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RESEARCH PAPER

Bells of Presence: A brief Intervention inviting Mindfulness into our Daily Life

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Abstract

Objectives: Mindfulness has become a main topic in Positive Psychology, as well as other disciplines, due to its effect on numerous positive outcomes, such as wellbeing and stress reduction. Many different mindfulness-based interventions have emerged in the last decades, however, to this point there is limited literature available for brief mindfulness-based practices that can be easily integrated into people's daily life. To address this gap in research, this study is going to examine the Mindfulness Bell, which offers individuals an opportunity to focus on the present through an audible notification at random moments during the day.

Methodology: The study made use of an existing smartphone application, instructing participants to bring their attention to the sound of the bell, their breath, and their current activity at six random times each day. A two-week repeated-measures design was applied to measure effects of the Mindfulness Bell on participants' ($N = 21$) levels of mindfulness, both subjective and psychological wellbeing, and stress.

Results: A statistically significant correlation was found between the Mindfulness Bell intervention and levels of mindfulness, subjective wellbeing and psychological wellbeing. No significant correlation was found for stress.

Discussion: As a mediator of positive wellbeing outcomes, mindfulness is related to environmental mastery, purpose in life, and self-acceptance. Research shows that the length of the study and the level of mindfulness experience affected the success of the intervention.

Conclusion: This paper reveals insight on the importance of engaging with the mindfulness concept and outlines what scholars need to consider when creating mindfulness-based interventions.

Keywords: *Mindfulness, Mindfulness-Based Intervention, Mindfulness Bell, Subjective Wellbeing, Psychological Wellbeing, Stress*

OBJECTIVES

Nowadays, how to become more mindful is of growing interest to individuals as well as organisations. Research shows that mindfulness-based interventions (MBIs) are correlated with enhanced mindfulness (Spijkerman et al., 2016), as well as higher levels of wellbeing and more effective ways of managing stress (Chittaro & Vianello, 2016; Sas, 2007; Weinstein et al., 2009). MBIs have emerged in numerous variations (e.g., Chittaro & Vianello, 2016; Kabat-Zinn, 1982; Killingsworth & Gilbert, 2010; Langer,

1989); however, existing empirical research shows insufficiencies. First, hardly any publication describes in detail the mindfulness practice that was applied, making it difficult for other researchers to replicate (Hart, Ivtzan & Hart, 2013). Second, studies on brief mindfulness interventions were conducted mainly in laboratory settings (Chittaro & Vianello, 2014); however, there is a need to examine effects in real-world settings (Henze & Pielot, 2013) in order to allow higher ecological validity (Killingsworth & Gilbert, 2010; Miller, 2012). Third, there are rarely studies on MBIs integrating an element of surprise, which allows individuals to step back and "change a habit through a physical artifact for triggering the awareness of the moment" (Oprea, 2016, p. 1), and therefore promotes a mindful state (Oprea, 2016; Jordan, Messner & Becker, 2009). Finally, scholars claimed that numerous MBIs are difficult to integrate into daily life, especially for people who are not familiar with mindfulness (Chittaro & Vianello, 2014; Kabat-Zinn, 2005; Spijkerman et al., 2016). The mindfulness bell, by making use of a smartphone-based application (Spotlight Six Software LLC, 2018), could be an opportunity to make mindfulness more accessible and easier to integrate into people's life, because smartphone-based MBIs allow low cost and wide reach delivery (Spijkerman et al., 2016). Due to its random bell-ringing during the day, the application provides an element of surprise, which makes it an ideal stimulus for triggering mindfulness (Louis & Sutton, 1991; Oprea, 2016). Thus, we suggest that the mindfulness bell can be a new, simple tool for individuals to implement mindfulness into their daily lives.

LITERATURE REVIEW

In the last few decades, mindfulness has become a main field of interest in Positive Psychology, as well as other disciplines (e.g., Brown & Ryan, 2003; Hede, 2010; Kabat-Zinn, 1990; Langer, 2005). Although several researchers claimed that there is no universal definition of mindfulness (e.g., Brown & Ryan, 2004; Ivtzan, 2016), it is mainly referred to as a "state of being attentive to and aware of what is taking place in the present" (Brown & Ryan, 2003, p. 822) and was found to be developed by training and practice through which people achieve a state of presence in contrast to the usual state of mindlessness (Kabat-Zinn, 1990; Langer, 1989; 2005). Whereas mindlessness is characterized by a limited, judgmental perception of reality (Langer, 2005), mindfulness is associated with conscious awareness, attention, openness, acceptance and non-judgment (e.g., Brown & Ryan, 2004; Keng, Smoski & Robins, 2011; Langer, 2005).

Several mindfulness interventions have been shown to enhance wellbeing and reduce psychopathology, such as Mindfulness-based Stress Reduction programs (MBSR; Kabat-Zinn, 1982) and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams & Teasdale, 2002). While these interventions derive from an Eastern perspective, mindfulness concepts divided into Eastern (e.g., Kabat-Zinn, 1990) and Western (e.g., Langer, 1989; 2005) approaches, which differ mainly in their historical background and methodology (Langer, 1989). Referring to Brown & Ryan's (2004) claim that mindfulness is not necessarily associated with meditation, this research builds on Western approaches, which focus on mindfulness as one's conscious awareness of both internal and external experiences (e.g., Jankowski & Holas, 2014; Keng, Smoski & Robins, 2011). The main aim is to promote people's attention to the present moment and diminish mind-wandering states (Lomas, Hefferon & Ivtzan, 2014).

