



Mindful leadership: Evaluation of a mindfulness-based leader intervention

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Abstract

In times of tremendous organizational changes in the light of “Industry & Work 4.0” it is crucial to support leaders in regard to stress management and leadership effectiveness. Based on previous findings of mindfulness-based stress reduction and trait mindfulness affecting leadership quality, we developed a specific mindfulness-based leader intervention, which has been evaluated in regard to leaders’ stress and mindfulness as well as their leadership behaviors (Transformational & Destructive Leadership). We, specifically, looked at the subordinates’ perception of leaders’ destructive behaviors in the sense of Abusive Supervision. Moreover, we tested, if followers’ stress was affected, too. We used a pretest-posttest control group design. In total, the sample consists of 57 teams from different German organizations. 19 leaders participated voluntarily in the intervention called Mindful Leadership (one-day training, 2 follow-up sessions including one-on-one coaching and digital-based mindfulness/relaxation instructional videos), building the experimental group, 21 leaders only used the digital-based instructional videos and 18 leaders did not get any treatment. We collected data one month before the intervention and two to three months afterwards. Leadership has been rated by subordinates; all other variables are based on self-evaluations. Leaders, who participated the mindfulness-based intervention significantly reduced their level of stress and increased their mindfulness skills compared to both control groups. Furthermore, their leadership quality in terms of high transformational leadership behavior and low abusive supervision sustained and differed significantly compared to the controls. Effect sizes of the whole intervention were much larger in comparison to those of using the instructional videos only. Our findings contribute to the literature by expanding the effects of mindfulness-based interventions and integrate those to the organizational context. The new insight about leadership trainability should pave the way for more research. Practitioners should be incentivized to invest in mindfulness-based programs in order to develop employees holistically. In this article of the journal Group. Interaction. Organization, we clarify that such programs have the potential to reduce stress, enhance mindfulness and sustain leadership quality.

Keywords MBSR · Stress management · Training · Transformational leadership · Abusive supervision · Mindfulness

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Achtsame Führung: Evaluation eines achtsamkeits-basierten Führungskräfte trainings

Zusammenfassung

In Zeiten enormer organisationaler Veränderungen im Sinne von „Arbeit 4.0“, ist es entscheidend Führungskräfte hinsichtlich ihres Stressmanagements und ihrer Führungseffektivität zu unterstützen. Aus vorherigen Studien ist bereits bekannt, dass achtsamkeitsbasierte Interventionen Stress reduzieren und die Achtsamkeit einer Führungskraft ihr eigenes Führungsverhalten signifikant beeinflusst. Daher entwickelten wir eine achtsamkeitsbasierte Intervention für Führungskräfte, dessen Wirksamkeit wir in Bezug auf die Stressreduktion und die Entwicklung von Achtsamkeit und Führungsqualität, im Sinne einer erhöhten Ausprägung transformationaler Führung sowie einer Reduktion destruktiver Führung (hier: Abusive Supervision) evaluierten. Zudem testeten wir, ob die angewandte Intervention zusätzlich den Stress der Mitarbeitenden beeinflussen konnte. Die Studie wurde im Rahmen eines Pretest-Posttest Kontrollgruppen-Designs durchgeführt. Die Stichprobe bestand aus insgesamt 57 Teams verschiedener deutscher Organisationen, von denen 19 Führungskräfte freiwillig an der Intervention Mindful Leadership (eintägiges Training, 2 Follow-up-Sessions inklusive Einzelcoaching und digital-basierte Achtsamkeits-/Entspannungs-Übungen) teilnahmen und 21 Führungskräfte nur eine entsprechende digitalisierte Form von Instruktionsvideos nutzten. Die restlichen 18 Führungskräfte wurden nicht behandelt und dienen somit als passive Kontrollgruppe. Die Daten wurden einen Monat vor und zwei bis drei Monate nach der Intervention erhoben. Das Führungsverhalten wurde von den Mitarbeitenden bewertet; alle anderen Variablen basieren auf Selbsteinschätzungen. Führungskräfte, die an der Achtsamkeitsintervention teilnahmen, reduzierten signifikant ihr Stressniveau und erhöhten ihre Achtsamkeitsfähigkeiten im Vergleich zu beiden Kontrollgruppen. Darüber hinaus blieb ihre Führungsqualität in Bezug auf ein hohes transformationales und wenig destruktives Führungsverhalten erhalten und unterschied sich deutlich von denen der Kontrollgruppen. Die Effektstärken der gesamten Intervention waren deutlich größer als die der reinen digital-basierten Übungsgruppe. Unsere Ergebnisse tragen zur Literatur bei, indem sie die Auswirkungen achtsamkeits-basierter Interventionen erweitern und diese in den organisatorischen Kontext integrieren. Die neuen Erkenntnisse über die Trainierbarkeit von Führungskräften könnten den Weg neuer und innovativer Forschung ebnen. HR-Praktiker sollten angereizt werden, Achtsamkeitsprogramme zu integrieren, um Angestellte ganzheitlich zu fördern. In diesem Beitrag der Zeitschrift Gruppe. Interaktion. Organisation wird verdeutlicht, dass gezielte achtsamkeitsbasierte Trainings Stress reduzieren, Achtsamkeit fördern und Führungsqualität bewahren können.

Schlüsselwörter MBSR · Stressmanagement · Training · Transformationale Führung · Destruktive/Abusive Führung · Achtsamkeit

1 Introduction

Human capital is created by changes in persons that bring about skills and capabilities that make them able to act in new ways. (Coleman 1988, p. 100)

When it comes to leader development, targeting such capital represents a successful and commonly used procedure. In line with Day (2000), those trainings primarily develop intrapersonal competencies including self-awareness, self-regulation and self-motivation. A bridge to the concept of *mindfulness* seems inevitably, as it contains being aware and self-regulated in the present moment. Since a grown body of theoretical literature has paved the way for investigating its benefits at the workplace (Glomb et al. 2011; Good et al. 2016), first empirical studies have revealed the beneficial effects on general job satisfaction (Hülshager et al. 2013), performance (King and Haar 2017) and emotional exhaustion (Hülshager et al. 2013). However, much less is known about its effects on leadership capabilities. Still, a hand full of studies have confirmed a positive relationship

between leaders' mindfulness and transformational leadership (Lange et al. 2018; Pinck and Sonnentag 2018) and a negative prediction concerning the emergence of abusive supervision (Lange et al. 2018; Liang et al. 2016). In this paper, the terms *abusive supervision* and *destructive leadership* will be used synonymously, as the first has been identified as a form of destructive leadership behavior in which leaders' hostile attitude is directly aimed at subordinates (Einarsen, Aasland and Skogstad 2007).

Another important impact on the quality of leadership is mostly drawn from ego depletion theory: Accordingly, depleted leaders do not have enough resources to lead transformational or avoid destructive leadership behaviors (Byrne et al. 2014). This can be the case when leaders lack an appropriate sleep quality (Barnes et al. 2015), suppress emotions regularly (Yam et al. 2016) or suffer from high levels of stress (Harms et al. 2017; Zhang and Bednall 2016). Again, mindfulness seems fruitful to address the above mentioned antecedents and outcomes of ego depletion, since its mindfulness-based stress reduction (MBSR) program has been associated with lower levels of stress and

an enhanced well-being (Chiesa and Serretti 2009; Khoury et al. 2015).

