Three Papers Examining the
Psychological Mechanisms of Mindfulness

by

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Abstract

The three papers in this dissertation explore the mechanisms of mindfulness to shed light on how mindfulness operates. In Paper 1, I investigate the mechanisms of mindfulness that explain how mindfulness reduces stress. Specifically, I investigate whether mindfulness is effective in reducing stress because it helps employees re-appraise their work tasks. The findings suggest that mindfulness can reduce stress at work because it helps employees view work tasks less as a threat. In Paper 2, I unravel the seemingly paradoxical effects of mindfulness, by systematically reviewing empirical research on mindfulness mechanisms and organizing them into an integrative theoretical model. Specifically, I posit that established mindfulness mechanisms are not contradictory if considering that they occur in a sequence that unfolds over time: dereification producing non-evaluative experiences momentarily; reorientation producing modulated experiences in the short run; and assimilation producing durable changes in one's personal agency in the long run. In Paper 3, I investigate empirically whether mindfulness first fosters a neutral state of mind by removing negative thoughts (e.g., reduced negative affect, reduced depressive feelings), and later promotes increases in a positive state of mind (e.g., increased optimism, increased resilience). The findings suggest that mindfulness first leads to a neutral state of mind to make space for a positively modulated state of mind. Taken together, the three papers build on one another in exploring the mechanisms of mindfulness. Overall, the findings suggest that mindfulness can lead to a positive experience by first creating a neutral state of mind entailing the reduction of a negative state.

Keywords: Employee well-being; Mindfulness; Psychological mechanisms; Stress

Dedication

I would like to dedicate this dissertation to my daughter, *Mia*. Having her in my life has inspired me to persevere in my PhD journey.

Acknowledgements

I would like to start by expressing my special gratitude to my supervisor, *Dr. Lieke ten Brummelhuis*, for her invaluable guidance, mentorship, and unwavering support. I am also grateful to *Dr. Hannes Leroy*, for the consistent cheering and encouragement that he has given me throughout my PhD journey. Finally, I would also like to thank some fantastic people who gave me support and assistance at many different moments throughout my PhD studies: *Dr. Chris Zatzick*, *Dr. Jeffrey Yip*, *Dr. Christina Atanasova, Dr. Andrew von Nordenflycht, Dr. Leyland Pitt, Dr. David Hannah, Dr. Brent McFerran*, and *Joanne Kim*.

Table of Contents

List of Tables

List of Figures

Note

Introduction

Mindfulness, defined as non-judgmental awareness of and attention to what is occurring in the present moment (Brown & Ryan, 2003), has become increasingly popular in recent decades. Not only has mindfulness reached among the general public but has also been adopted by many organizations (Reb et al., 2020; Schaufenbuel, 2015), mainly aimed at reducing employees' stress (Gelles, 2015). Many influential companies, including Google and Target, offer mindfulness interventions to their employees, trusting that they will have a positive impact on workers' well-being (Schaufenbuel, 2015).

Although there has now been extensive research investigating the effects of mindfulness, theoretically, it remains unknown thus far exactly how mindfulness operates. There is a paradox in the mindfulness literature in that mindfulness is often described in research articles as a practice that gives individuals agency to decide on how to interpret and respond to situations (e.g., Kay & Skarlicki, 2020; Reina & Kudesia, 2020, Zivnuska et al., 2016), although mindfulness is defined as a non-evaluative, pre-reflexive state of mind (Bishop et al., 2004; Brown & Ryan, 2003; Shapiro et al., 2006). Some scholars even critique mindfulness putting forward the idea that it may have a sedating effect (Purser, 2019), due to the suspension of thoughts that it creates. Indeed, the question that arises is, if individuals are not evaluating or reflecting on what is happening around them, how can they interpret situations and decide how to respond?

In this dissertation, I investigate the mechanisms of mindfulness to elucidate how mindfulness operates. The overall goal of my dissertation is to understand the seemingly paradoxical impact that mindfulness has on a variety of outcomes. On the one hand, mindfulness enables a neutral state of mind, whereby people accept feelings and situations judgement-free (Shapiro et al., 2006). On the other hand, mindfulness induces positive states of mind (e.g., positive affect, McLaughlin et al., 2019; positive reappraisal, Kay & Skarlicki, 2020) that might help them when they encounter stressors or make decisions. To unravel how mindfulness affects people's state of mind, I aim to examine how mindfulness affects negative and positive states of mind, and how these pathways can co-exist in short-time (daily) and longer timeframes (over months). Therefore, in Paper 1, I investigate whether naturally occurring mindfulness affects negative and positive appraisals at work, thereby affecting stress. I conduct two empirical studies, consisting of a two-wave study over three months and a daily experience sampling

study, to investigate whether mindfulness can reduce work stress by enabling employees to view their tasks in a more favorable light. Specifically, I examine whether mindfulness is related to reduced stress because mindfulness takes away negative task appraisals, allowing employees to perceive their job tasks less as a threat (i.e., with potential for negative consequences) and if mindfulness instigates more positive appraisals, whereby employees view work tasks more as a challenge (i.e., with potential for benefits and opportunities for growth).

In Paper 2, I cast further light on the paradox permeating the mechanisms of mindfulness by systematically reviewing the mechanisms of mindfulness and developing a theoretical model that reconciles the discrepancies found among them. I developed an organizing framework to identify the major categories/themes of mechanisms of mindfulness tested by the empirical studies thus far, and I put forward an integrative theoretical model to explain how mindfulness operates. Specifically, I posit that the mechanisms of mindfulness occur in a sequence of three overarching processes that unfold with the passage of time: *dereification, reorientation,* and *assimilation.* Dereification involves seeing thoughts, feelings, and perceptions as mental processes rather than as accurate depictions of reality, whereas reorientation involves generating modulated experiences, such as more beneficial appraisals and increased positive emotions. Assimilation, in turn, refers to the generation of durable changes in the individual's sense of agency.

In Paper 3, I empirically investigate the sequential order of mechanisms as theorized in Paper 2. That is, I examine if mindfulness first puts individuals in a more neutral state of mind, to then allow them to experience more positive states of mind. This process is examined in the short term (within three weeks) and in the long run (over six months), with two studies. In Study 1, I use an experimental experience sampling design to examine whether short-term mindfulness training will generate a neutral state of mind in the same week, whereas exposure to mindfulness training will lead to increases in a positive state of mind within a three-week timeframe. In Study 2, I use six-month longitudinal data collected in three waves, with a cross-lagged design, to examine whether trait mindfulness will be indirectly related to increased general levels of a positive state of mind through one's experiencing a more neutral state of mind, in the long run.

Taken together, the three papers advance the mindfulness literature by shedding light on the mechanisms of mindfulness and elucidating how mindfulness brings about

its beneficial effects in the workplace. Paper 1 contributes to the mindfulness literature by adding theoretical precision to the scholarly understanding of how mindfulness affects stress in the workplace. Paper 1 also contributes to the literature by examining whether mindfulness can reduce work stress through affecting the very way in which employees engage in their work, rather than focusing on the role of mindfulness as solely a strategy that fosters recovery after employees have already finished their workday (e.g., Hülsheger et al., 2014, 2015, 2018; Michel et al., 2014).

Paper 2 contributes to the mindfulness literature by identifying and organizing the mechanisms of mindfulness in an integrated way, contributing to a literature that has thus far been following a piecemeal approach when it comes to the investigation of the mechanisms of mindfulness. Paper 2 also contributes to the literature by putting forward a conceptual model that allows us to identify the theoretical path in which mindfulness affects its outcomes. In doing so, Paper 2 sheds light on the paradox that exists in the mindfulness literature as to whether and how mindfulness can also promote an agentic stance towards daily life events even though it is defined as a non-evaluative state of mind.

Drawing on Paper 2's conceptual model, in Paper 3, I conduct an empirical examination to elucidate the paradox permeating the mechanisms of mindfulness. Paper 3 advances the initial insights gained in Paper 1, by unraveling in more detail how mindfulness, when induced by an intervention (as opposed to naturally occurring), affects negative and positive states of mind, and what the temporal sequence is of this process. Paper 3 contributes to scholarly research on mindfulness by providing a clarification for how mindfulness can induce more neutral (e.g., reduced negative affect, reduced depressive feelings) followed by more positively modulated (e.g., increased optimism, increased resilience) experiences. In examining the effect of short-term mindfulness training as well as the long-term effects of one's having general levels of mindfulness, Paper 3's studies shed light on the role of time in explaining the duality that pervades the effects of mindfulness. Together, the three articles allow for a clear description of how mindfulness changes people's states of mind, bringing together what looks at first sight like a discrepancy in theory and empirical research on mindfulness. The key to reconcile these inconsistencies is to view mindfulness as a sequential process that affects negative and positive states of mind over time.

Paper 1. How does Mindfulness Reduce Stress at Work? A Two-Study Examination Using a Stress Appraisal Perspective[1]

Considering that 83% of US workers suffer from work stress and US businesses lose up to $300 billion a year as a result of stress – due to accidents, absenteeism, employee turnover, diminished productivity, and insurance costs – finding ways to reduce employee stress is a matter of vital importance to organizations (The American Institute of Stress, 2019). Mindfulness, defined as non-judgmental awareness of and attention to what is occurring in the present moment (e.g., thoughts, emotions, surroundings) (Brown & Ryan, 2003), has become an increasingly popular approach to reduce work stress (Gelles, 2015). Several influential companies, including Google, Target, and General Mills, offer mindfulness programs to their employees, trusting that they will have a positive impact on workers and profits alike (Schaufenbuel, 2015). Aside from the popularity of mindfulness interventions in practice, there is also ample empirical evidence showing that mindfulness interventions are effective in reducing stress (for meta-analytic studies, see Grossman et al., 2004; Gu et al., 2015; Khoury et al., 2013, 2015).

Although there is extensive literature showing that mindfulness reduces stress, theoretically, it remains unknown thus far exactly *how* mindfulness reduces stress. In their meta-analysis reviewing the mediating mechanisms that could explain the effects of mindfulness interventions on a wide range of well-being outcomes, Gu et al. (2015) conclude that, compared to the extensive research on the effects of mindfulness interventions on mental well-being, relatively few studies have tested the mechanisms that connect mindfulness to well-being outcomes. Similarly, in their seminal work on the psychological effects of various types of meditation, including mindfulness meditation, Sedlmeier et al. (2012) concluded that most studies were conducted without sufficient theoretical background. The lack of theory-based research creates a gap in both the scholarly and practical understanding of mindfulness, because it precludes scholars from understanding the psychological processes involved in the stress-reducing effects of

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[1] This paper was published in Personality and Individual Differences (Toniolo-Barrios, & Ten Brummelhuis, 2023).

mindfulness and precludes practitioners to develop more effective managerial interventions in their organizations.

Recently, mindfulness researchers have begun linking mindfulness to stress appraisals. Weinstein et al. (2009) found in one of their four studies that college students with higher levels of mindfulness appraised an upcoming exam as less threatening than students with lower levels of mindfulness. Similarly, Hoffmann and Geisler (2020) found that college students experienced less threat appraisal when two attributes of mindfulness (observing and acceptance) were present together (Hoffmann & Geisler, 2020). These studies highlight that mindfulness affects stress appraisal. In line with this insight, Jamieson et al. (2022) recently applied the Transactional Model of Stress (Lazarus & Folkman, 1984) to understand the beneficial effect of mindfulness. These authors showed that mindfulness results in more favorable appraisals (i.e., increased challenge appraisal, reduced threat appraisal), which explains why mindfulness puts individuals in a more favorable affective state (i.e., increased positive affect, reduced negative affect). Extending this line of research, we examine if the Transactional Model of Stress can also explain why mindfulness reduces *stress*. This seminal theory of stress is particularly well suited to better understand how mindfulness operates because mindfulness changes individuals' perception (i.e., less reactive, less judgmental) and the perception of events is the core aspect of this stress model. More specifically, we investigate how mindfulness may affect one's outlook towards the activity that is at the very core of one's job: performing work tasks. Thus, we examine if mindfulness is related to increased challenge task appraisal and reduced threat task appraisal, and if this more favorable appraisal of work tasks explains why employees experience less stress when they are more mindful.

We conducted two empirical studies, consisting of a two-wave study and an experience sampling study, to investigate whether mindfulness can reduce work stress by enabling employees to view their tasks in a more favorable light. The different study designs allow us to examine if natural variations in mindfulness at the person level (Study 1) and at the daily level (Study 2) can reduce stress through our proposed theoretical mechanisms. As can be seen in Figure 1-1, we examine whether mindfulness is related to reduced stress because mindfulness may allow employees to perceive their job tasks less as a threat (i.e., with potential for negative consequences) and more as a challenge (i.e., with potential for benefits and opportunities for growth).

Figure 1-1. Hypothesized Model
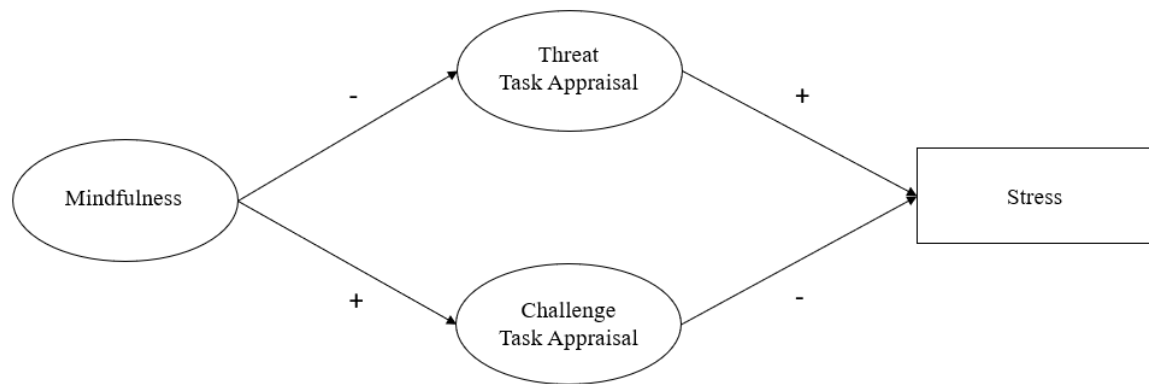
This research contributes to our understanding of mindfulness in the workplace in two ways. First, by drawing on a seminal, well-supported theory of stress (i.e., Transactional Model of Stress), our research develops a more comprehensive theoretical understanding of *how* mindfulness may reduce stress at work. Consequently, our studies add theoretical precision to the scholarly understanding of how mindfulness affects stress in the workplace. Furthermore, we extend the application of the stress appraisal framework in mindfulness research to understand the outcome that this theory was developed for – stress. Thus, we broaden our understanding of how mindfulness, by inducing more favorable appraisals, might not only put individuals in a better mood (Jamieson et al., 2022), but also reduce experienced stress at work.

Second, much of the existing mindfulness research has focused on the role of mindfulness as a strategy that enables recovery from work after the employee has already finished working (e.g., Hülsheger et al., 2014, 2015, 2018; Michel et al., 2014). We change this vantage point, and instead examine whether mindfulness can reduce work stress through affecting the way in which employees engage in their work. More specifically, we investigate the possibility that mindfulness helps employees view their work tasks in a more positive light, thereby preventing stress from escalating. Since work is a major source of stress for many employees (The American Institute of Stress, 2019), investigating if mindfulness helps employees approach their work in a healthier fashion, which more directly prevents stress, instead of viewing mindfulness exclusively as a recovery strategy, seems to be a promising new avenue for employees and organizations alike.

Theoretical Framework

Mindfulness

By fostering awareness of and attention to the present-moment occurrences without judgment, mindfulness allows one to take a step back and simply observe what is happening *in the here and now*, without evaluating or attaching any interpretation to it (Bishop et al., 2004; Shapiro et al., 2006). Such an observant stance arises because mindfulness promotes a distancing between the self and the situation, a process known as "reperceiving" (Shapiro et al., 2006). Reperceiving leads to an increased capacity for objectivity in relation to one's internal and external experiences, because it allows one to disidentify from their thoughts and emotions, and simply observe them instead (Shapiro et al., 2006). Through reperceiving, individuals only experience *what is*, without an evaluative commentary accompanying it (Shapiro et al., 2006). In a mindful state, individuals are only noticing what is happening, without evaluating, analyzing, or reflecting upon it (Brown & Ryan, 2003).

Although originally conceptualized as a state, mindfulness has now also been recognized as a trait. Not only are there day-to-day variations in the capacity of being mindful, but there are also individual differences in the general propensity of being mindful (Brown & Ryan, 2003; Mesmer-Magnus et al., 2017). Since any state can be regarded as the expression of a specific individual trait at a particular moment (Fleeson, 2001; Liang et al., 2018), the propensity to be mindful from moment to moment (i.e., state mindfulness) can also be an indication of one's level of trait mindfulness (Hülsheger et al., 2013; Liang et al., 2018). There is a wealth of empirical evidence showing that both state and trait mindfulness lead to reductions in stress (Gu et al., 2015; Lomas et al., 2019; Mesmer-Magnus et al., 2017), and thus we expect the relationships proposed in our theoretical model to hold true irrespective of mindfulness' conceptualization as a state or a trait.

Mindfulness and Task Appraisal

To investigate how mindfulness affects stress at work, we draw on the Transactional Model of Stress (Lazarus & Folkman, 1984). This well-established stress model is particularly fitting for the examination of mindfulness, because much of the nascent theoretical work on mindfulness (e.g., Kabat-Zinn, 1990; Shapiro et al., 2006) emphasizes the changes in perception that are generated by mindfulness through the process of "reperceiving" (e.g., less reactive, less judgmental); the perception of events

is, in turn, the core component of the Transactional Model of Stress, as this stress model underscores the importance of perception for the experience of stress (Lazarus & Folkman, 1984). As a result, the Transactional Model of Stress allows us to translate the nascent theoretical underpinnings of mindfulness into more concrete and measurable phenomena from the stress and coping literature.