Numerous studies have examined the effectiveness of meditative mindfulness programs, such as MBSR (Kabat-Zinn, 1982), which requires a time-frame of eight weeks (Kabat-Zinn, 2003). However, there is only limited research on brief mindfulness interventions, which allow individuals to enter a mindfulness state in a short time-frame (Michel, Bosch & Rexroth, 2014). Studies usually do not clearly state the procedure of these interventions, neither do they propose how other researchers can replicate the intervention (Borker, 2013; Hart, Ivtzan & Hart, 2013). In order to make mindfulness implementable, however, there is a need to precisely describe brief mindfulness practices.

Mindfulness practice has been associated with higher levels of mindfulness and wellbeing as well as lower levels of stress. Langer's (e.g., 2005) research shows enhanced levels of mindfulness in participants after undertaking brief mindfulness interventions. Referring to Howells et al.'s (2016) claim that MBIs are an important catalyst of wellbeing, numerous studies have shown a correlation between mindfulness and enhanced wellbeing (e.g., Chittaro & Vianello, 2016; Sas, 2007). Foundational to understanding the effects on wellbeing, previous research has been divided into two main research domains of wellbeing: subjective wellbeing (SWB; e.g., Diener, 1984) and psychological wellbeing (PWB; e.g. Ryff, 1989). Whereas SWB is often associated with a hedonic perspective (Abbott et al., 2006), including high levels of positive affect and satisfaction with life and low levels of negative affect (Diener, 2000), scholars have claimed that wellbeing includes more than just the experience of positive affect (e.g., Ryff, 1989). Therefore, more inclusive, multidimensional

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concepts have been developed, such as PWB (Ryff, 1989), which outlines self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth as key factors of positive functioning. Several scholars have suggested that the main purpose of mindfulness is not to enhance positive affect, but rather to enable individuals to deal with existential challenges in life (e.g., Keyes et al., 2002; Langer, 2005). Nevertheless, mindfulness and SWB were also found to be correlated (e.g., Brown, Kasser, Ryan, Linley & Orzech, 2009), suggesting that mindfulness enables individuals to savor moment-to-moment experiences (LeBel & Dubé, 2001). Therefore, this research is going to explore the effect of the mindfulness bell on both SWB and PWB.

A meta-analysis has also demonstrated a significant, moderate effect of online MBIs on stress (Spijkerman, Pots & Bohlmeijer, 2016). Stress, namely psychological distress, is conceptualized as a consequence of an imbalance between demands and coping resources for events that are significant for a person (e.g., Lazarus, 1966), resulting in psychological or physical consequences (Hede, 2010). Studies show that higher levels of mindfulness correlate with a lower experience of daily stress (Nyklíček & Kuijpers, 2008; Weinstein et al., 2009). Building on Folkman and Moskowitz' (2000) claim that positive reappraisal, problem-focused coping and infusing ordinary events with positive meaning facilitate positive affect in individuals in stressful situations, mindfulness appears to promote a decrease in stress levels in multiple ways. By triggering new thoughts (Kerfoot, 2006), mindfulness allows individuals to reappraise the situation and, therefore, promotes the development of more constructive interpretations of the reality. Moreover, by enabling a "monitoring function over the thoughts and feelings that the individuals experience" (Hede, 2010, p. 104), individuals can react differently to external pressures. Lastly, by promoting a higher degree of non-judgment (Sas, 2007), mindfulness has been found to decrease levels of psychological distress (e.g., Walach et al., 2006).

Since online interventions allow an expression of real-world context study designs, growing research on mobile app interventions has emerged in the last years (Spijkerman et al., 2016): "If mindfulness is considered as a psychological mode or process, then any technique that is effective in producing that mode or process can be considered as a mindfulness technique" (Chittaro & Vianello, 2014, p. 338). In line with this, a study demonstrated the validity of smartphone-based delivery of positive interventions (Howells et al., 2016). In contrast to Kabat-Zinn's (2005) claim that practicing mindfulness can be difficult for people who are not experienced with meditation, Chittaro and Vianello (2014) provided evidence that mobile applications can be useful in introducing MBIs due to an enhanced variety of contexts in which people can practice mindfulness. Smartphone-based delivery of interventions shows advantages to traditional MBIs by allowing anonymity of users, independence from therapeutic support and low cost (Spijkerman et al., 2016). However, there is only limited evidence on the effectiveness of mobile applications in facilitating mindfulness in users (Chittaro & Vianello, 2014), and Spijkerman et al. (2016) claimed a smaller effect of online MBIs compared to face-to-face delivery because of potential non-adherence. To mitigate this, providing support has been found to positively impact participants' adherence (Spijkerman et al., 2016), such as text messages, interaction, and personalization (Oinas-Kukkonen & Harjumaa, 2009). In sum, through enabling wide reach and low costs, smartphone-based MBIs demonstrate a "useful alternative for people who may benefit from cultivating their mindfulness skills but cannot be reached with traditional face-to-face formats" (Spijkerman et al., 2016, p. 112).

There are several approaches of mindfulness-based interventions, although most of them are not clearly instructed (Hart, Ivtzan & Hart, 2013). To this point, no empirical research on a mindfulness bell exists. The mindfulness bell functions as a reminder that brings people back to the present moment. When the bell rings at random points throughout the day, individuals are instructed to focus on the sensation of the bell.

