

Stop the Spin

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Stop the Spin: The Role of Mindfulness Practices in Reducing Affect Spin

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Affect spin refers to shifts in emotional states over time; it captures people's reactivity to affective events. Recent evidence suggests that affect spin has costs for both organizations and for employees, yet little is known about the antecedents of affect spin and possibilities to reduce it. The present study builds on existing research by examining mindfulness as an antecedent of affect spin in employees. Specifically, we hypothesized that mindfulness practice reduces affect spin over time. We also expected that levels of affect spin are positively related to emotional exhaustion and negatively to job satisfaction, both at the between- and the within-person level of analysis. Finally, we hypothesized that decreases in affect spin due to mindfulness practice are associated with lower levels of emotional exhaustion and higher levels of job satisfaction. To examine trajectories of affect spin over time, we tested our hypotheses in a randomized controlled mindfulness intervention study (with a wait-list control group; total $N = 173$ individuals) using experience sampling methods over the course of a month. Results revealed that mindfulness practice led to gradual decreases in affect spin over the course of the study. As expected, between-person differences in affect spin were positively related to emotional exhaustion and negatively to job satisfaction. However, affect spin was not related to well-being outcomes at the within-person level and decreases in affect spin over time were also not associated with levels of emotional exhaustion and job satisfaction.

Keywords: mindfulness, intervention, affect spin, well-being, randomized controlled trial

Day-to-day work and organizational experiences shape how employees feel (Barsade et al., 2003). Thus, affect plays a key role in the study of occupational health and well-being. Since the "affective revolution" (Barsade et al., 2003) in organizational behavior and psychology, significant strides have been made in understanding the complex interplay between work, affect, and employee well-being. For instance, work demands influence employees' affective experiences in work and nonwork domains (Ilies et al., 2010; Jones & Fletcher, 1996), and work events both trigger affective reactions and affect employees' physical and psychological well-being (Bono et al., 2013; Ilies et al., 2007; Kuba & Scheibe, 2017; Weiss & Cropanzano, 1996). The vast majority of studies on

affect at work examine either stable, trait affect or state affect *at a particular point in time*, with far less investigation of the dynamic aspects of affect. Even many experience sampling studies focus on affect in the moment or the day without considerations of how the "trajectories, patterns, and regularities with which emotions . . . fluctuate *across time*" (Kuppens & Verduyn, 2017, p. 22) may impact occupational well-being.

Yet, there is a solid body of evidence outside the organizational sciences in which variability in affect is associated with reduced psychological well-being (Gruber et al., 2013; for a meta-analysis see Houben et al., 2015). Affect variability has been shown to predict psychological distress and physical ill health up to 10 years later (Hardy & Segerstrom, 2017). Affect spin, a specific form of affect variability, refers to fluctuations between qualitatively different affect states over time (Kuppens et al., 2007); it captures movement from one affect state to another within the two-dimensional affect space of valence and activation (e.g., from positive deactivated affect to positive activated affect to negative deactivated affect). The experience of affect changes is complementary to the experience of valence and intensity of each affective state alone (Weiss & Rupp, 2011) and may have implications for work outcomes concomitant to affect, especially for employee well-being.

In recent years, organizational scholars have linked affect spin to a variety of workplace outcomes, including reduced goal progress, voluntary work behavior, creativity, and increased crossover effects of work-family conflict (Clark et al., 2018; Park et al., 2021; Uy et al., 2017; Yang & Dahm, 2021). There is also some research in the organizational literature showing that affect spin undermines

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employee well-being (Beal et al., 2013; Uy et al., 2017). Although these studies provide initial evidence that affect spin has personal and organizational costs, very little is known about the causes of affect spin or how it can be reduced in employees. One exception is a recent study revealing that daily affect spin was higher on days that employees experienced both positive and negative work events (Clark et al., 2018). This finding provides important first insights into the work-related antecedents of affect spin, suggesting that, at least in part, employees experience affect spin in reaction to the shifting affective events they experience at work. Given the ubiquity of positive and negative affective events at work (Bono et al., 2013; Ilies et al., 2007; Weiss & Cropanzano, 1996), it is important to identify other antecedents of affect spin, ideally antecedents that are malleable and can readily be influenced through occupational health interventions. In this study we take a first step in that direction. We introduce mindfulness as a means to reduce affect spin and thereby benefit employee well-being. Specifically, we examine the effects of a mindfulness intervention on affect spin, and its downstream relations with employee well-being, using a randomized field experiment.

Mindfulness is defined as paying attention purposefully, without judgment, to the present-moment, with an open and receptive attitude (Kabat-Zinn, 2011; Van Dam et al., 2018). It is best understood as a state of consciousness, one which can be trained by regular engagement in mindfulness practices (Kabat-Zinn, 2003; Kiken et al., 2015). Mindfulness theory suggests that mindfulness fosters self- and emotion-regulation (Good et al., 2016; Roemer et al., 2015; Teper et al., 2013). Integrating the mindfulness and affect spin literatures, we propose that mindfulness reduces employee affect spin and that affect spin relates negatively to employee well-being. We operationalize well-being by studying emotional exhaustion and job satisfaction. Emotional exhaustion is the core dimension of burnout (Maslach et al., 2001) and therefore an important indicator of impaired well-being, whereas job satisfaction reflects work-related aspects of well-being and is a key variable of interest in organizational research.

Our research contributes to the literature in several ways. First, we contribute to the emerging literature on affect dynamics, particularly affect spin, in the context of work. While initial evidence suggests that affect spin has personal and organizational costs (Beal et al., 2013; Clark et al., 2018; Park et al., 2021; Uy et al., 2017), antecedents of this maladaptive dynamic aspect of affect have received little attention. This is problematic, as a comprehensive theoretical understanding of affect spin requires not only knowledge of its consequences, but also of its antecedents. Such understanding is critical in the design and implementation of targeted interventions to reduce employees' affect spin. From both a theoretical and practical perspective, mindfulness is an optimal candidate to examine, as both mindfulness theory and empirical evidence speak to the affect calming functions of mindfulness (Good et al., 2016; Shapiro et al., 2006). Mindfulness is also useful practically, as it can readily be trained with available interventions (Bartlett et al., 2019; Eby et al., 2019).

Second, by examining the effects of mindfulness on affect spin, we also extend the mindfulness literature. According to Buddhist philosophy, a key function of mindfulness practice is the cultivation of equanimity, an evenness of mind and composure that results in a balanced and calm emotional life (Brown & Ryan, 2003; Desbordes et al., 2015; Weber, 2017). Mindfulness research has documented the associations of mindfulness with reduced emotional reactivity

(Arch & Craske, 2006), reduced difficulty in emotion regulation (Hülshéger et al., 2013; Roemer et al., 2015), and lower levels of negative affect (Brown & Ryan, 2003). Most of these studies examine effects of mindfulness on affect and emotions at a particular point in time. Yet, the notion of emotional balance includes a temporal component and should therefore also be studied *over time*. The notions of equanimity and calm emotions that sit at the core of mindfulness theory appear quite similar in nature to that of (low) affect spin. By studying the effects of mindfulness on affect spin, capturing employees' affective profiles over time, our research also offers a novel and unique test of the fundamental proposition of mindfulness theory.