The Transactional Model of Stress argues that the experience of stress emerges as a result of an individual's evaluation of a situation, a process called *appraisal* (Lazarus, 1991). During the appraisal, one assigns meaning to the situation or event by determining its significance to one's well-being. Individuals generally evaluate situations as being benign or detrimental to their well-being. In particular, individuals appraise situations with regard to how harmful, threatening, or challenging they perceive them to be (Biggs et al., 2017; Lazarus, 1991).

Whereas the evaluation of harm refers to a negative consequence that has already occurred, the perceptions of threat or challenge are characterized by the *anticipation* of negative or positive outcomes in the future. The perception of threat results from an anticipation of potential harm in the future, while the perception of challenge refers to a condition where one needs to master their skills to overcome obstacles, and thus one can grow and expand as a result (Lazarus, 1991). When evaluating a situation as threatening, the individual focuses on protection against harm; when the evaluation is one of challenge, the individual focuses on potential positive outcomes (Lazarus, 1991; Peacock & Wong, 1990). Such appraisals occur repeatedly at work, given that employees face a variety of demands and pressures to perform work tasks. Whereas some tasks may be seen more negatively, with the potential to cause harm (i.e., threat), other tasks may be seen in a more positive light, as opportunities for growth and professional development (i.e., challenge).

Because mindfulness allows individuals to see things as *they are*, without judgment, mindfulness makes one less likely to automatically attach negative evaluations to events (Shapiro et al., 2006; Weinstein et al., 2009). Mindfulness enables one to experience situations with greater objectivity, thereby becoming less reactive to events and thoughts (Kay & Skarlicki, 2020; Zivnuska et al., 2016). Consequently, mindfulness may help employees see their job tasks with greater objectivity, without letting old patterns, hasty reactions, and negative intrusive thoughts influence their perception of the tasks. Based on this reasoning, mindfulness may help employees feel less threatened by the tasks they need to perform at work.

Hypothesis 1a. Mindfulness is negatively related to threat task appraisal.

In addition to involving a neutral observant stance towards external events (Brown et al., 2007; Brown & Ryan, 2003), mindfulness also facilitates the modification and beneficial interpretation of events, leading to positive reappraisal of events (Hanley et al., 2015; Kay & Skarlicki, 2020). This is theorized to happen because momentary neutrality facilitates the elimination of an automatic negative evaluation, which then gives space to a new, more adaptive interpretation (Lutz et al., 2015). Because mindfulness first enables a neutral stance towards experiences, it later allows for the cognitive reinterpretation of events (Lutz et al., 2015; Kay & Skarlicki, 2020). Thus, the neutral stance generated by mindfulness is a first step that creates a mental space that then can be followed by the modification of cognitive appraisals of situations so that the appraisals become more beneficial (E. Garland et al., 2009). Indeed, mindfulness has been related to a variety of positive states, including enhanced hope, resilience and optimism (Roche et al., 2014).

Furthermore, mindfulness has also been linked to positive emotional valence (Good et al., 2016). Because mindfulness fosters awareness of emotions as they arise, mindfulness allows individuals to more optimally respond to their emotions, by generating and/or sustaining positive emotions (Jimenez et al., 2010a). Mindfulness leads to improved emotion regulation (Hülsheger et al., 2013; Tangney et al., 2017), thus allowing individuals to experience fewer negative emotions and more positive emotions (Eberth & Sedlmeier, 2012; Good et al., 2016; Jimenez et al., 2010a).

Drawing on these cumulative arguments, that indicate that mindfulness leads to positive cognitive processes and positive emotions, we posit that mindfulness may not only reduce threat task appraisal but may also augment challenge task appraisal. This reasoning is supported by previous empirical finding showing that mindfulness is positively related to positive affect via increased challenge appraisal (Jamieson et al., 2022).

Hypothesis 1b. Mindfulness is positively related to challenge task appraisal.

Task Appraisal and Stress

According to the Transactional Model of Stress, the experience of stress will emerge depending on one's appraisal of a situation. Whereas the appraisals of harm and threat provoke negative emotions, the appraisal of challenge provokes positive emotions because it provides one with the opportunity for rewards and growth from the

experience (Biggs et al., 2017; Peacock & Wong, 1990). The view of a threat makes one feel endangered, defensive, and self-protective, but the view of challenge makes one feel enthusiastic, motivated, and engaged (Lazarus, 1991). This argument is supported by research showing that threat appraisal is an important predictor of overall perceived stressfulness, increased dysphoric mood, and increased psychological symptoms, whereas challenge appraisal is negatively related to dysphoric mood (Peacock & Wong, 1990). Therefore, we expect that threat task appraisal will be related to increased stress levels, whereas challenge task appraisals will be related to reduced stress levels. These arguments thus suggest that mindfulness will have an indirect effect on stress via task appraisal.

Hypothesis 2a. Mindfulness is negatively related to stress through reduced threat task appraisal.

Hypothesis 2b. Mindfulness is negatively related to stress through enhanced challenge task appraisal.

Overview of Studies

In Study 1, we use a two-wave design to examine whether trait mindfulness is negatively related to stress through more favorable task appraisal (i.e., lower threat appraisal, higher challenge appraisal). By making between-person comparisons of trait mindfulness, Study 1 answers the question of whether more mindful employees experience less stress as compared to less mindful employees because the first appraise tasks more favorably than the latter. In Study 2, we use an experience sampling study design to zoom in on the psychological processes linking naturally occurring mindfulness to stress at the daily level. Thus, by making within-person comparisons, Study 2 answers the question of whether employees experience less stress on days in which they are more mindful because they appraise tasks more favorably (i.e., lower threat appraisal, higher challenge appraisal) on those days.

Study 1: Method

Participants and Procedure

Participants worked for a Canadian government agency, whose purpose is to stimulate the Canadian economy. The management of the agency sent an email to employees to introduce the opportunity to participate in a study on employee well-being, consisting of two surveys to be completed three months apart. We chose the time frame

of three months based on previous research using 3-month time lags to follow up on participants' stress levels (Yang et al., 2010). The first survey was sent at the end of January 2019, remained open for one month, and resulted in 197 responses.

Survey 1 included questions about background characteristics (e.g., work hours, tenure) as well as measures of mindfulness, task appraisal, and stress. Survey 2 was sent in May 2019 to remeasure stress levels. Survey 2 was open for one month and yielded 126 responses (64% retention rate). In both surveys, we asked participants to create a unique participant number by combining the answers to three questions (e.g., street number of home address, mother's year of birth, father's month of birth). We were able to link the surveys of 76 participants (63% completion rate). Our sample included more female (71.3%) than male (28.8%) participants. Most participants had a bachelor's degree (43.8%), whereas the remainder of participants had a master's degree (37.5%), MBA or PhD (7.5%), or completed high school or 2-year college (11.3%). Participants were on average 42.4 years old (*SD* = 8.9) and had worked for their current company for 10.8 years on average (*SD* = 15.2). Participants worked on average 39.2 hours per week (*SD* = 5.3) and 38.8% occupied a supervisor position. All participants provided informed consent in writing.

Measures

To increase the participation rate and satisfy the organization's request to keep the survey as short as possible, we included short scales.

Stress

We measured stress at time 1 and time 2 using the stress question by Pruessner et al. (2003). We asked participants *"Can you indicate on a scale from 1 (very low) to 10 (very high), how stressed you felt in the past month?"* Although a single-item question, Pruessner et al. (2003) used this question as a measure of acute stress and showed that it correlated with levels of cortisol in the body, which is a biomarker of stress (Pruessner et al., 2003). Single-item questions measuring stress have been long used in the literature with the aim to reduce participant burden (Eddy et al., 2019; Elo et al., 2003) and they have been shown to be valid and reliable (Eddy et al., 2019; Littman et al., 2006; Matthews et al., 2022). For example, Matthews et al. (2022) show that *subjective stress* can be measured, with very good validity, with the single question "Thinking about the past [insert recall window], how often did you find your job stressful?"

Task Appraisal

We used an adjusted 8-item Stress Appraisal Measure (Peacock & Wong, 1990) to measure challenge and threat task appraisals at time 1. All items of the threat/challenge scales, as well as a rationale for the adjustment of the scales, are included in Appendix A. We asked participants to rate the items while "keeping in mind the work tasks you were involved in the past month." Sample items were "I felt that my work could have a positive impact" (challenge appraisal, α = .83), and "I felt anxious about doing my tasks" (threat appraisal, α = .75). Answer categories ranged from 1 (*never*) to 7 (*always*). Results of a confirmatory factor analysis (CFA) for the threat/challenge scales are included in Appendix B.

Mindfulness

We used an abbreviated version of the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006), by removing items that were less relevant for a work setting (e.g., "When taking a shower or bath, I stayed alert to the sensation of water on my body"). This resulted in 11 items that cover all five facets of the FFMQ – acting with awareness, describing, nonreactivity to inner experience, nonjudging of inner experience, observing – to represent the breadth of content of mindfulness. We asked participants to indicate their (dis)agreement with the statements when thinking about experiences and feelings in the last month. Sample items included "When I had distressing thoughts or images, I just noticed them and let them go," and "I didn't pay attention to what I was doing because I was daydreaming, worrying, or otherwise distracted" (reversed). Answer categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). We measured mindfulness at time 1 and we used the total score of mindfulness for the analysis (α = .82). Results of a confirmatory factor analysis (CFA) of the mindfulness dimensions are included in Appendix B.

Control Variables

We controlled for years of work experience in the current position, because work role experience may reduce stress (Shoji et al., 2016) and increase mindfulness (Hohaus & Spark, 2013). Moreover, we controlled for supervisor position (1 = no, 2 = yes) because leadership role has been linked to both higher levels of stress (Cooper & Marshall, 1978; Nielsen & Daniels, 2012) and higher levels of mindfulness (Roche et al., 2014). Finally, we also controlled for baseline levels of stress. All control variables were

measured at time 1.

Analytical Approach

To test the hypotheses, we used regression analysis in Mplus (Muthén & Muthén, 2012). The indirect model included the relationships of T1 mindfulness (predictor) on T1 threat/challenge task appraisals (parallel mediators) as well as the relationships of T1 mindfulness, T1 threat appraisal and T1 challenge appraisal on T2 stress (outcome), while controlling for baseline levels of stress. The control variables were included as predictors of both mediators and the outcome variable. A power analysis shows that the power of our indirect model (Observed R2 = .35, α = .05, sample size = 76, number of predictors = 6) is higher than 0.99. For the indirect effect analysis, we used the indirect model command in Mplus, which gives the specific indirect estimate of each pathway in our model. In addition, we calculated the 90% bias corrected confidence intervals of each indirect effect using the Monte Carlo method in R with 20,000 repetitions (Preacher & Selig, 2012). Because we had directional hypotheses based on a-priori theory, we used 90% confidence intervals reflecting one-tailed tests, which is consistent with recommendations from Preacher et al. (2010) that it is justified to test mediation effects with one-tailed tests (see also Lanaj et al., 2016; Uy et al., 2017). An indirect effect is significant if the 90% confidence interval does not include zero.

Results

Table 1-1 presents the means, standard deviations, and correlations of the model and control variables.

Table 1-1. Study 1: Means, Standard Deviations, Correlations, and Internal Consistency Estimates for Model Variables

	M	SD	1	2	3	4	5	6	7
1. Stress T2	6.14	2.14	-						
2. Stress T1	5.72	2.32	.56**	-					
3. Threat Task Appraisal T1	2.69	0.91	.39**	.39**	.75				
4. Challenge Task Appraisal T1	4.72	0.97	-.20*	-.11	-.31**	.83			
5. Mindfulness T1	3.28	0.61	-.29**	-.49**	-.38**	.38**	.83		
6. Work role experience	10.79	15.20	-.08	-.02	-.10	.06	.04	-	
7. Supervisor role (1= no, 2 = yes)	1.32	0.47	-.03	.15	.11	.10	-.02	.04	-

Note. N = 76. **Cronbach's alpha** on diagonal. * p < .05; ** p < .01.

Table 1-2 shows the regression estimates of the mediation model. T1 mindfulness was negatively related to T1 threat task appraisal (b = -.55, *SE* = .07, *p* <

.001), and positively related to T1 challenge task appraisal (*b* = .62, *SE* = .08, *p* < .001), supporting Hypotheses 1a and 1b. Only T1 threat task appraisal, however, was positively related to T2 stress (*b* = .50, *SE* = .27, *p* < .05) while controlling for T1 stress, as the relationship between T1 challenge task appraisal and T2 stress was not significant (*b* = -.16, *SE* = .28, *ns*). The Monte Carlo confidence intervals indicated that the negative indirect effect of mindfulness on T2 stress through T1 threat task appraisal was significant (*b* = -.27, *SE* = .15, LL = -.54, UL = -.03). The indirect effect of mindfulness on T2 stress through T1 challenge task appraisal was not significant (*b* = -.10, *SE* = .17, LL = -.39, UL = .18). Therefore, Hypothesis 2a was supported, but not Hypothesis 2b.

Table 1-2. Study 1: Regression Analysis Results for Between-Person Model

Predictor	Threat Task Appraisal T1			Challenge Task Appraisal T1			Stress T2		
	b	*SE*	*t-value*	*b*	*SE*	*t-value*	*b*	*SE*	*t-value*
Mindfulness T1	-.548***	.074	-7.415	.619***	.084	7.361	.240	.342	0.702
Threat Task Appraisal T1							.498*	.265	1.879
Challenge Task Appraisal T1							-.163	.280	-.581
Work Role Experience	-.005***	.002	-3.274	.002	.003	.705	-.006	.007	-.872
Supervisor Role	.203*	.100	2.023	.222*	.101	2.208	-.653	.444	-1.470
Stress T1							.468***	.119	3.922
R^2	.159***	.036	4.422	.165***	.040	4.142	.349***	.093	3.769

Note. N = 76. *** *p* < .001, ** *p* < .01, * *p* < .05. One-tailed p-values are reported in line with the directional nature of our hypotheses. Unstandardized estimates.

Brief Discussion

The results from Study 1 show that individuals who score higher on mindfulness perceive their work tasks less as a threat and more as a challenge. However, only lower levels of threat appraisal were related to reduced stress three months later while controlling for baseline stress. The indirect effects confirm that mindfulness is negatively related to stress through reduced threat appraisal.

Next, we aimed to constructively replicate Study 1's results by examining how these relationships occur in day-to-day life. Therefore, we designed an experience sampling study (Study 2) to examine the relationships between daily mindfulness, daily task appraisals, and daily stress.

Study 2: Method

Participants and Procedure

We recruited employees willing to participate in a seven-day diary study. Employees could enroll in the study if they worked a minimum of 24 hours (3 days) per week. We advertised the study through a publicly funded platform that promotes health research studies, through social media platforms, and through emails that were sent out to individuals from our own personal and professional networks. We recruited 116 individuals working in a variety of industries (e.g., education, finance, government, production, professional services) in Canada (89.7%) and a variety of other countries, including Brazil, the Netherlands, and South Africa (8.6%).

Participants were asked to a) complete a general questionnaire measuring demographics, and b) participate in a seven-day diary study by completing three daily logs. During the diary study period, participants were asked to complete a morning log (available at 6 a.m.), a task appraisal log (sent at a random time between 10 a.m. – 4 p.m.), and an afternoon log (available at 5 p.m.) each day. These time points were selected to respectively reflect the beginning of the day, a random work task being performed, and the end of the workday.

We chose a momentary assessment for the task appraisal variables because this technique allows us to investigate participants' cognitive processes in the workplace as the stressor occurs (Biggs et al., 2017). Nonetheless, because our goal is to examine mindfulness, task appraisal, and stress levels *during the workday*, the assumption behind this design choice is that this momentary appraisal is representative of how employees assessed their work tasks during that workday. Then, in the afternoon log, we prompt participants to reflect on their workday and report their levels of mindfulness and stress during that day. Although mindfulness is a predictor in our model, we chose to measure it at the end of the workday because this measurement moment gives us an accurate picture of employees' mindfulness levels during the *entire* workday.

Timestamps of our survey data (i.e., the survey tool recorded the time of completion of a log) allowed us to verify if logs were filled in at the right time. We excluded participants who had missing logs on more than three days (n = 8). Furthermore, because we are examining mindfulness at work, we excluded days in which participants indicated that they did not work. The final sample consisted of 567 days (111 participants).

Our sample included female (48.3%), male (45.7%), and non-binary participants (0.9%). Participants were all professionals and had either obtained an MBA or PhD (42.2%), a bachelor's degree (25.9%), a master's degree (12.9%), a 2-year college degree (1.7%), or a medical degree (0.9%). Education information was missing for the remainder (16.4%). Participants were on average 40.5 years old (SD = 8.1) and had worked for their current company for 4.8 years on average (SD = 5.0). Participants worked on average 41.1 hours per week (SD = 10.4) and 36.9% occupied a supervisor position. All participants provided informed consent in writing.

Measures

Because participants had to complete three surveys a day for seven days, we kept the surveys as short as possible to reduce participant burden and prevent attrition.

Stress

The same stress measure from Pruessner et al. (2003) was used for our daily study, with an adjusted time frame. In the afternoon log, participants were asked: "*The following question is about how stressful you found your work today. Can you indicate on a scale from 1 (low) to 10 (high) how stressed you felt during this workday*?"