> *"The standard instruction for what to do during the pause is similar to meditation: simply listen to the sound of the bell. When thoughts or emotions arise while listening, return to the sound itself."* (Brown, 2011, p. 81)

Borker (2013) suggested that the mindfulness bell demonstrates a "powerful support and self-training tool" (p. 45) to promote openness and awareness. Moreover, research shows that individuals benefit from having regular reminders to practice mindfulness in their daily life to maintain a mindful attitude (Chittaro & Vianello, 2016). Since Killingsworth and Gilbert (2010) found that people's minds wander constantly, it can be helpful to create an intervention that combines conscious attention with an element of surprise (e.g., Louis & Sutton, 1991). As an element of surprise was suggested to be an ideal stimulus for mindfulness (Oprea, 2016), it allows individuals to bring the attention to the breath "instead of letting the mind ruminate in negative or cynical thoughts" (Steger & Ekman, 2016, p. 235).

Based on previous literature, we assume that the mindfulness bell can be a useful intervention in enhancing mindfulness, increasing wellbeing and decreasing stress. If positive outcomes of the mindfulness intervention on wellbeing and reduced stress are found, this research offers a new, easy implementable tool for people to promote mindfulness in their daily lives. If the anticipated correlations do not emerge, an explanatory model might provide insights on why this intervention is not effective, and what researchers need to consider when creating MBIs.

METHOD

Participants

A repeated-measures design was applied to examine whether the mindfulness bell has a positive impact on mindfulness, wellbeing and stress levels. Participants were recruited in every way possible via convenience sampling to ensure a high number of participants at baseline and to compensate for high drop-out rates, which have been found in similar studies (e.g., Chittaro & Vianello, 2016; Shapiro, Astin, Bishop & Cordova, 2005). Advertisements on Facebook, Instagram and LinkedIn were published over a period of 12 weeks, an influencer in the field of personal development on Instagram as well as the former supervisor of the researcher, who works in the research center of the university hospital Dresden, were contacted to share the advertisement and a blog post was set up on the researcher's blog. Participation criteria was a minimum age of 18, daily access to an iOS-based device and a good understanding of the English language to ensure the correct understanding of instructions and questionnaires. A landing page was created via MailChimp where people could sign up when interested in the study. Thirty-one potential participants completed the baseline questionnaires. Ten participants were excluded between baseline and follow-up because they did not use the app or did not complete the follow-up questionnaires. The final sample of 21 participants was predominantly female (71.4%), between 18 and 34 years old (76,2%), employed (47.6%) or student (33.3%), single (47.6%) or partnered (38.1%), Caucasian (85.7%) holding a university degree (71.5%).

Procedure

After signing up on the landing page, potential participants received an email and up to three reminders asking them to participate in the research. The email contained a link to a Qualtrics web page with a detailed study briefing including the right to withdraw at any time, the consent form and the first set of questionnaires. After completing the baseline questionnaires, participants received an email with a redeem code for the app and instructions on how to download and how to apply the app.

Mindfulness Bell

Participants (n = 21) engaged with the mindfulness bell app (Spotlight Six Software LLC, 2018) for a duration of two weeks. Building on Brace et al.'s (2012) claim that good experimental designs give all participants the same instructions, the participants were instructed to set six random bells during the day between 10am and 4pm, assuming that these are the busiest hours. Following Borker's (2013) suggestion that the mindfulness bell is always connected with mindful breathing, participants were instructed to, firstly, bring their full attention to the sound of the bell, secondly, for three breaths, bring their full attention to their breath, and lastly, bring their full attention to their current activity (see Table 1).

Table 1:
Instructions

Step 1	Bring your full attention to the sound of the bell
Step 2	For three breaths, bring your full attention to your breath, inhaling and exhaling fully while remaining aware of the flow of air into and out of your body
Step 3	Bring your full attention to your current activity (whatever it is) while keeping your mind focused on the activity

Because several studies have found a positive effect of supporting and interacting with participants on their adherence (e.g., Chittaro & Vianello, 2016; Oinas-Kukkonen & Harjumaa, 2009; Spijkerman et al., 2016), email reminders were sent to participants on day 5 and day 10 of the study.

After two weeks, participants received another email including a link to Qualtrics to complete the second set of questionnaires. Up to three reminders were sent over a timeframe of two weeks. Ten participants were excluded because they did not use the app or did not complete the post-intervention survey. Twenty-one participants (N = 21) completed the final stage of the study; thus, this study shows a drop-out of 32.3%.

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Measures

This study used multiple well-known, evidence-based measures to assess mindfulness, wellbeing and stress levels at baseline and follow-up. Moreover, a selection of questions was presented to assess demographic data and levels of mindfulness experience at baseline as well as subjective experiences of the intervention at follow-up.

Freiburg Mindfulness Inventory

The short form of the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006) is a 14-item version of the original 30-item scale (Walach et al., 2006), assessing mindfulness as a one-dimensional construct (Buchheld & Walach, 2002; Kohls, Sauer & Walach, 2009). While each item describes a state of mindfulness, participants are asked to rate the frequency of this state in a particular time-frame on a 4-point scale, ranging from "Rarely" (1) to "Almost always" (4) (Walach et al., 2006). The maximum score of 56 indicates the highest possible level of mindfulness. The FMI (Walach et al., 2006) was suggested as useful valid and reliable questionnaire for assessing mindfulness (Walach et al., 2006).