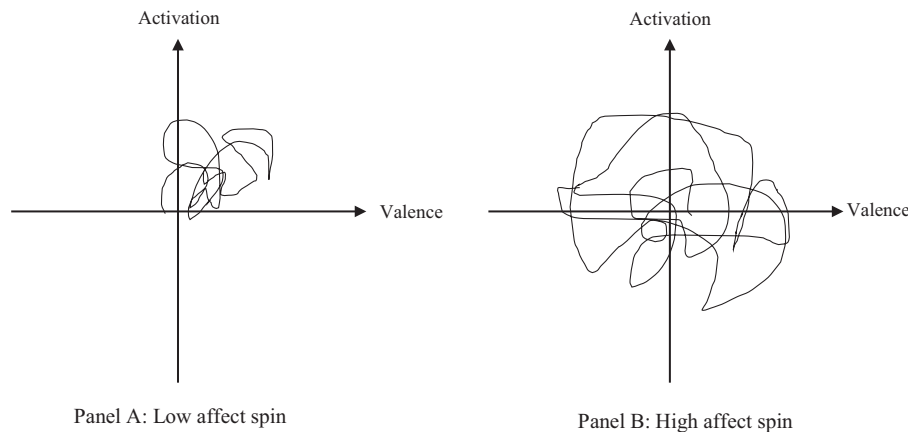
Lastly, we make a practical contribution by using a brief, readily deployable mindfulness intervention for our randomized field experiment (Bartlett et al., 2019; Eby et al., 2019). The efficacy of our mindfulness intervention in reducing affect spin directly informs the design of organizational interventions aiming to help employees respond adaptively to events and challenges in work settings, thereby safeguarding their well-being. We test our theoretical ideas about the effects of mindfulness on affect spin using a rigorous study design. Random assignment to intervention versus control groups allows us to draw causal conclusions about the effects of mindfulness on affect spin, and our 4-week experience sampling design provides insights into the timing and pattern of change in affect spin due to mindfulness practice (cf., Eby et al., 2019).

Mindfulness Reduces Affect Spin

Affect spin measures the extent to which individuals' affective feelings fluctuate over time in the core affect space defined by the two orthogonal dimensions of valence (pleasure–displeasure) and activation (activation–deactivation; Kuppens et al., 2007). Although affect spin can be assessed over varying periods of time, it has typically been assessed over the course of 1 or 2 weeks (Kuppens et al., 2007). In the present study, we adhere to this focus on affect spin at the weekly level. Thus, operationally, affect spin refers to fluctuation of affective states over the course of a work week across the four quadrants of the affect space: pleasant–activated, pleasant–deactivated, unpleasant–activated, and unpleasant deactivated (Kuppens et al., 2007). Figure 1 illustrates low (Panel A) and high (Panel B) affect spin.

Affect spin incorporates both valence and activation dimensions of affect, which are theoretically orthogonal. It thereby captures variability in affect more comprehensively than do unidimensional variance-based measures of affect (cf., Beal et al., 2013; Kuppens et al., 2007). For instance, the intraindividual standard deviation measures within-person variability in a single affect dimension, such as positive or negative affect (e.g., Eid & Diener, 1999; Gruber et al., 2013). It captures the extent to which individuals fluctuate in this particular dimension and deviate from their own baseline. A separate index of variability is thus calculated for each dimension (e.g., for positive or for negative affect) and variability is captured within these dimensions but not between dimensions (e.g., from a positive to a negative affective state). In contrast, affect spin captures fluctuations between qualitatively different affective experiences in the two-dimensional affect space consisting of valence and activation, thereby mapping the movement across pleasant activated, pleasant deactivated, unpleasant activated, and unpleasant deactivated affect.

Figure 1
Illustration of Low and High Affect Spin



Note. Figures modeled on and adapted from “Individual Differences in Core Affect Variability and Their Relationship to Personality and Psychological Adjustment,” by P. Kuppens, I. Van Mechelen, J. B. Nezlek, D. Dossche, and T. Timmermans, 2007, *Emotion*, 7(2), pp. 262–274 (<https://doi.org/10.1037/1528-3542.7.2.262>). Copyright 2007 by the American Psychological Association.

Measuring variability in two dimensions simultaneously and therefore across affective states, affect spin captures information that is not included in unidimensional variability measures (cf., Beal & Ghandour, 2011; Kuppens et al., 2007). Accordingly, unidimensional intraindividual variability measures of positive and negative affect only display moderate correlations with affect spin (Kuppens et al., 2007). Of note, the *variability* across the two dimensions of the affect space (i.e., affect spin) is conceptually independent of momentary or mean *levels* of affect across the same time frame.¹ Accordingly, Persons A and B can both experience low affect spin while having different mean affect levels. While both experience affective states over time that largely remain within one quadrant of the affect space (i.e., low affect spin), this may be the positive activated affect quadrant for Person A while it may be the positive deactivated affect quadrant for Person B.

Researchers have argued and shown that individuals high in affect spin are more reactive to affectively charged external or internal events (Beal & Ghandour, 2011; Beal et al., 2013) and this reactivity, in turn, has been shown to harm their well-being (Beal et al., 2013; Uy et al., 2017). It is therefore vital to learn more about how affect spin can be reduced and employee well-being can be preserved.

When all things are normal, individuals rest at unique default levels of valence and activation (Diener et al., 2006; Kuppens et al., 2013). This default level represents a home base in the affect space (Kuppens et al., 2010). When events occur, they spur appraisal processes (Lazarus, 1991; Weiss & Cropanzano, 1996) that shift affective states away from the home base. Individuals evaluate events with respect to their importance to the self, and as to whether they have the resources to cope with them. For example, an employee may feel excited (a positive activated affect) about a challenging project, nervous (a negative activated affect) about the short time frame, and satisfied (a positive deactivated affect) about project completion. These self-referential

appraisal processes lead to changes in affect valence and activation (Lazarus, 1991).

Mindfulness practices influence affect spin, in part, by creating distance between events and the self. Contemporary scientific definitions concur in highlighting two key aspects of mindfulness: (a) purposeful attention to present-moment experiences and (b) an attitude of nonjudgment and acceptance toward these experiences (Bishop et al., 2004; Brown & Ryan, 2004; Kabat-Zinn, 1994; Quaglia et al., 2015). These two aspects of mindfulness—attention monitoring and acceptance of experiences—are emphasized in most mindfulness interventions (Lindsay & Creswell, 2017; Lindsay et al., 2018); they enable individuals to observe and register their experiences in a pure, experiential way without evaluation. Mindfulness practice encourages participants to notice and be receptive to all experiences, without judgment or reaction. Thus, rather than trying to change how one feels about events and experiences, mindfulness fosters being aware of and accepting how one feels. As such, it differs markedly from other, more effortful emotion regulation strategies such as suppression or cognitive reappraisal (Gross, 1998) that aim at changing either the emotional experience itself (suppression) or the appraisal and thoughts that trigger the emotional experience (cognitive reappraisal; Troy et al., 2018).

It is this process of observing without judgment that creates separation between the self and the experience, allowing people to observe their own thoughts and impulses from the perspective of a neutral bystander (Glomb et al., 2011; Shapiro et al., 2006). This distancing of the core psychological self from external experiences dampens affective reaction to events and thereby reduces affect spin. Lazarus (1991) noted, “without . . . personal stake in a transaction, an encounter will not generate an emotion” (p. 824). This line of reasoning is supported by research documenting that mindfulness

¹ Empirically however, affect spin and mean levels of affect are often related in part for methodological reasons (Mestdagh et al., 2018).

produces less reactivity and more tolerance to unpleasant experiences in experimental settings (Arch & Craske, 2006; Hadash et al., 2016), as well as less reactivity to pleasant stimuli (Teper & Inzlicht, 2014).

As previous empirical research suggests that the effects of mindfulness interventions gradually built up over time (Hülshéger et al., 2015; Kiken et al., 2015; Nübold & Hülshéger, 2021), we hypothesize that a mindfulness intervention will lead to a gradual decrease in weekly affect spin over time (i.e., over the 4-week intervention period).

Hypothesis 1: A mindfulness intervention has a negative effect on affect spin over time, such that weekly affect spin decreases over time in the intervention condition compared to a control condition.

