction between internal and external dimensions of being: how do the things that happen around the participant (friends, family, and colleagues) influence the "inside" of the participant (e.g. commitment to-, and engagement in the training). Seeing that participants report having difficulty fitting mindfulness training into e.g. social-, family-, and work-life, this could be an interesting topic for future studies, in order to help teachers and practitioners deal more constructively with this obstacle to training.

The perceived outcomes and experiences of the 22 participants in this study varied across several dimensions such as relaxation, well-being, increased awareness and focus, and learning. The case of Sandra showed that a frustrating or unpleasant experience could also be a good learning experience, while for Wanda and Martina it became an obstacle to training. Thus, I call for more research on how frustrating experiences can be turned to the participant's advantage. In the present study, a simple FAQ was offered to the participants (along with every the daily training), which addressed how the participants in could tackle potential issues arising from the training such as frustration or anxiety. However, when asked, none of the participants reporting reading it. While this can be remedied by a competent teacher, the majority of mindfulness practitioners do not have teachers, and thus other options are needed to offer this kind of support.

Regarding generalizability, it is important to acknowledge the limits of the comparisons to aspects of e.g. MBSR and organizational contexts that the present study conducts at points. The present training was concluded in an experimental context and cannot qualitatively compare to the well-developed and widely researched MBSR program nor to an organizational context. I hope that it is clear from the individual comparison that it is meant to inspire discussion and future research. Further, the present study indicates that the type and magnitude of outcome of the 7-day mindfulness training varies depending on the individual participants and their respective contexts, which this leads us to wonder if this type of generic mindfulness training is suited for use in organizations, as the original mindfulness training study intended. If the training is adapted to an organizational contexts and performance criteria, this raises the topic of the boundaries of mindfulness training: How much can you change and still call it a mindfulness training?

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Discussion

The outcome of the present dissertation is a step to a deeper understanding of the effects of mindfulness in organizations, groups, and individuals. Through a mixed research approach, the three papers each shed new light on how mindfulness manifests in organizations at different levels of analysis. In the first paper, the dissertation provides guidance to the incoherent field of collective and organizational mindfulness. The second paper delivers surprising evidence on the effects of a mindfulness training influence on group performance in a strategic decision-making task. The third paper offers a deeper understanding of the experience, behaviors and decisions of participants undergoing a mindfulness training.

While leaving the discussion of the respective results to each paper, at this point, I would like to first describe in more detail the scope of the contribution of the present dissertation, and subsequently discuss points of consilience, or in other words, interesting areas of (potential) convergence of evidence across the three papers. Finally, next steps are outlined to show a possible path of investigation as a continuation of the present research.

Scope of the contribution

Regarding the scope of the contribution, at the level of the dissertation, new empirical evidence is provided to the nascent stream of research that critically seeks to address the effects of mindfulness while seeking to point the research in a realistic direction (Van Dam et al., 2018). This goal is accomplished through different means in each of the three papers. First, the conceptual basis of collective mindfulness is investigated in paper one. For example, the problematic lack of coherency of the concept of mindfulness at the organizational level and lack of knowledge of the costs of implementation, which in a practical sense makes it near impossible to do a cost-benefit analysis for a real-world implementation. This paved the way for papers two and three, which have in common (amongst other goals) that they seek to investigate the relationship

between mindfulness trainings and decision-making on the individual and group level with a predictive and explorative approach respectively.

Subsequently, in order to understand the scope of the present contribution, it can be valuable to see the topic of mindfulness in organizations as a matrix, which consists of the levels of analysis as well as the relevant subjects of organization that emerged in paper one. As Table 2 shows, paper one addresses broadly the organizational level[8] (blue letters), while paper two consists of an experimental study at the group and individual level in the areas of decision-making and strategy (orange letters), and paper three explores the individual level of training mindfulness (green letters). It is noteworthy that the latter contribution is more broadly positioned than just the two subject areas, but since the original experiment was conducted in this subject area, the categorization carries some meaning, because the participants completed a strategic decision-making task.