Task Appraisal

We measured the extent to which participants assessed a randomly chosen work task (task log between 10am – 4pm) as a challenge or a threat using an adjusted version of the Stress Appraisal Measure (Peacock & Wong, 1990). To adjust this scale for a momentary assessment, we added the following primer: "*Please answer the question for the work task you are currently involved in.*" All items, as well as a rationale for the adjustment and results of exploratory factor analyses (EFA), are included in Appendix A. A sample item of the four-item challenge appraisal sub-dimension (α = .66) was "I am eager to tackle this task." A sample item of the four-item threat appraisal sub-dimension (α = .74) was "I dread doing this task." Answer categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Mindfulness

We measured mindfulness in the afternoon log with the 5-item state version (α = .84) of the Mindful Attention Awareness Scale (MAAS), by Brown and Ryan (2003). Using a different scale of mindfulness allowed us to pursue a constructive replication (i.e.,

a replication that does not merely repeat, but also improves a study design) of our findings from Study 1, which offers greater confidence that the results found in both studies are due to true relationships between the constructs (Lykken, 1968). To adjust the items for daily measurement, the following primer was used *"To what degree were you having the following experiences today at work?"* A sample item was "I found myself doing things without paying attention" (reversed). Answer categories ranged from 1 *(not at all)* to 5 *(very much)*.

Control Variables

We controlled for weekend day (0 = week day, 1 = weekend day) to control for the possibility that mindfulness, task appraisals, and stress differ between workdays that occur in the weekend versus regular workdays (Fritz et al., 2010). Furthermore, we controlled for state positive affect and negative affect measured in the afternoon log to control for the fact that the variables measured in this log (mindfulness and stress) may be correlated due to the individual's affective state at the time of completion of the survey (Podsakoff et al., 2003b). Based on a validation by Crawford and Henry (2004) we used five items of the PANAS (Watson et al., 1988) to assess current positive affect and five items to assess current negative affect. We asked participants to "Please indicate to what extent you feel like this *right now*" with sample items "excited" and "attentive" (positive affect; α = .88), as well as "irritable" and "upset" (negative affect α = .85). Answer categories ranged from 1 (*very slightly*) to 5 (*extremely*). Finally, we also controlled for day-specific mood, because mood may affect perceptions and appraisals (Gabriel et al., 2019). Mood was measured in the morning log, with the question "What is your mood right now?" (from 1-*very bad mood* to 5-*very good mood*). Because the inclusion of morning mood yielded no changes in the relationships of interest, we removed the control from the model and we report the results without it (Spector & Brannick, 2011).

Analytical Approach

Because we have multilevel data, with days (Level-1) nested within participants (Level-2), we tested our hypotheses using multilevel regression analysis in Mplus Version 8 (Muthén & Muthén, 2012). We calculated the proportion of variance attributed to the different levels of analysis for each of the variables via a null model and found significant levels of intraclass correlation (ICC) for all variables (stress = 51.9%, threat task appraisal = 39.9%; challenge task appraisal = 31.7%; mindfulness = 61.4%),

justifying a multilevel analytic approach. We followed the power analysis procedure for fixed parameter estimates in nested models as described by Scherbaum and Ferreter (2009). In our mediation model with a sample size of 111 employees with seven daily measurements, the standard error of our dependent variable (stress) is .15, resulting in a power of .93, assuming a medium effect size of .50 and α set to .05.

All Level-1 predictor variables were person-mean centered, allowing examination of the hypothesized within-person relationships (Enders & Tofighi, 2007; Ohly et al., 2010). For the indirect effect analysis, we used the indirect model command in Mplus, which gives the specific indirect estimate of each pathway in our model. In addition, we calculated the 95% bias corrected confidence intervals of each indirect effect using the Monte Carlo method in R with 20,000 repetitions (Preacher & Selig, 2012). Note that we use two-tailed significance tests in Study 2 to check if the findings in Study 1 – for which we used one-tailed tests – are robust.

Results

Table 1-3 presents the means, standard deviations, and correlations of all model and control variables.

Table 1-3. Study 2: Means, Standard Deviations, Correlations, and Internal Consistency Estimates for Model Variables

	M	SD	1	2	3	4	5	6	7
1. Stress	4.42	2.31	-						
2. Threat Task Appraisal	1.98	0.72	.33**	.74					
3. Challenge Task Appraisal	3.88	0.59	-.16**	-.55**	.66				
4. Mindfulness	3.96	0.83	-.32**	-.32**	.23**	.84			
5. Negative Affect	1.55	0.72	.38**	.34**	-.21**	-.50**	.85		
6. Positive Affect	2.85	0.93	-.08	-.33**	.39**	.26**	-.21**	.88	
7. Weekend	0.11	0.31	-.17**	.01	.00	.06	-.06	.11**	-

Note. N = 567 days (111 participants). Below diagonal = within level estimates. **Cronbach's alpha** on diagonal. * p < .05; ** p < .01. Two-tailed test.

To test our hypotheses, we estimated a model in which mindfulness predicted stress through the task appraisal variables. Mindfulness is negatively related to threat task appraisal (γ = -.26, *SE* = .07, *p* < .001) and positively related to challenge task appraisal (γ = .25, *SE* = .06, *p* < .001), thereby supporting Hypotheses 1a and 1b. Furthermore, threat task appraisal is positively related to stress (γ = .43, *SE* = .16, *p* < .01), but challenge appraisal is not significantly related to stress (γ = -.04, *SE* = .17, *ns*). The indirect effect analysis confirmed that mindfulness was indirectly negatively related

to stress through reduced threat task appraisal ($\gamma = -.11$, *SE* = .05, LL = -.24, UL = -.03), whereas the indirect effect of mindfulness on stress through challenge appraisal was not significant ($\gamma = -.01$, *SE* = .04, LL = -.10, UL = .07). These indirect effects support Hypothesis 2a, but not Hypothesis 2b. The results can be seen in Table 1-4.

Table 1-4. Study 2: Multi-Level Path Analysis Results for Daily Model

Predictor	Threat Task Appraisal			Challenge Task Appraisal			Stress		
	b	*SE*	*t-value*	*b*	*SE*	*t-value*	*b*	*SE*	*t-value*
Mindfulness	-.267***	.074	-3.619	.255***	.061	4.192	-.117	.181	-.647
Threat Task Appraisal							.434**	.156	2.780
Challenge Task Appraisal							-.036	.172	-.209
Weekend Day	.222*	.096	2.305	-.107	.090	-1.190	-1.547***	.326	-4.753
Negative Affect							.784***	.197	3.975
Positive Affect							-.211	.167	-1.263
R^2	.071*	.033	2.157	.077*	.032	2.403	.182***	.036	5.020

Note. N = 567 days (111 participants). *** *p* < .001, ** *p* < .01, * *p* < .05. Two-tailed p-values are reported. Unstandardized estimates.

Brief Discussion

The results from Study 2 replicate the findings from Study 1 at the daily level, and show that mindfulness is negatively related to stress through reduced threat appraisal. Study 2's findings thus suggest that, on days in which individuals experience higher levels of mindfulness, they experience less stress because they perceive their work tasks less as a threat.

General Discussion

Our findings extend the theoretical understanding of how mindfulness affects stress at work, by providing evidence that the appraisal of work tasks plays an important role in the relationship between mindfulness and employee stress. Based on insights from the Transactional Model of Stress, we examined whether mindfulness is related to reduced employee stress through more favorable task appraisal. Results from Study 1 indicate that individuals with high trait mindfulness experience lower levels of threat task appraisal and lower levels of stress, as compared to individuals with lower trait mindfulness. Results from Study 2 indicate that daily mindfulness is negatively related to daily stress because on highly mindful days employees perceive their work tasks as less threatening. Although mindfulness was positively related to challenge appraisal in both studies, challenge appraisal was not significantly associated with stress. These findings strongly suggest that mindfulness reduces stress because mindfulness diminishes

employees' threat appraisal.

Theoretical Implications

The present study advances research on mindfulness and work stress by drawing on the Transactional Model of Stress to examine if employees' adjusted appraisal of work task can explain why mindfulness is related to stress. By approaching mindfulness from a stress appraisal perspective, we offer a strong theoretical explanation for the beneficial effects of mindfulness on employee stress. In doing so, we advance scholarship on mindfulness by embedding nascent theory of mindfulness into the stress and coping literature, a mature and well-established literature in management.

Our findings also expand the scope of research on mindfulness and stress. Much of the research investigating the positive effects of mindfulness on employee well-being has framed mindfulness as a recovery strategy after work (e.g., Hülsheger et al., 2014, 2015, 2018; Michel et al., 2014). Expanding this line of research, we examined whether mindfulness can also help employees while they are performing work tasks and our results suggest that mindfulness can indeed help employees manage stress better while at work. Considering that employees spend most of their waking time from Monday to Friday at work, these insights are important because they indicate that mindfulness is not only limited to after-work recovery but can also help employees approach their work tasks in a less stress-provoking manner during worktime.

Furthermore, our work contributes to research on the Transactional Model of Stress. Our studies show that threat appraisal determines whether a person experiences stress, whereas challenge appraisal was unrelated to stress. Our results suggest therefore that threat appraisal might be particularly determinant – and more so than challenge appraisal – in the experience of stress. This is in line with research showing that challenge appraisal induces positive emotions, but also psychological strain, and that the positive emotions offset the negative consequences of said psychological strain (Rodell & Judge, 2009). Challenge appraisal can thus trigger a favorable (positive emotions) and an unfavorable (psychological strain) response that cancel each other out, thus leading to a non-significant relationship between challenge appraisal and stress. Alternatively, it is possible that challenge appraisals particularly instigate motivated behaviors, such as work engagement, whereas threat appraisals are more strongly related to depletion and stress (Crawford et al., 2010). This may be the case because the negative feelings of threat appraisal may match the negative feelings of

stress, whereas the positive feelings of challenge appraisal may be more strongly predictive of positive outcomes. Similarly, research on hindrance job demands (comparable to threats) and challenge job demands (Crawford et al., 2010) shows that hindrance job demands are more strongly related to burnout (comparable to stress), whereas challenge job demands are more strongly positively related to work engagement (i.e., a positive affective state at work).

Practical Implications

Our research has various practical implications for organizations and employees. First, our findings show that mindfulness helps employees during work hours, since it is related to more favorable appraisal of work tasks. Thus, employees do not need to wait until after work to reap the benefits of mindfulness, as is the case when mindfulness is used as a strategy to recover from work after the end of a workday. Instead, based on our research, employees are encouraged to practice mindfulness at work thereby preventing stress from accumulating during the workday.

Moreover, our detailed insights into the mechanism of mindfulness suggest that employees and mindfulness coaches could particularly focus on exercises that reduce anxiety and threat appraisals as this seems the pathway to reduce stress at work. Furthermore, to reduce employees' stress, managers could strive to diminish the threatening aspects of job tasks by highlighting the positive outcomes associated with the tasks performed by their followers, and creating safe learning environments in which employees are allowed to make mistakes (Edmondson, 1999).

Finally, our studies show that naturally occurring levels of mindfulness, in addition to the more often studied intervention-induced mindfulness, are related to lower stress levels among employees. This suggests that organizations do not necessarily need to organize mindfulness interventions, but could already reap the benefits of mindfulness by adopting a supportive stance toward mindfulness practices at work, encouraging employees to express naturally occurring mindfulness.

Limitations and Future Directions

Our research has notable strengths, including the use of two studies, the use of between- and within-person study designs, the use of a two-wave study, and the use of two different measures of mindfulness. Whereas Study 1 compares mindfulness, task appraisal, and stress levels between persons, Study 2 serves as a "magnifying glass" that allows us to dive into the micro relationship between the variables at the daily level.

In Study 2 we measure task appraisal in real time, while the employee performed a work task. This method is also known as *ecological momentary assessment*, a technique that advances scholarship on stress appraisal and coping because it allows researchers to investigate behavioral and cognitive processes within their natural environments, as the stressor occurs (Biggs et al., 2017). By asking participants to provide their appraisal in real time, we gained precise insight into the actual appraisal process as it unfolded (Biggs et al., 2017). Finally, we used different mindfulness scales across the studies to ensure that the relationships under study were not due to the use of a specific measure of mindfulness (Lykken, 1968).

Our research also has limitations. Some of the variables of our theoretical model were measured at the same time, which may raise the possibility of common methods bias influencing our results (Podsakoff et al., 2003b). Although mindfulness and the appraisal measures were collected at the same time in Study 1, in Study 2 we alleviate this limitation by measuring mindfulness and task appraisal at different times. In Study 2, although mindfulness and stress were collected at the same time, we controlled for affective state in the afternoon log to rule out that momentary affect inflated the relationships under study (Podsakoff et al., 2003b, 2012). Taken together, the two studies' designs help mitigate the concern of common method bias.

Furthermore, we acknowledge that, in Study 2, the measurement of mindfulness at the end of the day may have generated recency bias, in that levels of mindfulness at the end of the day might have weighed more heavily in employee's ratings. We argue that any possible recency bias would have been the same every day, and since we examined daily relationships in Study 2, those biases would not have influenced the daily relationship between mindfulness, task appraisals and stress.

Because our research design does not allow us to make causal inferences on the relationship between mindfulness, task appraisal, and stress, questions remain concerning the causal direction of these relationships. Although we based the direction of the expected relationship on a strong theoretical framework, future experimental research should investigate the causal steps between mindfulness, task appraisal, and stress. It is worth noting, however, that the causal relationship between mindfulness and stress has been supported by other experimental studies that examine the effects of mindfulness interventions on stress (Grossman et al., 2004; Gu et al., 2015; Khoury et al., 2013, 2015). Finally, we note that Study 1 had a high attrition rate of participants across the two waves, with a 63% completion rate, which is not uncommon for

longitudinal studies (Deng et al., 2013). Moreover, collecting data in organizations has the advantage that it reflects real work life well, but it often also means that there is lower response and substantial attrition among participants (Kalmijn et al., 1999). Although we were able to replicate our findings in a second study, we encourage future research using a larger longitudinal sample to examine the relationship between trait mindfulness, task appraisal, and stress.

Our results present opportunities for future research. Since challenge appraisal was not related to stress, scholars could investigate whether mindfulness affects other outcomes (e.g., work engagement, motivation) through enhanced challenge appraisal. Researchers could also investigate whether challenge appraisal generates feelings of "good stress," or "eustress" (Le Fevre et al., 2003), given its connection to positive emotions. Furthermore, in Study 2 we examine the relationship between appraisal of a discrete task during the workday with overall daily perceptions of mindfulness and stress, with the assumption that this momentary appraisal is representative of the day. Future studies could aim to replicate our findings using a daily assessment of task appraisal or multiple momentary measurements per day.

Future studies could also investigate whether the type of task being performed by the employee may moderate the effects of mindfulness on stress. For instance, since doing things habitually without conscious awareness (i.e., *mindlessness*) may conserve cognitive and energetic resources (Levinthal & Rerup, 2006) and reduce stress (Wood et al., 2002), it could be that the stress-reducing effect of mindfulness may be stronger in tasks where more conscious awareness is needed (e.g., when the employee is working on something novel), and that *mindlessness*, as opposed to mindfulness, may be more effective in reducing stress particularly for routine and ordinary tasks. Another interesting direction for future research could be to examine how the temporal changes of mindfulness throughout the day (e.g., Zheng et al., 2023) relates to threat/challenge appraisals.

Conclusion

Our research advances the mindfulness literature by providing evidence from two studies that mindfulness is related to reduced stress levels because employees appraise their work tasks as less threatening when they have higher levels of mindfulness. This research offers a theoretical framework for mindfulness, by suggesting stress appraisal, based on the Transactional Model of Stress, as a core mechanism that explains the

stress-reducing effects of mindfulness at work. We therefore hope that our findings can be used as a starting point for future, theory-based, research on mindfulness and stress in organizations.

Paper 2. Unpacking the Black Box of Mindfulness: A Three-Step Model of the Psychological Mechanisms of Mindfulness

Mindfulness is a cognitive state in which one pays attention to the present moment with a non-judgmental attitude (Crain et al., 2017; Liang et al., 2018; Reina & Kudesia, 2020; Rizvi et al., 2022). The construct of mindfulness has inspired considerable interest in the general public in the last years, with a growing number of books, blog posts and mass media articles dedicated to the topic. The trend of mindfulness has not only reached individuals at home but has also arrived at work. Several leading companies offer mindfulness programs to their workforce (Schaufenbuel, 2015), primarily aimed at reducing employees' stress (Gelles, 2015). Undeniably, mindfulness is *en vogue.* In addition to the popular appeal surrounding mindfulness, scholarly interest in the construct has also increased in recent years, both in psychology and in management.

As is usually the case with topics that become trendy, there is also a hot debate permeating the pros and cons of mindfulness (Choi, Gruman, et al., 2022). Among the general public, whereas some people consider mindfulness a tool that allows individuals to step fully into their lives and approach their day-to-day challenges more successfully (Lusinski, 2021), some find that mindfulness simply helps individuals not to be overly reactive or overwhelmed by their daily experiences (Mindful, n.d., "Getting Started with Mindfulness"), and others even criticize it as being "the pursuit of a blank mental oblivion" that stops individuals from "actively engaging with the world" ("Is Mindfulness Bad for Your Health?," 2015). In scholarly research on mindfulness, there have also been critiques putting forward the idea that mindfulness may have a sedating effect (Purser, 2019), and that mindfulness makes individuals oblivious to injustice and hence more accepting and tolerant of injustice (Cameron & Fredrickson, 2015). Indeed, there is a paradox in the mindfulness literature in that mindfulness is often described in research articles as a practice that gives individuals agency to decide on how to interpret and respond to situations (e.g., Kay & Skarlicki, 2020; Reina & Kudesia, 2020, Zivnuska et al., 2016), although mindfulness is defined as a non-evaluative, pre-reflexive state of mind (Bishop et al., 2004; Brown & Ryan, 2003; Shapiro et al., 2006). If individuals are

not evaluating or reflecting on what is happening around them, how can they interpret situations and decide how to respond?