No wonder that quite a number of authors suggest to cultivate mindfulness in order to develop leadership skills (Barnes et al. 2015; Byrne et al. 2014; Good et al. 2016; Liang et al. 2016). That is where the present study is positioned: By developing and evaluating a specific mindfulness-based leader intervention, targeting human capital in order to improve mindfulness, reduce irritation and affect transformational and destructive leadership behaviors, this study contributes to the literature of different fields in several important ways. First of all, we replicate findings of MBSR adjusted programs on mindfulness and stress reduction. We, furthermore, extend those to the workplace setting and on to the specific sample of leaders by using a very economic and efficient trainings' concept compared to the traditional 8-week MBSR treatment. The findings will contribute to the effectiveness of shortened versions of MBSR programs and we will provide a more nuanced insight by evaluating which mindfulness facets will be developed most. Beyond, we expand its beneficial effects to the potential of affecting sustainability of leadership quality. This opens new perspectives on leadership trainability in a way that practitioners do not necessarily have to train transformational leadership skills in order to keep up its occurrence. To further contribute to existing literature on the stress-reducing effects of mindfulness-based interventions, we, additionally, examine whether such leader intervention has the potential to affect subordinates' stress level, too. As we find promising tendencies, researchers should be incentivized to investigate in crossover effects of MBSR on leaders' stress reduction, cascading through the organization on to subordinates' stress level.

Practically, this is highly relevant because occupational stress leads to health problems (f.e. depressions), which, in turn, diminishes job performance (Motowidlo, Packard and Manning 1986). It is estimated that work stress resulting in burnout costs Germany 9 billion euros per year due to lost productivity (Nink 2016). Therefore, the present study provides organizations with an incentive to invest in mindfulness-based leader interventions as they, most predominately have the potential to reduce stress and enhance mindfulness in individuals (Eby et al. 2019; Khoury et al. 2015), and further sustain leadership quality of leaders.

2 Theoretical background

2.1 The intervention addressing leader mindfulness

"Mindfulness is considered an inherent capacity of the human organism that can be enhanced through training [...]" (Brown and Ryan 2007). It is described as a state of con-

sciousness where individuals intentionally pay attention to one's current internal and external experiences (Baer 2003) by systematically observing and inquiring in a non-judgmental way (Kabat-Zinn 2003). More specifically, Baer et al. (2006) identified the following five central facets of the mindful state: *observation, description, non-judgment, non-reactivity* and *act aware*. As we know from Hülshager et al. (2013), mindfulness can be identified as a) a trait, varying between individuals naturally, b) a state, varying between situations within individuals and c) a skill, trainable for every individual. Also in line with Kabat-Zinn (2012), we follow the notion of mindfulness as being a trainable state of mind.

One of the most popular methods to cultivate mindfulness skills is the above mentioned MBSR program developed by Kabat-Zinn (1982, 1990, 2003). First, it was predominantly used in terms of clinical interventions establishing its' wide-ranging improving outcomes, for example concerning chronic pain (Kabat-Zinn 1982; Grossman et al. 2007), anxiety (Vøllestad et al. 2011) and depression (Grossman et al. 2007). Despite all benefits clinical patients gather from MBSR, a grown body of interventional studies in non-clinical settings has also proven its beneficial effects for healthy individuals, mainly in regard to stress management or quality of life (Chiesa and Serretti 2009; Khoury et al. 2015).

The question of what leads to those benefits arises: Why is MBSR so extensively effective? Gu et al. (2015) came to the conclusion, that it may simply be, because an increase in mindfulness itself evolves. By reviewing the literature investigating mindfulness as a potential mediator between an intervention and the common outcomes (affectivity, stress or depression), they generally approved the enhancement of mindfulness affecting those outcomes. Just as Chiesa and Serretti (2009) confirmed an enhancement of general attention and awareness in terms of mindfulness and Bartlett et al. (2019) revealed evidence concerning the cultivation of mindfulness focusing on workplace-based mindfulness interventions.

One goal of the present study's training was to intrinsically motivate and encourage the participants to develop their level of mindfulness by simply developing their understanding of it, knowing about its benefits concerning their interests as leaders. Following the notion of Schiefele (1999), interests based on a high personal significance to a specific topic, have the ability to increase the quality of learning. To do so, the trainer used Good and his colleagues' (2016) integrative framework of mindfulness explaining the impact that it has on human functioning affecting workplace outcomes such as performance, relationships and well-being. To address the leaders' intrinsic motivation, the trainer followed the notion of Ryan and Deci (2000) addressing their innate needs of competence, autonomy and related-

ness. By providing feedback in regard to their current levels of mindfulness based on Baer et al. (2006) and focusing on their strengths, positive feelings concerning their competences should have been addressed. To provide an appropriate amount of autonomy, participating leaders were free to choose any facet of mindfulness to work on after the training. Furthermore, the trainer tried to be as caring as possible, even added one-on-one-coachings to the curriculum to deepen the relationship between the *coach* and the *coachee* addressing the facet of relatedness. Therefore, an increase in mindfulness could be explained by a deeper understanding of the construct and its' benefits paired with enough personal significance and intrinsic motivation as well as a trustworthy relationship with the trainer to mobilize the leaders internalizing and acting more mindful.

In sum, a great amount of interventional studies in the clinical and non-clinical contexts, which have been mentioned above, showed robust evidence that mindfulness as a skill is trainable and increasable after MBSR and MBSR-adjusted programs. Since our intervention mainly consists of MBSR elements and was methodological built on interest- and intrinsic motivation theories, we derive the following hypothesis:

Hypothesis 1 (H1) The mindfulness-based intervention significantly increases participating leaders' level of mindfulness in comparison to the control groups.

3 The intervention addressing leader stress

While Kabat-Zinn (1982) paved the way for investigations evaluating MBSR, there is clear efficacy evidence by now: Khoury et al. (2015) confirmed large effects on stress reduction, moderate ones on distress and even small ones on burnout. They, therefore, claim that MBSR efficacy on stress reduction in healthy individuals is solid. Baer (2003) summarized possible mechanisms lying behind the evolving effects. She suggested it is the nonjudgmental observation of unpleasant sensations that alleviate elicited reactions like distress. Stress occurs when a stimulus seems threatening or when it exceeds one's resources to cope with it (Lazarus and Folkman 1984). Transferring Baer's (2003) assumption to this transactional stress model, an individual would just observe the unpleasant feeling of the threatening stressor without judging it or excessively emotional reacting to it. Therefore, the perception of stress would decrease in a way that mindful individuals notice body sensations, thoughts or emotions related to stress with an accepting state of mind whereas less mindful individuals would dramatize this unpleasant feeling, resulting in even more irritation. Baer et al. (2006) confirmed that *nonjudging* observed emotions and actions is the most solid predictor for psychological

symptoms (here: different states of distress such as anxiety, depression or hostility), as well as the attentive *observing* itself and the *act with awareness* resulting from it. On the one hand, this non-judgmental observation leads to emotion regulation (Hülshager et al. 2013), known as a central mechanism in stress appraisals (Lazarus and Folkman 1984). On the other hand, this decentered view leads to a reduction of ruminative thinking (Teasdale 1999). Thus, one would less ruminate about stressful situations but rather cope with them effectively.

To include the concept of rumination into this study, the irritation scale has been used as a recommended measurement to evaluate interventions in occupational stress contexts (Mohr et al. 2006). The authors distinguish between two aspects of irritation: the emotional irritation (irritability) and the cognitive irritation, namely rumination. Since multiple studies have already revealed the significantly negative effect of MBSR on rumination (Chiesa and Serretti 2009), we propose a decrease in overall irritation from the given intervention.