Table 2. Overview of contribution across levels of analysis (left) and subjects of organization (top)

	Leadership & Change	**Decision-making**	**Strategy**	**Ethics**	**HRM**	**Costs**	Etc.
Organization	One	One	One	One	One	One	One
Group		Two	Two				
Individual		Two, Three	Two, Three				

In summary, Table 2 indicates that paper one results in new, more coherent understanding of mindfulness in organizations as well as suggestions for future research, while papers two and three explore and expose facets of this picture from different methodological angles in the subject areas of decision-making and strategy.

[8] Paper one in some instances also addresses the group and individual level. However, these other levels of analysis are only addressed when seen as relevant to the collective and organizational level of mindfulness

Discussion of paper two

Since paper two is under review (as a research note with a limit of 20 pages), I elaborate on specific issues here: 1) How the findings influence our view of mindfulness in organizations. 2) If our prediction that a longer training will lead to better outcomes is reasonable. 3) The intended and unintended effects of training / learning on performance. 4) The relationship of mindfulness training and the relevant outcomes. 5) The methodology of the study (e.g. justification of the choice of NASA task, group size, etc.). 6) How do the results of paper 2 change, challenge and advance our understanding of the concepts, relationships, models and theories in the literature on mindfulness.

First, the results are contrary to our predictions that more mindfulness training would lead to better outcomes. How does this influence our view of mindfulness in organizations? The influence of the experimental results is limited because we compared a 1-day and a 7-day training, and thus we cannot predict how a training of a longer duration than 7 days of mindfulness training (or between 1- and 7 days to be precise) influences performance on the given task. Thus, a next step to understand the relation is to investigate its nature: is it linear, U-shaped or something else (for further discussion, see below). Further, the result that the longer mindfulness training leads to decreased performance at group level on the given task challenges the current view on mindfulness that the longer mindfulness training should lead to superior group performance (see paper 2 for elaboration). Our finding that training mindfulness can have a detrimental impact is a relevant factor for organizations that need to calculate the costs and benefits of mindfulness trainings and interventions, and provides added momentum to calls for critically studying mindfulness (Van Dam et al., 2018).

Mindfulness has been suggested to influence performance through different mechanisms; for example, letting the individual have a broader awareness as well as the ability to navigate more

easily between objects of attention in this broader field (see paper 1 for an elaboration). The recent review of (Good et al., 2016) outlines more such mechanisms by describing the relation between mindfulness and attention, and suggesting ways that the improved attention positively influences performance. However, if the described mechanisms truly lead to improved performance, then why did the longer training lead to decreased performance? Recently, mindfulness has also been found to be negatively related to implicit learning (Stillman, Feldman, Wambach, Howard, & Howard, 2015), and we suggest that together these findings present a growing need to reexamine the exact relationship between mindfulness (training), attention and performance, in order to get a deeper understanding of mindfulness and its potential adverse effects.

Second, in retrospect, it is worth considering if our prediction that a longer training will lead to better outcomes is reasonable. Our prediction hinges on three pieces of prior information. First, that training mindfulness leads to beneficial outcomes (for a review, see Parsons et al., 2017). Second, that the specific improved outcomes of training mindfulness include attentional control, stability and efficiency (for a review, s ee Good et al., 2016). Third, the improvement in attention leads to increased performance on the given task. The latter is an argument that has its origins with Kahneman (1973) and builds on recent findings (e.g. Good et al., 2016, see paper 2 for an elaboration of the argument; Kahneman, 1973, 2011). There does not seem to be a reason doubt the findings of Parsons and colleagues, since in our case the training was found to have a significant effect (although it was adverse at the group level). Thus, that the effect is opposite to our expectations indicates that the problem with our assumption is to be found in the idea that the outcomes of mindfulness training (Body Scans in the present case) are beneficial for performance on the given task.