Such a paradox is also apparent in empirical research on mindfulness, as there is a key contradiction surrounding the mechanisms of mindfulness tested by empirical studies to date, where a group of mechanisms entail an objective, neutral stance towards experiences, whereas another group entails the modification of experiences. For example, mindfulness has been shown to lead to increased decentering (Fuochi & Voci, 2020), greater acceptance of emotions (Arlt Mutch et al., 2021), and reduced avoidance of emotions (Feldman et al., 2011), even though it has also been shown to lead to increased positive reappraisal of events (e.g., Hanley et al., 2015; Kay & Skarlicki, 2020) and increased positive affect and emotions (e.g., Jimenez et al., 2010a; Sawyer et al., 2022). This raises the question of whether mindfulness puts individuals in a more neutral, perhaps even numb, state of mind, or whether mindfulness puts them in an active and agentic state of mind. To the extent that research on mindfulness keeps leaving this contradiction unresolved, the understanding of how mindfulness affects individuals will remain limited.

In this paper, we cast light on this paradox by systematically reviewing the mechanisms of mindfulness and we develop a theoretical model that reconciles the discrepancies found among them. We begin with a brief overview of how mindfulness has been conceptualized; then, we explain the phases and selection criteria of our systematic review. Next, based on the findings of our systematic review, we develop an organizing framework to identify the major categories of mindfulness mechanisms tested by the empirical studies in our sample. Lastly, we put forward an integrative theoretical model to explain how mindfulness operates. Specifically, we posit that the mechanisms of mindfulness occur in a sequence of three overarching processes that unfold with the passage of time: *dereification, reorientation,* and *assimilation.* Dereification involves seeing thoughts, feelings, and perceptions as mental processes rather than as accurate depictions of reality, whereas reorientation involves generating modulated experiences, such as more beneficial appraisals and increased positive emotions. Assimilation, in turn, refers to the generation of durable changes in the individual's sense of agency. Finally, we discuss how our theoretical model informs future empirical research on mindfulness.

Our research contributes to the mindfulness literature in three ways. First, our systematic review allows us to identify and organize the mechanisms of mindfulness in

an integrated way, contributing to a literature that has thus far been following a piecemeal approach when it comes to the investigation of the mechanisms of mindfulness. Second, our conceptual model allows us to identify the theoretical path in which mindfulness affects its outcomes, which provides important insights and guidance for the designing of future empirical studies and the development of mindfulness interventions for clinical and general populations. Third, this research sheds light on the paradox that exists in the mindfulness literature as to whether and how mindfulness can promote an agentic stance towards daily life events even though it is defined as a non-evaluative state of mind.

Mindfulness

Although different conceptualizations of mindfulness have been offered throughout the many years of research on mindfulness, the most well-established and widely used definition of mindfulness consists of attention to the present moment with a non-judgmental attitude (Crain et al., 2017; Liang et al., 2018; Reina & Kudesia, 2020; Rizvi et al., 2022), based on the conceptualizations provided by Bishop et al. (2004) and Brown and Ryan (2003). In this perspective, mindfulness is viewed as a pre-reflexive phenomenon, entailing a non-judgmental stance, where the individual does not reflect upon the occurring present events; rather, the individual merely observes what is happening in the present (Brown & Ryan, 2003). In line with this well-established view of mindfulness, it is accepted in the literature that there is a core process generated by mindfulness known as "reperceiving" (Shapiro et al., 2006), also often referred to as "decoupling" (Glomb et al., 2011) or "decentering" (Vago & David, 2012). Reperceiving entails a distancing between the self and the situation, which leads to an augmented capacity for objectivity in relation to one's experiences (Shapiro et al., 2006). Reperceiving allows individuals to disengage from evaluative narratives about the ongoing events and, instead, simply observe them from a *witnessing* perspective (Kay & Skarlicki, 2020; Shapiro et al., 2006). Through reperceiving, individuals only experience *what is*, without an evaluative commentary accompanying it (Shapiro et al., 2006); in other words, individuals disidentify from their thoughts and emotions, and instead only observe them in a detached manner (Vago & David, 2012).

Although mindfulness is defined as a pre-reflexive phenomenon entailing a non-judgmental attitude, many mindfulness scholars describe and study mindfulness as a tool that promotes personal agency, self-directed behavior, and changes in one's

interpretations of situations (e.g., Dust, 2022; Hanley et al., 2015; Kay & Skarlicki, 2020; Kudesia; 2019). The question that arises then is the following. How can mindfulness foster modification of thoughts, feelings, and behavior, and promote personal agency while being defined as a pre-reflexive, non-judgmental state of mind? To address this question, we provide an integrated examination of the mechanisms of mindfulness reported by empirical research, aimed at increasing our understanding of the specific psychological processes generated by mindfulness and revealing if those processes can be labeled as more neutral, more agentic, or both.

Systematic Review

To identify the psychological mechanisms of mindfulness supported by empirical research to date, we conducted a comprehensive systematic review that consisted of three phases. In the first phase, we used Web of Science database to search for peer-reviewed journal articles containing the word *mindfulness* in their title and abstract. The search, performed in March 2022, included articles published in 26 top psychology and management journals: *Academy of Management Journal, Advances in Experimental Social Psychology, American Psychologist, Human Relations, Journal of Applied Psychology, Journal of Business Ethics, Journal of Experimental Psychology: Applied, Journal of Experimental Psychology: General, Journal of Experimental Social Psychology, Journal of Management, Journal of Occupational Health Psychology, Journal of Occupational and Organizational Psychology, Journal of Organizational Behavior, Journal of Personality, Journal of Vocational Behavior, Leadership Quarterly, Organizational Behavior and Human Decision Processes, Personality and Social Psychology Bulletin, Personnel Psychology, Psychological Bulletin, Psychological Inquiry, Psychological Science, Journal of Clinical Psychology, Journal of Personality and Social Psychology, Personality and Individual Differences, Work and Stress.* This first phase yielded 346 articles.

In the second phase, we manually scanned each article's title and abstract to identify those articles with empirical studies testing mediating mechanisms that explained the indirect effects of mindfulness on its outcomes. By using this inclusion criteria, we obtained 90 articles (for a similar search approach, see Zhong & Robinson, 2021; S. Park et al., 2020). Our review focuses on mindfulness at the individual level, as the individual level is the most widely examined level in the mindfulness literature and the one that best exemplifies extant research and practice; therefore, two articles that

examined the construct of *team mindfulness* were removed. In the end, we obtained 88

articles for our analysis of the mechanisms of mindfulness. To examine the effects of

mindfulness, the articles either measured mindfulness with self-report surveys or

examined mindfulness as an intervention. Between those articles utilizing self-report

surveys, the vast majority used either the Mindfulness Attention Awareness Scale

(MAAS; Brown & Ryan, 2003) or the Five-Facet Mindfulness Questionnaire (FFMQ;

Baer et al., 2006), which are the most widely used scales to measure mindfulness. In the

third and final phase of our systematic review, we read all the articles to inspect the

theoretical rationale behind the choice of mechanisms that were tested by the authors[2].

Mechanisms of Mindfulness

In reading all the articles contained in our sample, we sought to identify the major

categories of mediating mechanisms tested by the empirical studies and group them by

common themes, thereby developing a framework that would allow us to organize the

different types of mechanisms. Since the sample included many articles, the breadth of

mechanisms and the resulting categories of mechanisms that would be identified by the

review was unknown *ex ante*. Therefore, to pursue the categorization of the mechanisms

of mindfulness, we conducted a thematic analysis with an inductive-coding approach

(see Braun & Clarke, 2006; Thomas, 2006). We used a bottom-up classification

approach to generate different categories, where different mechanisms were first

manually coded, and similar codes associated with a particular theoretical rationale were

then manually combined into a category. For example, mechanisms that involved

autonomous motivation and self-regulation were combined into a category labeled as

"self-directed behavior", because the theoretical arguments offered by the authors

behind the choice of these mechanisms were similar to one another, and all involved the

broader concept of self-directed behavior. Similarly, mechanisms that involved neutrality

towards external events were combined into a category labeled "objectivity towards

external events", because the theoretical arguments used by the authors all involved the

fact that mindfulness leads individuals to not reflect upon nor attach interpretations to

external events. This coding procedure provided an organizing framework for the

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[2] To rule out the possibility of the mechanisms supported by the empirical studies being a function of how mindfulness was measured by the study, we inspected the sample of articles to examine if there was any pattern of certain mechanisms being supported by specific measures. We found no pattern in our sample that indicated that this could be the case. Studies using either the MAAS or the FFMQ scale, as well as studies examining mindfulness as an intervention, reported different kinds of mechanisms with no specific configuration.

mechanisms of mindfulness tested by the empirical studies, consisting of 10 different perspectives, each emphasizing a different aspect of how mindfulness operates.

The Ten Perspectives

The perspective *temporal attentional focus* puts emphasis on the core attribute of mindfulness that entails one's paying attention to what is occurring in the present moment (Bishop et al., 2004; Brown & Ryan, 2003): When being mindful, individuals do not think about the past nor the future (Williams, 2008). The mechanisms in this category involve the sustained attention to present-moment events, but do not include any specific attitude towards what is happening in the present moment; in other words, the crux of this category is the focus of attention to the present moment, regardless of one's attitude. The perspective *objectivity towards external events*, in turn, focuses on another core attribute of mindfulness, namely that mindfulness involves a neutral stance towards ongoing experiences (Brown et al., 2007; Brown & Ryan, 2003), which is theorized to be enabled by "reperceiving" (i.e., a distancing between one's self and the situation that leads to one's disidentification from evaluative narratives) (Shapiro et al., 2006). Thus, mechanisms in this category refer to one having an augmented capacity for objectivity in relation to external experiences. The perspective *positive reappraisal of external events,* in contrast to the previous category, shows that mindfulness in fact facilitates the alteration of how situations are interpreted; hence, rather than only accepting what is happening, mindfulness also enables the modification and beneficial interpretation of an event. In this perspective, mechanisms involve the reappraisal of events, so they are seen in a positive light.

Next, much like the non-evaluative stance towards external events, mindfulness also increases the capacity of objectivity in relation to one's emotions through the process of reperceiving (Shapiro et al., 2006), which is the focus of the perspective *non-reactivity towards emotions*. Accordingly, mechanisms included in this category relate to an observant, accepting stance towards emotions. The perspective *modification of emotions*, in turn, shows that mindfulness also facilitates the modification of emotions and the emergence of positive emotions (Garland et al., 2015; Sawyer et al., 2022). Hence, mindfulness not only creates a neutral, observant stance towards emotions, but also promotes the modification of emotions so they become positive (E. L. Garland, Farb, R. Goldin, et al., 2015).

Mindfulness is also theorized to encourage insight into the true nature of the self (Hanley & Garland, 2017), and to increase awareness of one's core self (Leroy et al., 2013), which is the focus of the perspective *neutral acceptance of the self*. Mechanisms supported by this category involve heightened self-awareness, and an open, accepting view of the self as it is. In this category, there is neither a modification of one's view of the self nor positive valence associated with one's view of the self. Examples of mechanisms in this category include increased self-acceptance (Jimenez et al., 2010a), increased self-concept clarity (Bharti et al., 2022; Hanley & Garland, 2017), and increased self-compassion (Amemiya & Sakairi, 2020; Sünbül & Güneri, 2019). Nonetheless, in addition to promoting an accepting view of the self as it is, mindfulness has also been linked to positive appraisal of the self, which is the emphasis of the category *positive appraisal of the self*. In this category, mechanisms refer to the positive evaluation of one's personal characteristics, such as increased psychological capital (self-esteem, self-efficacy, resilience, and optimism) (e.g., Bajaj et al., 2016; Roche et al., 2014), and increased positive core self-evaluation (Kong et al., 2014). Additionally, another perspective permeating some of the mechanisms of mindfulness is the *self-directed behavior* perspective, that focuses on how mindfulness relates to enhanced self-regulation and self-determined behavior (Brown et al., 2007), because mindfulness allows individuals to disengage from automatic, unhealthy habits and behavior patterns (Lyddy & Good, 2017).

Then, another emphasis given by mindfulness research relates to showing that mindfulness leads individuals to stop thinking in self-referent terms, as it allows individuals to "step back" from self-focused modes of information processing (Sawyer et al., 2022). In this perspective (*self-transcendence* perspective**)**, mechanisms involve one's detaching from a self-involved viewpoint, with decreased self-identification with experiences and decreased focus on one's ego (Hafenbrack et al., 2020; Sawyer et al., 2022). Finally, the perspective *others' viewpoints* concerns how mindfulness leads individuals to view situations through others' points of views, which is theorized to be enabled by the fact that mindfulness leads to reduced self-focus. After the reductions in self-focus occur, the next step would then be for individuals to shift their perspective towards others' vantage points (Hafenbrack et al., 2020; Sawyer et al., 2022).

Table 2-1 briefly describes each perspective, enumerates the mechanisms classified under each of them, provides representative articles, and lists the distal outcomes supported by the reviewed studies.

Table 2-1. **Theoretical Perspectives Used in the Examination of the Psychological Mechanisms of Mindfulness**

Perspective	Characterization	Psychological Mechanisms	Distal Outcomes	Representative Articles
Temporal attentional focus	Mechanisms entail the sustained attention to present-moment events, but do not include any specific attitude towards what is happening in the present moment.	Acting with awareness (+) Attention (+) Balanced time perspective (+) Future or past temporal focus (-) Future focus (-) Imagery vividness (+) Mind wandering (-) Momentary attentional control (+) Recovery experience (+) Sleep quality (+)	Experienced pleasantness (+) Fatigue (-) Inclusionary behavior (+) Life satisfaction (+) Arousal (-) Performance (+) Rumination (-) Sleep quality (+) Sunk-cost bias (-) Task focus (+) Trait attentional control (+) Work-family balance (+)	Hafenbrack et al. (2014); Hafenbrack & Vohs (2018); Jones et al. (2019); Querstret et al. (2017)
Objectivity towards external events	Mechanisms involve an augmented capacity for objectivity in relation to experiences, due to the process of "reperceiving" (i.e., a distancing between the self and the situation, leading to disidentification	Boredom (-) Creative process engagement (+) Cognitive distortion (-) Decentering (+) Flight-fight-freeze system (-)	Abstract thinking (+) Acceptance (+) Aggression (-) Anxiety (-) Boredom (-) Burnout (-) Creativity (+) Depression (-)	Crain et al. (2017); Hoffmann & Geisler (2020); Hülsheger et al. (2013); Liang et al. (2018)

	from evaluative narratives).	Negative posttraumatic beliefs (-) Negatively biased cognition (-) Negative cognitive appraisals about social encounters (-) Nonattachment (+) Openness to experiences (+) Open processing of mortal salience experience (+) Stress appraisal (-) Rumination (-) Self-blame coping (-) Surface acting (-) Threat appraisal (-) Unhealthy risk-taking decisions (-) Worry (-)	Distress (-) Empathy (+) Emotional exhaustion (-) Gambling severity (-) Hope (+) Job satisfaction (+) Life satisfaction (+) Negative affect (-) Negative mood (-) Performance (+) Physical Health (+) Positive association between hostility and aggression (-) Psychological distress (-) Sleep quality (+) Social anxiety (-) Stress (-) Turnover intention (-) Worldview defense (-)	
Positive reappraisal of external events	Mechanisms involve the reappraisal of events, so they are seen in a positive light. Mindfulness enables	Cognitive reappraisal (+) Positive reappraisal (+)	Collaboration (+) Posttraumatic growth (+) Posttraumatic stress disorder (PTSD) (-)	Hanley et al. (2015); Kay & Skarlicki (2020)

	the modification of one's interpretation of an event, allowing for a more beneficial interpretation.		Self-efficacy (+)	
Non-reactivity towards emotions	Mechanisms relate to an observant, neutral stance towards emotions, because mindfulness increases the capacity of objectivity in relation to one's emotions.	Acceptance (+) Avoidance of emotions (-) Difficulties with emotion regulation (-) Distress tolerance (+) Emotion-driven impulsivity (-) Experiential avoidance (-) Expressive suppression (-) Guilt (-) Negative affect (-) Negative beliefs about worry (-) Problem-solving (+)	Action crises (-) Anxiety (-) Criminogenic cognitions (-) Depression (-) Empathy (+) Posttraumatic growth (+) Posttraumatic stress disorder (PTSD) (-) Prosocial reparation (-) Resilience (+) Texting while driving (-) Stress (-) Well-being (+)	Feldman et al. (2011); Pepping et al. (2016); Tangney et al. (2017)
Modification of emotions	Mechanisms entail the generation of positive emotions or alteration of negative emotions, so they become positive ones.	Emotional intelligence (+) Gratitude (+) Mood regulation expectancies (+) Positive affect (+) Positive emotions (+) Regulation of emotions (+)	Depression (-) Emotion regulation difficulties (-) Helping behavior (+) Impulsive buying tendency (-) Life satisfaction (+)	Allen & Kiburz (2012); Bao et al. (2015); Jimenez et al. (2010); Sawyer et al. (2022)