Affect Spin and Employee Well-Being

Adopting a self-regulation perspective, researchers have argued that affect spin impairs psychological well-being by depleting regulatory resources (Beal et al., 2013; Uy et al., 2017). Being more sensitive and reactive to affective events, individuals high in affect spin experience both (a) a wider range of affective states, and (b) more frequent switching between positive and negative affective states over a given period of time than do individuals low in affect spin (Beal et al., 2013; Uy et al., 2017). When affect spin is high, future affective experiences are less predictable, creating uncertainty, and resulting in regulatory effort (Beal et al., 2013; Kuppens et al., 2007). As a result, high affect spin requires more effortful emotional regulation and takes a toll on reservoirs of regulatory resources. Depletion of resources undermines the capacity to regulate emotions in the future, but also leaves individuals with fewer resources available to deal with other stressors, thereby further reducing well-being.

Supporting this position is a meta-analysis (summarizing studies conducted primarily in nonwork and clinical settings) that documents negative associations between trait affect variability and a wide range of indicators of adaptive functioning, including psychological well-being (Houben et al., 2015). Similarly, two studies conducted in the context of work found trait affect spin to be negatively related to psychological well-being: Restaurant servers who were higher in affect spin experienced more strain at work than servers whose affect spin was lower (Beal et al., 2013); and trait affect spin negatively predicted psychological well-being among entrepreneurs (Uy et al., 2017). These studies have treated affect spin as a stable individual difference, but recent research suggests that affect spin not only has stable, trait-like properties but also varies within people as well, in reaction to affective events (Clark et al., 2018).

Taken together, theory and empirical findings suggest that the experience of shifting affective states harms, while an even-keeled emotional life benefits psychological well-being. As affect spin has both trait- and state-like properties and therefore varies between as well as within individuals, we expect a negative association between affect spin and well-being at the between-level as well as at the within-person level of analysis. Focusing on the more chronic, trait-like properties of affect spin, we expect that individuals who generally experience higher levels of affect spin, tend to experience

higher levels of emotional exhaustion and lower levels of job satisfaction.

Hypothesis 2: Between-person differences in affect spin levels are (a) positively related to between-person differences in emotional exhaustion levels and (b) negatively related to between-person differences in job satisfaction levels.

Considering the state-like properties of affect spin that manifest in week-to-week within-person fluctuations in affect spin, we expect that deviations from a person's average level of affect spin are associated with deviations from that person's average levels of emotional exhaustion and job satisfaction. Put differently, we expect that in weeks that individuals experience higher levels of affect spin than they typically do, they are more likely to experience higher levels of emotional exhaustion and lower levels of job satisfaction than they typically do.

Hypothesis 3: Within individuals, fluctuations of weekly affect spin levels are (a) positively related to fluctuations of weekly emotional exhaustion levels and (b) negatively related to fluctuations of weekly job satisfaction levels.

As detailed in Hypothesis 1, we propose that the mindfulness training leads to changes in affect spin over time such that participants in the mindfulness training condition experience decreases in affect spin over time relative to participants in the control condition. One may therefore expect that such changes (i.e., reductions) in affect spin over the course of the mindfulness training period are associated with higher employee well-being in terms of lower average levels of emotional exhaustion and higher average levels of job satisfaction. We thus expect that people who experience decreases in affect spin over the course of the study tend to experience lower levels of exhaustion and higher levels of job satisfaction. Our final hypothesis thus focuses on differences between people in the extent to which they experience change in affect spin over time (i.e., over the course of the mindfulness training period) and how this relates to lower average levels of emotional exhaustion and higher average levels of job satisfaction.

Hypothesis 4: Reduction in affect spin over time is associated with (a) lower average levels of emotional exhaustion and (b) higher average levels of job satisfaction.

Method

Participants and Procedure

To test our hypotheses, we conducted an intervention (field experiment with wait-list control group) combined with experience sampling methodology. Our study spanned 6 weeks and was delivered online using smartphone friendly online questionnaires. The study was approved by the local ethical review board (#ERCPN_166_03_08_2014_A4), and was part of a larger data-collection effort. Workers were invited to participate in an intervention study using a mindfulness-app without mention of the specific app to be used. They were eligible if they worked at least 20 hr per week and could earn an Amazon gift voucher of €15 or €35, depending on the number of surveys completed. Interested individuals were directed to a webpage with practical

information (e.g., study duration and intensity, information on experience sampling) and an enrollment survey, assessing control variables and demographic information (occupation, gender, tenure, working hours).

In addition to the enrollment survey, the study involved an experience sampling segment that started a week after completion of the enrollment survey. The start of the experience sampling segment was slightly altered for some participants based on their schedule (e.g., vacation). It spanned 5 weeks, during which participants received four surveys per day (morning, lunchtime, end-of-workday, evening) on each Tuesday and Thursday, resulting in a total of 40 possible surveys per person. On Friday evening of the first week, the intervention group received a code to the app along with instructions on how to install and use it. The intervention period thus spanned 4 weeks (i.e., Weeks 2–5 of the experience-sampling part). Week 1 of the experience sampling segment had two purposes: allowing participants to get acquainted with the experience sampling procedure and giving us the opportunity to solve technical issues (e.g., study mails getting blocked by participants' email service providers) before the intervention period started. The wait-list control group received a code giving them access to the app upon study completion, at the end of Week 5 of the experience sampling segment.

Data collection took place between July 2016 and May 2017. Participants were recruited in Germany from a variety of occupations (e.g., clerks, engineers, teachers, social workers, researchers, journalists, and medical professionals), using researcher contacts with organizations, as well as social media advertisements, personal networks of research assistants and the snowballing technique. A total of 228 individuals expressed interest, provided their informed consent, and completed the enrollment survey. Of these, 193 participants continued their participation and provided at least one valid entry in the 5-week experience sampling portion of the research, completing 4,677 of 7,720 surveys over 10 days (60.6%). We inspected time stamps collected in the online surveys and deleted entries with time stamps indicating that participants had not responded within the requested time frame (e.g., when multiple daily surveys were completed in batches or when surveys were filled in on the next day). Surveys not completed in the requested period were excluded, resulting in 4,361 useable responses. Daily surveys were sent at 7:30 a.m. (morning survey), 12:00 p.m. (lunchtime survey), 4:30 p.m. (end-of-workday survey), and 8:00 p.m. (evening survey). On average, participants completed the morning survey at 8:46 a.m. ($SD = 64$ min), the lunchtime survey at 12:51 p.m. ($SD = 50$ min), the end-of-work survey at 5:17 p.m. ($SD = 47$ min), and the evening survey at 8:59 p.m. ($SD = 61$ min). A total of 20 participants were not included in the final analyses as they did not fill in surveys during the intervention period (i.e., Weeks 2–5). The final analysis was therefore based on 173 participants, in which 87 participants were in the mindfulness intervention group and 86 in the control group. The majority of participants were female (63%; 28.3% male; 8.7% did not indicate their gender), they were on average 35.3 years old ($SD = 10.50$), had organizational tenure of 6.8 years ($SD = 8.31$), and worked 38.24 hr per week on average ($SD = 7.83$).