In paper 2 we suggest one explanation for the problem using the FFMQ factor of acting with awareness (Baer et al., 2006), which is found to be adversely associated with performance on the

given task. We suggest that this could be part of the reason for the mindfulness training being adversely related to task performance (see paper 2 and the discussion below for an elaboration). In retrospect, with this finding in mind, it no longer seems as "fair" to assume that a longer training is better. However, it should be noted that this finding is contrary to the literature, and needs to be thoroughly investigated before we can truly judge if the assumption is fair or not. Furthermore, it is worth considering the possibility that completing a week of Body Scans has other effects (adverse and beneficial) that we do not control for, if we are to understand the results fully. In other words, because there is a limit to what we controlled, it is possible that the longer training (7 days of Body Scans) has one or more adverse effects at the group level that we did not account for, which would further invalidate the assumption for the given experimental setup.

One such potential adverse effect that we did not account for is the idea that mindfulness can be detrimental if there is a lack of task expertise amongst participants (Dane, 2011). Furthermore, since the task is not simple and involves groups of three solving it, trying to understand the exact causal link between the training and the surprising results could quickly become subject to wild speculation. Regrettably, the task includes several steps that we cannot account for distinctly, which forces us to look only at the task as a whole (the individual and group scores). Thus, in addition to our attempt to account for theoretically relevant explanations in paper 2 and in the present discussion (below), it could be useful to isolate the steps of the task in a new experiment in order to understand how the mindfulness training leads to reduced performance at the group level.

Further examples of factors that could be tested experimentally include: 1) Varying the type of the task, in order to test if the experimental setup "always" leads to reduced performance at the group level for the longer training. 2) Varying the type of training, in order to test if our assumption holds for e.g. yoga or other types of meditation. 3) Varying the task expertise of the participants,

in order to control for the idea that mindfulness can be detrimental for participants that lack task expertise (Dane, 2011).

Third, we did not include an active control condition, which would have been optimal to control for the effect of training, as well as a "no training" control to compare to the short condition. This would have allowed us to qualify the results by comparing to an alternative training as well as no training. However, given the already large sample size (N = x), required, given the a priori power calculation, we did not have the opportunity to recruit an additional x participants. The fact that the study did not include the these control conditions means there is a questions as to whether the effects are due to the specific training, or "just" training. Therefore, adding controls to a follow up experiment has become a potential next step in investigating these results.

However, what would be reasonable outcome of a "just" training condition? Training is the systematic acquisition and development of the knowledge, skills, and attitudes required by employees to perform a task or to improve performance in the job environment. In other words, training is applied to attain individual (as well as group and organizational) needs related to organizational tasks. Meta-analytic reviews on empirical findings raise doubt on the actual contribution of training to firm performance (Tharenou, Saks, & Moore, 2007). In a recent publication on this topic, Sung and Choi (2018) note studies claiming that training is positively related to employee competence and others claiming that training is not a meaningful predictor of knowledge, skills, and abilities. Subsequently, they suggest that "the right" training conditions are important for the subsequent outcomes to manifest. Thus, while training may lead to improved performance under "the right" conditions, it may also lead to negative consequences, for example because training frequently irritates employees, which can result in dysfunctional outcomes and cancel out potential benefits (Ployhart, Call, & McFarland, 2017). Because we can see that 92 % of the participants in the long condition completed 5 days of training or more, and because we

found that the longer mindfulness had a significant effect on task performance, we have no reason to believe that the mindfulness training had no effect. However, when taking into consideration the findings of Ployhart and colleagues, it becomes a vulnerability that we lack controls for factors such as "employee irritation". Is it possible that the resulting dysfunctional outcomes of the longer mindfulness training cancelled out the potential benefits? We cannot say for sure since we do not possess the relevant data, but the related results from paper 3 do not indicate that participants were generally irritated. Nor can it completely disprove it due to its qualitative nature; I cannot know if mostly satisfied participants self-selected to participate in the study (although I have no reason to suspect this). Again, resolving this issue will be up to future research.

Fourth, what is the exact relationship of mindfulness training and the relevant outcomes? We hypothesize that longer mindfulness training should increase performance on the given task compared to the short training. Underlying that hypothesis is an assumption based on previous research that mindfulness can be improved, and that so can performance on the task. In other words, we assumed that for the pool of participants, there would be "room for improvement" in both dimensions (mindfulness and performance).