		Safe affect (+) Vitality (+)	Negative affect (-) Positive affect (+) Prosocial motivation (+) Resilience (+) Social safeness (+) Stress (-) Work-family balance (+)	
Neutral acceptance of the self	Mechanisms involve heightened self-awareness, and an open, accepting view of the self as it is.	Consumer susceptibility to normative influence (-) Negative self-focused cognitions and emotions (-) Private self-consciousness insight (+) Self-acceptance (+) Self-compassion (+) Self-concept clarity (+)	Apologizing (+) Burnout (-) Conspicuous consumption (-) Depression (-) Resilience (+) Well-being (+)	Bharti et al. (2022); Hanley & Garland (2017); Harrington et al. (2014); Rizvi et al. (2022)
Positive appraisal of the self	Mechanisms involve the generation of a positive appraisal of the self, with more positive evaluation of one's personal characteristics.	Core self-evaluation (+) Individual strengths (+) Psychological capital (+) Resilience (+) Resourcefulness (+) Self-efficacy (+) Self-esteem (+)	Anxiety (-) Burnout (-) Conspicuous consumption (-) Depression (-) Life satisfaction (+) Negative affect (-)	Bajaj et al. (2016); Kong et al. (2014); Orazi et al. (2021); Roche et al. (2014)

			Other-focused ethical behaviors (+)	
			Positive affect (+)	
			Psychological distress (-)	
			Stress (-)	
			Well-being (+)	
Self-directed behavior	Mechanisms entail enhanced self-regulation and self-determined behavior because mindfulness allows individuals to act in accordance with their autonomous goals.	Attitude toward healthier food (+) Authentic functioning (+) Autonomous goal motivation (+) Autonomy-oriented self-motivating strategies (+) Avaricious monetary attitude (-) Behavioural Inhibition System (-) Controlled goal motivation (-) Declining weekly trajectory of motivational control (-) Executive function (+) Lack of self-motivating strategies (-) Self-control (+)	Action crises (-) Aggression (-) Boredom (-) Consumer ethics (+) Declining weekly trajectory of performance (-) Healthy eating (+) Life satisfaction (+) Negative affect (-) Opioid use (-) Positive affect (+) Self-harm (-) Stress (-) Well-being (+) Work engagement (+)	Dust et al. (2022); Garland et al. (2020); Leroy et al. (2013); Marion-Jetten et al. (2022)

		Self-regulation (+)		
		Sleep-related self-regulation (+)		
		Use of emotions (+)		
Self-transcendence	Mechanisms involve one's detaching from a self-involved viewpoint and moving away from self-focused modes of information processing.	Connectedness to nature (+) Insecure adult attachment (-) Relational self-construal (+) Selflessness (+) Self-transcendence (+) Social connectedness (+)	Aggression (-) Cooperation (+) Empathy (+) Well-being (+) Pro-environmental behavior (+)	Hanley et al. (2017); Masters-Waage et al. (2021)
Others' viewpoints	Mechanisms entail a better understanding of others' perspectives and viewpoints.	Empathy (+) Internalized prosocial motivation (+) Interpersonal justice perception (+) Leader-member exchange (LMX) quality (+) Leader procedural justice enactment (+) Perspective taking (+) Subordinate's perceived stress (-)	Helping behavior (+) LMX quality (+) Subordinate's performance (+) Partner's work-family balance (+) Partner's work-to-family enrichment (+) Prosocial behavior (+) Prosocial motivation (+)	Chen et al. (2020); Hafenbrack et al. (2020); Sawyer et al. (2022); Schuh et al. (2019)

When organizing and describing each category, we observed a central contradiction between two main groups of mechanisms: one that entails an awareness or neutral acceptance of present-moment experiences (i.e., non-evaluative experience) versus another that entails a modulation of experiences. Our analysis of the mechanisms found in the literature shows that there are conflicting findings regarding how individuals, when being mindful, respond to present-moment experiences. For example, while mindfulness involves a neutral observant stance towards external events (Brown et al., 2007; Brown & Ryan, 2003), it also facilitates the modification and beneficial interpretation of an event (Hanley et al., 2015; Kay & Skarlicki, 2020). Similarly, while mindfulness increases the capacity of objectivity in relation to one's emotions (Shapiro et al., 2006), it also facilitates the emergence of positive emotions and the modification of negative emotions so they become positive ones (Garland et al., 2015; Sawyer et al., 2022). Furthermore, mindfulness not only increases awareness of one's core self (Leroy et al., 2013) and promotes self-acceptance (Jimenez et al., 2010a), but also increases one's positive self-appraisal (Kong et al., 2014) and personal resources (Roche et al., 2014), as well as self-directed behavior (Dust et al., 2022; E. L. Garland et al., 2020; Marion-Jetten et al., 2022). Finally, mindfulness not only leads individuals to increased self-transcendence (Masters-Waage et al., 2021), but also leads to increased capacity to view situations through others' viewpoints (Hafenbrack et al., 2020; Sawyer et al., 2022), which entails a shift in perspective.

We then observed that the 10 perspectives permeating the mediating mechanisms identified in our review can also be differentiated by four discrete categories, depending on the object of attention: cognitions, emotions, self, relations. That is, the effects of mindfulness concerning one's having a non-evaluative stance towards experiences versus one's engaging in the modification of experiences can affect different objects of experience, namely, one's cognitions, one's emotions, one's sense of self, and one's interactions with others. These categories are also in line with the fact that mindfulness refers to present-moment awareness of both internal and external events (Brown & Ryan, 2003). Figure 2-1 shows an integration of the perspectives.

Figure 2-1. Categorization of the Mediating Mechanisms of Mindfulness

	Cognitions	Emotions	Self	Relations
Non-evaluative experiences	Temporal attentional focus / Objectivity towards external events	Non-reactivity towards emotions	Neutral acceptance of the self	Self-transcendence
Modulated experiences	Positive reappraisal of external events	Modification of emotions	Positive appraisal of the self / Self-directed behavior	Others' viewpoints

Dereification, Reorientation, and Assimilation

To reconcile the central contradiction found between two main groups of mechanisms of mindfulness, namely, one that entails a neutral acceptance of present-moment experiences and another that entails a modulation of experiences, we developed a theoretical model that explains how these contradictory psychological processes unfold. We pursued a close inspection of the theoretical arguments put forward by the authors of the reviewed articles and used them as input for the development of our theoretical model. In the reviewed studies, mindfulness is theorized to allow modulated experiences only because, *first,* mindfulness enables a neutral, observant stance towards experiences, enabled by mindfulness' core process of reperceiving (e.g., Bajaj, Robins, et al., 2016; Hafenbrack et al., 2020; Hanley et al., 2015; Kay & Skarlicki, 2020; Kong et al., 2014; Sawyer et al., 2022). Such neutral stance *later* allows for cognitive reinterpretation of events, alteration of emotions, positive appraisal of the self, increased self-directed behavior, and a shift in perspective towards others' viewpoints. Although the empirical studies reviewed only have tested parts of this two-step process, this theoretical rationale permeates much of the arguments used by the authors of the reviewed articles. The following section provides examples of the theoretical rationale used by the authors to explain why mindfulness promotes the different modulated experiences.

Theoretical Rationale Provided by Reviewed Articles for why Mindfulness Promotes Modulated Experiences

Regarding cognitions, we found in our systematic review that much of the rationale behind the linking of mindfulness to enhanced cognitive reappraisal relates to the fact that mindfulness first allows individuals to perceive their thoughts more objectively (Kay & Skarlicki, 2020) and accurately (Hanley et al., 2015). As such, one can step outside of one's immediate experience, and bypass initial automatic reactions to the ongoing events. Then, such metacognition enabled by mindfulness allows the cognitive reappraisal of the situations, by which individuals change their view of a situation and its perceived meaning (Hanley et al., 2015; Kay & Skarlicki, 2020). This may happen because mindfulness' open receptiveness may first facilitate the elimination of an earlier interpretation of an event, which then makes room for the new, positive interpretation provided by the reappraisal process (Lutz et al., 2015). For instance, by attenuating one's attachment to fear-provoking initial appraisals, mindfulness can then facilitate the generation of new situational appraisals, thereby allowing for more beneficial appraisals of otherwise threatening stimuli (E. L. Garland et al., 2011).

Similarly, regarding emotions, Sawyer et al. (2022) postulated that mindfulness may lead to enhanced positive affect because mindfulness first involves the process of reperceiving, which allows employees to mentally "step back" from and simply observe present-moment events, thoughts, and emotions from a "witnessing" perspective, without becoming self-identified with what is happening (Sawyer et al., 2022). Then, "by preventing employees from becoming overly self-immersed in daily work demands, mindfulness may promote the generation of PA [positive affect]" (Sawyer et al., 2022, p. 241).

With regard to one's sense of self, much of the rationale found in our review behind the linking of mindfulness to increased personal resources relies on the fact that mindfulness leads to a distancing between the self and situations, and thus one's ego becomes separated from negative events, which then protects one's sense of self-worth (Glomb et al., 2011). In other words, mindfulness leads to increases in personal resources and positive core self-evaluation indirectly, in that mindfulness first protects individuals from negative self-view, negative rumination about the self, and self-criticism (Bajaj, Gupta, et al., 2016; Bajaj, Robins, et al., 2016; Kong et al., 2014). Furthermore, authors of empirical studies showing that mindfulness leads to increased self-directed behavior explain that this is the case because mindfulness first allows one to become

aware of one's core values, emotions, needs, and goals (Donald et al., 2020; Dust et al., 2022; Marion-Jetten et al., 2022). Previous literature on mindfulness gives support to this theoretical rationale, as other scholars have alluded to the fact that mindfulness promotes behavioral responses that are self-directed by first allowing individuals to bring attention to themselves (Brown & Ryan, 2003; Donald et al., 2020).

Finally, regarding relations, to explain how mindfulness leads to an increased ability to understand others' viewpoints, authors put forward theoretical arguments that relate to the fact that mindfulness *first* leads to reduced self-focus and self-referent thinking, because the process of reperceiving lessens one's self-identification with experiences (Hafenbrack et al., 2020; Sawyer et al., 2022). Then, after the reductions in self-focus occur, individuals are able to shift their perspective towards others' vantage points (Hafenbrack et al., 2020; Sawyer et al., 2022).

Based on these findings, we first postulate that these different processes occur in a two-step sequence of psychological processes, as follows. First, mindfulness leads to the *dereification* of experiences, a process that refers to seeing thoughts, feelings, and perceptions as mental processes rather than as accurate depictions of reality (Lutz et al., 2015). Dereification occurs when one's mental content (e.g., thoughts, feelings) is not seen as an accurate depiction of reality; rather, such mental content is observed neutrally, with no face value attached to it (Lutz et al., 2015). Accordingly, this first step promotes a neutral, observant stance towards internal and external experiences. It corresponds to what nascent theory of mindfulness refers to as "reperceiving" (Shapiro et al., 2006)[3]. Since dereification generates a neutral observant stance, one's automatic negative evaluations of events and emotions are eliminated as a result of this process. We postulate that dereification is the psychological process that generates the following mechanisms of mindfulness supported by empirical research, for example: reduced threat appraisal (Hoffmann & Geisler, 2020), reduced cognitive distortion (Sears & Kraus, 2009), reduced avoidance of emotions (Feldman et al., 2011; Tangney et al., 2017), increased self-concept clarity (Bharti et al., 2022; Hanley & Garland, 2017), and increased decentering (Fuochi & Voci, 2020; Waterschoot et al., 2021).

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[3] Although dereification corresponds to what nascent theory of mindfulness refers to as "reperceiving" it is useful to label it as dereification instead of "reperceiving", because dereification is a well-established concept from psychology whereas "reperceiving" is a concept that is only known by mindfulness scholars. Therefore, re-labeling the phenomenon of suspension of thoughts from "reperceiving" to dereification allows us to connect and translate nascent theory of mindfulness to a well-established psychology literature.

Then, in a second step, mindfulness supports the *reorientation* of experiences, which entails the modification of experiences as follows: the generation of positive appraisals of events, positive emotions, and positive self-appraisal; increased self-directed behavior; and, shifts in perspective towards others' viewpoints. In contrast to dereification, reorientation involves a *change* in individuals' appraisals, by replacing their initial thoughts with new thoughts. The modification of one's evaluation of an event or of oneself occurs sequentially after dereification, because momentary dereification may facilitate the elimination of an initial, automatic evaluation, which then gives space to a new, more adaptive interpretation (Lutz et al., 2015). When achieving an observant stance, imbued with decentered awareness and disidentification from thoughts/emotions (i.e., achieved by dereification), the individual can then reappraise the given situation by attributing to it a new, more beneficial meaning (E. Garland et al., 2009). In addition to positive appraisals, the process of reorientation also includes the generation of positive emotions and self-directed behavior, because positive appraisals are associated with the generation of positive emotions (Gross & John, 2003), and an individual's thoughts and feelings will affect the way they behave (Seymour Epstein, 2012; Seymour Epstein & Meier, 1989; Metcalfe & Mischel, 1999).

We postulate that reorientation is the psychological process responsible for the following mechanisms of mindfulness supported by empirical research, for example: increased cognitive reappraisal (Kay & Skarlicki, 2020), increased positive reappraisal (Hanley et al., 2015), increased positive emotions (Jimenez et al., 2010), increased emotional intelligence (Bao et al., 2015; H. J. Park & Dhandra, 2017; Schutte & Malouff, 2011; Yuan, 2021), increased self-esteem (Bajaj, Gupta, et al., 2016; Bajaj, Robins, et al., 2016), and increased self-regulation and self-control (e.g., Garland et al., 2020; Short et al., 2016). By enabling the modification of thoughts, feelings, and behaviors, the process of reorientation should give individuals a greater sense of control. Specifically, we expect that individuals should experience an increased feeling of control over their minds and behaviors when going through the process of reorientation, since the process will enable them to consciously modify automatic maladaptive interpretations to more beneficial ones, as well as modify their behavior so that they behave according to their own volition. Indeed, previous research has shown that mindfulness leads to increased sense of control over one's body, mind, relationships, self, and behavior (Astin, 1997).

To better illustrate the difference between dereification and reorientation of mental content, consider the following example illustrating when a person has a thought.

If an individual has the thought "I will fail in doing this work task," dereification occurs if this thought is seen merely as a mental event, without predictive validity (Lutz et al., 2015). This means that the individual will not take that thought at face value, that is, the individual will not believe that thought to be true. Rather, the individual will see that thought as mere content generated by the mind, without any accuracy or truthfulness attached to it. Because the thought is seen as a mere mental event, the automatic negative evaluation ascribed to the situation is eliminated. In other words, an automatic negative evaluation attributed to a situation is replaced by a neutral observant stance, with no negative valence. Then, a new interpretation (i.e., reorientation) occurs if the individual replaces their initial thought with a more beneficial thought, such as "I prepared for this work task, so I should be successful in it". Accompanying this reappraisal, enhanced positive emotion is also expected to emerge (E. Garland et al., 2009; Gross & John, 2003).

The Third and Final Process: Assimilation

To explain the processes of *dereification* and *reorientation*, we based our reasoning on the inspection of the theoretical assertions made by the authors of the reviewed studies. Now we turn our attention to explaining the third and final step, the process of *assimilation*, which refers to the production of durable changes in the individual's agentic self, in particular with the generation of increased personal agency. Personal agency can be described as the "feeling of being in the driving seat when it comes to our actions" (Moore, 2016, p.1). In other words, individuals have increased personal agency when they feel in control over their actions and associated consequences instead of feeling that they simply happen to them (Little et al., 2014; Moore, 2016). When an individual has high personal agency, they tend to see events in their lives as being a result of their own doing and actions, as opposed to being "at the mercy of fate". The goal of theorizing on how mindfulness can increase personal agency is to answer the initial question posited at the beginning of this paper: How can mindfulness be described by many mindfulness scholars as a practice that increases personal agency if it is defined as a non-evaluative state?

To explain our theoretical rationale to support the existence of this final psychological process, we draw on cognitive-experiential self-theory (Seymour Epstein, 2012), a well-established theory of psychology that is particularly suitable to understand change processes in the self. According to this theory, individuals learn from their life

experiences through associations, pattern identification, and reinforcement, and this learning will in turn affect how individuals see themselves and the world around them (Seymour Epstein, 2012). Therefore, an individual's pattern of thoughts, feelings, and behaviors over time will affect that individual's self-view in the long run (S. Epstein, 1973; Seymour Epstein, 2012). As individuals pursue different actions throughout their lives, they give meanings to those actions that will continually serve to "define, refine, and update a person's sense of self" (Little et al., 2014, p. 62).

We had argued in the preceding section that the process of *reorientation* should give individuals greater sense of control, since reorientation involves the deliberate modification of one's ways of thinking to more beneficial ones, experiencing more positive emotions, and engaging in increased self-directed behavior. Now, drawing on the theoretical postulations of cognitive-experiential self-theory (Seymour Epstein, 2012), we argue that, once these modulated experiences of thoughts, feelings and volitional behaviors happen consistently *over time* (as a result of repeated instances of reorientation), durable changes in the individual's sense of self will occur because the individual will learn from these experiences and *assimilate* them into their sense of self. When going through the process of reorientation over and over, consistently ascribing positive evaluations to experiences and behaving according to their own volition, the individual should experience a general feeling of control over their mind and life in general. Therefore, we postulate that experiencing reorientation repeatedly over an extended period will lead to the assimilation of the modulated experiences, resulting in increased personal agency, because feeling increased control consistently over time will strengthen the individual's view of themselves as being someone who is "in the driving seat" of their life and their actions. In line with this proposition, extant research shows that when individuals consistently engage in self-directed behaviors, they experience increased personal agency (Little et al., 2014).

