

It's so boring - or is it?

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It's so boring – or is it? Examining the role of mindfulness for work performance and attitudes in monotonous jobs

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We examine the role of employee mindfulness in the context of highly monotonous work conditions. Integrating research on task monotony with theorizing on mindfulness, we hypothesized that mindfulness is negatively associated with the extent to which employees feel generally bored by their jobs. We further hypothesized that this lower employee boredom would relate to downstream outcomes in the form of job attitudes (job satisfaction and turnover intentions) and task performance. We examined both objective task performance quality and quantity to shed light on the complexity of the mindfulness–task performance relation, which has so far mostly been investigated using subjective supervisor ratings. In a sample of 174 blue-collar workers in a Mexican company, results showed that employee mindfulness was negatively related to boredom. Further, mindfulness was positively related to job satisfaction and negatively to turnover intentions, partly mediated through boredom. Mindfulness turned out to be a double-edged sword for task performance in monotonous jobs: Mindfulness was positively related to task performance quality but negatively related to quantity.

Practitioner points

- In repetitive, monotonous jobs held by millions of people worldwide, more mindful employees perceive their job as less boring.
- Furthermore, mindful employees have higher job satisfaction and are less likely to quit.
- With regard to objective job performance, mindfulness can be a double-edged sword: It positively affects objective performance quality via boredom, but negatively affects objective performance quantity directly.

The essence of boredom is to be found in the obsessive search for novelty. Satisfaction lies in mindful repetition, the discovery of endless richness in subtle variations on familiar themes. (George Leonard)

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During the global pandemic in 2020, magazines and newspapers published many articles recommending how to deal with boredom caused by remote work (e.g., Morgan, 2020; Morris, 2020). Among other measures, mindfulness – defined as receptive attention to and awareness of what is happening in the present moment (Brown & Ryan, 2003; Quaglia, Brown, Lindsay, Creswell, & Goodman, 2015) – has been recommended as a potential remedy (Fitzgerald, 2020), largely in response to a great surge of organizational interest in the concept in recent years (e.g., Good et al., 2016; Reb & Atkins, 2015).

However, while boredom in relation to remote work may be a temporary nuisance for white-collar workers, the majority of workers in the manufacturing, service, and agricultural sectors around the world (International Labor Organization, 2018), and particularly in developing countries, face boredom on a daily basis because of monotonous jobs that require the completion of repetitive tasks (Huang & Van De Vliert, 2003). A closer look at existing research and the organizations that are adopting mindfulness suggests that workplace mindfulness has been studied and practised largely in the context of white-collar jobs where there are relatively high levels of variety and human interaction. In contrast, monotonous work environments have received little attention in the mindfulness literature, despite their prevalence across many industries and regions.

This neglect is consistent with organizational scholarship more broadly (Loukidou, Loan-Clarke, & Daniels, 2009), which from both a theoretical and a practical perspective tends to focus on white-collar work, leaving working experiences in monotonous jobs, such as working on an assembly line or delivering simple services, poorly understood (Green, 2004; Maume & Purcell, 2007). What we do know is that both job performance and job attitudes are negatively affected when employees carry out highly monotonous work (Gould, 1979; Melamed, Ben-Avi, Luz, & Green, 1995), which suggests that blue-collar monotonous work environments need more attention so that solutions to the many enduring and aversive problems of these workplaces can be identified. Although systematic, structural, organizational, and political solutions are much needed, learning more about the role of mindfulness for job performance and attitudes in monotonous jobs may also help in understanding which personal factors enable employees to cope with such challenging work conditions (Bakker & Schaufeli, 2008).

Against this backdrop, the purpose of the present study was to examine the role of mindfulness in highly monotonous jobs. Drawing on research into mindfulness, task monotony, and boredom (e.g., Cox, 1985; Dane, 2011; Good et al., 2016; Loukidou et al., 2009), we suggest that individual differences in trait mindfulness shape how employees experience monotonous work. More specifically, we postulate that by adopting what is known as a beginner's mind (Kabat-Zinn, 2013), more mindful employees experience objectively monotonous work as subjectively less boring than their less mindful peers do. We hypothesize that because of this different experience, more mindful employees will have higher job satisfaction and lower turnover intentions. We also predict that through reduction of boredom, employee mindfulness will be positively related to task performance with respect to both quantity and quality of objective performance (Campbell, McCloy, Oppler, & Sager, 1993).

We test our hypotheses concerning the relationships between mindfulness and boredom, job attitudes (i.e., job satisfaction and turnover intentions), and task performance (i.e., objective quality and quantity of output) in a multi-time point multi-source field study in a Mexican company. The company is one of over a thousand so-called maquiladoras that operate near the United States–Mexico border under a special US tax-free agreement and that offer simple services such as processing, assembling, and

manufacturing at a fraction of US rates of pay. The employees in the maquiladora under study all do the same simple, highly repetitive job and are exposed to the same objectively monotonous work conditions. Because the work conditions are constant for all employees, the setting enables us to study exclusively the effect of individual differences in mindfulness and how these relate to perceptions of boredom, task performance, and job attitudes (Figure 1).

Our research makes several contributions. First, we add to the growing literature on workplace mindfulness by examining the role of employee mindfulness in jobs with high monotony. Our findings thereby complement prior studies conducted in settings that are more dynamic, more complex, and have higher task variety (e.g., Hülshager et al., 2014; Reb, Narayanan, & Ho, 2015), allowing us to test whether the benefits of employee mindfulness for job performance and attitudes generalize to monotonous work settings. In addition, we empirically inform the theoretical debate about the role of mindfulness for task performance. One position in this debate (Dane, 2011) suggests that mindfulness facilitates performance in complex, varied jobs but impairs performance in monotonous contexts; another position (Bishop et al., 2004; Good et al., 2016) argues for the positive effects of mindfulness on performance, even in monotonous jobs, as it draws employee attention towards task accomplishment.