Building up on the JD-R model, occupational stressors that require sustained effort, result in emotional exhaustion (Demerouti et al. 2001). The authors found that emotional exhaustion and disengagement both result when resources are diminished and, at the same time, job demands are high, resulting in burnout. In line with Richter and Hacker's (1998) definition of internal resources, mindfulness could be such a cognitive feature, preventing individuals from burnout and stress in the first place. Furthermore, the accepting mind of mindful individuals can result in higher uses of approach coping strategies in terms of emotional and cognitive acknowledgement of stressful situations (Weinstein et al. 2009).

Additionally, the engagement in mindfulness-based relaxation exercises could help leaders to better recover from stressful situations. Hence, regular exercising could reduce the exhaustion resulting from high job demands. To boost the engagement in regular practice after the intervention, we provided feedback concerning participants' current subjective stress and irritation levels to specifically foster attention and awareness to their health. The primary goal was to facilitate self-awareness in regard to their needs to promote self-determined behavior towards an engagement in more mindfulness-based relaxation exercises (Ryan and Deci 2000). To provide optimal support, participants had free access to instructional videos after the training. According to Caldwell et al. (2012) performing such exercises for 12 weeks can even decrease breathing rates and increases heart rhythm coherences, both associated with relaxation. Thus, if participating leaders get encouraged enough to exercise regularly, this could even affect their bodies.

In line with the rationale stated above and the results of previous meta-analysis in regard to the effects of MBSR and

MBSR adjustments on stress reduction (Chiesa and Serretti 2009; Grossman et al. 2007; Khoury et al. 2015), we come to the following assumption:

Hypothesis 2 (H2) The mindfulness-based intervention significantly decreases participating leaders' irritation in comparison to the control groups.

4 The intervention fostering leadership behavior

With this intervention, we specifically address two contrary leadership behaviors, namely Abusive Supervision and Transformational Leadership (Zhang and Bednall 2016). The former represents a form of destructive leadership behavior that specifically and directly aims at subordinates (Einarsen, Aasland and Skodstad 2007). Abusive leaders "engage in the sustained display of hostile verbal and non-verbal behaviors, excluding physical contact" (Tepper 2000, p. 178). Typical actions involve ridiculing, exposing or taking one's anger out on subordinates. While investigations concerning the negative consequences (Mackey et al. 2017; Martinko et al. 2013; Schyns and Schilling 2013; Tepper 2000) and antecedents of abusive supervision (Zhang and Bednall 2016) are blossoming, interventional research aiming to affect or even reduce such behaviors is scarce. To our knowledge, only one notable study has aimed at defeating abusive supervision through training (Gonzalez-Morales et al. 2018), whereas the trainability of transformational leadership has been well established (Abrell et al. 2011; Bass and Avolio 1990). Transformational leaders, in opposite to abusive ones, motivate subordinates to show extra effort (Bass 1985) by individually supporting and intellectually stimulating them, providing a compelling vision, acting as a role models and fostering group goals (Rowold and Poethke 2017).

Day (2000) differentiates between leader and leadership development, while emphasizing the importance to train both dimensions. On the one hand, typical leader development includes the training of individual-based skills and abilities specifically needed in leadership positions such as self-awareness, self-regulation and self-motivation (Day 2000). On the other hand, in leadership development, the emphasis is on developing social capital by training respectful and trustworthy social interactions to build networked relationships fostering cooperation and commitment. Typically trained interpersonal competencies in the face of leadership development are social awareness and social skills such as empathy and communication. The present intervention mainly belongs to the concept of leader development, since it predominantly focuses on training emotional self-awareness and -regulation. Hence, the primary target was to

embrace the leaders' human capital in two different ways, affecting leadership behaviors. First, a primary goal was to target a reduction of leaders' stress level. The second goal was to set free even more resources through embracing mindfulness. To follow the notion of Day (2000), we also targeted to cultivate social capital through mindfulness. The overall goal was to affect leaders' transformational as well as abusive behaviors through this intervention.

To address the first two pathways, we followed ego depletion theory (Muraven et al. 1998), claiming that if depleted leaders get into stressful work situations, they will tend to lead unethically and fail to have enough cognitive capacities to lead effectively afterwards, especially in terms of transformational leadership or abusive supervision (Harms et al. 2017; Lin et al. 2016; Zhang and Bednall 2016). Collins and Jackson (2015) assessed the mediating effect of self-regulation in a way that leaders' high in self-regulation showed higher scores in transformational and lower ones in abusive supervision when dealing with stressful situations. Krasikova et al. (2013) confirmed leaders' lack of self-regulation as an antecedent of destructive leadership behavior. Following the work frustration and aggression model of Fox and Spector (1999), depleted leaders may produce aggressive inclinations in terms of abusive supervision due to frustrating events when lacking self-regulation. Since mindfulness and mindfulness-based practices are associated with improved emotion regulation (Hülshager et al. 2013), improved regulation of behavior (Keng et al. 2011) and reduced expressed anger (Gu et al. 2015), it could buffer the effect from strain to dysfunctional leadership behaviors. Liang et al. (2016) found, when it comes to emotion regulation at work, trait and state mindful awareness mitigate the effect of hostility on aggression.

Moreover, through an enhancement of mindfulness when dealing with subordinates, specific leadership behaviors could be affected. In fact, there are a few studies which have directly (Lange et al. 2018; Pinck and Sonnentag 2018) and indirectly (Pinck and Sonnentag 2018) linked mindfulness to specific leadership styles, confirming that it relates to transformational and destructive behaviors (Lange et al. 2018). To additionally address the third pathway, leadership feedback has been provided with the focus set on transformational and abusive behaviors as well as attentive communication. During the training, leaders were supposed to transfer their mindful resources in regard to the five facets of Baer et al. (2006) (*observe, describe, nonreact, nonjudge and act aware*) on to specific facets of transformational leadership and anti-abusive leadership behaviors. Hence, the term "Mindful Leadership" as we used it for the intervention contains the leaders' internal mindful capital based on Baer et al. (2006) and specific transformational and anti-abusive leadership behaviors. The concept of "Mindful Communication" has additionally

been integrated in to the training in terms of exercises to cultivate perspective taking and active listening skills (Amberg 2016). This way, particular aspects of empathy as in empathic concern and perspective taking could be promoted (Skinner and Spurgeon 2005). Moreover, MBSR is associated with an increase in empathy (Chiesa and Serretti 2009), which could further enhance transformational leadership following the notion of Skinner and Spurgeon (2005) and decrease destructive interpersonal behaviors (Eisenberg and Miller 1987).

Shapiro et al. (2006) proposed that *reperceiving* (the shift in perspective) is a meta-mechanism emerging through the process of mindfulness—intentionally attending the present moment with an open and non-judgmental attitude. This mechanism can be very helpful to facilitate intellectual stimulation, especially because open-minded leaders could encourage followers to create new ideas or problem solutions that actually would be considered rather than being criticized, even if they differ from the leaders' original notion (Avolio and Bass 2001). Therefore, the specific exercises addressing perspective taking in a non-judging way could affect such transformational leadership behavior.