Positive and Negative Affect Scale

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a 20-item instrument including ten items of each positive and negative affect. While each item describes a positive or negative emotion, participants are asked to rate its momentary intensity, ranging from "very slightly or not at all" (1) to "extremely" (5). In sum, participants can attain a minimum score of 10 and a maximum score of 50 for both positive and negative affect. The PANAS (Watson et al., 1988) was found to be a precise, reliable and valid measure (Egloff, Schmukle, Burns, Kohlmann & Hock, 2003) of affect.

Psychological Wellbeing Scale

Psychological wellbeing was assessed by the 42-item version of the Psychological Wellbeing Scale (PWB; Ryff, 1989). The PWB scale (Ryff, 1989) include seven items for each of the six factors of PWB (Ryff, 1989), using a 6-point Likert Scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (6). In any factor, participants can reach a maximum score of 42, resulting in a maximum overall score of 252. The 42-item version of the PWB scale (Ryff, 1989) offers the shortest possible assessment of PWB while still providing reliable construct scores (Abbott et al., 2006).

Perceived Stress Scale

Stress was measured by the 10-item version of the Perceived Stress Scale (PSS; Cohen et al., 1983). The scale asks individuals to assess how often they have found their lives unpredictable, uncontrollable, and overloaded during the last month using a 5-point Likert Scale, ranging from "Never" (0) to "Very often" (4) (Cohen et al., 1983). The maximum score of 40 indicates the highest degree of perceived stress. The well-validated PSS (Cohen et al., 1983) is a common-used instrument for measuring the perception of stress (Baer, Carmody & Hunsinger, 2012; Lee, 2012; Cohen et al., 1983).

Mindfulness Experience

Participants' previous mindfulness experience was assessed at baseline using one item ("How familiar are you with the concept of mindfulness at the moment? (Including knowledge and practical experiences?)"). Response options were "Not at all" (no mindfulness experience), "A bit, e.g., tried it in a yoga class or seminar, read about it" (medium mindfulness experience) and "Very much, e.g., having a daily mindfulness routine" (high mindfulness experience) (see Chittaro & Vianello, 2016 for similar classification).

Participants' Adherence and Subjective Experience

Since the use of an existing app does not provide information about the frequency of usage, it appeared beneficial to check the frequency that participants have made use of the application in order to assess whether the effects are actually a result of the intervention, or subject to individual tendencies. Thus, building on previous studies (e.g., Chittaro & Vianello, 2016; Howells et al., 2016), participants were asked for the number of days the activity was completed as well as the number of times they followed the bell ring each day on average. Finally, participants were asked to rate how much they enjoyed using the app and to leave feedback (see Table 2).

Table 2:
Participants' Adherence and Enjoyment Scale

1.	How many days (out of 14) have you used the app?
2.	How many times each day (out of 6) have you followed the instructions in relation to the bell ring on average?
3.	On a scale from 0-10, how much did you enjoy using the app?
4.	Since this is the first study of its kind, we are very interested in your experiences. Would you like to leave some feedback?

Table 3:
Statistical differences on all dependent variables after the intervention

Variable	n = 21				Significance		
	Baseline		Follow-up				
	M	SD	M	SD	t	df	p
Mindfulness (FMI)	35.00	6.31	38.38	5.68	2.870	20	.009
Stress (PSS)	16.67	5.22	15.62	4.46	1.562	20	.134
Positive Affect (PANAS)	33.29	5.48	36.00	5.17	2.282	20	.034
Negative Affect (PANAS)	19.48	6.07	17.29	4.96	2.230	20	.037
Psychological wellbeing (PWB)	190.81	17.49	199.71	21.34	2.617	20	.017

Table 4:
Statistical differences on the six factors of PWB (Ryff, 1989) after the intervention

Variable	*n* = 21				Significance		
Factor of PWB	Baseline		Follow-up				
	M	SD	M	SD	t	df	p
Autonomy	28.62	5.13	29.76	4.39	1.080	20	.293
Environmental Mastery	30.57	4.80	31.71	4.83	2.208	20	.039
Personal Growth	33.43	5.07	34.90	4.61	1.773	20	.092
Positive Relations	35.14	3.35	35.48	4.55	0.358	20	.724
Purpose in Life	31.24	4.83	33.62	4.85	2.462	20	.023
Self-Acceptance	31.81	5.54	34.24	5.21	2.727	20	.013

Statistical Analysis

Statistical analysis was conducted using SPSS 25.0. Paired t-tests were performed to compare differences on levels of mindfulness, stress, subjective and psychological wellbeing as well as the six factors of psychological wellbeing (PWB; Ryff, 1989) before and after the 14-day intervention phase. A two-way mixed ANOVA was conducted to assess whether the interaction of mindfulness experience and assessment point shows a significant effect on the dependent variables. Analyses were performed repeatedly both including and excluding outliers, however, no extreme values appeared. Thus, due to the small number of participants in the sample, the following results include statistical outliers.

RESULTS

Paired t-tests were performed to examine differences before and after the intervention on levels of mindfulness, stress, positive and negative affect, and psychological wellbeing. As Table 3 shows, statistically significant differences at the $p > .05$ level emerged for levels of mindfulness, positive affect, negative affect and psychological wellbeing. Participants showed increased levels of mindfulness, positive affect and psychological wellbeing as well as decreased levels of negative affect after the intervention. Despite participants demonstrating reduced levels of stress at follow-up (see Table 3), no significant difference was found: $t(20) = 1.562$; $p = 0.134$.