Second, by assessing employee performance objectively in terms of both quantity and quality, we address a limitation in previous research on the mindfulness–performance relation, which has relied on subjective ratings (typically, supervisor ratings; e.g., Reb et al., 2015). As such ratings can be affected by several different influences, such as the social context (Judge & Ferris, 1993) and attitudes (Tziner & Murphy, 1999), they are highly idiosyncratic and do not fully reflect actual performance (Hoffman, Lance, Bynum, & Gentry, 2010). For example, a positive relation between employee mindfulness and supervisor ratings could be at least partly due to supervisors liking mindful employees more (Turban, Jones, & Rozelle, 1990). Assessing objective performance reduces measurement error (Bommer, Johnson, Rich, Podsakoff, & MacKenzie, 1995) and can result in measurements that have greater validity. Examining both performance quantity and quality also enables a more comprehensive investigation of the role of mindfulness for employee task performance.

Finally, our research contributes to a better understanding of boredom at work, a negative emotion that is receiving increasing scholarly attention (e.g., Cummings, Gao, & Thornburg, 2016; Gkorezis & Kastritsi, 2017; Park, Lim, & Oh, 2019; Pindek, Krajcevska, & Spector, 2018). We examine how mindfulness affects boredom by shaping employees'

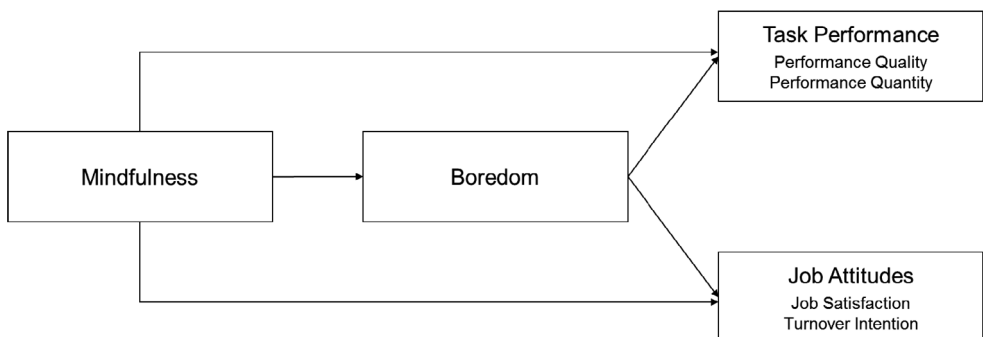


Figure 1. Conceptual model.

subjective experiences of objective work conditions. Although monotony is one main antecedent of boredom (Loukidou et al., 2009), the relationship between objectively monotonous work conditions and subjective experiences is not as strong as one might expect (Melamed et al., 1995). Theoretical work on mindfulness enabling individuals to adopt a beginner's mind (Kabat-Zinn, 2013) suggests that more mindful employees may adopt a receptive, curious stance that helps them to experience monotonous tasks as less boring; a beginner's mind 'allows us to be receptive to new possibilities and prevents us from getting stuck in the rut of our own expertise, which often thinks it knows more than it does' (Kabat-Zinn, 2013, p. 24). Relatedly, Garland et al. (2015) have argued that mindfulness creates meaning by enabling individuals to reappraise negative experiences positively, which supports the regulation of emotions from such experiences and the valuing of their positive aspects. By introducing mindfulness as an individual difference that affects boredom, we add to a growing body of literature on monotony and boredom at work.

Theory and hypothesis development

Mindfulness

Mindfulness has its roots in Buddhist spiritual practices but has been studied in psychology since the 1980s (Bishop et al., 2004). Mindfulness concerns how individuals relate to themselves and to reality. In a state of mindfulness, individuals focus their attention on and become aware of what is happening in the present moment; this attention and awareness are characterized as being open and receptive (Brown & Ryan, 2003; Quaglia et al., 2015). Receptive attention and awareness can be brought to bear on external stimuli, but also on internal stimuli such as bodily sensations, thoughts, and emotions (Shapiro, Astin, Bishop, & Cordova, 2005).

Mindfulness has been conceptualized at different, interrelated levels (for a review, see Sutcliffe, Vogus, & Dane, 2016). At the organizational level, it refers to the collective attention that 'enables managers and employees to minimize errors, remain vigilant, and respond effectively to unexpected events' (Rerup & Levinthal, 2014, p. 33). In this connection, interest has mostly been given to how mindful attention facilitates reliability and learning from failure (e.g., Rerup, 2009) in high-reliability organizations where negative events may have severe consequences (Weick & Sutcliffe, 2006). Monitoring processes, examining errors, and building resilience and expertise have thus been referred to as mindful organizing (Weick & Sutcliffe, 2001).

At the individual level, the mindfulness literature has witnessed several operationalizations (Good et al., 2016; Quaglia et al., 2015). First, mindfulness can be conceptualized as a state that characterizes the extent to which individuals are mindful at a given moment or within a short time frame. Second, mindfulness is commonly studied by investigating the effects of mindfulness interventions that consist of a bundle of mindfulness practices. These aim to focus attention on experiences such as breathing or the open monitoring of sensory stimuli (e.g., emotions and bodily sensations). Third, mindfulness can be studied as a personality trait that describes individuals' dispositions to be mindful across situations and time. Trait mindfulness varies naturally between individuals because of genetic differences and differences in non-shared environmental influences (Waszczuk et al., 2015). In the present study, we focus on this last operationalization: interindividual differences in trait mindfulness and how they relate to interindividual differences in performance outcomes and job attitudes. Our interest in relating mindfulness to job

attitudes and performance that reflect mid-range time periods makes this approach more suitable than a state approach.

Mindfulness and boredom

Many jobs, such as mechanical assembly, inspection and monitoring jobs, and piecework, feature tasks that are highly repetitive (Melamed et al., 1995; Schaufeli & Salanova, 2014). Repetitiveness has been identified as the key element of objectively monotonous jobs (Melamed et al., 1995) and defined as ‘work in which discrete sets of work activities are repeated in the same order’ again and again (Cox, 1985, p. 86). Repetitiveness can be measured in terms of work–cycle time (Cox, 1985; Melamed et al., 1995), which indicates the amount of time spent on a task before it starts again. The shorter the task cycle, the more repetitive and thus monotonous the work.