The Mindfulness Intervention

For the mindfulness intervention, we used the Headspace app (www.headspace.com), which has surpassed 2 million subscribers

worldwide and is used by organizations such as Adobe, LinkedIn, Delta, United, and Spotify. The app consists of short instructional videos and daily guided mindfulness exercises. The exercises are similar to, but shorter than, the exercises used in the mindfulness-based stress reduction program (MBSR; e.g., mindful breathing, body scan; Kabat-Zinn, 1990). Specifically, sustained attention is cultivated via guided meditation exercises in which the breath, bodily sensations, or environmental stimuli (sounds, smells) are used as an anchor to bring attention and awareness to present-moment experiences. Whenever participants notice that their thoughts wander off, they are encouraged to gently bring their attention back to the present-moment without judging themselves for being distracted. Participants started with 10 min of daily practice for the first 10 days (Take 10). Subsequently, they could choose between daily guided meditation practices of 10, 15, or to 20 min in duration. The 15- and 20-min sessions provide identical instruction and guidance as compared to the 10-min sessions, but include more time for silent meditation. These guided audio meditation exercises were completed in sequential order as set by the Headspace app and were all guided by the same teacher. A common core of all exercises was that attention was focused on present-moment experiences, thoughts were observed without reacting to them, and attention was gently brought back to the present moment whenever thoughts wandered off. Yet, the exercises differed in the anchor used for focused attention (e.g., the breath, bodily sensations, sounds, smells, or emotions).

We chose the Headspace app as an intervention, because it introduces individuals to mindfulness meditation in a secular way and because it can be readily used by participants on- and off-line using computers, smartphones, and tablets, making it easily integrated into peoples' busy work lives. Finally, its effectiveness in increasing individuals' levels of mindfulness and well-being outcomes has been demonstrated in previous research (Bostock et al., 2019; Nübold et al., 2020).²

Compliance With Intervention Protocol

We sought to verify that participants in the intervention condition complied with instructions to regularly practice mindfulness using the Headspace app. To this end, we asked participants in the experience-sampling surveys on Tuesday and Thursday mornings how often they had practiced with the app in the past days. On average, participants in the intervention group reported practicing 2.7 days ($SD = 2.6$ days) per week.³

² Since our data collection in 2016–2017, the Headspace app has been further developed. The current version offers more user choice, by virtue of including a greater absolute number of guided meditation courses and single-session meditation sessions. The app also now features additional content domains beyond guided meditation (e.g., content on sleep, movement, focus), more interactivity (such as buddies), and the possibility to choose one of several teachers for most meditation content. Compared to the current Headspace version, the version we used was therefore more standardized. It was predominantly oriented around classical audio-guided mindfulness meditation exercises in which attention and awareness are brought to the breath, bodily sensations, sounds, smells, or activities.

³ Weekly practice was assessed as the sum of the number of practice days indicated in the Tuesday and the Thursday morning surveys, respectively. As there are cases that participants missed one or more surveys, but might still have practiced on preceding days, this is likely an underestimation of the actual number of days practiced.

Measures

Unless otherwise stated, all items were assessed on 5-point Likert-type agreement scale, where 1 = *strongly disagree* and 5 = *strongly agree*. Items were averaged to form a score for each assessment period (week, person), as appropriate for the measure.

Affect Spin

Following Kuppens et al. (2007), positive activated (PA: enthusiastic, happy, alert, proud, excited), positive deactivated (PD: calm, peaceful, satisfied, relaxed), negative activated (NA: nervous, upset, stressed, tense), and negative deactivated affect (ND: sluggish, sad, bored, depressed, disappointed) were assessed four times a day, on Tuesdays and Thursdays. Thus, participants completed all 18 items from Kuppens et al. (2007) in all four daily surveys, twice a week. The item stem referred to how participants felt in the moment, at the time of filling in the survey. The repeated assessment of activated and deactivated positive and negative affect was used to compute weekly affect spin scores as described in the analysis section. Assessment of weekly affect spin with eight measurement occasions allowed for an adequate number of measurement episodes to compute affect spin (Kuppens et al., 2007).⁴

To confirm the factor structure at the within-person level, we conducted a multilevel confirmatory factor analysis (MCFA) with Mplus 8.4. As a first step, we inspected intraclass correlation coefficients (ICCs) to assess the amount of variability within and between persons, respectively, for each affect item. ICCs ranged from .28 to .47, indicating that more than 50% of the variability in affect items was within persons. A MCFA was thus warranted. Accordingly, we specified four correlated factors (positive activated, positive deactivated, negative activated, negative deactivated affect). Model fit was adequate when considering RMSEA and SRMR, $\chi^2(258) = 2,933.932, p < .001$; RMSEA = .06; SRMR_{within} = .07. Yet, the CFI value of .83 was lower than conventional standards (Lai & Green, 2016), in part because of three correlated errors that we did not specify in the above analysis (e.g., the error terms for calm, a positive deactivated mood, and sluggish, a similar construct in the negative deactivated space, were correlated). Because altering the measurement of affect spin would preclude aggregation of knowledge across studies, we proceeded with the four dimensions. We note, moreover, that inconsistencies between fit indices such as RMSEA and CFI are common and it has been recommended not to discard models based on such inconsistencies alone (Lai & Green, 2016; Williams et al., 2020), especially since the standards for goodness-of-fit are based on single-level analysis (cf., Gabriel et al., 2018). As RMSEA and the within-person specific SRMR met conventional standards of adequate model fit, we followed the existing literature and computed separate scales for activated and deactivated positive and negative affect, respectively, and use them in our within-person analyses. Further supporting these scales were internal consistency estimates ($\alpha = .81$ for positive activated, positive deactivated, and negative activated affect, respectively, and .75 for negative deactivated affect). In line with Kuppens et al. (2007), we calculated valence as (PA + PD) – (NA + ND), activation as (PA + NA) – (PD + ND). For the sake of running supplemental analyses, we also computed positive affect as (PA – ND) and negative affect as (NA – PD).

All well-being variables were assessed in the evening survey, twice per week, on each Tuesday and Thursday. As recommended for experience sampling studies, we used brief measures whenever possible to reduce response burden for participants and facilitate regular responding to our experience sampling surveys (Fisher & To, 2012). To this end, we used brief one- or two-item measures that have previously been used in experience-sampling and diary studies.

Emotional Exhaustion

Emotional exhaustion was assessed with two items previously used in experience sampling studies (Hülshéger et al., 2013; Teuchmann et al., 1999). Items referred to how participants felt at the time of filling in the survey: “At the moment I feel emotionally drained;” “At the moment I feel burned out.” Cronbach’s α was .75, on average.

Job Satisfaction

Job satisfaction was assessed with one item that has commonly been used in previous experience sampling studies (Bono et al., 2007; Hülshéger et al., 2013): “At this very moment I am fairly satisfied with my job.”

Analytical Strategy

Calculation of Weekly Affect Spin

Because affect spin refers to variation in affective states over time, our time frame of interest was weekly. Thus, we computed a weekly score of affect spin, based on the eight weekly measurement occasions (i.e., 2 days per week, 4 times per day). In computing affect spin, we followed procedures outlined in Kuppens et al. (2007) and used momentary raw (i.e., uncentered) valence and activation scores to compute a weekly affect spin score.⁵ Accordingly, we computed weekly affect spin as the circular standard deviation of responses over the eight weekly measurement occasions using formulas provided in Kuppens et al. (2007). This approach is in line with extant affect spin research combining affect measurements within and across days and relying on at least seven measurement occasions to derive an affect spin index (Kuppens et al., 2007; Park et al., 2021; Uy et al., 2017). Higher scores represent higher levels of affect spin.

Consistent with our weekly focus, we also computed a weekly average for each of the well-being variables, combining well-being reports from Tuesday and Thursday each week into a single score for the week.

⁴ Although we are not aware of any explicit guidelines on how many measurement points are necessary for a reliable estimation of affect spin, the majority of affect spin studies relied on at least seven measurement points (e.g., Jung et al., 2015; Kuppens et al., 2007; Uy et al., 2017).

⁵ We computed affect spin using the original metrics of valence and activation, each ranging from –8 to +8. As such, we defined the affect space using the theoretical (absolute) center point of zero, which allowed comparison across participants on the same affect space (Kuppens et al., 2007). Depending on research contexts, affect spin can also be computed using person-mean centered valence and activation (Beal et al., 2013), which defined a unique affect space for each individual based on their own typical affective experience. We also note that affect spin is identical when calculated from valence and activation or from positive and negative affect scores (Kuppens et al., 2007).