Therefore, in conclusion, we postulate that the three overarching processes of dereification, reorientation, and assimilation occur in sequence and unfold with the passage of time. If the individual is mindful when facing a specific situation, dereification will occur momentarily, that is, dereification of the experience will be the individual's immediate response to the thoughts arising related to that experience. This is proposed because, when being mindful, one will inevitably distance oneself from one's thoughts and emotions and instead adopt a witnessing perspective, which is created by the process of reperceiving (Shapiro et al., 2006). Then, we suggest that the process of

reorientation takes longer to evolve, and occurs after dereification, as reorientation will be more likely to occur when the individual has had a greater extent of mindfulness practice or training (E. Garland et al., 2009). By detaching and disidentifying from thoughts and emotions *over and over*, then there will be spaciousness for new ways of thinking to arise (E. Garland et al., 2009). Finally, we propose that mindfulness leads to durable changes in one's sense of personal agency through the process of assimilation after reorientation of experiences has repeatedly occurred over time, in the long run, since this process refers to more permanent changes in one's self-view (S. Epstein, 1973; Seymour Epstein, 2012). This chain of processes is shown in Figure 2-2.

Figure 2-2.   Chain of Psychological Processes over Time
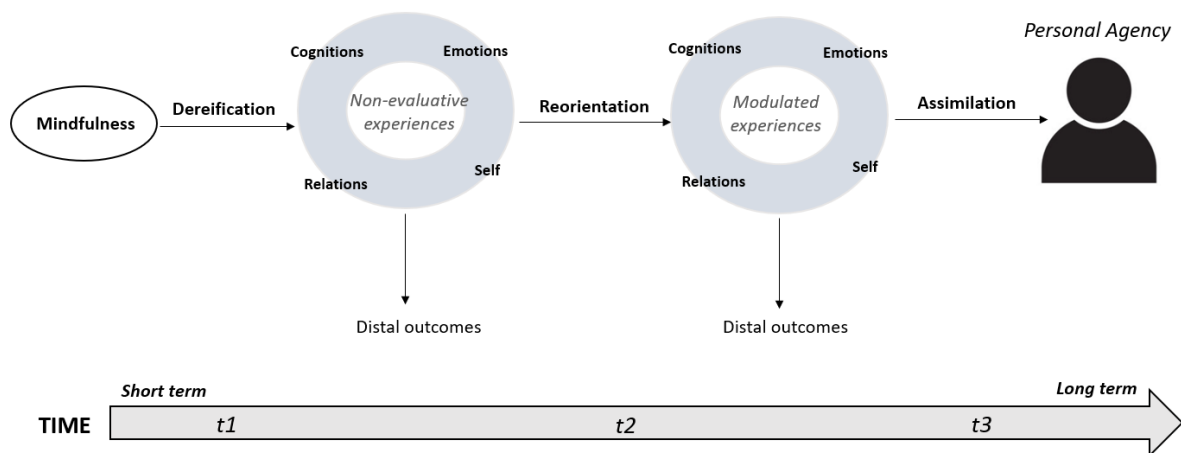
Discussion and Future Directions

The present integrative conceptual review focused on the psychological mechanisms of mindfulness. We started our literature review with the aim to address the seemingly contradictory positions in the mindfulness literature that position mindfulness as pre-reflective non-judgmental state that puts individuals in a more natural state, versus a tool that can enhance agency. Our literature review reveals that mindfulness has been related to both mechanisms. Many studies confirm that mindfulness strips negative thoughts and feelings and brings about serenity and observant neutrality (e.g., Hülsheger et al., 2014; Masters-Waage et al., 2021; Wihler et al., 2022). Other studies reported that mindfulness contributes to positive, more agentic states, including positive affect (e.g., Sawyer et al., 2022), cognitive and positive reappraisal (Hanley et al., 2015;

Kay & Skarlicki, 2020), authentic functioning (Leroy et al., 2013), and autonomous goal motivation (Marion-Jetten et al., 2022).

Integrating the findings from this review, we then proposed a theoretical model that explains how mindfulness operates, by reconciling the wide range of mechanisms that have been supported by empirical research to date. With our theoretical model, we argue that the passage of time is an important determinant of the different, and at first sight contradictory, psychological processes that unfold from one's being mindful. Specifically, we posit that mindfulness can generate non-evaluative experiences, modulated experiences, and increased personal agency due to the sequential processes of dereification, reorientation, and assimilation, which occur with the passage of time.

Three central empirical propositions can be deducted from our theorizing:

1. The psychological processes generated by mindfulness unfold in sequence, with the passage of time.
2. Mindfulness first generates a neutral, objective experience, followed by a modulated experience.
3. Over time, modulated experiences are assimilated and create durable changes in one's personal agency.

We contribute to the mindfulness literature in three ways. First, our systematic review allowed us to identify and organize the mechanisms of mindfulness in a consolidated fashion, providing an integrated overview of extant mindfulness research that has examined how mindfulness affects outcomes. This is important because this allows mindfulness researchers to have a concrete, consolidated basis of knowledge about mindfulness, that can be used as a foundation for their future research studies.

Second, our conceptual model allowed us to identify the theoretical path in which mindfulness affects its outcomes, thereby providing a conceptual map to guide the designing of future empirical studies and the development of mindfulness interventions. In particular, our proposition that mindfulness first promotes a neutral state of mind and later fosters modulated experiences informs mindfulness scholars that they should consider the role of time when designing their empirical studies. For example, instead of exploring these two different experiences (i.e., neutral versus modulated experiences) as parallel mediators, it may make more sense to examine them as sequential mediators.

Third, this research provided an answer to the paradox in the mindfulness literature as to whether mindfulness promotes a more agentic or passive stance towards daily life events, since mindfulness is defined as a non-evaluative state of mind although

it is often deemed as a helpful tool for one to overcome life challenges. Our theoretical models based on the literature review posits that mindfulness first promotes a more neutral stance, which then creates room for a more agentic stance. This insight gives confidence to mindfulness practitioners that their practice will ultimately result in them experiencing a positively modulated outlook towards life, instead of feeling merely relaxed or even "sedated" in life.

Research on Mindfulness: Where to Next

At the core of our theoretical model is the unfolding of the three overarching processes of dereification, reorientation, and assimilation. Future research is needed to test this model and examine how these processes evolve causally over time, which would allow us to determine the time lags in which each process occurs. To that aim, future research could use experimental longitudinal studies to investigate how the passage of time affects the unfolding of the psychological processes generated. This kind of study could also shed light on the period of time of mindfulness practice/training that is needed for an individual to start engaging in the process of reorientation of experiences.

Then, future research can also examine whether mindfulness leads to significant changes in individual level traits. More specifically, it will be important to examine how practicing mindfulness habitually might change personal agency and if this change is due the more frequent experience of non-evaluative and more positively modulated states of mind.

The model is particularly relevant for organizational psychology and management research because the integrative framework proposed here, can be applied to work experiences. More specifically, management scholars could investigate if the sequential process works with different kinds of work-related experiences, namely, experiences related to cognitions (e.g., reduced threat task appraisal leading to enhanced challenge task appraisal), emotions (e.g., reduced negative emotions leading to enhanced positive emotions), the self (e.g., increased self-acceptance leading to increased psychological capital), or relations (e.g., increased self-transcendence leading to increased perspective taking).

Another natural and important next step would be to investigate possible unique outcomes for each step proposed in our theoretical model. More specifically, future research could examine what outcomes mindfulness might generate through each of the

three overarching psychological processes (i.e., dereification, reorientation, and assimilation). One promising direction, for example, can be to investigate whether mindfulness differentially predicts "avoidance-behavior performance" (i.e., decreased task withdrawal) and "approach-behavior performance" (i.e., increased in-role performance) through the processes of dereification and reorientation, respectively. Finally, to have a more nuanced and concrete understanding of the unique outcomes associated with each of the psychological processes, mindfulness scholars could run fine-grained experimental studies that seek to trigger the distinct theoretical mechanisms. For example, the process of dereification could be manipulated with a focused breathing meditation (e.g., Hafenbrack et al., 2020), whereas the process of reorientation could be manipulated with a mindfulness intervention emphasizing skills related to cognitive reappraisal (e.g., Garland et al., 2020).

Another promising direction of research on mindfulness can be to examine a potential "dark side" of mindfulness, which would answer recent calls for mindfulness scholars to investigate potential detrimental effects of mindfulness (e.g., Choi et al., 2022; Reb et al., 2020). Germane to the theoretical model presented here, scholars could investigate whether mindfulness may generate detrimental consequences for individuals due to the processes of dereification and reorientation. For example, according to the theoretical model, employees may become neutral about negative events in the very short run and later make positive interpretations of those same events. Therefore, it may be the case that mindfulness may lead individuals to ignore negative situations that should be paid attention to in order to be addressed. Examples of research questions in this vein are the following. Could mindfulness make an employee become neutral about the abusive behavior from a supervisor towards them in the very short run, and later even lead that employee to reappraise the abusive behavior, interpreting or justifying it in a positive manner?

Still on the topic of a potential "dark side" of mindfulness, researchers could investigate whether mindfulness may increase negative behavior among employees with high Dark Triad traits (e.g., narcissism, Machiavellianism, psychopathy) due to enhanced self-acceptance, self-appraisal, and personal agency. A final interesting research to be pursued related to one's having enhanced personal agency is the examination of whether mindfulness changes employees' goal orientation at work in the long run, so that employees set and strive to achieve autonomous goals (i.e., aligned with their own

interests and values) instead of externally-regulated goals (i.e., to prove their performance to others and avoid negative judgment from others).

Conclusion

The theory proposed in this paper advances the mindfulness literature by suggesting that the seemingly contradictory psychological processes generated by mindfulness unfold consecutively over time. Our central argument is that mindfulness generates a sequence of three psychological processes: dereification, which produces non-evaluative experiences first; reorientation, which produces modulated experiences next; and assimilation, which produces durable changes in one's personal agency over time if the process of reorientation is consistently repeated. In line with the fact that mindfulness refers to present-moment awareness of both internal and external events, these experiences may relate to one's cognitions, emotions, self, or relations. In conclusion, this research offers a theoretical framework for the mindfulness literature, and we hope that our propositions can be used as a starting point for future empirical research on mindfulness that can pinpoint more precisely how mindfulness results in a variety of outcomes that are relevant for employees and employers.

Paper 3. Creating an Upward Spiral: The Effects of Mindfulness on Thinking Positively

Mindfulness, defined as non-judgmental awareness of and attention to what is occurring in the present moment (Brown & Ryan, 2003), has grown in popularity in recent decades. The practice of mindfulness has not only reached individuals at home but has also been adopted by many organizations (Reb et al., 2020; Schaufenbuel, 2015), mainly aimed at reducing employees' stress (Gelles, 2015). In addition to the popularity of mindfulness among the general public, scholarly interest in the construct has also increased (Good et al., 2016; Reb et al., 2020). Scholarly research has described mindfulness in two different ways. One group of scholars put emphasis on the fact that mindfulness is a non-evaluative, pre-reflexive state of mind that creates a neutral state due to the suspension of thoughts and elimination of evaluative narratives in one's mind (Bishop et al., 2004; Brown & Ryan, 2003; Shapiro et al., 2006). Another group of scholars position mindfulness as a practice that gives individuals agency in interpreting and responding to situations (e.g., Kay & Skarlicki, 2020; Reina & Kudesia, 2020; Zivnuska et al., 2016), thereby creating positive evaluative narratives and modulated states of mind – which at first glance seems to contradict the very definition of mindfulness as being a non-evaluative state. Similarly, practitioners of mindfulness also differ in terms of whether they view mindfulness as a tool that fosters a neutral state of mind or a positively modulated state of mind. Whereas some focus on the relaxing aspect of mindfulness and consider it a tool that helps individuals to be calmer, and not to be overwhelmed and negatively impacted by their experiences (Mindful, n.d., "Getting Started with Mindfulness"), others deem mindfulness a tool that allows individuals to step fully into their lives, tackle challenges successfully, and thrive (Lusinski, 2021).

Research shows that the psychological mechanisms of mindfulness indeed fall into these two broad categories, namely, neutral versus positively modulated states of mind. For instance, it has been shown that mindfulness leads to greater acceptance of emotions (Arlt Mutch et al., 2021), reduced avoidance of emotions (Feldman et al., 2011), and increased decentering (Fuochi & Voci, 2020). These are all indicators of more neutral states of mind, whereby the individual experiences reduced negative thoughts/reactions in response to what is happening in the present moment due to having a non-evaluative observant stance. But, at the same time, mindfulness has also

been shown to lead to increased *positive* reappraisal of events (e.g., Hanley et al., 2015; Kay & Skarlicki, 2020) and increased *positive* affect and emotions (e.g., Jimenez et al., 2010a; Sawyer et al., 2022), which can be considered as positively modulated states of mind, since they entail the modification of the individual's thinking processes.

Although extant research shows that mindfulness can induce more neutral states of mind as well as more positive state of mind, it is still unknown how these processes unfold. To align these seemingly contradictory findings, we examine whether mindfulness first reduces negative states of mind, and this reduction then creates space for positive states of mind, consisting of more adaptive and positive ways of thinking, to arise. In other words, we propose that mindfulness first puts individuals in a neutral state of mind, whereas positively modulated states of mind arise later. We investigate the effects of mindfulness on neutral versus positive experiences in the short term and in the long run. In Study 1, we use an experimental experience sampling design to examine whether short-term mindfulness training will immediately generate a neutral state of mind and whether it takes more time for exposure to mindfulness training to result in an increased positive state of mind. Specifically, in Study 1, we examine if mindfulness is related to a neutral state of mind in the same week (but not to a positive state), whereas increases in state mindfulness (due to mindfulness training) within three weeks go together with increases in a positive state of mind within this three-week timespan. In Study 2, we use longitudinal data collected in three waves to examine whether trait mindfulness will be indirectly related to increased general levels of a positive state of mind through one's experiencing a more neutral state of mind. Specifically, using a cross-lagged design, we test whether trait mindfulness at time 1 is positively associated with a positive experience at time 3 through one's experiencing greater neutrality at time 2.

Our research contributes to the mindfulness literature in two ways. First, our paper provides insight into the paradox that exists in the mindfulness literature given that mindfulness is defined as a non-evaluative state of mind while it is also frequently described as helpful to foster positive reappraisals and positive emotions (E. L. Garland, Farb, Goldin, et al., 2015; Jimenez et al., 2010a; Kay & Skarlicki, 2020). Specifically, our research reconciles the at-first-sight contradictory literature suggesting that mindfulness instills more neutral and more positive states of mind. By examining if mindfulness promotes neutrality before facilitating positive states of mind, we provide a clarification

for how mindfulness can induce more neutral as well as more positively modulated experiences.

Second, our studies shed light on the role of time in explaining the apparent duality that pervades the effects of mindfulness, that is, the duality that exists in the fact that extant research has found some effects of mindfulness involving neutrality of mind as well as other effects of mindfulness involving positively modulated experiences. Study 1, an intervention study, sheds light on what happens when individuals are exposed to short-term mindfulness training leading to short-term increases in their mindfulness levels. This study allows us to investigate in detail how mindfulness relates to neutral versus positive states immediately (same week) versus over time (over three weeks). In contrast, Study 2 sheds light on what happens at an equilibrium state, that is, a steady state where individuals already have high versus low levels of *trait* mindfulness (i.e., general levels of mindfulness experienced in the long run), without having their mindfulness levels manipulated by an intervention. This examination sheds light on the longer-term effects of the micro processes investigated in Study 1, as it allows us to examine what happens to individuals' experiences when they already master mindfulness and now naturally experience higher levels of mindfulness in general. Thus, the combination of these two studies provides detailed insight into the possible sequential short time changes in employees' states of mind if they engage in mindfulness training, as well as more enduring implications if employees are habitually more mindful.

Theoretical Framework

The Witnessing Perspective: Mindfulness and a Neutral State of Mind

Mindfulness fosters awareness of and attention to the present-moment events in a non-judgmental manner, thereby allowing individuals to take a step back and simply observe what is happening "in the here and now", without evaluating, reflecting upon, or trying to assign an interpretation to the situation (Bishop et al., 2004; Shapiro et al., 2006). Such an observant stance arises because mindfulness promotes a distancing between the individual's self and the situation that they are facing, a process known as "reperceiving" (Shapiro et al., 2006), also often referred to as "decoupling" (Glomb et al., 2011) or "decentering" (Vago & David, 2012). Because reperceiving allows individuals to disengage from mental interpretations of ongoing events, it leads individuals to face their life experiences with augmented objectivity (Shapiro et al., 2006). Through reperceiving,

52

individuals disidentify from their thoughts and emotions, and instead only observe them in a detached manner (Vago & David, 2012), from a *witnessing* perspective (Kay & Skarlicki, 2020; Shapiro et al., 2006).

Since reperceiving generates a neutral observant stance towards events, thereby leading individuals to face experiences with increased objectivity, individuals' automatic negative evaluations of events and associated negative emotions should be eliminated as a result of this process. Furthermore, the *witnessing* perspective created by reperceiving leads individuals to see thoughts and emotions as mere mental events, without any predictive validity associated to them (Lutz et al., 2015), which weakens the impact of those thoughts and emotions. For example, if an employee has the thought "I will fail in giving this presentation", the neutral stance fostered by reperceiving will lead that employee to see that thought as a mere fleeting mental event, and the employee will not take that thought at face value (i.e., they will not believe that thought to be true). The employee will see that thought as mere content generated by their mind, without any accuracy or truthfulness to it. As a result, the automatic negative evaluation ascribed to the situation is eliminated, and, given the close connection between thoughts and emotions (Gross & John, 2003), negative emotions should also be eliminated. Thus, an automatic negative evaluation ascribed to a situation is replaced by a neutral observant state of mind, with no negative valence associated with it. In support of these theoretical arguments, previous empirical research has shown that mindfulness is related to reduced threat appraisal (Hoffmann & Geisler, 2020; Toniolo-Barrios & Ten Brummelhuis, 2023), reduced guilt (Hafenbrack et al., 2021), and reduced negatively biased cognition (Kiken & Shook, 2012).