Monotony can cause boredom (Loukidou et al., 2009). Boredom is an aversive state characterized as unpleasant and deactivated (Watson & Tellegen, 1985). However, the degree to which employees feel bored by objectively monotonous jobs differs. Research shows that boredom caused by job monotony varies, even when employees are placed under the same conditions and do the same job. For example, Melamed et al. (1995) found that objective monotony and boredom were only moderately related (ranging from $r = .34$ to $r = .42$). They also found that the effects of objective monotony were, at least to some degree, channelled through boredom. These findings are in line with the overarching theme in psychology that how we react to the world around us depends not only on how that world is objectively configured but also on how we perceive it subjectively (Salancik & Pfeffer, 1978). The research by Melamed et al. (1995) suggests that not all employees experience repetitive tasks as equally boring and that their boredom may be due, at least in part, to individual differences.

We propose that mindfulness is one such individual difference that affects how people experience the world around them. Specifically, we suggest that individuals with high trait mindfulness are less likely to feel bored by their work. The first reason for this is that they perceive the same objectively monotonous work differently. Mindful information processing is experiential in nature (Good et al., 2016); it involves paying attention to external and internal stimuli (physiological sensations, thoughts, or emotions) as they are. In contrast to a conceptual information processing mode, where thoughts dominate attention and individuals think *about* events, categorizing, evaluating, or trying to derive meaning from them, experiential information processing involves the pure and simple experience of what is in the present moment. The orientation brought to these present-moment experiences is therefore characterized by curiosity, openness, and acceptance (Bishop et al., 2004). Accordingly, one of the core attitudes of mindfulness is referred to as the beginner’s mind, an orientation brought to present-moment experiences as if one is experiencing them for the first time (Kabat-Zinn, 2013). With a beginner’s mind, even repetitive activities are perceived as unique. By bringing one’s full attention and awareness to the experiences associated with conducting repetitive tasks with a receptive, open mind, the tasks appear less monotonous, as every moment is, by definition, new and includes unique elements (Weick & Sutcliffe, 2006).

Furthermore, in addition to perceiving their work differently, employees with high trait mindfulness may also react different emotionally. It has been argued that mindfulness promotes more neutral evaluations of stimuli by providing psychological distance from negative events (Hülshager et al., 2014; Weinstein, Brown, & Ryan, 2009). Thus, mindful employees may experience less intense boredom in the face of monotonous work. We

therefore hypothesize that even when employees are placed in the same objectively monotonous work conditions, those who are high in trait mindfulness are less likely to feel bored by their job than those who are low in mindfulness.

Hypothesis 1. Mindfulness is negatively related to boredom.

Mindfulness and task performance in monotonous jobs

Task performance is vitally important for organizational effectiveness and is the most researched facet of the broader concept of job performance (Schmitt, Cortina, Ingerick, & Wiechmann, 2003). Task performance refers to work activities that are formalized parts of a job (Rotundo & Sackett, 2002) and manifests in the quality and quantity of an employee's output (J. P. Campbell et al., 1993). Theoretical and empirical evidence has long suggested that monotonous work has a negative effect on employee task performance (e.g., Wyatt, 1929; for a review, see Loukidou et al., 2009). Short task cycles are seen as particularly problematic for job performance (Schaufeli & Salanova, 2014).

However, we know little about the individual difference factors that allow some employees to cope better than others with monotonous jobs and to achieve higher task performance as a result. The role of mindfulness, as one such interindividual difference, is unclear; to date, only a handful of empirical studies have addressed the mindfulness–task performance relationship in real work settings with samples drawn from the working population (Good et al., 2016). Overall, the findings have been mixed. Whereas some studies have found evidence that mindfulness may benefit task performance (Dane & Brummel, 2014; Reb et al., 2015; Shonin, Van Gordon, Dunn, Singh, & Griffith, 2014), others have found no relationship between mindfulness and task performance (Giluk, 2010), or have found a relationship only when considering boundary conditions (Zhang, Ding, Li, & Wu, 2013). A recent meta-analysis observed a positive relationship between mindfulness and job performance ($\rho = .34$, Mesmer-Magnus, Manapragada, Viswesvaran, & Allen, 2017). However, it should be noted that the study integrated different measures (overall vs. specific) and different sources (self- vs. other ratings) of job performance, thus potentially providing an inflated estimate (Podsakoff, MacKenzie, & Podsakoff, 2012).

Similarly, extant theory is ambiguous with respect to the effects of mindfulness on task performance in monotonous jobs. In their review of mindfulness at work, Good et al. (2016) argued that mindfulness can increase work performance by positively affecting three attentional qualities: stability, control, and efficiency. First, by stabilizing attention in the present, mindfulness stops the mind from wandering (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). Allowing the mind to wander can be a maladaptive way to cope with monotonous work, as it potentially increases errors and decreases task performance. Mindfulness allows employees to stay focused on the task, ensuring that their output is of high quality. In line with this argument, research has shown that mindfulness interventions can indeed increase task quality (Hafenbrack & Vohs, 2018, in relation to a letter-correction task). However, these studies were conducted in a laboratory. Thus, to date, how task quality is affected by mindfulness is still poorly understood, and we suggest that the effect occurs through reduction of perceived boredom.

Second, Good et al. (2016) have argued that mindfulness provides control over attention, and thus that mindful individuals are able to direct their attention to relevant demands instead of distractions (Ocasio, 2011). Employees in monotonous work are likely to give in to distractions in order to decrease their boredom (Schaufeli & Salanova, 2014),

and impairment to task performance ensues. Mindfulness, in contrast, may help employees to keep their attention directed to the task at hand and to ignore or resist distractions. Consequently, mindfulness should decrease errors and increase task performance quality.

Third, mindfulness increases attentional efficiency, thereby reducing attentional lapses (short periods during which the attention drifts away) that can lead to errors, especially in the monotonous work settings that are particularly associated with such lapses. Comparable arguments have been presented by Bishop et al. (2004), who described self-regulation of attention as a core element of mindfulness and mindfulness practice. In a mindful state, individuals bring attention and awareness to present-moment experiences. Mindful individuals are therefore skilled in sustained attention (i.e., regulating the focus of attention to the present moment and maintaining an awareness of current-moment experiences) and are able to maintain vigilance over a longer period of time. Sustained attention should thus help employees in monotonous conditions to stay focused on the task at hand, avoid attentional lapses, and bring attention back to the task whenever the mind wanders off.