Analyses

Because the data had a hierarchical structure with repeated observations (4 weeks) nested within individuals, we analyzed our data with multilevel modeling in Mplus 8.4 using maximum likelihood estimation with robust standard errors (Muthen & Muthen, 2017). As people were assigned to either the mindfulness practice intervention or the wait-list group, mindfulness intervention was a person-level variable (Level 2) that varied between people. In contrast, the passage of time (4 weeks of intervention) was modeled at Level 1. Furthermore, affect spin and well-being were measured over time, with four measurements for each person. To decompose their variance into latent within- and between-person components, relationships were modeled simultaneously at Levels 1 and 2, corresponding to latent person-mean centering of the week-level covariates for the estimation of pure within-person relationships at Level 1 (Muthen & Muthen, 2017).

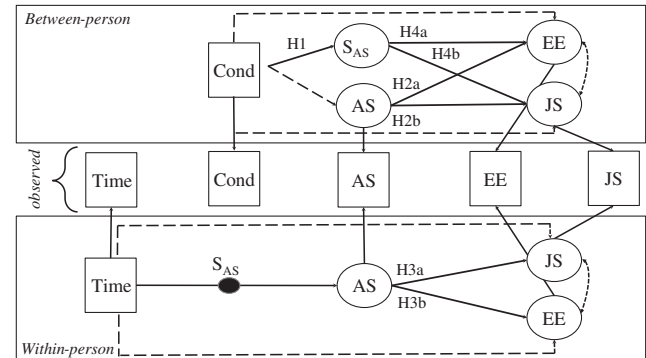
We specified a series of multilevel path models to examine the hypothesized paths. To test Hypothesis 1, we modeled change in affect spin over time (i.e., over the 4-week intervention period) and as a function of intervention condition (1 = *mindfulness group*, 0 = *control group*). This approach is recommended for analysis of the effects of randomized interventions in organizational settings, as it provides information about the intervention's effects, and also about the direction and form of change in response to the intervention (Bodner & Bliese, 2018). Specifically, we modeled the random effect of time (i.e., Week, coded 0–3, starting with Week 2 of the experience sampling part in which the intervention was introduced)⁶ on affect spin at Level 1, and the cross-level effect of the intervention condition on that random slope. A significant cross-level interaction, where the intervention condition affects the slope of affect spin over time would confirm Hypothesis 1, indicating that the trajectory of affect spin over the 4-week period is significantly different for participants in the mindfulness training condition, as compared to those on the wait-list. To assess the form of change within each condition, we estimated simple slopes. Hypothesis 1 would be supported if affect spin decreased in the intervention group over the 4-week intervention period while remaining stable in the control group. We followed Bodner and Bliese (2018) recommendation to use a one-tailed test when assessing statistical significance of such hypothesized directional effects (i.e., decrease in affect spin in the mindfulness condition).

Hypotheses 2 and 3 were tested with a multilevel path model, using affect spin as a predictor of emotional exhaustion and job satisfaction, respectively, both at the between- and within-person level. The model included main effects of time (Level 1) and condition (Level 2) on affect spin, emotional exhaustion, and job satisfaction as controls.

To examine Hypothesis 4, we combined models to test Hypotheses 1, 2, and 3 and added paths from slope of affect spin to levels of emotional exhaustion and job satisfaction at the between-person level. This model tests effects of the *slope* of affect spin (i.e., changes in affect spin over the 4-week study period) on *levels* of emotional exhaustion and job satisfaction across the 4-week study period. The model is depicted in Figure 2. As can be seen from Figure 2, we included additional paths and covariances for accurate specification of our models (Figure 3).

Figure 2

Multilevel Path Model of Effects of Change in Affect Spin on Emotional Exhaustion and Job Satisfaction



Note. Cond. = condition; AS = affect spin; EE = emotional exhaustion; JS = job satisfaction. Control paths are depicted with dashed lines. Figure adapted from “A General Multilevel SEM Framework for Assessing Multi-level Mediation,” by K. J. Preacher, M. J. Zychur, and Z. Zhang, (2010), *Psychological Methods*, 15(3), pp. 209–233 (<https://doi.org/10.1037/a0020141>). Copyright 2010 by the American Psychological Association.

Results

Before testing our hypotheses, we calculated ICC values. As can be seen from Table 1, all Level 1 variables varied both within and between persons; within-person variation ranged from 31% for job satisfaction to 72% for affect spin, confirming that a considerable amount of variation in affect spin resides at the within-person level. Table 2 shows the means and standard deviations of study variables by condition.

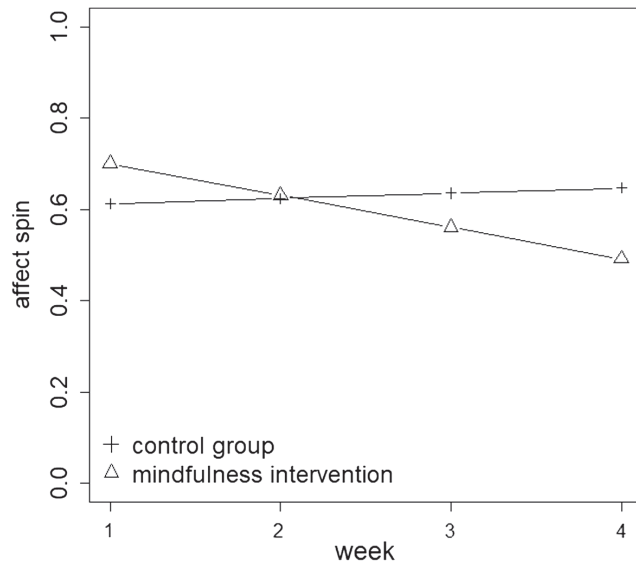
As can be seen from Table 3, the cross-level interaction between week and mindfulness condition on affect spin was significant (estimate = $-.07$, $p < .05$) indicating that changes over the 4-week intervention period in affect spin differed between the mindfulness and the wait-list control group. Furthermore, simple slopes revealed that affect spin decreased over time in the mindfulness group (estimate = $-.06$, $p < .05$), but it did not change significantly in the control group (estimate = $.01$, $p = .79$). Hypothesis 1 was therefore supported.

Table 4 reveals that affect spin was positively related to emotional exhaustion (estimate = 1.24 , $p < .00$) and negatively related to job satisfaction (estimate = $-.68$, $p < .05$) at the between-person level. Hypothesis 2 was therefore supported. But, affect spin was not significantly related to emotional exhaustion (estimate = $.21$, $p = .07$) or job satisfaction (estimate = $-.06$, $p = .23$) at the within-person level when applying a conservative two-tailed significance test.⁷ Thus, Hypothesis 3 was not supported.

⁶ As recommended in the literature (Bliese & Ployhart, 2002), we tested whether in addition to this linear time trend there was also evidence for a quadratic time trend. The quadratic time trend was, however, not significant and there was no interaction between a quadratic time trend and intervention condition. We therefore limited the analysis to the linear time trend.

⁷ Considering that we had directional hypotheses, a one-tailed significance test could be considered applicable. In that case, the effect of affect spin on emotional exhaustion would be significant with $p = .04$.

Figure 3
Changes in Affect Spin Over Time as a Function of Experimental Condition



As can be seen from Table 5, the slope of affect spin (i.e., changes in affect spin over time) was not significantly related to levels of emotional exhaustion (estimate = -1.15 , $p = .98$) or levels of job satisfaction (estimate = 17.59 , $p = .20$). Hypothesis 4 was not supported.