While paper 2 measures and compares the difference in performance relative to the short and longer mindfulness training, it does not discuss what the exact relationship between mindfulness training duration and performance looks like (on the given task). Is the relationship it linear, curved, declining, or exponential? In the following, we argue that it depends on the characteristics of the task, as well as suggest that it depends on the duration of the mindfulness training.

Regarding a given task, there will often be natural limits to how much performance can be increased (symbolized by a maximum score in the NASA task, in other cases there will be other limits), and therefore, the will also be limits as to how much mindfulness can improve performance. This assumption is naturally only relevant for tasks where training mindfulness can

lead to improved performance. In the NASA task, where performance is calculated with a points system, it has been shown to become more difficult to improve scores by a single point the closer the score is to the correct solution (Hall & Watson, 1970). Based on our hypotheses, this would have resulted in a relationship where mindfulness training would lead to lower potential for improvement in performance for high performers, while it would lead to higher potential for improvement for low performers (all other things equal). However, we did not find support for this idea, since the longer mindfulness training led to a decrease in performance at the group level (see point three above for elaboration).

Regarding the impact of varying the duration of the mindfulness training on performance, we can only speculate based on or results in paper 2, since we could not find support for our hypotheses. The finding in paper 2 that the 7-day training leads to decreased performance on the given task relative to the 1-day training might represent the first part of a straight line, a descending curve or something harder to describe with a simple equation. A simple explanation is that more mindfulness training leads to worse performance on the given task, making the relation a descending line or slope until it is not possible to worsen performance any further with addition mindfulness training. A more complex shape could be e.g. a U-shaped curve, with a traditional 8-week having a decrease in performance at first and a longer training leading to an increase in performance with time.

In addition, since the present experiment focuses on the beginning of training, and our findings point to a decline in performance (at the group level), this would speak against any depiction of the relation that starts with and ascending slope such as an inverted U-shape. Our finding at the individual level does not support a significant relationship between mindfulness training and performance. Thus, the exact shape of the curve (if any) will have to be investigated by future research, and it will be up to future research to determine to which degree the shape of the

relationship varies depending on the characteristics of the task as well as the type of training. Since there is a limit to how mindful a person can become, there will also be diminishing returns to additional training with time.

Fifth, regarding the methodology of the study, the research note format did not allow sufficient space for thoroughly justifying the choice of NASA task, group size, time for the task, instructions. Would it have been better to choose another task or design one? The task was chosen because we found it to be a "good enough" fit for the task, which was to contain elements typical of strategic decision-making such at prioritization, ambiguity, complexity, as well as to include individual and group work. Mindfulness has been suggested to be particularly useful regarding such tasks (Dane, 2011). Other reasons for choosing the task are that the NASA task has been rigorously tested and validated and we judged that it would be new to the participants (it was, none of them reported having experienced it before, only other survival scenarios). Perhaps now, with this experience, it would be possible to create a task better suited for the experiment, although it might be better to start with smaller iterations (making smaller tasks, to "divide and conquer" the challenge). While the findings were surprising, we did not find any clear indications that lead us to believe it would have been better to design a task for the experiment.

Further, why did we decide to go with triads and not with greater team sizes? It was due to economic considerations that we chose the smallest team that we believed would still be "large enough" to test our hypotheses based on the available literature (a triad is considered a "group", while a dyad does not qualify). We did not find a reason to spend additional resources on larger groups (although it might be an interesting control in future experiments).

Regarding time allotted for the task, we pilot-tested different configurations based on the original experiments (Hall & Watson, 1970) and subsequently found that 10 minutes for the individual task and 20 minutes for the group was sufficient. During the pilot, we also tested the original

instructions and slightly changed them since we found that participants did not know what certain items were such as e.g. “1 case of dehydrated Pet milk”. After these corrections the participants were generally able to understand the instructions but were provided with dictionaries just in case (they were hardly used).

Sixth, regarding the contribution, how do the results of paper 2 change, challenge and advance our understanding of the concepts, relationships, models and theories in the literature on mindfulness? While we were only able to speculate about the exact factors of mindfulness that lead to an inferior performance at the group level, the findings still present a noteworthy extension to the present state of knowledge. The specific relation between mindfulness and decision-making has been described above, and the following will discuss how the present findings challenge our understanding.