Although the aforementioned theories suggest that mindfulness may be beneficial in monotonous work environments, some researchers disagree. For example, Dane's (2011) contingency model suggests that mindfulness is positively related to task performance only in dynamic work conditions, and that it may be negatively related to task performance in static contexts, including monotonous work environments. The reason is that mindful employees are assumed to have increased attentional breadth in relation to external stimuli that would distract them from their current work task in static contexts.

Similarly, Anderson's (1982) model of skill acquisition entails that repetitive tasks are learned over time and compiled in procedural memory. As a result, tasks that have become automatic through repetition are most effectively performed without conscious attention, that is, mindlessly (Kudesia, 2019). Mindfulness, however, disrupts this compilation process by drawing attention to an otherwise automated process. Performance then decreases, because the efficiency of automatic performance is lost and individuals spend more time thinking about the given repetitive task. Thus, mindfulness interferes with the cognitive simplification process of building routines (Earley, Lee, & Hanson, 1990), which would otherwise increase work speed in monotonous work environments. Thus, it is argued that an advantage in dynamic work environments may be a disadvantage in monotonous work environments.

Initial empirical support for a negative relationship between mindfulness and task performance under certain conditions has been provided by Zhang et al. (2013), who investigated the role of mindfulness for employees of a nuclear power plant. They found that mindfulness had a negative effect on task performance for jobs with relatively low complexity (field operators), whereas this relationship became positive for jobs with relatively high complexity (control-room operators). However, as low complexity is not the same as high monotony (consider, for example, air-traffic control or grading student papers; see also Campbell, 1988), the nature of these effects for highly monotonous work environments has yet to be evaluated.

Siding with the more positive perspective on mindfulness and performance (Bishop et al., 2004; Good et al., 2016), we argue that the potential benefits of mindfulness outweigh the potential disadvantages in monotonous work environments. As mindfulness benefits the regulation of attention to the present moment and thus reduces boredom in repetitive jobs, it could benefit employees' task performance in two ways. First, in monotonous jobs, errors are often a consequence of inattention and boredom (Loukidou

et al., 2009; Schaufeli & Salanova, 2014). As argued above, mindfulness promotes the regulation of attention to the present moment, and it should thus reduce the risk of attentional lapses caused by boredom. Second, given sustained attention on the task (Bishop et al., 2004) and on the present moment, negative experiences of boredom should be reduced, and thus, performance may be steadier and productivity may increase (Pan, Shell, & Schleifer, 1994). Consequently, we propose the following hypothesis:

Hypothesis 2. Mindfulness is positively related to task performance, as mediated by lower boredom.

Mindfulness and job attitudes in monotonous jobs

There is a new body of research that documents the benefits of mindfulness for job attitudes, especially job satisfaction and turnover intentions (Dane & Brummel, 2014; Hülshager, Alberts, Feinholdt, & Lang, 2013; Reb, Narayanan, Chaturvedi, & Srinivasan, 2017; Reb et al., 2015): These studies have provided valuable first insights into the role of mindfulness for job attitudes. However, a number of questions have yet to be addressed. First, these studies have focused on dynamic service or interactive work environments (Dane & Brummel, 2014; Hülshager et al., 2013), or they have involved samples that include a broad range of jobs (Reb et al., 2015, 2017). It therefore remains to be determined whether the findings can be generalized to the large numbers of individuals who hold monotonous jobs that are markedly different from those investigated in the above-mentioned studies. Second, the different pathways that explain the outcomes of mindfulness in the context of work are still poorly understood (Good et al., 2016). With regard to job satisfaction, Hülshager Alberts Feinholdt and Lang (2013) found partial support for the proposition that reductions in maladaptive emotion regulation strategies explain the positive relationship between mindfulness and job satisfaction in emotional labour-intensive jobs. This mechanism, however, was specific to the context of interactive service work and the emotional demands and stressors associated with it. In other work contexts, especially in monotonous jobs, a potentially positive relationship between mindfulness and job attitudes may be driven by different mechanisms. In the present study, we address this question by investigating the role of mindfulness for job attitudes among individuals with monotonous work and by shedding light on boredom as a mediating mechanism.

Previous research has documented that monotony negatively affects job attitudes, including job satisfaction (Melamed et al., 1995) and turnover intentions (Schaufeli & Salanova, 2014), probably because of the inherently aversive reactions that are triggered by monotonous tasks (Lundberg, Granqvist, Hansson, Magnusson, & Wallin, 1989). Thus, in the monotonous jobs that are the focus of the present study, the repetitiveness of the task is itself potentially aversive and boring, triggering negative affective reactions that result in reduced job satisfaction and turnover intentions in the long run (Weiss & Cropanzano, 1996). As suggested above, mindful individuals are better able to adopt a beginner's mind, which will enable them to experience even monotonous work tasks in novel and fresh ways (Bishop et al., 2004). We therefore suggest that in monotonous jobs, the relationship between mindfulness and job attitudes is mediated by boredom. Thus, we propose the following hypotheses:

Hypothesis 3. Mindfulness is positively related to job satisfaction, as mediated by lower boredom.

Hypothesis 4. Mindfulness is negatively related to turnover intentions, as mediated by lower boredom.

Method

Participants and procedure

We conducted the study in a Mexican company that specializes in processing discount coupons from US retailers for accounting purposes. The company receives the coupons in shipping containers, and the employees' task is to take out coupon after coupon, scan the barcode, and check that the system has counted the coupon and categorized it correctly—a task cycle usually completed in less than a minute. The work is very repetitive and simple and thus monotonous. The working conditions and work processes are highly standardized across employees, who receive payment depending on the number of hours they work, and there are no additional incentives for higher task performance in terms of either quality or quantity. Thus, increases or decreases in task performance are unlikely to be contingent on extrinsic motivation. With working conditions and incentives held constant across all the employees in the sample, variations in job attitudes and task performance are thus likely to result from differences in how individuals respond subjectively to these conditions and work processes.

The employees work in four shifts; for the purpose of this study, we invited 192 employees from one shift to participate.¹ We collected data from two separate sources and at three different time points. At the first time point, we measured employee trait mindfulness and demographic information. Four weeks later, we assessed employee boredom and attitudes. We used this approach because time-separated collection of data from the same source reduces common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Finally, four months later, we obtained information from the objective performance monitoring system of the company about the number of coupons that the employees had processed and the number of errors they had made over the four months, starting after they had completed the second questionnaire. As is typical in maquiladoras, all the employees were women (Sklair, 2011), with the exception of some of the managers.