Moreover, Pinck and Sonnentag (2018) claimed leaders who are more attentive and present in the moment when dealing with subordinates are more aware of their needs and interests. Since “transformational leaders pay special attention to each individual follower's needs” (Bass and Riggio 2005, p. 7), mindful leadership, as it has been trained in the training, could especially enhance the facet of *individualized consideration*.

Furthermore, our training supported awareness of one's internal world through short MBSR exercises which can lead to a better understanding of one's true values and goals and acting accordingly (Brown and Ryan 2003). In order to act as an authentic role model or articulate an inspiring vision, as transformational leaders do (Bass 1985), it seems inevitable to be aware of one's own values and goals in the first place. In order to articulate an appealing vision, especially the mindfulness facet *describing* seems helpful (Baer et al. 2006). Dimidjian and Linehan (2003) already mentioned this facet as a central element of mindfulness related to *what* mindful individuals do.

Additionally, we addressed leaders' awareness of their present leadership behaviors by providing a 360-degree feedback focusing on transformational and destructive leadership. Therefore, participants have been motivated to work on their development potentials concerning those leadership capacities.

In sum, to embrace leaders' human capital engaging in more transformational and less destructive leadership, we followed the notion of ego-depletion theory and targeted to reduce stress, setting free resources to lead effectively. Furthermore, through the enhancement of mindful leadership

we expect the given intervention to affect transformational and destructive leadership behaviors. Moreover, leadership feedback and specific exercises to embrace a compassionate dealing with subordinates derives the following hypotheses:

Hypothesis 3 (H3) The mindfulness-based intervention significantly (a) decreases subordinates' perception of participating leaders' abusive supervision in comparison to the control groups and (b) increases their perception of participating leaders' transformational leadership in comparison to the controls.

5 The intervention addressing follower irritation

In line with Kelloway and Barling (2010), the root of occupational stress can be caused by leaders of the organization. The present leader intervention can, therefore, beneficially impact followers' stress for several reasons. First, the enhancement of leader mindfulness in the working context, as we trained it, could affect a reduction as explained in the following:

Mindfulness includes the attitude of putting others above oneself, or how Good et al. (2016) named it: Mindfulness means *other-orientation* over *self-orientation*. This compassionate state of mind fosters a greater interest in other peoples' concerns and needs (Good et al. 2016). In the working context, caring leaders constitute as a resource providing additional individualized support for their subordinates (Demerouti et al. 2001). Along with Richter and Hacker's (1998) subdivision of job resources, those leaders represent an external resource for subordinates. Thus, high job demands could get buffered through this resource in a way that subordinates get less emotionally exhausted. Reb et al. (2014) already revealed a positive effect of leaders' mindfulness on followers' emotional exhaustion.

Moreover, Good et al. (2016) claimed mindfulness has the potential to cultivate greater relationships. We follow their notion: The promotion of empathy, compassion and mindful communication affects the quality of relationships between individuals. Since the intervention specifically included mindful and attentive communication in to the curriculum through exercises addressing empathic concern and active listening, we propose this intervention strengthens the relationship between leader and follower, resulting in a reduction of followers' stress by feeling more understood and valued. This assumption gets undergirded by Schabracq et al. (2001) who stated leaders' willingness to listen to their subordinates attentively leads to a successful stress management. Hence, greater communication and higher-quality relationships through the enhancement of mindfulness, could lead to a stress reduction for subordinates. In

line with Thomas and Lankau (2009), we claim high-quality exchanges between leader and follower diminishes the occurrence of stress.

Furthermore, a potential increase in transformational and a decrease in destructive leadership behavior could reduce follower stress. This leads us to the second reason to assume the present hypothesis. Previous research has well examined the negative relationship between aspects of transformational leadership and follower stress (Diebig et al. 2017, 2016; Rowold and Schlotz 2009; Sosik and Godshalk 2000) as well as the positive one between destructive leadership and follower stress (Schyns and Schilling 2013). Thus, by cultivating transformational behaviors and diminish destructive ones, subordinates of participating leaders could feel less stressed in comparison to the leaders of the control groups.

A third and final assumption on the impact of the intervention on followers stress could be explained via stress contagion (Wethington 1999–2000) and social learning theory (Bandura 1977). Firstly, stress can cross over from one individual to another (Wethington 1999–2000). Oberle and Schonert-Reichl (2016) found this effect in the classroom, linking teachers' burnout to students physiological stress reaction through morning cortisol. They revealed, teachers' stress level predicted those of their students. Additionally, Li, Wang, Yang and Liu (2016) found this crossover effect of distress in the organizational context from supervisor to the team of subordinates. Hence, if the participating leaders of our study reduce their stress level, it may cross over to their followers. Even in line with emotional contagion theory (Hatfield et al. 1993), followers could get affected by their mindful leaders experiencing more positive and less negative affect (Brown and Ryan 2003). Secondly, to follow the notion of Bandura (1977), if the leader acts like a role model regarding his/her own stress management, it is likely for the followers to acquire identical behavior through observational learning. This way, mindfulness as a resource to manage stress could cascade throughout the team of the leader, affecting their stress levels, too.

Hypothesis 4 (H4) The mindfulness-based intervention significantly decreases subordinates' irritation of participating leaders' in comparison to the control groups.

6 Methods

6.1 Procedure

We conducted a quasi-experiment with a pretest-posttest experimental- and control group design. The data collection took place four weeks before (T0) and three months after the intervention (T1) for the experimental group. Partici-

pants were recruited through advertisements and individual contacts. A group of research assistants helped collecting the data for the control groups: T0 and T1, similarly, 3–4 months apart. We used a code-based online survey to match all leader and follower ratings to a team level. This way, we were able to ensure anonymity to all participating respondents. Leaders of the first control group have had free access to the online platform FITMIT5 and have been instructed to use its' mindfulness practices regularly for the next three months. To motivate those leaders, reminders have been sent on a regular basis. Leaders of the experimental group had been informed that they would receive a training called *Mindful Leadership* in combination with feedback on their levels of stress and mindfulness as well as their leadership skills. All variables were collected at both measurement time points.

7 Interventions' design

The intervention consisted of three components: First, a one-day group training session, second, one-on-one coachings (Follow-up 1) and third, a group closing-session (Follow-up 2). Each of these elements will be explained in detail below. To ensure individual support, group sizes of each of the three trainings in total did not exceed more than ten participating leaders per training and the assignment was dependent on company affiliation. All trainings have been conducted by one and the same trainer.

8 The training

A seven-hour training called *Mindful Leadership*, which basically covered the topics *stress* and *stress management*, *mindfulness*, *leadership and communication*, has been received by leaders of different organizations. The main focus laid on the concept of mindfulness. Enhancing mindfulness as a resource to manage own levels of stress on the one hand and to become more mindful during interactions with followers on the other hand. In detail, one hour was spent on understanding stress in general, its antecedents and consequences including possible resources to diminish its occurrence, based on Kaluza (2015). Another hour and a half was spent on mindfulness as a specific resource, based on Kabat-Zinn's (1990) definition, Bear et al.'s (2006) five facets of mindfulness and Good and his colleagues' (2016) integrative framework of mindfulness including its impact on human functioning effecting workplace outcomes. For approximately four and a half hour, participants dealt with the topic of leadership and communication based on their individual 360-degree feedbacks (Rowold and Poethke 2017). Since our previous study had shown that mindfulness relates

to transformational and anti-destructive behaviors (Lange et al. 2018), participants focused those, exclusively. They finally transferred the mindfulness facets based on Baer et al. (2006) on to specific transformational and destructive behavior facets working with the imagination of specific situations happening in the daily routine when leading subordinates.