The findings of paper 2 indicate that we might also consider adverse effects of mindfulness training on specific tasks. The original work of Weick and colleagues (1999) as well as recent reviews suggest that mindfulness should have a positive relation to decision-making (Good et al., 2016; Sutcliffe et al., 2016). More generally, mindfulness is often predicted to have positive relationships to organizational factors, and it has only been suggested to have negative relations to e.g. task-performance in certain situations, such as when one is a task novice (Dane, 2011).

Furthermore, only a few cases actually provide evidence to suggest that mindfulness has negative effects, for example, that mindfulness has a negative relation to implicit learning (Stillman et al., 2015). However, this latter finding has also been interpreted as part of the habit-breaking benefit of mindfulness, and thus may be seen more of a strength than a weakness depending on the situation. Therefore, the finding that mindfulness has a negative relation to decision-making in the present case can be seen as pioneering, challenging the current understanding of mindfulness and its relation to decision-making – and perhaps other (related, yet unidentified) constructs. Building

on these findings, future work in this field can advance our understanding further by investigating the elements of mindfulness that lead to inferior (and perhaps in other cases superior) decision-making as well as the antecedents and contextual factors that strengthen or weaken this relation.

The apparently contrasting results of papers two and three

As described in previous sections, there was an apparent contradiction between papers two and three. While paper two indicated that groups that completed the long mindfulness performed significantly worse, paper three gave a deeper understanding of participants' experience with the mindfulness training, which was predominantly positive and resulted in positive (though rarely enduring) outcomes for the majority of the participants. So why did the investigation in paper two lead to a negative association while paper three reported mainly positive experiences and outcomes (except for two unique cases)?

I suggest that part of the reason is to be found in the difference in the research questions and respective approaches. Paper two was an experimental study focused on the causal relation between strategic decision-making and mindfulness training duration. Paper three was explorative and open for a broader set of outcomes, and thus reported positive experiences and outcomes from the mindfulness training, which can be related to widely recognized literature on the salutary effects of mindfulness training. This reflects the literature, where the evidence is inconclusive regarding effects of mindfulness on performance as well as the necessary boundary conditions, while there is solid evidence that training mindfulness leads to improved mental health when following specific well-researched programs, such as MBSR and MBCT (Khoury et al., 2015; Kuyken et al., 2016).

While paper two offers possible explanations regarding the unexpected results, it becomes possible to suggest further promising avenues of research when considering the understanding gained from paper three. The following two paragraphs discuss how the results from paper three

can help explain and expand the results from paper two. One the one hand, I retrospectively speculate that the lower decision-making performance in the long mindfulness training condition could be due to a lack of specialization or focus in the mindfulness training. Alternatively, based on the work of (Chajut & Algom, 2003) on stress and task performance, I speculate that the reduced performance could be due to the stress reducing effect of the longer mindfulness training.

First, is the unexpected lack of enhanced decision-making performance due a lack of specialization or focus (in this case decision-making- or performance-oriented) in the mindfulness training? While the mindfulness training provided in paper two emulates the first week of MBSR and MBCT to a degree, the question emerges retrospectively, did the training not focus enough on factors that were supposed to improve decision-making performance? Did the lack of a teacher lead to a loss of focus? An important component of the MBSR program is the teacher, which was not included in the experimental study. To make a further comparison, in the MBSR program, the participants work with the personal issues that in various ways present themselves during the program, which is an explicit therapeutic goal for both teacher and participants. The teacher helps them to focus on this aspect of the training, confronting issues from the past and present that are difficult for them. However, when aiming to improve e.g. attention and thereby decision-making performance through mindfulness training, as the training in the present experimental study did, perhaps the training needs to be redesigned in order to be more effective. While this in retrospect might seem as a good idea, as far as the author of this dissertation is aware, it has not received scholarly attention. Paper three indicates that in lack of a well-defined purpose (some participants also mentioned that they would have liked a teacher), many of the participants invented their own goals, which were more hedonic in nature than attention or performance oriented. In summary, perhaps more structure, focus, personal guidance or simply time was needed in order to achieve the expected results. This aligns with Young et al. (2017), who suggest that more research should be done on how to design a training to focus on achieving various specific purposes (increased

mental health, increased performance, etc.) with a given group of participants (employees, CEOs, soldiers, teachers, etc.).