Of the 192 employees invited to take part, 174 provided complete data (response rate: 90.6%). Their mean age was 34 ($SD = 8.48$), and they had worked for the company for 5.36 years on average ($SD = 5.70$).

Measures

All the measurement items were translated from English to Spanish according to the common back-translation procedure to ensure semantic equivalence with the original items (Brislin, 1986; Schaffer & Riordan, 2003).

¹ We conducted a separate study with a different shift (Menges et al., 2017), including different participants and using different measures. There was no overlap between the studies or samples.

Mindfulness

We assessed participants' trait mindfulness using six items taken from the mindfulness attention awareness scale (MAAS; Brown & Ryan, 2003).² The items included in this study were 'I find it difficult to stay focused on what's happening in the present,' 'It seems I am 'running on automatic' without much awareness of what I'm doing', 'I rush through activities without being really attentive to them', 'I do jobs or tasks automatically without being aware of what I'm doing', 'I find myself preoccupied with the future or the past', and 'I find myself doing things without paying attention'. All the items were answered on a six-point scale (1 = almost always, 6 = almost never), with higher values indicating higher trait mindfulness. Cronbach's alpha internal consistency for the six items was $\alpha = .79$.

Boredom

To assess boredom, we used four items previously developed and validated by Melamed et al. (1995). Employees were asked to rate on a seven-point scale (1 = strongly disagree, 7 = strongly agree) whether the following descriptions fit their work: 'boring', 'routine', 'monotonous', and 'not varied enough' ($\alpha = .86$).

Task performance

The company's HR department provided us with objective information drawn from the performance management system. To provide a more nuanced picture of the effects of mindfulness and boredom, we used two different measures of task performance, namely quality and quantity (J. P. Campbell et al., 1993). The company logged totals for (a) how many coupons employees processed (*task performance quantity*) and (b) how many errors employees produced in the scanning process (*task performance quality*) over the course of the four months after our survey study was completed. To ease the interpretation of the reported numbers, we divided the totals by four to compute monthly averages; thus, the scores used in our analyses reflect average monthly task performance. Before our analysis, again to ease interpretation, we multiplied the number of errors by -1 such that higher values indicate higher task performance quality (i.e., fewer errors).

Job attitudes

Job satisfaction was measured using the Michigan organizational assessment questionnaire job satisfaction scale (MOAQ-JSS; Cammann, Fichman, Jenkins, & Klesh, 1983), a measure with high construct validity according to meta-analyses (Bowling & Hammond, 2008). In the MOAQ-JSS, employees indicate the extent to which they agree with three items: 'All in all, I am satisfied with my job', 'In general, I don't like my job' (reverse-coded), and 'In general, I like working here' ($\alpha = .62$). *Turnover intention* was assessed using one item developed by Wayne,

² To assess the validity of the abbreviated measure, we compared the shortened MAAS scale with the complete 15-item scale using data (sample 6, $N = 370$) provided by Hülshager & Alberts (2020). The correlation between our workplace-adapted measure and the overall MAAS was $r = .95$ ($p < .001$). Thus, we conclude that our abbreviated measure assesses the same construct as the complete MAAS scale.

Shore, and Liden (1997); employees were asked to what extent they agree with the statement 'I am seriously thinking about quitting my job'. All job attitudes items were answered on a seven-point scale (1 = strongly disagree to 7 = strongly agree).

Results

Table 1 presents the means, standard deviations, correlations, and internal consistency reliability estimates for all variables. To assess the distinctiveness of multi-item constructs (i.e., mindfulness, boredom, and job satisfaction), we ran confirmatory factor analyses. In the first model, the items for each construct loaded onto their respective factor. The fit indices were good: $\chi^2(62) = 72.72$, RMSEA = .03, CFI = .99, and SRMR = .05. In the second model, the items for boredom and job satisfaction loaded together onto one factor. The fit indices were worse in this second model: $\chi^2(64) = 113.08$, RMSEA = .07, CFI = .94, SRMR = .07. Furthermore, the first model exhibited a significantly better fit than the second model: $\Delta\chi^2 = 40.35$, $\Delta df = 2$, $p < .001$ (a χ^2_{diff} test for collapsing two factors in a three-factor model has two degrees of freedom, not one; van der Sluis, Dolan, & Stoel, 2005, p. 557). In the third model, items for boredom and mindfulness loaded together onto one factor. The fit indices were again worse in this model ($\chi^2(64) = 406.69$, RMSEA = .18, CFI = .56, SRMR = .16), and the first model exhibited a significantly better fit than the third model ($\Delta\chi^2 = 333.97$, $\Delta df = 2$, $p < .001$). Finally, in the fourth model, we collapsed all the constructs into one factor. The fit indices were again worse than in the first model ($\chi^2[65] = 456.55$, RMSEA = .19, CFI = .50, SRMR = .17), and the first model exhibited a significantly better fit than the third model ($\Delta\chi^2 = 383.83$, $\Delta df = 3$, $p < .001$).

Employee mindfulness and boredom

Hypothesis 1 states that trait mindfulness is negatively related to boredom. A regression analysis (Cohen, Cohen, West, & Aiken, 2003) showed that this was indeed the case (see Table 2, Model 1: $\beta = -.19$, $p = .015$). The more mindful the employees were, the less bored they were by their monotonous work.

Table 1. Means, standard deviations, correlations, and Cronbach's alpha of study variables

	M	SD	1	2	3	4	5
1 Mindfulness	5.07	0.75	(.79)				
2 Boredom	4.13	1.42	-.19*	(.86)			
3 Task performance quality	-10.60	15.97	.06	-.14 ⁺			
4 Task performance quantity	7,417.18	3,876.50	-.13 ⁺	.13 ⁺	-.45**		
5 Job satisfaction	5.53	1.15	.22**	-.36**	.04	-.05	(.62)
6 Turnover intention	2.08	1.65	-.20**	.20**	-.04	-.03	-.49**

Note. $N = 174$ employees; Cronbach's alpha values in parentheses. Task performance quality and quantity report the monthly average of a four-month period after administering the last surveys; task performance quality was measured as number of errors, multiplied by -1 such that higher values indicate greater quality (i.e., fewer errors). Task performance quantity was measured as number of coupons processed.