The training took place in a seminar setting including lecture, where a trainer presented theoretical input orally (definitions, psychological models, empirical results, etc.), actual mindfulness practices (mindful breathing, body scan and yoga) and single person working, where leaders reflected their own levels of stress and mindfulness on the one hand and their leadership and communication behavior on the other hand. In order to do so, feedback as an effective method to develop humans (Goldstein and Ford 2002; Kaufeld et al. 2008) was provided. The first feedback was built on their self-rated stress in comparison to norms. Secondly, their self-rated level of mindfulness, broken down to the five facets (Baer et al. 2006) has been evaluated and finally the 360-degree leadership and communication feedback has been integrated. Participants were free to pick any two to three goals with regard to improving their transformational or reducing their destructive leadership behavior. Specific action planning took place via exchange in teams of two with similar goals. Moreover, role plays were included to improve mindful communication skills.

To wrap up the training, after a few minutes of quiet reflection, each participant summarized what he/she has learnt during the day and which goal he/she wants to focus on in the future. This way, a summary of the content was given and success of goal attainment might have been manipulated in a way that self-determination and goal-commitment within the group may affect their performance.

The overall goal of the training was to provide the leaders with a basis of knowledge about mindful stress management and mindful leadership and communication. Moreover, the objective was to get the participants to reflect on and analyze their own behavior thoroughly, recognizing their own level of stress and mindfulness on the one hand, their strengths and weaknesses concerning mindful leadership and communication on the other hand.

9 The one-on-one coachings (follow-up 1)

The first follow-up consisted of individual coachings realized as a one-on-one conversation via phone between each leader (*coachee*) and the trainer (*coach*), lasting approximately 30 min. The goal of these coachings was to increase the level of reciprocal understanding at first and providing centered attention to the coachee and his/her situation to individually support the leaders in a more confidential setting.

Specifically, the aim of the first follow-up was to deepen the understanding of mindful leadership and communication retrospectively based on the theory presented in the training in combination with the practical experiences the leaders gained after the training. The coach mainly structured the conversation by linking the coachees' saying to the known theories and his/her goals set during the training. Individual challenges have been discussed and solution-oriented questions have been asked to let the coachees figure out a way of improving the goal attainment by themselves.

10 The closing session (follow-up 2)

The second follow up took place as a 90-minute group meeting two to three months after the training. Participants and the coach came together to sum up what they have learnt and experienced after the training. The primary function of this session was to increase the leaders' commitment to change their behavior, knowing in advance that at the end of the intervention everyone has to present their goals in front of the group.

11 Mindfulness practice with "FITMIT5"

To promote regular MBSR practice, participants of the experimental and first control group were supposed to use an online platform after the training and until the closing session took place. FITMIT5 is an internet platform run by Shenti Business, which was primary developed by Chris and Esther Bell, sport scientists and experts for stress and burnout prevention. FITMIT5 stands for movement and relaxation at the work place and consists of over 160 different instructional videos, each 5 min short. Using this platform usually costs organizations 77 euros per subordinate per year; however participants in this study were able to use it for free. Since this platform consists of the two elements: movement (activating exercises) and relaxation (mindfulness-based relaxation exercises), participants were told to only use the mindfulness-based relaxation exercises, in order to only practice mindfulness. This specific platform has yet not been evaluated concerning an actual stress reduction or the development of mindfulness, but it regard to its' content it seems comparable to the App called "Headspace" which has at least been proven to enhance users' well-being (Howells et al. 2016). The web-based instructional videos of FITMIT5 consist of the usual elements of mindfulness-based stress reduction (Kabat-Zinn 1990): Body scans, breathing exercises and sitting meditations. Participants were encouraged to complete at least one 5 min-video each working-day over the period of 2–3 months. This way, the participants have had the oppor-

tunity to build a habit of practicing mindfulness on a daily basis. To start practicing, participants accessed the instructional videos through the following website: <https://www.fitmit5.de/>. First, they registered with one universal study-specific code and then they were able to login to their individual accounts and receive reminders via e-mail on a regular basis. An additional mobile view allowed participants to watch the videos on their smart phones, alternatively.

12 Sample

In total, the sample size consisted of $N=58$ teams, specifically 58 leaders (27.6% female) and 270 subordinates, from different German organizations. Different sectors were represented (industry, finance & insurance, health, attendance, consulting & auditing, public service and others). The leaders' average job tenure was 7 years ($SD=4.13$). All managerial levels were equally to one third (from lower to top management) represented. Overall, 58.5% of the subordinates worked fulltime, (56.1%) spending less than 10h per week in direct contact with their leaders. The sample is composed of the following three almost similar large groups:

Firstly, 19 teams built the experimental group, where 19 leaders (26.3% female) took part in the intervention. Those leaders had a mean age of 44.28 years ($SD=10.67$). Most of them (78.9%) worked for their current organization for more than 10 years, leading their current team for approximately 7 years ($SD=3.69$). The actual mean team size indicated approximately 16 subordinates per leader ($SD=21.78$). Their followers had a mean age of 41.61 years ($SD=12.25$); 51.8% of them were female.

Secondly, 21 teams formed *control group 1*, where 21 leaders were supposed to practice mindfulness by following the web-based instructional videos on a regular basis. Therefore, regular reminders were sent via e-mail. Those leaders (19% female) had a mean age of 39.52 years ($SD=12.61$). The mean job tenure in their current organization was approximately 7 years ($SD=4.13$), leading their current team (actual team size: $M=19$ subordinates per leader; $SD=22.32$) for almost 5 years ($M=4.83$; $SD=3.94$). The mean age of their followers was 35.69 years ($SD=12.32$); 55.7% of them were female.

Thirdly, *control group 2*, where leaders did not get any treatment, consisted of 18 teams (18 leaders and 63/57 followers). The mean age of those leaders was 44.06 years ($SD=11.31$); 38.9% were female. They were working for their current organization for approximately 7.35 years ($SD=4.18$), leading their team for 6.73 years ($SD=4.32$). Their followers had a mean age of 33.66 years ($SD=11.63$); 50.8% of them were female.

No significant differences were found for leaders' demographics regarding gender (Chi-Square Crosstable Test:

$\chi^2(2,58)=1.93, p=0.38$, age ($F(2,58)=0.52, p=0.60$), job tenure ($F(2,49)=2.26, p=0.12$), team tenure ($F(2,49)=1.82, p=0.17$) and team size ($F(2,48)=0.13, p=0.88$). The subordinates did not differ in regard to gender ($\chi^2(2,243)=2.43, p=0.30$), but they did concerning age ($F(2,234)=9.73, p=0.00$). The bonferroni-adjusted post-hoc test revealed the significant differences ($p<0.01$) in a way, that the subordinates of the leaders' participating in the training were almost 8 years older (7.95, 95%-CI [3.24, 12.65]) than those of the leaders with no treatment and they were almost 6 years older than those who used the web-based variant of practicing only (5.92, 95%-CI [1.39, 10.45]).