As Table 4 shows, statistically significant differences at the $p > .05$ level emerged on PWB factors (Ryff, 1989) environmental mastery,

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purpose in life and self-acceptance after the intervention. Participants reported increased levels of all six PWB factors (Ryff, 1989) at follow-up, however, no statistically significant difference was found on autonomy, personal growth, and self-acceptance (see Table 4).

Mindfulness Experience

Furthermore, we analyzed the level of mindfulness experience and its impact on the findings. A two-way mixed ANOVA was performed on levels of mindfulness in participants with no, medium, or high mindfulness experience. The analysis showed a statistically significant difference at the $p < .05$ level in mindfulness scores for the interaction of time and mindfulness experience: F (2,18) = 4,94, p = .020. The participants with medium mindfulness experience (pre-intervention: M = 33.42, SD = 6.89; post-intervention: M = 39.50, SD = 5.71) experienced higher increases in mindfulness levels than participants with no (pre-intervention: M = 35.00, SD = 6.68; post-intervention: M = 34.25, SD = 5.32) or high mindfulness experience (pre-intervention: M = 38.80, SD = 3.03; post-intervention: M = 39.00, SD = 5.39). Thus, the level of acquaintance with mindfulness appeared to make a difference in experiencing the intervention.

In addition to that, participants reported qualitative feedback after the intervention. One participant stated to "have used guided meditations in the past but have sometimes found them overwhelming, however, this bell was a nice sound, having good connotations with hearing it rings, finding it grounding and giving something to focus on". Another participant mentioned that the intervention aroused curiosity, now wanting "to find out more about mindfulness".

DISCUSSION

The study has shown statistically significant correlations between the mindfulness bell and levels of mindfulness, subjective wellbeing and psychological wellbeing. Furthermore, it has demonstrated a significant effect of the mindfulness experience in participants. However, it has not shown a significant correlation between the mindfulness intervention and perceived stress. These findings will be discussed based on previous literature before considerations for further research will be suggested.

Mindfulness Makes People Happier

Results of the study revealed the anticipated outcomes. Similar to Langer's (2005) and Spijkerman et al.'s (2016) findings, participants in our study showed enhanced levels of mindfulness. Furthermore, we confirmed previous findings suggesting that enhanced levels of subjective and psychological wellbeing were linked to engaging with a mindfulness intervention (Chittaro & Vianello, 2016; Sas, 2007). Thus, the mindfulness bell intervention led to enhanced levels of wellbeing.

In addition, participants showed statistically significant differences on three factors of psychological wellbeing (Ryff, 1989) after the intervention. Levels of environmental mastery, purpose in life and self-acceptance were significantly enhanced. Similarly, a study investigating effects of intensive meditating on telomerase activity (Singleton, Hölzel, Vangel, Brach, Carmody & Lazar, 2014) found significant changes on these three factors. Due to various mechanisms, mindfulness appears as a mediator of positive wellbeing outcomes. First, mindfulness appears to enable individuals to deal with existential challenges in life (Keyes et al., 2002; Langer, 2005) and therefore facilitates environmental mastery. Carson and Langer (2006) elucidate that mindfulness allows individuals to "draw novel distinctions about the situation and the environment" (p. 29), thus promotes flexible cognitive states. Second, Jacobs et al. (2010) found that meditative practices led to mindfulness and purpose in life by making one's purpose clearer. Rather than engaging in hedonic pleasure, intentions are focused on contributing to something bigger than oneself (Nanamoli & Bodhi, 1995; Wallace & Shapiro, 2006). Third, mindfulness was suggested as a facilitator of self-acceptance (Carson & Langer, 2006). It encourages people to live authentically by enabling them to be aware of the present. Also, it allows individuals to see mistakes as an opportunity for learning and growth instead of something negative. Lastly, mindfulness encourages people to see themselves as "multifaceted individuals" (Carson & Langer, 2006, p. 42), rather than as a reflection of other people's opinions.

Why Perceived Stress Did Not Decrease

Despite reporting decreased levels of stress at follow-up, participants did not demonstrate statistically significant differences in perceived stress after the intervention. In contrast to this, several studies have shown a correlation between regular practiced mindfulness and lower levels of stress (e.g., Bostock et al., 2018; Spijkerman, Pots & Bohlmeijer, 2016). Thus, various mechanisms may have influenced the results of our study. First, participants showed relatively high levels of perceived stress at baseline (M = 16.67, SD = 5.22) compared

to norm values (M = 13.19, SD = 6.32) (Cohen, 1994). Consequently, one might argue that the sample of this study tends to be more stressed than the average and, therefore, did not show significant decreases at follow-up. However, studies have shown that highly stressed individuals benefit even more from mindfulness interventions than moderately stressed individuals (Donald & Atkins, 2016; Krusche, Cyhlarova, King & Williams, 2012). Thus, high stress levels at baseline might not account for our findings. However, the number of participants in our study was relatively small. Thus, findings might be biased due to a small sample number. Moreover, studies that showed significant stress reduction after the mindfulness intervention mostly used a time frame of eight weeks (e.g., Bostock et al., 2018; Carmody, Baer, Lykins & Olendzki, 2009). Baer, Carmody and Hunsinger (2012) demonstrated that significant reductions in perceived stress levels take effect not before week four. Participants in our study, however, engaged with the mindfulness app for two weeks only. Thus, the time frame of our study might have prevented participants from showing significant reductions in stress levels.