+ $p < .05$ (one-tailed), * $p < .05$, ** $p < .01$ (two-tailed).

Table 2. Results for the regression analyses for boredom and task performance

	Boredom		Task performance quality				Task performance quantity			
	Model 1		Model 2a		Model 2b		Model 3a		Model 3b	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β	<i>b</i> (SE)	β
Mindfulness	-.35 (0.14)	-.19*	1.20 (1.61)	.06	.68 (1.63)	.03	-666.94 (388.95)	-.13 ⁺	-561.63 (394.50)	-.11
Boredom					-1.50 (.87)	-.13 ⁺			303.76 (210.02)	.11
<i>F</i> (df1, df2), <i>R</i> ²	6.07* (1, 172), .03		0.56 (1, 172), .00		1.77 (2, 171), .02		2.94 ⁺ (1, 172), .02		2.53 ⁺ (2, 171), .03	
<i>F</i> (df1, df2), ΔR^2					2.97 ⁺ (1, 171), .02				2.09 (1, 171), .01	

Note. *N* = 174 employees.

+*p* < .05 (one-tailed), **p* < .05 (two-tailed).

Employee mindfulness, boredom, and task performance

Hypothesis 2 concerned the link between mindfulness and task performance (i.e., performance quality and quantity), as mediated by employee boredom. To test this hypothesis, we ran two mediation analyses using PROCESS (V2.16; Hayes, 2013), one for each performance outcome, and we calculated confidence intervals based on 10,000 bias-corrected bootstrap samples.

Hypothesis 2 proposes that mindfulness is positively related to task performance quality, as mediated by boredom. Table 2 shows that employee boredom had a significant negative relation with performance quality (Model 2b: $\beta = -.13$, $p = .044$, one-tailed). There was also a significant indirect effect of mindfulness on performance quality via boredom (Table 4: unstandardized estimate = .52, $bootSE = .42$, 95% CI [.030, 1.948]). Thus, we found support for an indirect effect: Employee mindfulness was negatively related to boredom, which, in turn, was negatively related to performance quality.

We also hypothesized that mindfulness is positively related to task performance quantity, as mediated by boredom. However, the results show that mindfulness was negatively related to performance quantity (Table 2, Model 3a: $\beta = -.13$, $p = .044$, one-tailed). Boredom was not related to performance quantity (Model 3b: $\beta = -.11$, $p = .150$), and the indirect effect was not significant (Table 4: unstandardized estimate = -105.31 , $bootSE = 91.49$, 95% CI [-366.447 , 11.289]). Thus, the results suggest that mindfulness is related to employees completing a reduced quantity of work. In sum, we find only partial support for Hypothesis 2: the hypothesized effect was supported for task performance quality only, and mindfulness was directly and negatively related to task performance quantity.

Employee mindfulness, boredom, and job attitudes

Hypotheses 3 and 4 concern the links between mindfulness and job attitudes, as mediated by boredom. We tested these hypotheses using mediation analyses (i.e., PROCESS; Hayes, 2013) and confidence intervals based on 10,000 bias-corrected bootstrap samples. Hypothesis 3 states that employee mindfulness is positively related to job satisfaction, mediated by boredom. Table 3 shows the regression results: As expected, mindfulness was positively related to job satisfaction (Model 4a: $\beta = .22$, $p < .01$). We also found a significant effect of boredom on job satisfaction (Model 4b: $\beta = -.33$, $p < .01$) and a

Table 3. Results for the regression analyses for job attitudes

	Job satisfaction				Turnover intention			
	Model 4a		Model 4b		Model 5a		Model 5b	
	b (SE)	β	b (SE)	β	b (SE)	β	b (SE)	β
Mindfulness	.33 (0.11)	.22**	.24 (0.11)	.16*	-.44 (0.16)	-.20**	-.37 (0.17)	-.17*
Boredom			-.27 (0.06)	-.33**			.20 (0.09)	.17*
$F(df1, df2)$	8.62** (1, 172),		15.29** (2, 171),		7.07** (1, 172),		6.29** (2, 171),	
R^2	.05				.04		.07	
$F(df1, df2)$			20.96** (1, 171),				5.34* (1, 171),	
ΔR^2			.10				.03	

Note. $N = 174$ employees.

* $p < .05$, ** $p < .01$ (two-tailed).

Table 4. Unstandardized indirect effects of mindfulness via boredom on task performance and job attitudes

Outcome		Estimate	Boot SE	95% Confidence interval
Task performance	Performance quality	0.52*	0.42	0.030, 1.948
	Performance quantity	−105.31	91.49	−366.447, 11.289
Job attitudes	Job satisfaction	0.09*	0.05	0.023, 0.207
	Turnover intention	−0.07	0.05	−0.212, 0.002

Note. $N = 174$ employees; confidence intervals based on 10,000 bootstrapping samples (using PROCESS 2.16, Hayes, 2013).

* $p < .05$ (two-tailed).

significant indirect effect of mindfulness on job satisfaction through boredom (Table 4: unstandardized estimate = .09, *bootSE* = .05, 95% CI [0.023, 0.207]). Thus, Hypothesis 3 was supported: The more mindful employees were, the more satisfied they were with their job, in part because they felt less bored by their monotonous work.

Hypothesis 4 states that employee mindfulness is negatively related to turnover intentions and that this relationship is mediated by boredom. As can be seen in Table 3, mindfulness was indeed negatively related to turnover intentions (Model 5a: $\beta = -.20$, $p < .01$). Boredom was also significantly related to turnover intentions (Model 5b: $\beta = .17$, $p < .05$). However, the indirect effect was not significant (Table 4: unstandardized estimate = $-.07$, *bootSE* = .05, 95% CI [−0.212, 0.002]), and thus, there was only partial support for Hypothesis 4: The more mindful employees were, the lower their intention to quit, but this relationship could not be explained by lower employee boredom.