Supplementary Analyses

At the suggestion of reviewers, we also conducted a series of post hoc, supplementary analyses to explore the extent to which controlling for levels of affect (i.e., positive and negative affect, or valence and activation, respectively⁸) might change results related to Hypotheses 1 and 2. First, we examined the effects of our mindfulness intervention on the dimensions of affect spin: valence and activation as well as positive and negative affect. We repeated our analyses testing Hypothesis 1, controlling for the effect of the intervention on valence and activation and on positive and negative affect, respectively. Specifically, we added the random effect of time

on affect levels, with the intervention as a cross-level moderator. While the cross-level interactions of time and intervention on affect spin remained significant (estimate = $-.07$, $p < .05$), none of the cross-level interactions on affect levels was significant (valence: $.04$, $p = .66$; activation: $-.05$, $p = .26$; positive affect: $-.01$, $p = .90$; negative affect: $-.05$, $p = .40$), suggesting that mindfulness uniquely influences affect spin.

We also repeated our analyses testing Hypotheses 2 and 3, controlling for positive and negative affect, and for valence and activation, respectively, at the within- and between-person levels of analysis. We ran this analysis at the request of reviewers and we report our findings here for the sake of completeness and transparency. But, we note that these results should be interpreted with great caution. Some researchers advise against controlling for levels of affect when assessing the effects of affect variability, due to concerns of multicollinearity, nonlinear dependencies, and difficulty in interpreting relationships (Mestdagh et al., 2018). Furthermore, when controlling for affect levels, one partials out substantive covariation between mean affect levels and affect spin and may thereby “throw(s) out the baby with the bath water” (Spector et al., 2000, p. 79). When we controlled for positive and negative affect, and separately for valence and activation, the unique effects of affect spin on well-being at the between-person level are no longer significant (emotional exhaustion: estimate = $.34$, $p = .29$; job satisfaction: estimate = $-.19$, $p = .60$). This appears to be because of the variance in the well-being variables that is explained by positive affect (emotional exhaustion: estimate = $-.22$, $p = .16$; job satisfaction: estimate = $.77$, $p < .001$), negative affect (emotional exhaustion: estimate = $.33$, $p < .05$; job satisfaction: estimate = $.18$, $p = .15$), valence (emotional exhaustion: estimate = $-.28$, $p < .001$; job satisfaction: estimate = $.30$, $p < .001$), and activation (emotional exhaustion: estimate = $.05$, $p = .69$; job satisfaction: estimate = $.47$, $p < .001$). This is not surprising considering studies that conceptualize levels of positive and negative affect as proximal outcomes of affect spin, mediating the association between affect spin and work outcomes (Clark et al., 2018; Park et al., 2021).

Results concerning Hypothesis 4 revealed that changes in affect spin were not significantly related to levels of emotional exhaustion and job satisfaction. Yet, as suggested by a reviewer, *change* in affect spin over time may be related to concurrent *changes* in emotional exhaustion and job satisfaction over the 4-week study period.

Table 1
Descriptive Statistics and Intercorrelations Between Study Variables

Variable	<i>M</i>	<i>SD</i>	ICC	1	2	3	4	5	6	7
1. Affect spin	.62	.43	.28	—	-.41***	.11*	-.34***	.39***	.15**	-.06
2. Valence	2.16	1.76	.68	-.56***	—	-.16***	.87***	-.90***	-.49***	.27***
3. Activation	-.40	.78	.59	.31***	-.26**	—	.35***	.57***	.08	-.03
4. Positive affect	.88	.87	.64	-.43***	.90***	.19*	—	-.57***	-.42***	.24***
5. Negative affect	-1.28	1.05	.68	.59***	-.93***	.59***	-.69***	—	.44***	-.24***
6. Emotional exhaustion	2.34	.87	.46	.38***	-.61***	.24**	-.49***	.61***	—	-.17***
7. Job satisfaction	3.28	.89	.69	-.20*	.48***	.19*	.56***	-.32***	-.25**	—

Note. $N = 151$ – 173 individuals, 465 – 603 observations. M = mean; SD = standard deviation. Correlations at the between-person level are indicated in the lower triangle, correlations at the within-person level are indicated in the upper triangle. ICC = intraclass correlation coefficient (percentage of between-person variance).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2
Means and SDs of Study Variables Over the 4-Week Intervention Period

Variable by condition	Week							
	1		2		3		4	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Affect spin								
Intervention	.74	1.04	.56	.47	.56	.43	.53	.46
Control	.63	.50	.57	.44	.68	.55	.62	.51
Valence								
Intervention	2.25	1.82	2.15	2.02	2.14	1.95	2.40	1.61
Control	2.21	2.07	2.26	1.89	2.12	2.08	2.17	2.12
Activation								
Intervention	-.47	.94	-.33	1.04	-.40	.89	-.43	.10
Control	-.39	.73	-.56	.98	-.29	.83	-.29	.84
Positive affect								
Intervention	.89	.93	.91	.95	.87	.95	.99	.79
Control	.91	1.00	.85	1.03	.91	1.05	.94	1.08
Negative affect								
Intervention	-1.36	1.11	-1.24	1.30	-1.27	1.78	-1.42	1.08
Control	-1.30	1.18	-1.41	1.10	-1.21	1.19	-1.23	1.19
Emotional exhaustion								
Intervention	2.30	1.11	2.25	1.09	2.23	.99	2.10	.91
Control	2.30	1.06	2.31	.91	2.31	.98	2.49	1.08
Job satisfaction								
Intervention	3.17	.98	3.20	.94	3.17	.97	3.29	.97
Control	3.40	1.03	3.33	.97	3.18	1.09	3.24	1.00

Note. $N = 603$ observations. $M =$ mean; $SD =$ standard deviation.

We therefore tested effects of the *slope* of affect spin on the *slopes* of emotional exhaustion and job satisfaction, respectively. Accordingly, we adapted the model depicted in Figure 2 by including random slopes of within-person paths from time to emotional

exhaustion and job satisfaction, respectively. Instead of modeling the paths from the affect spin slope to the levels of emotional exhaustion and job satisfaction, we estimated the paths from the affect spin slope to the slopes of emotional exhaustion and job satisfaction. The affect spin slope was not significantly related to the slope of emotional exhaustion (estimate = .57, $p = .99$) or the slope of job satisfaction (estimate = -1.32 , $p = .99$), suggesting change in affect spin was not related to the concurrent change in well-being over the study period.

Table 3
Results From Multilevel Model Predicting Changes in Affect Spin Over Time

Variable	Affect spin	
	Estimate	<i>SE</i>
Level 1		
Time → affect spin ^a	.01	.02
Level 2		
Intercept ^b	.61***	.05
Condition → affect spin ^c	.08	.10
Cross-level interaction		
Time × Condition → affect spin ^d	-.07*	.04
Simple slope comparison		
Time → affect spin—mindfulness group	-.06*	.03
Time → affect spin—control group	.01	.02

Note. $N = 173$ individuals, 603 observations. $SE =$ standard error. Time coded as 0 = Week 1 to 3 = Week 4 of the intervention period; condition coded as 0 = control condition, 1 = mindfulness intervention condition. All estimates are unstandardized and were tested two-tailed except for Time × Condition and the corresponding simple slope in the mindfulness group for which a one-tailed test was used as recommended by Bodner and Bliese (2018).

^a Due to the coding of condition, the estimate indicates the effect of time on affect spin in the control condition. ^b Due to the coding of time and condition, the intercept indicates mean levels of affect spin in Week 1 in the control condition. ^c Due to the coding of time, the estimate indicates the effect of condition on affect spin in Week 1 of the intervention period. ^d Differences between groups in change over time, that is, effect of the mindfulness intervention (cf., Bodner & Bliese, 2018).

* $p < .05$. *** $p < .001$.