The Influence of Mindfulness Experience

To examine the possible influence of participants' mindfulness experience on the outcomes, this study asked participants to assess their level of mindfulness experience (see Methods). Whereas participants with medium mindfulness experience showed significant increases in their mindfulness levels, participants with no or high experience did not. Foundational to this, Lyubomirsky, Dickerhoof, Boehm and Sheldon (2011) showed that an individual's expectation of an intervention and the amount of effort put in affect the success of the intervention. In our study, participants with medium mindfulness experience put more effort into the intervention and enjoyed it more than those with no or high mindfulness experience, even though no statistically significant difference was found. One interpretation is that those participants who were already acquainted with the mindfulness concept showed greater expectation to experience positive effects due to the mindfulness practice compared to participants with no mindfulness experience and, therefore, put more effort in it. Participants with high mindfulness experience, on the contrary, were already extremely acquainted with mindfulness practice, so that they did not experience big improvements through the mindfulness bell (see Chittaro & Vianello, 2016 for similar outcomes). Thus, our findings are in line with Lyubomirsky and colleagues' (2011) claim, suggesting that participants' effort and enjoyment had an impact on the outcomes of the mindfulness bell.

Limitations

Despite the present study revealing most of the anticipated outcomes, some limitations must be stated.

Time matters: Although Spijkerman and colleagues' (2016) meta-analysis revealed significant effects of online MBIs on wellbeing, mindfulness and stress, it is important to note that 14 of 17 studies had an intervention duration of minimum six weeks. Prior to this, mindfulness was proposed to demand a certain timeframe to be developed (Kabat-Zinn, 2003). Our intervention, however, allowed a duration of two weeks only. Although significant differences have been shown after two weeks, a study revealed that levels of mindfulness increased significantly between week two and four of an intervention (see Chittaro & Vianello, 2016). In addition, the follow-up questionnaires were assessed directly after the end of the intervention, whereas the effects may have taken longer to emerge (Howells et al., 2016). Hence, a longer time frame of the intervention would have been beneficial to accurately capture outcomes of the study.

Procedural issues: Although a landing page was created where interested persons could sign up and participants were recruited in every way possible, only thirty-one participants completed the baseline questionnaires. Moreover, ten participants were screened out at follow-up because they did not use the app or did not complete the follow-up questionnaires. Thus, the study shows a sample of twenty-one participants only. This number is relatively small and therefore does not allow for general conclusions from our study.

Participants' experience: According to Lyubomirsky et al. (2011), two meta factors affect the success of an intervention: the will of the participant and the amount of effort that is put into the activity. In our study, 30% of the participants used the app every day, whereas 30% used it only seven days or less. Similarly, 50% of the participants followed the bell ring four to six times each day, whereas the other 50% followed it only one to three times. Scholars have suggested that three random reminders are an ideal frequency (see Killingsworth & Gilbert, 2010), however, the app did not allow to set less than six reminders each day. Feedback from the participants underlines the difficulty of using the app six times each day as they

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mentioned that "*during seminars it's unfortunately not possible to have a bell ringing every hour"* and "*it would be too distracting (or embarrassing) to have the bell ring in a meeting."* Nevertheless, when assessing how much participants enjoyed using the app, only 25% indicated a number between zero and four on a 0 to 10 scale, whereas 55% picked a five to nine and, 20% selected ten as highest enjoyment. Thus, participants mainly seemed to enjoy using the mindfulness bell, but the frequency of the bell-ringing was not ideal and only 30% of the participants used the app every day. Hence, not enough effort may have been put into the intervention.

Considerations for Further Research

Since this is the first experimental study on the mindfulness bell, key learnings from our process may be helpful for other scholars to expand the research on the mindfulness bell. In addition, some insights may be helpful when creating MBIs in general. Thus, we want to suggest the following recommendations for further research: First, it appears significant to recruit a high number of participants in order to compensate for high attrition and drop-out rates. Second, it may be beneficial to create an application that is accessible for both iOS and Android users since it allows more people to participate. Building on Cramer and colleagues' (2010) claim that Android and iOS may have different kind of users, it would also promote a bigger heterogeneity. Third, to make it more convenient for individuals, creating an application that allows users to turn off the sound when necessary and set only three bells per day would be useful. Lastly, an additional follow-up questionnaire that is sent out a month after the intervention may capture changes that take longer to transpire. Nonetheless, we want to emphasize the positive feedback we received from participants regarding the intervention. They found the bell ring "*grounding"* and saw it as an opportunity to "*enjoy a few breaths and return to what I'm doing renewed."* Participants mentioned that this intervention made them more interested in mindfulness and encouraged them to develop a mindfulness practice. Hence, with the right application, the mindfulness bell offers an easy way for individuals to integrate mindfulness into their everyday lives.

CONCLUSION

Mindfulness is a main determinant of happiness (Williams, 2013). The more ways researchers find to encourage mindfulness in individuals, the more individuals will be attracted to engage with this topic. This study has revealed statistically significant outcomes for the mindfulness bell on levels of mindfulness, subjective wellbeing and psychological wellbeing. Therefore, it has shown the significance of engaging with the mindfulness concept. In addition, it has suggested what scholars need to consider when creating MBIs. While further research is needed to expand methodologies to make the mindfulness bell more accessible, with this study, we have accelerated a new angle on mindfulness and offered an accessible opportunity for individuals to engage with mindfulness in their daily lives. ■

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References

Abbott, R. A., Ploubidis, G. B., Huppert, F. A., Kuh, D., Wadsworth, M. E. J., & Croudace, T. J. (2006). Psychometric evaluation and predictive validity of Ryff's psychological wellbeing items in a UK birth cohort sample of women. *Health and Quality of Life Outcomes, 4*(76).