Discussion

Mindfulness has gained considerable importance in organizational settings in recent years. However, despite growing evidence for the benefits of mindfulness for task performance and job attitudes, many questions remain unanswered. Competing theoretical arguments concerning the link between mindfulness and task performance have been put forward by different authors (Dane, 2011; Good et al., 2016), but the empirical evidence has been too limited to draw firm conclusions. In order to understand fully the link between employee mindfulness and job satisfaction and turnover intentions, more research is needed that examines the mechanisms through which mindfulness relates to job attitudes. Another important question is whether mindfulness matters beyond the fancy offices at Google, Intel, or General Mills (Good et al., 2016; Hyland, Lee, & Mills, 2015). Silicon Valley may be ‘a hotbed for mindfulness at work’ (Gelles, 2012), but what about 500 miles further south in maquiladoras every day? Does mindfulness matter in jobs that involve simple, repetitive tasks, such as processing coupons?

With the current study, we aimed to address these questions. We investigated how mindfulness is related to task performance (both performance quality and quantity, measured objectively) and to job attitudes (job satisfaction and turnover intentions). We tested our hypotheses with a sample of workers whose job was processing coupons, an objectively monotonous task. We hypothesized that, under such conditions, employee boredom would mediate the relationship between employee mindfulness and both task

performance and job attitudes; that is, more mindful employees would experience the same objectively monotonous work as less boring, and as a result would show greater job satisfaction, lower turnover intentions, and higher task performance.

Empirically, we found that employee mindfulness was indeed positively related to job satisfaction and negatively related to turnover intentions. These results confirm and extend earlier findings (e.g., Hülshager et al., 2013; Reb et al., 2017) to monotonous work conditions. Furthermore, boredom mediated the relationship of mindfulness with job satisfaction. Thus, our research suggests that it was at least partly because mindful employees felt less bored by their monotonous jobs that they were more satisfied with their work. For task performance, our findings reveal a more complex pattern of results. With respect to performance quality, we found that more mindful employees felt less bored by their objectively monotonous work and committed fewer errors. However, with respect to performance quantity, we found that the more mindful employees processed fewer coupons, and that this relation was not mediated by boredom. Thus, although performance quality benefited from mindfulness, performance quantity suffered.

Theoretical contributions

Given the constraining nature of monotonous work, one might assume that individual differences, such as trait mindfulness, play a minor role in predicting task performance. Monotonous work conditions are set up to minimize the influence of human variability (Taylor, 1914). Thus, they create ‘strong situations’, characterized by psychologists as situations in which interindividual differences do not matter much and in which situational factors streamline most people into similar behaviour (Mischel, 1977). Nevertheless, despite these constraints, our research shows that there is an individual difference that allows some employees to deal with the monotony of their jobs better than others: mindfulness.

This research thus adds to the growing conversation about the role of mindfulness for task performance (Hafenbrack & Vohs, 2018). Whereas prior studies focused on supervisor ratings of employee job performance (e.g., Reb et al., 2015; for an exception in a laboratory setting, see Hafenbrack & Vohs, 2018), we used objective indicators of task performance and differentiated between performance quality and quantity. Our findings suggest that in a monotonous work setting that is the same for all employees, trait mindfulness leads to lower task performance *quantity*, but through lower employee boredom, it also leads to higher task performance *quality*. This mixed picture of how mindfulness affects task performance in such contexts informs the debate at the heart of contemporary research on workplace mindfulness. According to one position in this debate, mindfulness is detrimental to task performance in monotonous work contexts because the increased external attentional breadth may lead employees to become distracted from their current task (Dane, 2011). Furthermore, task performance may be impaired if mindfulness leads to a more pronounced awareness of the present moment (Hafenbrack & Vohs, 2018), which in turn reduces awareness of the target work goal. Another position in the debate is that mindfulness is beneficial for task performance in monotonous jobs because an increased focus on the task (Good et al., 2016), in combination with a beginner’s mind (Bishop et al., 2004), channels employees’ attention towards task accomplishment.

Our results suggest that both sides in this debate are to some extent correct. Mindfulness is detrimental to task performance with respect to performance quantity, perhaps because employees who are more mindful are slowed down by their attentional

breadth. Mindfulness is, however, beneficial to task performance with respect to quality of output, perhaps because mindful employees pay attention to performing the task correctly. Hence, there seems to be a trade-off between task performance quality and quantity (as indicated by the negative correlation between the two of $r = -.45$; see Table 1). Since previous studies have not differentiated within-person between task performance quantity and quality, such divergent effects may have easily gone unnoticed until now.

Our research also contributes to the expanding body of knowledge on the role of mindfulness for job attitudes, in particular job satisfaction and turnover intentions. Although previous studies examined these job attitudes, they focused on jobs with high amounts of emotional labour (Hülshager et al., 2013), dynamic environments (Dane & Brummel, 2014), or broad ranges of occupations (Reb et al., 2015, 2017). Our research adds to this literature by identifying mindfulness as beneficial for job attitudes in contexts of simple, highly repetitive work. Furthermore, by introducing boredom as a novel mediator in the relationship between trait mindfulness and both job satisfaction and turnover intentions, we enrich the otherwise meagre understanding of pathways (Good et al., 2016) that explain the attitudinal outcomes of mindfulness (Hülshager et al., 2013). We highlight the role played by employees' subjective experiences of their jobs: In objectively monotonous jobs, mindful employees were more satisfied with their jobs because they were less bored.

We also add to a better understanding of the relationship between objective monotony and subjective boredom. Although monotony is one of the main drivers of boredom (Loukidou et al., 2009), the relationship between objectively monotonous work conditions and subjective experiences is not as strong as one might expect (Melamed et al., 1995). The results of our study suggest that employee mindfulness plays an important role in this relationship and can explain differences between objective task characteristics and subjective experiences, with important implications for the growing body of research on boredom (Cummings et al., 2016; Gkorezis & Kastritsi, 2017; Park et al., 2019; Pindek et al., 2018). Mindfulness helps individuals to adopt a beginner's mind (Kabat-Zinn, 2013), which enables them to experience a task as if engaging in it for the first time. It appears that the benefits of this sense of uniqueness and novelty extend beyond daily activities—such as eating mindfully—to objectively monotonous and repetitive tasks such that they are experienced subjectively as less boring. Consequently, mindful employees, being less bored, are able to increase the quality of their work and feel more satisfied.

Limitations and future research

The present findings need to be interpreted in the light of the study's strengths and limitations. Among its strengths, the study used validated scales, objective measures of both quantitative and qualitative performance, multiple measurement points, and collected data within one organization, which limits noise and reduces error variance.