13 Measures

Leadership behavior Destructive and transformational leadership behaviors have been assessed with Rowold and Poethke's (2017) measurement of integrative leadership, originally called Fragebogen zur Integrativen Führung (FIF). The FIF proved convergent validity by correlating highly with Tepper's (2000) measure of abusive supervision and Podsakoff et al.'s (1990) Transformational Leadership Inventory (German validated version of Heinitz and Rowold 2007; Krüger et al. 2011). Five items indicated destructive leadership behavior in the face of abusive supervision, for example by: "My supervisor takes his/her emotions (anger, frustration) out on me." 24 items operationalized transformational leadership behavior based on the following six facets: Innovation, focus of individuality, team spirit, performance development, vision and role modeling. Sample items are: "My supervisor ..." "... shows new ways to interpret tasks and goals.", "... knows my individual interests and personal goals.", "... sets an example of what he/she prioritizes his/herself." The Ratings of leadership behavior were obtained from the subordinates' perspective on a 5-point Likert-scale from 1 ("I strongly disagree") to 5 ("I strongly agree"). Internal consistency was good at both measurement points, for destructive leadership (T0: $\alpha=0.86$; T1: $\alpha=0.89$) as well as for transformational leadership (T0: $\alpha=0.97$; T1: $\alpha=0.98$). All subordinate ratings have been aggregated to the leader-level, due to appropriate intra-class correlations (for transformational leadership behavior: T0: ICC1=0.26; ICC2=0.62; T1: ICC1=0.25; ICC2=0.61; for destructive leadership behavior: T0: ICC1=0.21; ICC2=0.56; T1: ICC1=0.35; ICC2=0.72) (Bliese 1998; Fleiss 1986).

Mindfulness For the assessment of mindfulness a short (Bohlmeijer et al. 2010) and German (Michalak et al. 2016) version of the original Five Facet Mindfulness Questionnaire of Bear et al. (2006) was used. It consisted of

24 items in total. Sample items were: “I’m good at finding words to describe my feelings” (describe), “Usually when I have distressing thoughts or images I can just notice them without reacting.” (non-react), “I do jobs or tasks automatically without being aware of what I’m doing.” (acting aware). Mindfulness was rated by the leaders on a scale from 1 (never) to 5 (always), where negatively formulated items have been recoded the other way around. Internal consistency was appropriate (T0: $\alpha = 0.85$; T1: $\alpha = 0.83$).

Irritation Leaders as well as their subordinates provided information regarding their stress-level using the eight-item Irritation Scale of Mohr et al. (2006). The response format ranged from 1 (“I strongly disagree”) to 7 (“I strongly agree”). Cronbach’s alpha was 0.88 at measurement point one and 0.87 at measurement point two for leaders and 0.85/0.87 for subordinates. Again, all subordinate ratings have been aggregated to the leader-level (T0: ICC1 = 0.08; ICC2 = 0.29; T1: ICC1 = 0.18; ICC2 = 0.51).

14 Analysis

For potential differences between the groups in the additionally reported variables, we performed Analyses of Variance (ANOVA) for age, job tenure, team tenure and team size and Chi-Square Crosstable Tests for gender, up front.

To test the interventions’ effectiveness, analyses of covariance (ANCOVA) comparing all groups have been performed. In all variants, we used ‘group’ as the between factor, comparing the posttest scores while controlling for the pretest ones. Furthermore, to test hypotheses one to three, we additionally controlled for leaders’ age and gender. To test hypothesis four, we controlled similarly for subordinates’ age and gender. Since pre-analyses haven’t shown a significant effect concerning the frequency of practicing mindfulness through the instructional videos, this factor has been excluded from the ANCOVA. Moreover, eta-squared scores have been converted into the effect sizes Cohen’s d .

Following the leadership training literature (Abrell et al. 2011) and due to rather small sample sizes in all three groups, results of ANCOVA beyond $p < 0.10$ have been interpreted as significant.

15 Results

Means and standard deviations for all three groups, inter-correlations of all study variables at pretest and posttest for experimental group and internal consistencies are presented in Table 1.

Results of ANCOVA and RM-ANOVA are reported by using F-statistics of the direct effects as well as the effect

sizes η^2 and d . According to Cohen (1988) $\eta^2 = 0.01$ constitutes a small, $\eta^2 = 0.06$ a medium and $\eta^2 = 0.14$ a large effect; $|d| \geq 0.20$ = constitutes a small, $|d| \geq 0.50$ = a medium and $|d| \geq 0.80$ a large effect.

In regard to hypothesis 1, “The mindfulness-based intervention significantly increases participating leaders’ level of mindfulness in comparison to the control groups”, an overall significant effect was found, $F(2, 57) = 5.82$, $p = 0.01$, $\eta^2 = 0.19$, Cohen’s $d = 0.97$, each of the effect sizes referring to a large effect (Cohen 1988). Hence, hypothesis 1 can be accepted.

In detail, the mean change in comparison to the first control group revealed a significant difference (0.32; 90%-CI [0.16; 0.53]), whereas no significant difference was obtained compared with the second control group (0.20; 90%-CI [-0.02; 0.42]). The more nuanced additional analysis confirmed significant changes of the following specific mindfulness facets: *observe* $F(2, 56) = 3.38$, $p = 0.04$, $\eta^2 = 0.12$, $d = 0.74$, *non-react* $F(2, 56) = 2.64$, $p = 0.08$, $\eta^2 = 0.10$, $d = 0.67$ and *act aware* $F(2, 56) = 3.32$, $p = 0.04$, $\eta^2 = 0.12$, $d = 0.74$, whereas *non-judge* and *describe* did not change significantly.

Similarly, a significant large effect was obtained for leader stress, $F(2, 56) = 7.32$, $p = 0.00$, $\eta^2 = 0.23$, Cohen’s $d = 1.09$. Therefore, hypothesis 2, “The mindfulness-based intervention significantly decreases participating leaders’ irritation in comparison to the control groups” can be accepted, too. The mean change in comparison to the control groups were both significant.

To reveal hypothesis 3a, whether follower’s rating of destructive leadership differs from experimental to control groups, a marginally significant and medium effect of $F(2, 58) = 2.97$, $p = 0.06$, $\eta^2 = 0.10$, Cohen’s $d = 0.67$ was found. Comparing the mean change with each group, a significant difference was obtained between the experimental and the digital-based training’s group, not the no-treatment one.

To confirm hypothesis 3b, whether followers’ rating of transformational leadership differs from experimental to control groups, a significant and large effect of $F(2, 58) = 5.11$, $p = 0.01$, $\eta^2 = 0.16$, Cohen’s $d = 0.87$ was found.

No significant effect was obtained for hypothesis 4, whether followers’ stress differs from experimental to control groups: $F(2, 58) = 2.10$, $p = 0.13$, even though $\eta^2 = 0.08$ and Cohen’s $d = 0.59$ showed promising effect tendencies. Nevertheless, this hypothesis has to be rejected. Similarly, mean changes did not differ significantly in comparison to the control groups.