Second, I speculate that the problem was that the stress reducing effects of training mindfulness led to lower performance. The participants completed their final mindfulness training moments before addressing the task, which would leave them in a (relaxed) state of mindfulness. Why should reducing stress lead to inferior decision-making performance? In their pivotal study of stress and task performance, Chajut and Algom (2003) found that selectivity of attention improved under a degree of task-related stress, which is consistent with the prediction of the attention view. Thus, it is possible that the longer mindfulness training would lead to a state of reduced stress that would counterintuitively lead to a reduced performance. To be more specific, according to Chajut and Algom (2003), increasing stress leads to an increasingly selective or narrow attention, which to a point has been found to lead to increased task performance. This is explained to be because the mind then automatically rejects irrelevant information while selecting the relevant, a mechanism that naturally only works within certain boundary conditions, such as the degree of stress and normal mental health of the individual. In contrast, mindfulness has been shown to be stress reducing while widening awareness and attention (Brown et al., 2007), which in this case according to Chajut and colleagues could lead to reduced performance.

Implications of findings across the individual, group, and organizational level

This section starts by discussing the usefulness of the concept of organizational mindfulness before moving on to the implications of the findings (of the present dissertation) across analytical levels. Does it make sense to continue the "organizational mindfulness" avenue of organizational research, or would it be more beneficial to study mindfulness in organizations by focusing on the group- and individual level? Since the outset, it has been a recurring topic of speculation between my co-authors and I, if it makes sense to continue the effort to conceptualize and operationalize

organizational mindfulness (or a similar concept that defines and measures mindfulness at the organizational level). The speculation arises because while several useful training regimes to increase mindfulness as well as scales to measure mindfulness have been developed at the individual level, there has not been a similar development at the organizational level.

I further speculate that part of the reason for the lack of development is that an organization is a collective and not a single "whole", like the individual, which has a dominant monad. It is easier to hire and integrate a new programmer in an organization than it is to add an extra brain or heart to the individual. Thus, organizations can consist of different amounts of individuals and resources, organize according to different principles and at various geographical localities, are part of industries and serve markets, and so on (Weick et al (1999) focused on HROs). Perhaps the larger complexity of organizations is what makes it difficult and time-consuming to pin down and use "organizational mindfulness", since it also manifests at the supra-individual level such as teams, hierarchies, and organizational culture (see paper 1 as well as Sutcliffe et al., 2016).

Therefore, if working with organizational mindfulness really is as time-consuming and cumbersome as it seems, I speculate that it will turn out to be unfeasible and unacceptable (due to costs) to develop a complete "organizational mindfulness" concept and operationalization, much less apply and use it in organizations. Perhaps the situation is similar to other organizational level concepts, such as organizational attention and managerial discretion, which are interesting and seem promising, but turn out to be notoriously difficult to operationalize as well as apply in business.

However, recent attempts have been made to investigate how mindfulness manifests in groups and teams (for an aggregate approach at group level, see paper 2; for the concept of "team-mindfulness", see e.g. Yu & Zellmer-Bruhn, 2018), which may turn out to be more promising. Thus, I speculate that in many cases it is more feasible and acceptable (costs and time) to study

mindfulness in groups and individuals, and in turn apply relevant lessons learned in organizations. For example, the counter intuitive results from paper 2 cautions us that a 7-day mindfulness training can have a negative impact at the group level. In contrast, the findings from paper 3 indicate that the impact of a 7-day mindfulness training on the individual depends on many factors in and around the individual before and during the training, and that it was mostly experienced as positive.