Discussion

The primary purpose of our study was to better understand the nature of affect spin and how it can be influenced. Specifically, we hypothesized that mindfulness practices, which lead to a decoupling of the self from affective experiences, led employees to experience more calmness and less variable emotional states. Our focus was integrating the mindfulness literature with emerging literature on affect spin at work, to test the efficacy of mindfulness practice in reducing affect spin. In doing so, we also provide an indirect test of a central proposition of mindfulness theory, namely that mindfulness practice fosters equanimity, promoting an even-keeled, balanced emotional life. Our results partially supported our predictions: mindfulness practice led to gradual decreases in affect spin over the 4-week intervention period. While affect spin, in turn, was significantly related to better well-being (i.e., lower emotional exhaustion and higher job satisfaction) at the between-person level, it was not related to well-being outcomes at the within-person level.

⁸ We thereby credit the ongoing discussion about whether positive and negative affect or valence and activation are the best way to define the two-dimensional affective space (Kuppens et al., 2007).

Table 4
Results From Multilevel Model Predicting Emotional Exhaustion and Job Satisfaction From Affect Spin

Variable	Emotional exhaustion		Job satisfaction	
	Estimate	SE	Estimate	SE
Level 1				
Affect spin	.21 [†]	.12	-.06	.05
Level 2				
Intercept	1.51***	.21	3.77***	.21
Affect spin	1.24***	.28	-.68*	.28

Note. $N = 173$ individuals, 603 observations. $SE =$ standard error. Main effects of time (Level 1) and condition (Level 2) were controlled. Time coded as 0 = Week 1 to 3 = Week 4 of the intervention period; condition coded as 0 = control condition, 1 = mindfulness intervention condition.

[†] $p < .10$. * $p < .05$. *** $p < .001$.

Nor were changes in affect spin over time significantly related to emotional exhaustion or job satisfaction.

Theoretical Implications

Affect spin has recently found its way into the organizational literature documenting that it has personal and organizational costs (Beal et al., 2013; Clark et al., 2018; Uy et al., 2017; Yang & Dahm, 2021). Yet, little was known about what drives affect spin in employees and how affect spin can be reduced or prevented. This is in part because affect spin was treated mostly as a chronic disposition that varies between people (Beal et al., 2013; Kuppens et al., 2007; Uy et al., 2017).

Our findings suggest that affect spin is not (only) a chronic or innate disposition, but that it is subject to environmental influences and is malleable. Not only did our results show that there is substantial

within-person variation in affect spin, we also identified mindfulness as a key antecedent of affect spin. Participants who were randomly assigned to the mindfulness practice condition experienced reductions in affect spin, while this was not the case for participants assigned to the control condition. Thus, regardless of participants' natural predisposition to experience affect spin and regardless of the specific affective events participants experienced during a work week, mindfulness practice led to reductions in affect spin. By using an experimental field study design, our study offered a rigorous test of the effect of mindfulness on affect spin, overcoming shortcomings of correlational survey designs. It, thus, provides insight into the causal role of mindfulness in reducing affect spin while at the same time safeguarding ecological validity. Our supplementary analyses further revealed that effects of the mindfulness intervention were unique to affect spin, as levels of positive and negative affect or valence and activation were not significantly affected by the mindfulness intervention. This is in line with previous mindfulness intervention research in the context of work that also did not find changes in positive and negative affect (Chin et al., 2019) and it can be explained by the conceptual independence of affect spin from affect levels.

Our findings also shed light on the timing of mindfulness practice effects on affect spin. Combining a randomized-controlled intervention with experience sampling methodology, our study design offered the unique possibility to assess how changes in affect spin unfold during the intervention period. This is an important advantage over "simple" pre-post intervention study designs in which it is only possible to assess whether the intervention has an effect without informing about the timing of the effect. In principle, an intervention could stimulate different forms of change in the focal outcome variable. For instance, the intervention could lead to immediate changes which remain stable for the rest of the intervention period, it could follow a linear change trajectory in which intervention effects gradually build up over time, or it could lead to initial benefits that taper off over time. We

Table 5
Results From Multilevel Path Models Predicting Levels of Emotional Exhaustion and Job Satisfaction From Changes in Affect Spin

Variable	Affect spin		Emotional exhaustion		Job satisfaction	
	Estimate	SE	Estimate	SE	Estimate	SE
Level 1						
Time	.01 ^a	.02	.00	.04	-.02	.03
Affect spin			.21 ^{†,c}	.12	-.06 ^c	.05
Level 2						
Intercept	.61*** ^b	.05	1.57***	.21	3.68***	.48
Affect spin			1.24*** ^c	.35	-.73* ^c	.36
Condition	.08 ^c	.10	-.21	2.52	1.20	.97
Affect spin slope (S_{AS})			-1.15	38.21	17.59	13.71
Cross-level interaction						
Time × Condition	-.07* ^d	.04				
Simple slope comparison						
Time → affect spin—mindfulness group	-.06*	.03				
Time → affect spin—control group	.01	.02				

Note. $N = 173$ individuals, 603 observations. $SE =$ standard error. Time coded as 0 = Week 1 to 3 = Week 4 of the intervention period; condition coded as 0 = control condition, 1 = mindfulness intervention condition. All estimates are unstandardized and were tested two-tailed except for Time × Condition and the corresponding simple slope in the mindfulness group for which a one-tailed test was used as recommended by Bodner and Bliese (2018).

^a Due to the coding of condition, the estimate indicates the effect of time on affect spin in the control condition. ^b Due to the coding of time and condition, the intercept indicates mean levels of affect spin in Week 1 in the control condition. ^c Due to the coding of time, the estimate indicates the effect of condition on affect spin in Week 1 of the intervention period. ^d Differences between groups in change over time, that is, effect of the mindfulness intervention. ^e Effects of affect spin on outcomes across time and condition (Bodner & Bliese, 2018).

[†] $p < .10$. * $p < .05$. *** $p < .001$.

tested for linear and quadratic forms of change and found evidence only for linear decreases in affect spin (quadratic terms were not significant), and only in the intervention group (no change was found in the control group). Our results suggest that rather than having immediate strong effects on affect spin, the benefits of mindfulness practice slowly but gradually build up for at least 4 weeks as participants get more experienced with practice and implement these novel experiences into their everyday work lives. An open question for theory and empirical testing is at what point in time the reductions in affect spin due to mindfulness practice diminish or level off. We discuss this further in the future research directions section.

Our study findings also contribute to the mindfulness literature. At the heart of mindfulness theory lies the notion of equanimity, “an even mindedness in the face of every sort of experience regardless of whether pleasure (or) pain are present” (Weber, 2017, p. 151). Accordingly, mindfulness practice should increase equanimity (Desbordes et al., 2015) and promote an “even-keeled emotional life” (Brown & Ryan, 2003, p. 839). By showing that mindfulness practice leads to reductions in affect spin, our study provided a unique test of this proposition. This finding confirms that mindfulness practice promotes a more balanced profile of affective experiences (i.e., reduced affect spin) despite the many ups and downs that everyday work life brings about. Our results thereby extend previous research showing that mindfulness reduces emotional reactivity *at a specific moment in time* and in experimental settings (Arch & Craske, 2006; Keng et al., 2013; Taylor et al., 2011) by showing that it reduces variability in employees’ affective experiences *over time* and under real-life working conditions.