However, the study also has limitations that point to important boundary conditions and directions for future research. First, because our study took place in a Mexican maquiladora, we cannot rule out the possibility that cultural influences (Erez, 2011) moderated the links between mindfulness, boredom, job performance, and job attitudes. Although research in psychology (Christopher, Charoensuk, Gilbert, Neary, & Pearce, 2009) has shown that mindfulness can be assessed validly across cultures, and although monotonous jobs are common not only in Mexico but also in many other countries (e.g.,

car manufacturing in the United States and Europe; Landsbergis, Cahill, & Schnall, 1999), future research should attempt to replicate and extend the present findings in other cultural settings.

Second, with regard to the measurement of mindfulness, we relied on a shortened version of the MAAS (Brown & Ryan, 2003), which has mostly been used within the work domain (Mesmer-Magnus et al., 2017). However, one shortcoming of the MAAS is its unidimensional focus on attention (Hülshager & Alberts, 2021). Although some scholars (Quaglia et al., 2015) have argued that attention is a necessary prerequisite for the other elements of mindfulness to unfold, future research should address this concern by using mindfulness measures that are both work-related and multifaceted (e.g., the Mindfulness@Work Scale; Hülshager & Alberts, 2021) to capture the attitudinal elements of mindfulness.

Third, because of the survey design, causal inferences need to be made with caution. We tried to address concerns about causality by using multiple time points, objective performance measures, and control over objective work monotony. Nevertheless, questions about potentially complex causal relations remain. For example, whereas Reb et al. (2015) suggested that performing routine tasks induces employees to be less mindful, our findings suggest that being more mindful allows employees to experience objectively monotonous jobs as less boring. Longitudinal research would be helpful in addressing such questions. Our cautious prediction is that causality is reciprocal. Monotonous or routine jobs may indeed induce mindlessness, other things being equal, just as more mindful employees may experience monotonous or routine work as less boring; the two possibilities do not contradict each other.

In addition to longitudinal studies, future research could use field or quasi-experimental designs (Grant & Wall, 2009) to study the role of mindfulness in monotonous work. Currently, mindfulness training programmes appear to be popular among Silicon Valley's tech companies. However, it would be interesting to explore whether such training interventions can also benefit employees working on the other side of the US–Mexico border, as well as in other similar environments where employees, often with lower qualification levels, work in monotonous, and low-paid jobs.

Furthermore, future research could examine daily fluctuations in mindfulness and their effects on employee boredom, performance, and attitudes. Here, we focused on trait mindfulness, but other studies (e.g., Hülshager et al., 2014) have operationalized mindfulness as a state that varies significantly over time. Similarly, job performance has been shown to have state-like components and to vary over relatively short time frames (Miner & Glomb, 2010). Thus, future research could investigate in greater detail how daily boredom depends on state mindfulness and affects day-to-day performance and attitudes, as well as exploring both trait- and state-based boundary conditions.

Finally, researchers studying mindfulness have not only focused on the individual level (as our study has done) but have also considered mindfulness as a collective phenomenon (Weick & Sutcliffe, 2006) that is described as mindful organizing (Sutcliffe et al., 2016). Within this domain, researchers have studied the role of attention for learning (Rerup, 2009) and for high-reliability organizations (Sutcliffe et al., 2016). Research on the role of collective mindfulness for collective boredom and its organizational consequences (e.g., adaptivity or organizational learning; Rerup, 2009) could provide an interesting avenue for evaluating whether the effects of individual and collective mindfulness are comparable. This will be particularly relevant for high-reliability organizations, as boredom threatens the continued alertness that is required to prevent errors.

Practical implications

Despite the finding that mindfulness was negatively related to the quantity of work completed, our results show that it was also related to higher job satisfaction, fewer task errors, and lower turnover intentions. Thus, our results suggest that organizations can reap the benefits of employee mindfulness in the form of higher work quality and lower turnover intentions; at the same time, employees can reap the benefits of greater job satisfaction and less boredom (an aversive emotional state). Moreover, mindful employees can experience mastery in their job by producing high-quality work outputs, which may help them to satisfy the psychological need for competence and provide greater meaning (Deci et al., 2001). For organizations, errors may have potentially severe consequences, even outside high-reliability contexts. In such cases, it may be preferable to have fewer errors than to have higher quantities of production overall.

If organizations want to reap the benefits of mindfulness (i.e., increasing job satisfaction and decreasing errors, turnover intentions, and boredom), they could offer their employees mindfulness training. Such training programmes have been successfully applied in the organizational context (Irving, Dobkin, & Park, 2009), thus providing organizations that rely on monotonous tasks with a feasible way to reduce employees' error rates and improve their attitudes towards their jobs, as well as helping them to feel less bored.

Importantly, however, this is not to suggest that mindfulness or mindfulness training is a panacea for the many problems associated with monotonous work tasks. We point to the ethical framework of mindfulness (Monteiro, Musten, & Compson, 2015), which suggests that mindfulness training itself should be founded on ethical intentions and practices that respect and do no harm to participants' lives. That framework also considers participants as an integral part of ethical mindfulness, rather than just recipients who, through the training, increase productivity for their organization. It is important to us that mindfulness training should thus not be misused by organizations as a way to make employees who are exposed to monotonous work conditions work harder, to make employees more compliant with non-ethical procedures, to gloss over glaring structural and organizational deficits in the treatment of workers, or to avoid addressing systemic problems that could limit monotonous work and improve working conditions (for example, through job redesign). Instead, mindfulness training should be used to help employees to deal with the monotonous aspects of their work, just as it helps white-collar workers to deal with stress in their jobs, while organizations make every effort to improve the adverse work conditions to which their employees are exposed. Accordingly, researchers need to pay more attention to the context in which we study mindfulness here in order to address the enduring disadvantages that workers face in maquiladoras and elsewhere around the world.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Andreas Wihler: Conceptualization (equal); Data curation (equal); Formal analysis (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal). **Ute R. Hülshager:** Conceptualization (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal). **Jochen Reb:** Conceptualization (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal). **Jochen I. Menges:** Conceptualization (equal); Investigation (equal); Methodology (equal); Writing – original draft (equal); Writing – review & editing (equal).

Data availability statement

The data that support the findings of this study are available from the corresponding author upon request.

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