Thus remains the question of whether to invest in mindfulness. While findings in psychology and medicine indicate that mindfulness is helpful in dealing with a range of pathological conditions, results are less clear for organizations outcomes. Some authors suggest situations where mindfulness "works" (e.g. with regards to task-performance, see Dane, 2011), while others suggest more general mechanisms through which mindfulness improves job-performance (e.g. Good et al., 2016; Sutcliffe et al., 2016). However, these ideas mostly remain to be empirically tested. The findings in paper 2 and paper 3 emphasize the need to further investigate the relationship between mindfulness (training and its components, e.g. the five components in the FFMQ, Baer et al., 2006) and organizational outcomes, the nature of which can depend on the type of task, the characteristics of the individual and group, as well as the context. This more fine-grained approach signifies a necessary departure from the idea of mindfulness as a panacea (Van Dam et al., 2018), to a more nuanced approach, with the goal of being able to predict which kind of training (mindfulness or other) is appropriate for a given problem.

Limitations

While each paper outlines its own strengths and limitations, I want to describe three additional limitations from paper two for completeness, since the length of that paper was limited by it being submitted as a research note. Paper two was inspired by research that similarly investigated the effects of differing training duration (e.g. research on ritual duration and group coordination, see

Hobson et al., 2017) and therefore we chose to a between-subjects condition with a short and a long duration mindfulness training. However, with the counterintuitive results in mind, it would have been useful with an additional control condition with no training, since our ability to explain the results is limited by our only having mindfulness training conditions. An additional limitation is the lack of a positive control such as a daily 30-minute health education program, which would have allowed us to control for the effects of training. Further, the NASA task in the experimental study has also received some critique for supposedly being too brief for group level aspects to develop, such as trust and shared mental models. These limitations are all aspects of the experimental design that merit investigation in future research.

Finally, I acknowledge that the generalizability of the empirical contributions in the present dissertation is limited by the nature of the research designs as well as the population that the samples were drawn from, which was a (mostly) student population. For example, in the case of paper two, the strength of the experimental design is that it isolates relevant independent variables and improves internal validity. Further, the training condition in the experimental study of paper two was one versus seven days respectively, which are both relatively short periods when compared to the widely researched 8-week MBSR and MBCT programs, which also include yoga and other types of meditation (Fjorback et al., 2011). Thus, in order to improve external validity, the findings would need to be tested in relevant situations with relevant populations, which in this case could imply organizations with strategic decision-makers.

Suggestions for future research

While each paper discusses several future research suggestions, the combined results of the three papers and the above discussion is a step forward in the research on mindfulness in organizations, and the newly covered ground makes it possible and relevant to present the following three new suggestions.

First, the above presented idea that the stress reducing effects of training mindfulness should lead to decreased performance is contrary to the mindfulness literature, which proposes that the stress reducing effect and the improved attentional functioning of training mindfulness should lead to increased performance (for a review, see Good et al., 2016). In light of the present results, we suggest that this should be reconsidered and tested as the object of future research. For example, in addition to a baseline similar to the one in paper two, future experiments could include manipulation checks for stress, facets of mindfulness, and other relevant variables, before and after the training as well as before and after the task.

Second, when discussing the findings from papers two and three, I suggested that future research could benefit from focusing more on useful ways of adapting the training to the organizational context and purpose. Such purposes could include increasing factors such as performance (Dane, 2018; Good et al., 2016), employee mental health, interpersonal outcomes (Creswell, 2017), or high organizational reliability (Vogus & Sutcliffe, 2017). What is the best training for a given situation and population? Investigating this question could include manipulating factors such as: time per training session, training program structure and duration, the explicit purpose and outcome of the training, including a teacher, the costs of the training, and other factors. In order to isolate and manipulate these factors, I suggest that a suitable and feasible first step could be lab experiments. The present research could be seen as one of the first steps in a systematic approach, which aims to chart these factors and how they interact and influence organizational mindfulness trainings and their outcomes (see also Dane & Brummel, 2014; Kirk et al., 2016). As next steps, in order to increase external validity and assess the costs and benefits of the mindfulness training, I suggest that longer field experiments and other interventions "in the wild" would be necessary to understand how mindfulness trainings influence organizations at different levels in the short and long term. The present dissertation also points to the necessity of complementing the experimental results with qualitative research, which is needed to understand participants' lived experience of

the mindfulness trainings. This deeper understanding is needed in order to equip teachers with the necessary tools and knowledge to help participants reach the goals of a given mindfulness training in an organizational context that has yet to be studied systematically.