Reperceiving is a core process of mindfulness that inevitably happens when an individual is being mindful (Shapiro et al., 2006). Therefore, if the individual has a high level of mindfulness when facing a specific event, reperceiving should occur at that same moment. In other words, facing the situation with the neutrality fostered by reperceiving should be the individual's inevitable and immediate response to the thoughts and emotions arising from that situation (Shapiro et al., 2006). Based on this reasoning, we propose that mindfulness should be related to a neutral state of mind at the same moment.

It is well documented in the psychology literature that individuals have a general bias towards negativity – when making judgements about an event, individuals have a tendency to weigh negative information more heavily than positive (Baumeister et al.,

2001; Peeters & Czapinski, 1990). Thus, experiencing a neutral state of mind should mean that one's automatic negative thoughts and appraisals will be eliminated (Lutz et al., 2015). For that reason, we consider the reduction of negative feelings/thoughts as suitable indicators of one's having a neutral state of mind. Individuals with reduced negative feelings/thoughts will be experiencing a more neutral state of mind than those individuals with negative feelings/thoughts present.

The reason why we chose to focus on negative affect as the indicator for a neutral state of mind is because negative affect is generally described as a momentary unpleasant state (Schimmack & Crites, 2005), which fits well with our investigation of a moment-level relationship between state mindfulness and a neutral state of mind. Previous empirical research has shown support to the negative association between trait mindfulness and general levels of negative affect (Brown & Ryan, 2003; Moskowitz et al., 2015). Expanding this research, we investigate this relationship within the timeframe of a week, which fits better with theory suggesting that mindfulness immediately reduces negative feelings.

Hypothesis 1. State mindfulness is negatively related to negative affect in the same week.

Thinking Positively: Induced Mindfulness and Modulated States of Mind in the Short Term

In addition to fostering a neutral observant stance towards external events (Brown et al., 2007; Brown & Ryan, 2003), mindfulness has also been shown to facilitate the modification and beneficial interpretation of events, leading to positive reappraisal of events (Hanley et al., 2015; Kay & Skarlicki, 2020) and increased positive emotions (Good et al., 2016). This is theorized to happen because a neutral state of mind entails the elimination of an initial automatic negative evaluation of a situation, which then creates space for a more positive interpretation of the same situation (Lutz et al., 2015). That is, because mindfulness first enables a neutral stance towards events, it later allows for beneficial reinterpretation of events (E. L. Garland, Farb, Goldin, et al., 2015; Kay & Skarlicki, 2020; Lutz et al., 2015). The process of reinterpreting events involves searching for a positive meaning in a difficult situation, and adopting an optimistic attitude towards that situation (Gross & John, 2003). The reinterpretation of events entails a cognitive change (i.e., cognitive reappraisal), and this reappraisal involves reinterpreting a situation that would otherwise elicit negative emotions in a way that

changes its emotional impact (Gross & John, 2003). Cognitive reappraisal occurs early in one's emotional response to a situation, and can effectively *alter* the entire emotional trajectory that one feels towards a situation, leading to the experience of increased positive emotions (Gross & John, 2003).

To better illustrate the difference between neutrality towards thoughts and emotions versus the actual modification of thoughts and emotions, consider the same example presented in the previous section, where an employee has the thought "I will fail in giving this presentation". Whereas the neutrality fostered by reperceiving will lead the individual to see that thought as a mere mental event without any truthfulness associated with it, the actual modification of the thought would entail a new thought, with a positive framing or interpretation of a situation. In other words, a new interpretation will occur if the individual replaces their initial thought with a more beneficial thought, such as "I am prepared, so I will be successful in giving this presentation". Accompanying such positive reappraisal, enhanced positive emotion (e.g., enthusiasm, excitement) would also be expected to arise (E. Garland et al., 2009; Gross & John, 2003).

The ability to develop a positively modulated state of mind, thereby creating a positive outlook on a situation, should become strengthened through a longer period of exposure to augmented mindfulness levels, because the actual modification of a thought or emotion will be more likely to occur when an individual has had a greater degree of mindfulness practice (E. Garland et al., 2009). When one is able to detach and disidentify from one's thoughts and emotions repeatedly, *over and over*, then there will be openness in one's mind for new, more adaptive and positive ways of thinking to arise (E. Garland et al., 2009). Through a greater extent of exposure to mindfulness, the individual will engage in an upward spiral that will lead them to become increasingly propense to engage in empowering interpretations of events, and reframe events in more meaningful and beneficial ways (E. L. Garland et al., 2011).

We chose optimism as a fitting construct to be examined as a positively modulated state of mind, since optimism is described as "making positive attributions and having positive future expectations" (Roche et al., 2014, p. 479). Previous empirical research has shown support for the positive association between trait mindfulness and general levels of optimism (Brown & Ryan, 2003; Moskowitz et al., 2015). We now expand this research by examining if actively engaging in mindfulness exercises can already increase optimistic feelings within a timespan of three weeks. Given that we expect that individuals need some mindfulness practice before positively modulated

feelings appear, we also expect that mindfulness is not related to optimism within the same week. In other words, we hypothesize that mindfulness does not immediately (same-week) enhance optimism, but that over a timespan of three weeks, increases in mindfulness bring about increases in optimism.

Hypothesis 2a. In the short term, increases in mindfulness are positively associated with increases in optimism within the same time frame.

Hypothesis 2b. In the same week, mindfulness is only related to state negative affect, and not to optimism.

Thinking Positively: Trait Mindfulness and Modulated States of Mind in the Long Run

In addition to being a practice that can be implemented with the aim to increase one's mindfulness levels in the short run, mindfulness can also be conceptualized as a trait, which reflects individual differences in one's general propensity to be mindful (Brown & Ryan, 2003). Trait mindfulness, as is the case with any personality trait, shows a high degree of stability over time (Mccrae & Costa, 1994). In the preceding sections we hypothesized about the effects of state mindfulness on a neutral state of mind as well as the effects of increases of short-term induced mindfulness on increases in a positive state of mind. We now focus our attention to the implications of mindfulness in an equilibrium state, i.e. a steady state with no external interference aimed at manipulating changes in state mindfulness, where individuals already have stable individual differences indicating high versus low levels of mindfulness in general, over a long period of time.

An individual's level of *trait* mindfulness reflects the *frequency* at which that individual experiences naturally-occurring mindfulness states as well as the *duration* of these states (Hülsheger et al., 2013). Because people high in trait mindfulness are more often, and for a long duration, in a mindful state, they are skilled at the core process of mindfulness "reperceiving" (Shapiro et al., 2006). More specifically, individuals high in trait mindfulness are more likely to engage in reperceiving activities when the situation requires it. That is, if a negative thought appears, they will naturally distance themselves from this thought and view it merely as a thought, stripping it from its negative appraisal.

Then, because they habitually remove negative thoughts and feelings around life events, people with trait mindfulness have room for positive ways of thinking and feelings to ensue (E. L. Garland, Farb, Goldin, et al., 2015; Kay & Skarlicki, 2020; Lutz et

al., 2015). Over time, individuals who master mindfulness have a more positive mindset, because they are able adopt more beneficial appraisals and interpretations of events due to experiencing fewer negative states of mind. In other words, we expect that trait mindfulness will be related to the emergence of positively modulated experiences, and this emergence is explained by the reduction of negative thoughts/feelings (because this reduction creates room for positive reframing/reappraisal).

Empirical research has reported that trait mindfulness is negatively associated with negative states of mind such as negative affect (Brown & Ryan, 2003; Moskowitz et al., 2015), and positively with positive states of mind including optimism, resilience, self-efficacy and hope (Roche et al., 2014). Extending this research, we examine the *long-term* effects of trait mindfulness on a positive state of mind several months later, and whether this long-term effect is explained by the fact that individuals scoring higher on trait mindfulness will also experience fewer negative thoughts and feelings. More specifically, we examine if people high in trait mindfulness experience more resilience because they have fewer depressive feelings. We focus on depressive feelings in particular, because they are a good indicator of a person's negative state of mind that might persist over longer periods of time (Williams, 2008). We chose resilience as a fitting construct to be examined as a positive experience, since resilience "allows adversities and setbacks to be viewed as opportunities for learning, growth, and development" (Luthans & Youssef, 2007, p. 334).

Hypothesis 3. In the long run, general levels of mindfulness (i.e., trait mindfulness) are positively related to general levels of resilience through reduced general levels of depressive feelings.

Overview of Studies

In Study 1, we use an experimental experience sampling design, where we conduct an experiment with random assignment to different conditions and implement a diary study across three weeks. In this study, we examine 1) whether weekly mindfulness is negatively related to weekly negative affect (i.e., static, moment-level association) (Hypothesis 1), and 2) whether increases in mindfulness across the three weeks resulting from mindfulness training in the last two weeks are dynamically related to increases in optimism across the same period (Hypothesis 2a). To robustly test our model in which we theorize that mindfulness should *not* be associated with optimism

immediately, we also examine whether mindfulness will (not) be associated with optimism statically, at the moment-level (Hypothesis 2b).

The static relationship between mindfulness and negative affect examines how the variables relate to each other cross-sectionally in the same week, whereas the dynamic relationship between mindfulness and optimism examines how changes in mindfulness between weeks relates to changes in optimism in the same time frame. In other words, the dynamic association looks at the relationship between the change trajectories of the two variables. A significant positive relationship between the change trajectories of two variables means that faster increases in one variable over time are associated with faster increases in another variable over time. A significant dynamic relationship between mindfulness and optimism thus suggests that if mindfulness increases at a greater speed from one week to the following, optimism will also increase at a greater speed from one week to the following. Since we aim to test if mindfulness does *not* immediately result in elevated optimism (static relationship) but that it takes time (and practice) before mindfulness results in positively modulated states, it is fitting to examine a dynamic relationship between the variables to be able to examine the developmental trajectories of the two variables.

In Study 2, aimed at complementing Study 1, we use cross-lagged design to analyze longitudinal data collected in three waves over a period of six months. In this study, we examine whether general levels of mindfulness (i.e., trait mindfulness) are related to increased general levels of resilience through reduced general levels of depressive feelings (Hypothesis 3). We operationalize negative and positive states of mind using different constructs than used in Study 1, thereby providing a constructive replication that examines if the relationships hold when using different measurement instruments (Lykken, 1968). In Study 2, we examine the variables of interest in an equilibrium state (i.e., a steady state) (Mitchell & James, 2001; Smith & Lewis, 2011), where individuals already have varying levels of trait mindfulness that reflect their experience of being less or more mindful in general, in the long run. Therefore, Study 2 answers the question as to whether individuals with higher general levels mindfulness experience increased general levels of resilience because they experience reduced general levels of depressive feelings.

Study 1: Method

Participants and Procedure

We recruited employees willing to participate in a diary study spanning three weeks. We advertised the study through different media, including a social media platform (LinkedIn) and a publicly funded platform that promotes health research studies in a Canadian province. We also recruited participants by sending out emails to individuals from our own personal and professional networks. In our recruitment effort, individuals were asked to a) complete an initial general questionnaire measuring demographics, b) complete a daily log in the afternoon, available at 5 p.m. each day, during the entire period of the diary study (i.e., 21 days), and c) engage in daily practices of mindfulness, positivity, or acts of kindness in Weeks 2 and 3 (i.e., last 14 days of the diary study).

Participants were randomly assigned to conditions, resulting in 24 participants in the mindfulness condition, 24 participants in the positivity condition, and 26 participants in the acts-of-kindness condition. In the mindfulness intervention, participants were asked to engage in three mindfulness exercises a day – breathing space meditation, mindful check-in, and body scan – which are mindfulness practices validated by the literature (e.g., Hülsheger et al., 2015). In the acts-of-kindness condition, participants were asked to help or interact with someone in a supportive way (Mongrain et al., 2011). In the positivity intervention participants were asked to write for 5–10 minutes a day about three good things that happened on that day, and to answer the following question for each event: "Why did this good thing happen?" (Bono et al., 2013).

Participants did not engage in any intervention in Week 1. In Weeks 2 and 3, mindfulness levels were manipulated through the three different interventions: mindfulness, the acts-of-kindness, and positivity interventions. Although different kinds of interventions were used, all three interventions were expected to increase mindfulness levels. We also expected the acts-of-kindness and positivity interventions to increase mindfulness because acts-of-kindness exercises encourage individuals to focus in the present moment in a non-judgmental way to be able to find opportunities to help others (Dutton et al., 2014), and positivity exercises encourage individuals to pay attention to the present moment to be able to savor their daily experiences (Ilies et al., 2024).

Using three types of intervention is aimed at preventing demand characteristics from happening. Demand characteristics refer to the fact that study participants may

behave and/or answer survey questions in a certain (desirable) way when they know the object of the research investigation (McCambridge et al., 2012). By using three different interventions, study participants were unaware that the goal of all three interventions were to manipulate mindfulness levels, which then prevented participants from answering the mindfulness scale questions in a biased way. Another reason to include the acts-of-kindness and positivity exercises is that they are not *mental health* interventions per se, and this is beneficial because previous research has referred to the fact that the widespread use of mental health interventions may be detrimental to certain groups of people (Foulkes & Andrews, 2023). A final reason to include the acts-of-kindness and positivity exercises is that they are relatively easy for participants to do, and they do not have the negative connotation that mindfulness may have for some people ("Is Mindfulness Bad for Your Health?," 2015).

Our sample consisted of 74 employees working in a variety of industries (e.g., education, finance, government, production, professional services) in Canada (87.8%) and in other countries, including Brazil, the Netherlands, and South Africa (12.2%). Our sample included female (64.9%), male (28.4%), and non-binary participants (1.4%). Gender information was missing for the remainder (5.4%). They were on average 39.3 years old (SD = 8.2). Participants had either obtained an MBA or PhD (43.2%), a bachelor's degree (24.3%), a master's degree (14.9%), a medical degree (1.4%), or a two-year college degree (1.4%). Education information was missing for the remainder (14.9%). All participants provided informed consent in writing.

Measures

Optimism

We measured optimism with three items of the Life Orientation Test, by Scheier and Carver (1985). To adjust the items for daily measurement, the following primer was used *"Please rate the extent to which the following statements were true for you today."* A sample item was *"Today, I looked on the bright side of things (regarding my job)."* Answer categories ranged from 1 *(not at all)* to 5 *(very much)*. Cronbach α coefficients were the following, for each week: 0.83 (Week 1), 0.90 (Week 2), 0.94 (Week 3).

Negative Affect

Based on a validation by Crawford and Henry (2004), we used five items of the PANAS (Watson et al., 1988) to measure daily state negative affect. We asked

participants to "Please indicate to what extent you feel like this right now" with sample items "irritable" and "upset". Answer categories ranged from 1 (*very slightly*) to 5 (*extremely*). Cronbach α coefficients were the following, for each week: 0.87 (Week 1), 0.90 (Week 2), 0.82 (Week 3).

Mindfulness

We measured state mindfulness with the 5-item state version of the Mindful Attention Awareness Scale (MAAS), by Brown and Ryan (2003). To adjust the items for daily measurement, the following primer was used *"To what degree were you having the following experiences today at work?".* A sample item was "I found myself doing things without paying attention" (reversed). Answer categories ranged from 1 *(not at all)* to 5 *(very much)*. Cronbach α coefficients were the following, for each week: 0.89 (Week 1), 0.90 (Week 2), 0.92 (Week 3).

Analytical Approach

We analyzed the data with a Latent Growth Model (LGM) (Bollen & Curran, 2006) using the Mplus statistical package (Muthén & Muthén, 2016), since LGM is particularly suitable to test concurrently the static and dynamic relationships between the variables of interest. We used LGM to test the cross-sectional relationship between state mindfulness and state negative affect at each time point, as well as the dynamic relationship between the slope of mindfulness and the slope of optimism (i.e., the rate of change of a variable predicting the rate of change of another variable) (Jamieson et al., 2022).

Although we measured the variables daily, we averaged the daily levels of the study variables across each of the three weeks to obtain more reliable assessments of participants' feelings and mental states for each week. The weekly averages of seven days provide reliable and robust indicators of participants' feelings in each week (e.g., Jensen & Candance, 1993). In our model (see Figure 3), weekly negative affect was regressed on weekly mindfulness over three weeks. More specifically, this model examines whether T1 mindfulness predicts T1 negative affect, and so on – similarly for T2 and T3. The effects were constrained to be equal over time to allow for parsimonious interpretation of effects (McArdle, 2009). In addition, the slope of optimism was regressed on the slope of mindfulness across the three weeks, so we could test whether increases in the rate of change of mindfulness are associated with increases in the rate of change of optimism (for similar analytical approach, see Jamieson et al., 2022).

Finally, weekly optimism was also regressed on weekly mindfulness over three weeks, to test whether there would be a static association between mindfulness and optimism.

The intercept of state mindfulness was allowed to correlate with the slope of state mindfulness. Similarly, the intercepts of state negative affect and state optimism were allowed to correlate with the slopes of state negative affect and state optimism, respectively. An intercept term represents an individual's initial standing on a variable, whereas a slope term represents the individual's rate of change over time (Bollen & Curran, 2006). To model the intercepts, we specified paths with equal loadings fixed to 1.0 for each measurement period to equally influence all repeated measures (Choi, Leroy, et al., 2022; Ployhart & Vandenberg, 2010). To model the slopes, we specified equally spaced paths for slope factor loadings to each of the three repeated measures of 0 (T1), 1 (T2), and 2 (T3) to test the rate of change factor depicting a linear growth trajectory (Choi, Leroy, et al., 2022; Ployhart & Vandenberg, 2010).