Comparing the effect of the whole intervention (one day of training including feedback, web-based practice and two follow-ups) to the effect of web-based practice only, the experimental group who received all of the above mentioned

Table 1 Means, standard deviations, intercorrelations and reliabilities of study variables at pretest and posttest

EG	CG 1 (online)										CG 2														
	Construct	N	M	SD	N	M	SD	N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Pretest																									
1L	age	18	44.28	10.67	21	39.52	12.61	18	44.06	11.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2L	sex ^a	19	1.74	0.45	21	1.81	0.40	18	1.61	0.50	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3F	age	102	41.61	12.25	69	35.69	12.32	62	33.66	11.63	0.07	0.55*	-	-	-	-	-	-	-	-	-	-	-	-	-
4F	sex ^a	112	1.37	0.48	70	1.43	0.50	62	1.48	0.50	0.26	0.59**	0.55*	-	-	-	-	-	-	-	-	-	-	-	-
5L	MF	19	3.51	0.53	20	3.45	0.41	18	3.55	0.54	-0.48*	-0.31	-0.41	-0.43	(0.85)	-	-	-	-	-	-	-	-	-	-
6L	I	19	2.93	0.97	20	3.31	1.17	18	3.15	1.52	0.21	0.33	0.31	0.43	-0.72**	(0.84)	-	-	-	-	-	-	-	-	-
7	TF	19 ^b	3.72	0.74	21 ^c	3.39	0.89	18 ^d	3.53	0.57	-0.09	-0.15	-0.32	-0.09	-0.07	0.26	(0.97)	-	-	-	-	-	-	-	-
8	AS	19 ^b	1.34	0.50	21 ^c	1.84	0.96	18 ^d	1.66	0.56	-0.09	-0.10	-0.21	-0.04	0.18	-0.23	-0.35	(0.86)	-	-	-	-	-	-	-
9	F	127	2.81	2.63	70	2.92	1.17	63	2.75	0.82	-0.05	0.26	0.45	0.34	-0.33	0.30	-0.49*	-0.07	(0.87)	-	-	-	-	-	-
Posttest																									
10	L	18	3.72	0.39	20	3.36	0.32	18	3.56	0.52	-0.26	-0.17	-0.25	-0.13	0.77**	-0.52*	-0.25	0.10	-0.24	(0.81)	-	-	-	-	-
MF																									
11	L	18	2.35	0.79	19	3.38	0.84	18	3.32	1.48	0.24	0.19	0.31	0.23	-0.70**	0.66**	0.14	-0.14	0.48*	-0.62**	(0.80)	-	-	-	-
12	TF	19 ^e	3.73	0.77	21 ^f	3.20	0.79	18 ^g	3.25	0.64	0.03	0.16	-0.09	0.09	-0.02	0.30	0.81**	-0.40	-0.36	-0.30	0.14	(0.98)	-	-	-
13	AS	19 ^e	1.38	0.62	21 ^f	2.11	0.92	18 ^g	1.84	0.83	-0.02	-0.41	-0.35	-0.16	0.18	-0.36	-0.28	0.86**	-0.17	0.17	-0.20	-0.51*	(0.89)	-	-
14	F	97	2.57	0.98	65	3.07	1.31	57	2.68	0.75	-0.00	0.12	0.28	0.29	-0.14	0.15	-0.17	0.13	0.74**	-0.19	0.36	-0.08	0.09	(0.87)	

EG Experimental Group, CG Control Group, L Leader, F Follower, MF Mindfulness, I Irritation, TF Transformational Leadership (rated by followers), AS Abusive Supervision (rated by followers)

* $p < 0.05$, ** $p < 0.01$

^aSex coded as 1 = female and 2 = male. The different conditions were coded as 1 = CG 2, 2 = CG 1 and 3 = EG. Values in the diagonal represent Internal Consistencies (Cronbach's α).

Intercorrelations are presented for Experimental group Data below the diagonal

^b3–17 ratings (Mean Team Size Rating (M) = 7.16; SD = 4.45)

^c3–5 ratings (M = 3.33; SD = 0.66)

^d2–11 ratings (M = 3.50; SD = 2.01)

^e2–4 ratings (M = 3.22; SD = 0.67)

^f2–4 ratings (M = 3.10; SD = 0.54)

^g2–8 ratings (M = 3.17; SD = 1.29)

Table 2 ANCOVA analyses on the effect of group (experimental vs. control groups and web-based practice only/CG1) vs. control group 2 (no treatment)

Variable	Effect size
Mindfulness (EG)	0.97
Mindfulness (CG1)	-0.29
Supervisor stress (EG)	1.09
Supervisor stress (CG1)	-0.00
Abusive supervision (EG)	0.67
Abusive supervision (CG1)	0.29
Transformational leadership (EG)	0.87
Transformational leadership (CG1)	0.00
Follower stress (EG)	0.59
Follower stress (CG1)	0.41

$N=58$ teams (EG=19, CG=21, CG2=18). Covariates: pretest, age and gender

interventions' elements benefits much more. Table 2 shows the results indicated by Cohen's d .

16 Discussion

The goal of the study was to evaluate a mindfulness-based leader intervention consisting of three elements: A one-day training, two follow-ups (telephone coachings and a closing session) as well as self-determined practice using a mindfulness-based relaxation online platform after the training and until the second measurement point. To differentiate between the effects of the whole intervention in comparison to only practicing mindfulness through the instructional videos, we provided an additional control group, to the no treatment group, where leaders watched the web-based instructional videos only. Obtaining control group data concerning all evaluation criteria is very rare (Collins and Holton 2004). We even extended this rarity by obtaining two different control groups, an active and a passive one. This design represents a methodological strength of the present study. As a result, only the whole intervention provided significant evidence in terms of the hypothesized effects. Thus, we were able to reduce participating leaders' stress, enhance their levels of mindfulness and sustain their leadership qualities in regard to transformational and destructive behaviors in comparison to both control groups. However, those last results have to be interpreted carefully, because within the experimental group means did not differ significantly from T0 to T1. The effect evolves, because leaders from the control groups significantly worsen their leadership behaviors. Furthermore, we couldn't reveal any crossover effects on to the followers' stress level. But since the effect almost reached significance, a promising tendency has been confirmed.

Contributing to the MBSR literature, our study provides evidence that even a shortened version of treatment can equally affect mindfulness and stress reduction. Even though standard MBSR programs (eight weeks of treatment) usually show higher effectiveness than compact versions (Khoury et al. 2015), this study's' effect sizes from T0 to T1 within the experimental group (based on an additional repeated measurement ANOVA) provide evidence that even shortened versions can be very beneficial. For traditional MBSR programs, effect sizes range from 0.21 to 2.86 on stress reduction (Chiesa and Seretti 2009), our intervention reveals a Cohens d of 0.66; effect sizes for enhancing mindfulness range from 0.25 to 1.96, we reach a Cohens d of 0.45.

Following the suggestions of Liang et al. (2018), to get a more nuanced perspective of mindfulness, our further analyses show that only the mindfulness facets *observe*, *non-react* and *act aware* had been enhanced significantly. Interestingly, *mindful observing* correlates the most with openness for experience and *acting with awareness* as well as *non-reactivity* belong to the most solid predictors for psychological well-being (Baer et al. 2006). As a conclusion, those facets appear to improve most easily and following the notion of Bear et al. (2006) are most important for stress management. Given that, the present study contributes to the literature of MBSR by providing a wide range of beneficial consequences of a shortened and MBSR-adjusted program in the working context.

In comparison to other mindfulness-based trainings' interventions in this context, which mostly consist of pre-test/post-test designs and to one third employ passive control groups (Eby et al. 2019), we provide an additional active control group. In terms of trainings' content, we follow the majority by including MBSR elements and mixed methods of delivering mindfulness-based content (Eby et al. 2019), but we, particularly, extend it by adding the topic of mindful leadership and -communication to the curriculum.