Baer, R. A., Carmody, J., & Hunsinger, M. (2012). Weekly change in mindfulness and perceived stress in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 68*(7): 755-765.

Borker, D. R. (2013). Mindfulness practices for accounting and business education: A new perspective. *American Journal of Business Education, 6*(1): 41-55.

Bostock, S. K., Crosswell, A. D., Prather, A. A., & Steptoe, A. (2018). Mindfulness on-the-go: Effects of a mindfulness meditation app on work stress and wellbeing. *Journal of Occupational Health Psychology*. Advanced online publication. https://doi.org/10.1037/ocp0000118

Brace, N., Kemp, R., & Snelgar, R. (2012). *SPSS for psychologists (5th ed.)*. Palgrave Macmillan.

Brown, K. W., Kasser, T., Ryan, R. M., Linley, A., & Orzech, K. (2009). When what one has is enough: Mindfulness, financial desire discrepancy, and subjective wellbeing. *Journal of Research in Personality, 43:* 727-736.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology, 84*(4): 822-848.

Brown, K. W., & Ryan, R. M. (2004). Perils and promise in defining and measuring mindfulness: Observations from experience. *Clinical Psychology: Science and Practice, 11*(3): 242-248.

Brown, R. C. (2011). The mindful teacher as the foundation of contemplative pedagogy. In J. Simmer-Brown and F. Grace (Eds.), *Meditation and the Classroom: Contemplative Pedagogy for Religious Studies*. State University of New York Press.

Buchheld, N., & Walach, H. (2002). Achtsamkeit in Vipassana-Meditation und Psychotherapie. Die Entwicklung des "Freiburger Fragebogens zur Achtsamkeit". *Zeitschrift für Klinische Psychologie, Psychiatrie und Psychotherapie, 50*: 153-172.

Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 65*: 613-626.

Carson, S. H., & Langer, E. J. (2006). Mindfulness and self-acceptance. *Journal of Rational-Emotive & Cognitive Behavior Therapy, 24*(1): 29-43.

Chittaro, L., & Vianello, A. (2014). Computer-supported mindfulness: Evaluation of a mobile thought distancing application on naive meditators. *International Journal of Human- Computer Studies, 72:* 337-348.

Chittaro, L., & Vianello, A. (2016). Evaluation of a mobile mindfulness app distributed through on-line stores: A 4-week study. *International Journal of Human-Computer Studies, 86:* 63-80.

Cohen, S. (1994). Perceived Stress Scale. http://www.mindgarden.com/documents/PerceivedStressScale.pdf

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24:* 386-396.

Cramer, H., Rost, M., Belloni, N., Bentley, F., & Chincholle, D. (2010). Research in the large. Using app stores, markets, and other wide distribution channels in Ubicomp research, in: Proceedings of the 12th ACM International Conference Adjunct Papers on Ubiquitous Computing-Adjunct. ACM Press, 511-514. https://doi.org/10.1145/1864431.1864501

Diener, E. (1984). Subjective wellbeing. *Psychological Bulletin, 95*(3): 542-575.

Diener, E. (2000). Subjective wellbeing. The science of happiness and a proposal for a national index. *American Psychologist, 55*(1): 34-43.

Donald, J. N. & Atkins, P. W. B. (2016). Mindfulness and Coping with Stress: Do Levels of Perceived Stress Matter? *Mindfulness, 7:* 1423-1436. https://doi.org/10.1007/s12671-016-0584-y

Egloff, B., Schmukle, S. C., Burns, L. R., Kohlmann, C.-W., & Hock, M. (2003): Facets of dynamic positive affect: Differentiating joy, interest, and activation in the positive and negative affect schedule (PANAS). *Journal of Personality and Social Psychology, 85*(3): 528-540.

Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist, 55:* 647-654.

Hart, R., Ivtzan, I., & Hart, D. (2013). Mind the gap in mindfulness research: A comparative account of the leading schools of thought. *Review of General Psychology, 17*(4): 453-466.

Hede, A. (2010). The dynamics of mindfulness in managing emotions and stress. *Journal of Management Development, 29*(1): 94-110.

Henze, N., & Pielot, M. (2013). App stores: External validity for mobile HCI. *Interactions,, 20*(2): 33-38.

Howells, A., Ivtzan, I., & Eiroa-Orosa, F. J. (2016). Putting the 'app' in happiness: A randomised controlled trial of a smartphone-based mindfulness intervention to enhance wellbeing. *Journal of Happiness Studies, 17*(1): 163-185.

European Journal of Applied Positive Psychology 2021, 5, Article 20 ISSN 2397-7116

Ivtzan, I. (2016). Mindfulness in Positive Psychology: An Introduction. In I. Ivtzan & T. Lomas (Eds.), *Mindfulness in Positive Psychology. The Science of Meditation and Wellbeing (pp. 1-12)*. Routledge.

Jacobs, T. L., Epel, E. S., Lin, J., Blackburn, E. H., Wolkowitz, O. M., Bridwell, D. A., & Saron, C. D. (2010). Intensive meditation training, immune cell telomerase activity, and psychological mediators. *Psychoneuroendocrinology, 36*: 664-681.

Jankowski, T., & Holas, P. (2014). Metacognitive model of mindfulness. *Consciousness and Cognition, 28*: 64-80.

Jordan, S., Messner, M., & Becker, A. (2009). Reflection and mindfulness in organizations: Rationales and possibilities for integration. *Management Learning, 40*(4): 465-473.