In addition to studying mindfulness as an antecedent to affect spin, we investigated how affect spin relates to emotional exhaustion and job satisfaction. Although findings revealed that affect spin not only varies between but also within persons over time, significant relations between affect spin and emotional exhaustion and job satisfaction emerged only at the between-person level. Thus, individuals who generally experience more affect spin have higher levels of emotional exhaustion and lower levels of job satisfaction. These findings add to previous research documenting costs of affect spin for well-being (Beal et al., 2013; Houben et al., 2015). Our supplementary analyses revealed that relations of affect spin with well-being outcomes were not unique, as positive and negative affect, or valence and activation were also associated with emotional exhaustion and/or job satisfaction. Indeed, our supplemental results suggest that affect spin does not explain significant unique variance in our outcomes, over that explained by positive and negative affect or valence and activation. On the one hand, this suggests that although mindfulness uniquely influences affect spin, between-person differences in affect spin may not uniquely predict well-being. On the other hand, this analysis may inappropriately limit our understanding of affect spin. To the extent that mean affect levels and affect spin are substantively related (cf., Mestdagh et al., 2018), controlling for affect levels, meaningful variance in affect spin would be removed, leading to potentially erroneous conclusions. This may also be the reason that extant research on affect spin in the context of work has not controlled for positive and negative affect (Beal & Ghandour, 2011; Beal et al., 2013; Clark et al., 2018; Park et al., 2021; Uy et al., 2017). Two studies even hypothesized and found that positive and negative affect serve as proximal outcomes of affect spin that mediate the effects of affect spin on more distal

outcomes such as citizenship behavior, counterproductive work behavior, and creativity (Clark et al., 2018; Park et al., 2021). Controlling for affect levels would therefore necessarily reduce any effect of affect spin on downstream outcomes.

Finally, we hypothesized that *changes* in affect spin that are stimulated by mindfulness training translate into lower levels of emotional exhaustion and higher levels of job satisfaction. Yet, our findings did not support this claim. Change in affect spin was not related to levels of emotional exhaustion and job satisfaction across the 4-week study period. Our supplementary analysis revealed that changes in affect spin over time were also not related to concurrent changes in emotional exhaustion and job satisfaction. Slope to level and slope to slope tests are uncommon in the literature, not only because slopes are less reliable than means and many studies are underpowered for such analysis, but also because there is no existing theory about the trajectory of change. Our test assumes that the gradual decrease in affect spin would directly translate into higher levels of well-being. In reality, it may be that it is only after affect spin drops to a certain level or remains low for a certain period of time, that well-being increases.

Practical Implications

Together with previous research our findings document that affect spin has costs for both employees and organizations. It is associated with reduced goal progress and voluntary work behavior, lower well-being, increased negative crossover effects of work–family conflict, and it exacerbates the costs of emotional labor (Beal et al., 2013; Clark et al., 2018; Uy et al., 2017; Yang & Dahm, 2021). Organizations may therefore be well advised to search for ways to reduce affect spin. The present findings suggest that mindfulness interventions may be a fruitful way to achieve this goal.

Mindfulness-based interventions can take many forms, ranging from on-site training programs provided by qualified mindfulness-based stress reduction trainers (e.g., Wolever et al., 2012) to informal grassroots initiatives driven by employees (see e.g., the Mindfulness@IBM program). The majority of mindfulness trainings are time consuming, consisting of lectures, audio recordings, and on-site group sessions with mindfulness-based stress reduction trainers (e.g., Wolever et al., 2012). In their review of the mindfulness at work literature, Eby et al. (2019) therefore called for more research on the effectiveness of alternative delivery modes for mindfulness training. We studied such an alternative delivery mode, namely an app-based mindfulness intervention. Such app-based mindfulness interventions have practical advantages as they are more accessible and scalable than in-person, group- or classroom-based interventions. They may be attractive to organizations as they can be practically and relatively economically supplied by organizations. We chose to study the Headspace app. With more than 2 million subscribers in 2020, headspace is one of the most popular mindfulness apps being used worldwide. Our findings demonstrated its efficacy in promoting affective balance in employees and they supplement previous research demonstrating its effectiveness in promoting leadership qualities, personality change, and well-being (Howells et al., 2016; Nübold & Hülsheger, 2021; Nübold et al., 2020).

In addition to encouraging employees to engage in regular mindfulness practice, organizations interested in reaping the benefits from mindfulness may focus on avoiding working conditions that

have been shown to harm employees' abilities to be mindful at work, that is, high workload and psychological demands (Hülshéger et al., 2018; Lawrie et al., 2018).

Limitations and Future Research Directions

Despite its strengths, our study also has some limitations worth noting. The implementation of a randomized control group design in combination with repeated measurement overcomes many shortcomings of correlational survey studies that disallow drawing causal inferences but also the shortcomings of many uncontrolled or quasiexperimental mindfulness intervention studies (Jamieson & Tuckey, 2017). Yet, a limitation of our wait-list control group design is that demand characteristics may be present (Davidson & Kaszniak, 2015). To reduce this risk as much as possible, we did not tell participants explicitly which condition they were assigned to in order not to trigger such demand characteristics. Nevertheless, participants were likely aware of the condition they were in after receiving a code to the mindfulness app at the end of the first week. Future research may therefore benefit from the use of carefully matched active control groups that may rule out the potential that observed effects were, in part, driven by the mere receipt of training and attention (Eby et al., 2019; for a recent study with an active control group see Nübold & Hülshéger, 2021).

Our goal was to study whether mindfulness practice leads to changes in weekly affect spin over time. Since affect varies both within and between days (e.g., Weiss et al., 1999), a comprehensive assessment of affect spin occurring during a work week would therefore ideally involve multiple measurements per day over each day of the week. Yet, considering that our study spanned a 4-week period, this was not practically feasible. We therefore measured affective states four times a day on 2 days per week (i.e., Tuesday and Thursday). This introduces discontinuity in measurements with time lags within days being shorter than time lags between Tuesday and Thursday measurements. While it is not uncommon to calculate affect spin based on unbalanced temporal spacing of affect measurements (Park et al., 2021; Uy et al., 2017; Yang & Dahm, 2021), this issue and how it may affect the reliability of the affect spin measure deserve more attention in the affect spin literature.

We followed participants over the course of the 4-week intervention period. This revealed not only *that* but also *how* affect spin changed over the course of this period. Over the 4-week period, affect spin linearly decreased. It may very well be—indeed it would be our expectation—that the effects of mindfulness practices will begin to stabilize over longer periods of time. For example, there may be a slow and steady gain over the course of 3 months, but then the effects would level off. In this case, the benefits on affect variability and well-being would remain over time, but they may not continue to grow. It is also possible that, like with many health practices, individuals might not persist with their mindfulness practices. Once the positive experience of a balanced, calmer affective profile becomes “normal,” compliance with daily mindfulness practice may begin to falter, leading to subsequent loss of the benefits. It thus remains to be investigated at what point the decreases in affect spin we observed will level off, whether and for how long the benefits of the intervention can be maintained, and to what extent this depends on sustained mindfulness practice after the training period.

This also suggests that we need to develop strong theory about when and how changes in affect spin will show their effects on well-being. For example, the effects may be lagged such that decreases in affect spin over several weeks (such as those found here) lead to steadily increasing well-being over several more weeks. Based on this theory, a test of lagged effects of affect spin on well-being might be appropriate; we did not have the appropriate data to test them here. Also, we focused on two key work-related well-being outcomes. It is likely that the calm emotional state brought on by mindfulness practice is also a key ingredient in other important work outcomes. Especially fruitful would be an investigation of the role of affect spin as a mechanism driving benefits of mindfulness for interpersonal relationships at work.

Finally, while our experimental design allowed us to test causal effects of mindfulness on affect spin, the relationships we found between affect spin and well-being outcomes are correlational in nature and do not speak to causality or directions of effects.

Conclusion

We identified mindfulness is an important antecedent to (reduced) affect spin, and show that its effects build over time. Our study thereby demonstrated the efficacy of a simple intervention for reducing affect spin. Furthermore, it confirmed previous findings that individuals with low levels of affect spin typically experience higher levels of employee well-being.

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