A final idea that could merit scientific attention is a meta-analysis of factors related to organizational outcomes. While the systematic review in paper one as well as other recent reviews (e.g. Good et al., 2016; Sutcliffe et al., 2016) contribute with valuable overviews of the organizational literature, they do not find enough data to conduct a meta-analysis. I suggest that it might be possible to bridge from the psychology literature on mindfulness and do conduct a meta-analysis on outcome related variables influenced by mindfulness trainings (for an example on prosocial behavior, see Donald et al., 2018). One such promising area is employee stress related leave, which is becoming an increasing burden to organizations. Administering mindfulness trainings to reduce stress related leave could potentially boost productivity and thus organizational performance. If possible, employee anxiety and depression could be added to such a meta-analysis. It would be interesting and valuable for both organizational and political stakeholders to be able to approximate the potential costs and benefits of mindfulness trainings across e.g. organizations, industries and nations. This could turn out to be an important further step in scoping and building a legitimate case for mindfulness in the workplace (for more on this topic, see Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016).

As a concluding remark, I note that the title of the present dissertation starts with "Minding the Hype". This is a reference to the influential recent article by Van Dam et al. (2018), which suggests that Mindfulness has gone from "being a fringe topic of scientific investigation to being an occasional replacement for psychotherapy, tool of corporate well-being, widely implemented educational practice". Van Dam and colleagues criticize the hype surrounding the topic of mindfulness, pointing to limitations of research to date, in order to provide a more nuanced map of

the field. In retrospect, this way of thinking suited the original idea of the present dissertation, which was to be critical concerning the topic. Although unintended, I was pleased to see that the surprising results from the second paper fit well with this agenda. Finally, it is my hope that others will see the present dissertation as a useful stepping-stone in their research and practice.

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Declaration of co-authors

First paper:

AARHUS BSS SCHOOL OF BUSINESS AND SOCIAL SCIENCES AARHUS UNIVERSITY

Declaration of co-authorship*

Full name of the PhD student: Thomas Hesselund Nielsen

This declaration concerns the following article/manuscript:

Title:	A discussion of mindfulness in relation to organizations and individuals in organizational settings
Authors:	Thomas Hesselund Nielsen, Ingo Kleindienst

The article/manuscript is: Published ☐ Accepted ☐ **Submitted** ☐ **In preparation: X**

The article was previously submitted to International Journal of Management Reviews, and is now in preparation for Long Range Planning.

Has the article/manuscript previously been used in other PhD or doctoral dissertations?

No: X Yes ☐ If yes, give details:

The PhD student has contributed to the elements of this article/manuscript as follows:

A. Has essentially done all the work
B. Major contribution
C. Equal contribution
D. Minor contribution
E. Not relevant

Element	Extent (A-E)
1. Formulation/identification of the scientific problem	B
2. Planning of the experiments/methodology design and development	C
3. Involvement in the experimental work/clinical studies/data collection	A
4. Interpretation of the results	B
5. Writing of the first draft of the manuscript	B
6. Finalization of the manuscript and submission	B

Signatures of the co-authors

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*As per policy the co-author statement will be published with the dissertation.

Second paper:

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This declaration concerns the following article/manuscript:

Title:	The Impact of Mindfulness Training on Performance in a Strategic Decision-Making Task: Evidence from an Experimental Study
Authors:	Thomas Hessellund Nielsen, Martin Petri Bagger, Panagiotis Mitkidis, Christine Parsons

The article/manuscript is: Published ☐ Accepted ☐ Submitted ☐ In preparation X

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Element	Extent (A-E)
1. Formulation/identification of the scientific problem	B
2. Planning of the experiments/methodology design and development	C
3. Involvement in the experimental work/clinical studies/data collection	B
4. Interpretation of the results	B
5. Writing of the first draft of the manuscript	B
6. Finalization of the manuscript and submission	B

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