Kabat-Zinn, J. (1982). An out-patient program in Behavioral Medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*: 33-47

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness.* Delacorte.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10,* 144-156.

Kabat-Zinn, J. (2005). *Coming to our senses: Healing ourselves and the world through mindfulness*. Hyperion.

Keng, S., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review, 31,* 1041-1056.

Kerfood, K. (2006). Allow yourself to be surprised. *Dermatology Nursing, 18*(1): 72.

Keyes, C. L. M., Shmotkin, D., & Ryff, C. D. (2002). Optimizing wellbeing: The empirical encounter of two traditions. *Journal of Personality and Social Psychology, 82*(5): 1007-1022.

Killingsworth, M. A., & Gilbert, D. (2010). A wandering mind is an unhappy mind. *Science, 330:* 932.

Kohls, N., Sauer, S., & Walach, H. (2009). Facets of mindfulness - Results of an online study investigating the Freiburg mindfulness inventory. *Personality and Individual Differences, 46*(2): 224-230.

Krusche, A., Cyhlarova, E., King, S., & Williams, J. M. G. (2012). Mindfulness online: a preliminary evaluation of the feasibility of a web-based mindfulness course and the impact on stress. *BMJ Open, 2012: 2*. https://doi.org/10.1136/bmjopen-2011-000803

Langer, E. (1989). *Mindfulness*. Perseus Books.

Langer, E. (2005). Wellbeing. Mindfulness versus positive evaluation. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of Positive Psychology (Chapter 16, pp. 214-330)*. Oxford University Press.

Lazarus, R. S. (1966). *Psychological stress and the coping process.* McGraw-Hill.

LeBel, J. L., & Dubé, L. (2001). The impact of sensory knowledge and attentional focus on pleasure and on behavioral responses to hedonic stimuli. *Paper presented at the 13th annual American Psychological Society Convention, Toronto, Ontario, Canada.*

Lee, E.-H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian Nursing Research, 6,* 121-127.

Lomas, T., Hefferon, K., & Ivtzan, I. (2014). *Applied positive psychology. Integrated positive practice.* Sage.

Louis, M. R., & Sutton, R. I. (1991). Switching Cognitive Gears: From Habits of Mind to Active Thinking. *Human Relations, 44*(1): 55-76.

Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost wellbeing. *Emotion, 11*(2): 391-402.

Michel, A., Bosch, C., & Rexroth, M. (2014). Mindfulness as a cognitive-emotional segmentation strategy: An intervention promoting work-life balance. *Journal of Occupational and Organizational Psychology, 87:* 733-754.

Miller, G. (2012). The smartphone psychology manifesto. *Perspectives on Psychological Science, 7:* 221-237.

Nanamoli, B., & Bodhi, B. (1995). *The Middle Length Discourses of the Buddha: A New Translation of the Majjhima Nikāya*. Wisdom Press.

Nyklíček, I., & Kuipers, K. (2008). Effects of mindfulness-based stress reduction intervention on psychological wellbeing and quality of life: Is increased mindfulness indeed the mechanism? *Annals of Behavioral Medicine, 35*: 331-340.

Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive systems design: Key issues, process model, and system features. *Communications of the Association for Information Systems, 24*: 485-500.

Oprea, L. E. (2016). Human behavior changes in embodied interaction through a nonobject artifact. *Paper presented at SIDeR, 2016.*

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations of the meaning of psychological wellbeing. *Journal of Personality and Social Psychology, 57:* 1069-1081.

Sas, C. (2007). Being present - being mindful. Conceptual delimitations and comparative analysis. *Peach Summer School Extended Abstract.* http://eprints.lancs.ac.uk/41812/1/beingpresent.pdf

Schlegel, K. (2018). *Glücksanfälle*. https://gluecksanfaelle.com/

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* Guilford Press.

Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-based stress reduction for health care professionals: Results from a randomized trial. *International Journal of Stress Management, 12*(2): 164-176.

Singleton, O., Holzel, B. K., Vangel, M., Brach, N., Carmody, J., & Lazar, S. W. (2014). Change in brainstem gray matter concentration following mindfulness-based intervention is correlated with improvement in psychological wellbeing. *Human Neuroscience, 18:* 33.

Spijkerman, M. P. J., Pots, W. T. M., & Bohlmeijer, E. T. (2016). Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta- analysis of randomised controlled trials. *Clinical Psychology Review, 45:* 102-114.

Spotlight Six Software LLC. (2018). *Mindfulness Bell* (Version 5.1.1) [Mobile application software]. https://itunes.apple.com/us/app/mindfulness-bell/id380816407?ls=1&mt=8

Steger, M. F., & Ekman, E. (2016). Working it: Making meaning with workplace mindfulness. In I. Ivtzan & T. Lomas (Eds.), *Mindfulness in positive psychology: The science of meditation and wellbeing (pp. 228-242)*. Routledge.

Walach, H., Buchheld, N., Buttermüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness - the Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40:* 1543-1555.

Wallace, B. A., & Shapiro, S. L. (2006). Mental balance and wellbeing: Building bridges between buddhism and western psychology. *161*(7): 690-701.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6): 1063-1070.

Weinstein, N., Brown, K.W., & Ryan, R.M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, & emotional wellbeing. *Journal of Research in Personality, 43*: 374-385.

Williams, P. B. (2013). *Your brain on happiness: The neuroscience of joy.* http://truehomewithin.net/Dharma_essays_files/essay_joy10_brain_on_happiness2.pdf

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