On the one hand, this study was built on the theoretical framework of Good et al. (2016) which states mindfulness has the potential to enhance a person's well-being and relationships in the workplace; on the other hand we used the pre-study evidence of trait mindfulness predicting transformational and destructive leadership behaviors (Lange et al. 2018). This study proved that a specific mindfulness-based leader intervention can, besides the common effects on stress reduction and spirituality, sustain leadership quality.

Moreover, this study was an attempt to show evidence for crossover effects, cascading MBSR throughout a working team, from leader to subordinates. Unfortunately, this hypothesis had to be rejected, but positive tendencies were revealed. Further research is, therefore, needed.

Table 3 Overview of the different treatments in regard to groups

Treatment	Content	Experimental Group	Control Group 1	Control Group 2
1 Day training	MBSR 360-degree feedback “Mindful Leadership”	x	–	–
Follow-up 1: Telephone-coaching	30 min. each individual Support goal attainment	x	–	–
Online mindfulness practice	5 min. each working day over 2-3 months	x	x	–
Follow-up 2: Closing session	90 min. group meeting Presentation of each goal attainment	x	–	–

x treatment received

Contributing to the leadership development literature, this study provides several important extensions to existing research. First of all, in contribution to Abrell et al. (2011), it could be confirmed that the sustainability of transformational leadership is trainable. The key issue here is that we did not specifically train any facet of transformational leadership.

In line with Day (2000), we emphasize the importance of leader development, embracing human capital instead of promoting leadership styles in terms of leadership development. Additionally, this was one of the few interventions attempting to reduce destructive leadership. To our knowledge, only one previous study has successfully trained supportive supervision in order to reduce abusive ones (Gonzalez-Morales et al. 2018). Adding to their findings, the present study provides evidence that a mindfulness-based leader intervention has the potential to affect subordinates' perception of destructive leadership behavior in comparison to controls. However, this stream of research is still very scarce and results should, therefore, be interpreted cautiously.

17 Limitations and implications for future research

Although this study is characterized by its innovative contribution to the literature and practice of leader development, there are several limitations with potential for future research.

First of all, a replication with a larger sample size is desirable. Even though we provided a sample heterogeneous in regard to branches and representative concerning leaders' gender (Statistisches Bundesamt 2016), the sample sizes in each group remained rather small; this reduces statistical power of the interventions' effects as well as affects the relationships among variables. Even though other comparable studies (e.g. Abrell et al. 2011; Gonzalez-Morales et al. 2018; Edelman and Van Knippenberg 2017; Flook et al. 2013) provide the same sample sizes, in order to further

evaluate mediating or moderating processes, a replication of the study with a larger sample size is needed.

Therefore, it remains unknown which mediating or moderating effects affected the effect of our intervention on leadership sustainability. Especially for hypothesis 3a and 3b our argumentation was strongly relying on ego-depletion theory and the results of previous research revealing the effect of leader stress on transformational and destructive leadership behaviors (Harms et al. 2017; Lin et al. 2016; Zhang and Bednall 2016). Relatedly, researchers could for example investigate if the skill mindfulness buffers the effect of strain on leadership quality. Even though, contrary to previous findings, correlations between leader stress and their leadership behaviors in the experimental group did not reach significance (see Table 3), an additional analysis of this relationship within the whole sample of $N=58$ teams replicated the correlation between leader stress and abusive supervision ($r=0.31^*$, $p<0.05$) for example. Hence, the present study opens a variety of possibilities for future research to investigate in mediating and moderating effects.

In regard to common method bias, we used two sources for data collection including teams' ratings of their supervisors' leadership behaviors and leaders' self-assessments of stress and mindfulness. Thus, a strength of our study lays in the avoidance of mono-source bias. Nevertheless, leaders as well as followers rated their own stress levels. Moving forward, future leader intervention studies should use objective indicators for stress like cortisol or heart-rate variability in order to reduce common method variance. The pilot study of Flook, Goldberg, Pinger, Bonus and Davidson (2013) sets a good example, using a mindfulness-based intervention for teachers, providing evidence for a student stress reduction at post-test measured by their morning cortisol.

Furthermore, as in most of the interventional studies, randomization of the different group assignments was not possible at the given time. Even though randomized, controlled studies are known as the 'gold standard' when evaluating the effectiveness of interventions, Concato et al. (2000) revealed average results do not differ significantly from well-designed observational studies like ours. Additionally, Lac-

erenza et al. (2017) found out that voluntary participation does not affect learning. Hence, results should be interpreted carefully due to the nonrandomized design, but still, this does not present a major limitation.

Another limitation lies within the irregularly use of the mindfulness-based internet platform. Even though the amount of practicing mindfulness did not have a significant influence on the outcomes, it is notable that 60% of the experimental-group leaders reported practicing mindfulness after the training on a regular basis vs. only one third did so in the first control group. On the one hand, this shows that having a day of training motivates participants to practice more than when just written assignments with the appeal to practice has been given to them. On the other hand, this could represent a limitation of the present study to the point that not all participants of the first control group used the digital-based instructions regularly. But an additional analysis showed no differences in regard to the result, when those leaders who haven't used the web-based instructions regularly have been excluded from the first control group and put to the no treatment group. Nevertheless, future research should make sure, that the required conditions are straight or investigate in larger sample sizes so that leaders who didn't fulfill the requirement can be excluded from the study.

18 Practical implications

Beyond the existing research implications, this study should motivate managerial practice to include mindfulness-based interventions for leaders to develop their human capital affecting their leadership sustainability. This study should pave the way for leader interventions to focus on mindfulness to affect not only stress and mindfulness, but additionally sustain high transformational and low destructive leadership behaviors. Khoury et al. (2015) as well as Donald and Atkins (2016) claim individuals related to higher levels of stress benefit the most from MBSR. Therefore, it is recommendable to train those who suffer the most from stress (first): Leaders (Ganesh et al. 2018).

Even though there is evidence that online mindfulness-based interventions are beneficial (Cavanagh et al. 2013) and that it may not make a difference if the intervention will be fulfilled in person or online (Caldwell et al. 2012), the results of the present study provide a different picture. Only the experimental group significantly benefited from the whole intervention (including a day of training, two follow-ups and self-determined practice with the help of instructional videos). Given that, the used internet platform in the present study might a) not have been the best in order to develop mindfulness and stress reduction or b) the effect has to be ascribed to the low amount of actual usage of the

online instructional videos in our study. Consequently, organizations should check the quality of mindfulness-based online courses considerably or investigate in a short personal intervention which combines a one-day training, individualized coaching and a closing session like the present study did. However, when it comes to targeting a development of leadership capacity, face-to face interventions are more effective (Lacerenza et al. 2017).

Moreover, the methodology used in the present study shows that organizations do not necessarily have to train leadership skills in order to treat transformational or destructive leadership behavior. Our intervention has only provided leadership feedback, other than that just mindfulness and mindfulness practices have been schooled. This insight is important for practitioners to open their eyes that not only traditional leadership interventions are fruitful. More importantly, leadership behavior significantly differed between groups after the manipulation in a way that leaders' transformational leadership from the control groups decreased while destructive leadership increased. Therefore, this intervention is useful, especially, to prevent leaders from worsening their leadership behaviors.

19 Conclusion

Ultimately, this study aimed at evaluating a mindfulness-based leader intervention. Findings suggest that such training has the potential to enhance leaders' trait mindfulness, reduce their levels of irritation and develop their leadership sustainability in terms of transformational and destructive leadership behaviors. Leadership research as well as practitioners of human resource development should be motivated to further investigate the mindfulness perspective in research and training.

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