Manipulation Check

Since all the interventions were expected to increase mindfulness levels, we pursued a manipulation check with all participants of the sample, across all three interventions. A one-way repeated measures ANOVA was conducted to examine if there was a significant increase in mindfulness levels across the three time points (three weeks). Results show that there was a significant increase in mindfulness level across time. The results indicated a significant time effect, Wilks Lambda = .84, $F(2, 64) = 5.92$, $p < 0.01$. Follow-up pairwise comparisons show that there was a significant increase in mindfulness levels from Week 1 to Week 3, (mean difference = 0.15, *SE* = 0.05, *p* < 0.05)*. These results indicate that the interventions were effective in increasing mindfulness levels, as expected[4].

Results

Means, standard deviations, and intercorrelations between study variables are shown in Table 3-1.

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[4] When examining each of the three groups separately, only the positivity group shows a significant increase in mindfulness levels, from Week 1 to Week 2. This is likely due to the small sample size in each group, making it difficult to detect significant differences. Therefore, the increase in mindfulness is reported for the full sample.

Table 3-1. Study 1: Means, Standard Deviations, and Intercorrelations Between Study Variables

	M	SD	1	2	3	4	5	6	7	8	9
1. Mindfulness (T1)	4.05	.64	*.89*								
2. Mindfulness (T2)	4.18	.65	.87**	*.90*							
3. Mindfulness (T3)	4.17	.70	.80**	.73**	*.92*						
4. Negative Affect (T1)	1.50	.51	-.68**	-.61**	-.57**	*.87*					
5. Negative Affect (T2)	1.44	.53	-.45**	-.59**	-.38**	.69**	*.90*				
6. Negative Affect (T3)	1.37	.40	-.57**	-.51**	-.65**	.74**	.74**	*.82*			
7. Optimism (T1)	3.47	.55	.33**	.30*	.15	-.41**	-.39**	-.29*	*.83*		
8. Optimism (T2)	3.52	.68	.17	.29*	.13	-.25*	-.45**	-.22	.81**	*.90*	
9. Optimism (T3)	3.55	.69	.18	.27*	.21	-.28*	-.44**	-.38**	.71**	.81**	*.94*

Note: Cronbach's alpha on diagonal. * p < .05; ** p < .01. Two-tailed test.

We report the results of our analyses in Figure 3-1 and describe them in more detail below. The model fit the data adequately, $\chi^2_{[20]}$ = 43.35 (p < .01), RMSEA = .13, CFI = .96. Weekly mindfulness was negatively related to weekly negative affect (same-week effects) (β = -.46, SE = .09, p < .001), thereby supporting Hypothesis 1. Furthermore, the slope of state mindfulness was positively and significantly related to the slope of state optimism (β = .36, SE = .17, p < .05), thereby supporting Hypothesis 2a. Finally, weekly mindfulness was *not* significantly associated with weekly optimism in the same week (T1 through T3) (β = 14, SE = .11, *ns*), thereby supporting Hypothesis 2b.

Figure 3-1. Study 1: Hypothesized Latent Growth Model
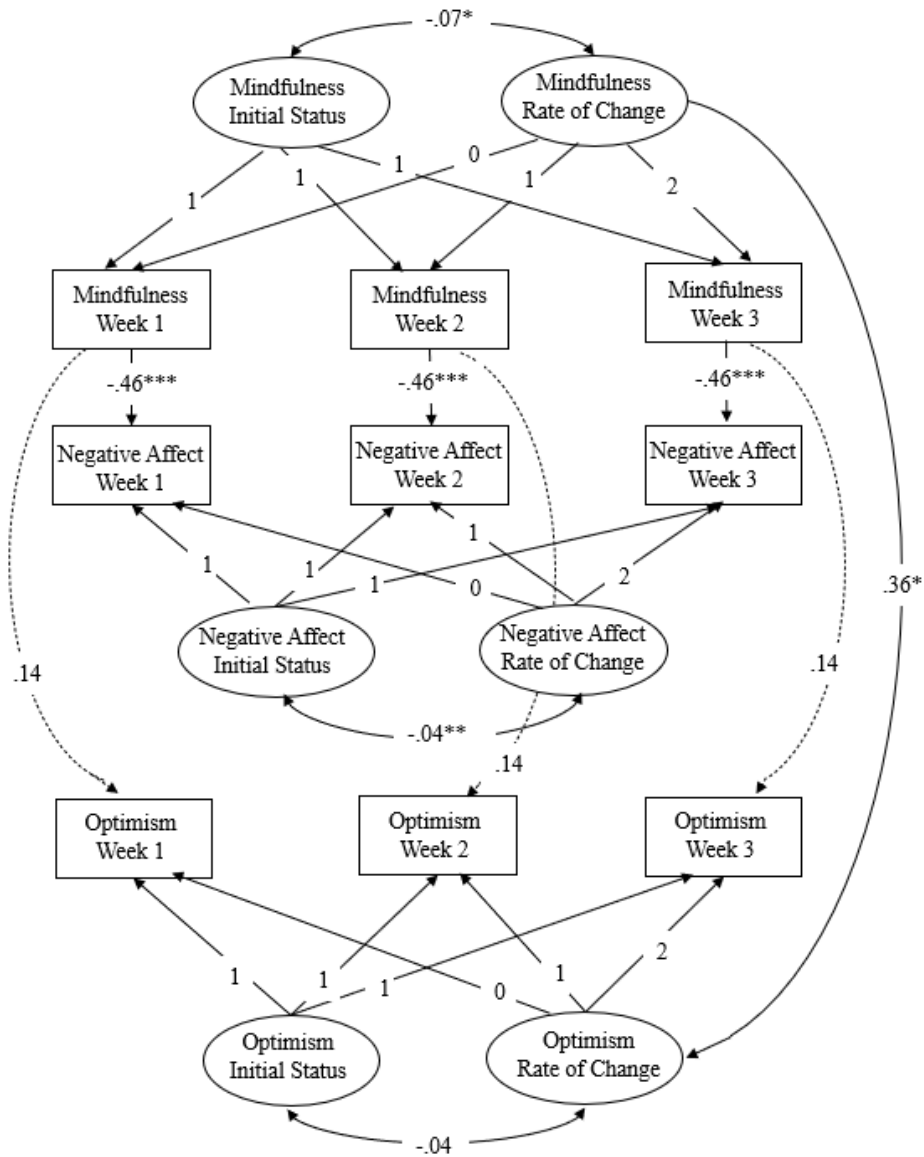
Note: * p < .05; ** p < .01; *** p < .001. Two-tailed test.

Brief Discussion

The results from Study 1 show that, in weeks in which individuals experience higher levels of mindfulness, they experience reduced levels of negative affect. Furthermore, increases in the rate of change of mindfulness were positively associated with increases in the rate of change of optimism across the three weeks. Taken together, these findings indicate that: 1) mindfulness levels are associated with reduced negative affect, supporting our theorizing that state mindfulness *first* creates a neutral state of

64

mind; 2) faster increases in mindfulness levels resulting from exposure to short-term mindfulness training are associated with faster increases in optimism within a three-week period, supporting our theorizing that mindfulness promotes increases in one's propensity to start thinking positively but that it will take time and practice for this effect to occur. Finally, weekly mindfulness was *not* significantly associated with same-week optimism, which adds robustness to our findings in support of the theoretical model being tested.

In Study 1, we manipulated increases in mindfulness levels with the implementation of a short-term mindfulness training, to examine the short-term effects of state mindfulness. In Study 2, aimed at complementing Study 1's findings, we examine the effects of *trait* mindfulness, that is, long-term individual differences in experiencing low versus high levels of mindfulness in general, while there is no external interference aimed at manipulating individuals' levels of mindfulness. Thus, Study 2 allows us to examine how individuals who habitually are more versus less mindful experience positive and negative states of mind. More specifically, the three-wave longitudinal design allows us to test if individuals who master mindfulness experience increased general levels of a positive state of mind (i.e., increased resilience) over time, because they have fewer negative thoughts/feelings (i.e., reduced depressive feelings).

Study 2: Method

Participants and Procedure

Participants worked for a large healthcare provider in Canada. The management of the organization sent an email to employees to introduce the opportunity to participate in a study on employee well-being, consisting of three surveys to be completed three months apart. Employees could enroll in the study if they worked a minimum of 32 hours (4 days) per week.

The first survey was sent to participants in February 2021. Survey 1 included questions about background characteristics (e.g., work hours, age, gender) as well as measures of mindfulness, depressive feelings, and resilience. Survey 2 and Survey 3 were sent in May 2021 and August 2021, respectively, and both surveys remeasured mindfulness, depressive feelings, and resilience levels. Study participants received a confidential Participant Number to be used to complete the three surveys. We were able to link responses for the three surveys for 262 participants, which composed the final sample for our analyses.

Our sample with 262 participants included female (87.4%), male (12.2%), and participants with another gender (0.4%). Most participants had obtained a bachelor's degree (44.3%), whereas the remainder had obtained a master's degree (21.0%), 2-year college degree (14.9%), high school degree (7.6%), medical degree (2.3%), or MBA or PhD degree (1.9%). Education information was missing for the remainder (8.0%). Most participants were less than 40 years old (39.3%), whereas the remainder were between 40-49 years old (29.4%), 50-59 years old (25.6%), or 60 years old or older (5.7%). Participants worked on average 40.9 hours per week (*SD* = 10.2). All participants provided informed consent in writing.

Measures

To increase the participation rate and satisfy the organization's request to keep the survey as short as possible, we used short scales where possible.

Resilience

We measured resilience with four items of the Resilience Scale, by Wagnild and Young (1993). The following primer was used *"Please select the number that best describes how you felt about yourself in the past month."* A sample item was *"I am strong enough to overcome setbacks."* Answer categories ranged from 1 *(strongly disagree)* to 7 *(strongly agree)*. Cronbach α coefficients were the following, for each time measure: 0.73 (T1), 0.78 (T2), 0.80 (T3).

Depressive Feelings

We measured depressive feelings using the depression/unhappiness question retrieved from Goldberg (1992). We used the primer *"Please rate the extent to which each of the following statements applied to you in the last month. Have you:"*. We then asked the question to participants: *"Been feeling unhappy and depressed?"* Answer categories ranged from 1 *(strongly disagree)* to 5 *(strongly agree)*. Although a single-item question, single-item questions have been long used in the well-being literature with the aim to reduce participant burden (e.g., Eddy et al., 2019; Elo et al., 2003), and they have been shown to be valid and reliable (e.g., Eddy et al., 2019; Littman et al., 2006; Matthews et al., 2022).

Mindfulness

We measured trait mindfulness with the shortened 5-item version of the Mindful

Attention Awareness Scale (MAAS), by Brown and Ryan (2003). The following primer was used *"To what degree did you experience the following in the past month?"* A sample item was "I found myself doing things without paying attention" (reversed). Answer categories ranged from 1 *(not at all)* to 7 *(very much)*. Cronbach α coefficients were the following, for each time measure: 0.91 (T1), 0.89 (T2), 0.92 (T3).

Analytical Approach

We analyzed the longitudinal data with a cross-lagged design by employing the analytical approach of Cole and Maxwell (2003), using Structural Equation Modeling (SEM) (for similar analytical approach, see Halbesleben et al., 2013). We used the Mplus statistical package (Muthén & Muthén, 2016) for the analysis. By pursuing a cross-lagged model analysis to examine longitudinal data, we consistently control for baseline levels of all variables in all time points (Cole & Maxwell, 2003). Furthermore, this method also allows us to compare our proposed model with a reverse model, which gives us greater confidence in the proposed direction of the relationships (Cole & Maxwell, 2003). Finally, time lags between data collections also serve to minimize concerns about common method bias (Podsakoff et al., 2012).

First, we examined the measurement model using confirmatory factor analysis (CFA) to ensure that the survey items were loading onto the expected factors. Then, we followed the analytical approach used by Halbesleben et al. (2013). To test the structural aspects of the model, we first tested a model (MDir) that included the direct effect of the predictor (T1 mindfulness) to the outcome (T3 resilience), without the mediator. We then created the stability model (MStab), which includes the autoregressive effects (i.e., T1 mindfulness to T2 mindfulness; T2 mindfulness to T3 mindfulness; T1 depressive feelings to T2 depressive feelings; T2 depressive feelings to T3 depressive feelings; etc.). Next, we tested the causal model (MCaus), which added the cross-lagged associations (i.e., T1 mindfulness to T2 depressive feelings; T1 depressive feelings to T2 resilience; T2 mindfulness to T3 depressive feelings, T2 depressive feelings to T3 resilience) to the stability model. Next, we tested a partial mediation model (MPar) that added the direct effects of mindfulness on resilience (i.e., T1 mindfulness to T2 resilience; T2 mindfulness to T3 resilience). Finally, we also tested a reserve causation model (MRev) that added reversed cross-lagged paths (e.g. T1 resilience to T2 depressive feelings; T1 depressive feelings to T2 mindfulness) to the stability model.

For the indirect effect analysis, we used the indirect model command in Mplus

with a one-tailed t-test, which gives the specific indirect estimate of the proposed in our model. There is growing consensus in the literature that one-tailed t-test are justified in mediational models if researchers have directional hypothesis based on a-priori theory (Preacher et al., 2010). Other researchers have used this approach as well (see for examples Lanaj et al., 2016; Uy et al., 2017).

Results

Means, standard deviations, and intercorrelations between study variables are shown in Table 3-2.

Table 3-2.   Study 2: Means, Standard Deviations, and Intercorrelations Between Study Variables

	M	SD	1	2	3	4	5	6	7	8	9
1. Mindfulness (T1)	4.25	1.33	.91								
2. Mindfulness (T2)	4.57	1.29	.67**	.89							
3. Mindfulness (T3)	4.71	1.29	.57**	.67**	.92						
4. Depressive Feelings (T1)	2.88	1.05	-.44**	-.42**	-.33**	-					
5. Depressive Feelings (T2)	2.76	1.09	-.41**	-.60**	-.49**	.60**	-				
6. Depressive Feelings (T3)	2.46	1.02	-.34**	-.44**	-.55**	.51**	.57**	-			
7. Resilience (T1)	5.10	0.83	.42**	.38**	.37**	-.39**	-.41**	-.29**	.73		
8. Resilience (T2)	5.21	0.87	.42**	.50**	.34**	-.42**	-.52**	-.28**	.60**	.78	
9. Resilience (T3)	5.33	0.81	.36**	.42**	.53**	-.33**	-.43**	-.47**	.66**	.57**	.80

Note: Cronbach's alpha on diagonal. * p < .05; ** p < .01. Two-tailed test.

Fit statistics for the different models and results of model comparisons are shown in Table 3-3 below. The proposed measurement model has a good fit, with the items showing strong loadings onto the expected factors. The direct effects model (MDir) provided adequate fit to the data; however, the coefficient of determination for the outcome resilience was low ($R^2 = 0.21$), indicating that while mindfulness was associated with resilience, there may be more direct factors that can improve in the prediction of resilience. The stability model (MStab) that included the autoregressive effects also fit the data adequately, and the coefficients of determination for resilience are higher in the stability model than the direct effects model (T2 resilience $R^2 = 0.56$; T3 resilience $R^2 = 0.57$).

We then added the various cross-lagged associations to the stability model to create the causal model (MCaus). The causal model also has adequate fit, with similar levels of goodness-of-fit indices as the stability model. We also computed a Chi-square difference test between the two competing models, MStab vs. MCaus, which indicates that the causal model fits the data better than the stability model. Importantly, all the parameters for the cross-lagged effects were significant and in the predicted directions.

Next, we tested the partial mediation model (MPar) that added the direct effects of mindfulness on resilience. Like the causal model, the MPar model also has adequate fit; however, the Chi-square difference test between the two competing models, MCaus vs. MPar, indicates that the causal model fits the data better. Importantly, the direct effects from mindfulness to resilience were non-significant. Finally, we also tested a reverse causation model (MRev) that added reversed cross-lagged paths to the stability model. Although the reverse model has similar goodness-of-fit indices to the causal model, it has slightly worse-fitting Chi-square value in comparison to MCaus. Furthermore, the effects from depressive feelings to mindfulness (i.e., reverse order than what we hypothesize) are non-significant.

Table 3-3.   Study 2: Fit Statistics and Model Comparisons

Model Description	χ^2	df	CFI	TLI	RMSEA	Model comparisons	χ^2_{diff}	df_{diff}
Measurement model	677.33	309	.90	.89	.07			
Direct effect of mindfulness (T1) on resilience (T3)	813.31	313	.87	.85	.08			
Stability model (MStab)	971.45	398	.86	.85	.08			
MCaus (MStab + cross-lagged paths)	954.04	396	.86	.85	.08	MStab vs. MCaus	17.41**	2
MPar (MCaus + direct effects mindfulness to resilience)	951.22	395	.87	.85	.08	MCaus vs. MPar	2.82	1
Reverse Model (MStab + reverse cross-lagged paths)	960.17	396	.86	.85	.08	MStab vs MRev	11.28**	2

Note: * p < .05; ** p < .01. Two-tailed test.

Considering the strong fit of the causal mediation model that we had predicted (MCaus), we further examined the parameter estimates for the hypothesized effects in the model. These results are depicted in Figure 3-2. Mindfulness is negatively associated with depressive feelings during the subsequent measurement period (β = -.14, *SE* = .04, *p* < .001), and depressive feelings are negatively associated with resilience in the subsequent measurement period (β = -.06, *SE* = .03, *p* < .05). Thus, in addition to the strong fit of the mediation model that we proposed, both in terms of goodness-of-fit indices as well as its relative comparison with alternative models, the parameter estimates resulting from our analysis confirm that the variables are associated in the directions we predicted. Furthermore, the one-tailed t-test of indirect effects shows that the indirect effect from T1 mindfulness to T3 resilience through T2 depressive feelings is positive and significant (β = .01, *SE* = .01, *p* < .05). Hypothesis 3 was supported by our analyses.

Figure 3-2. Study 2: Causal Cross-Lagged Model (MCaus)
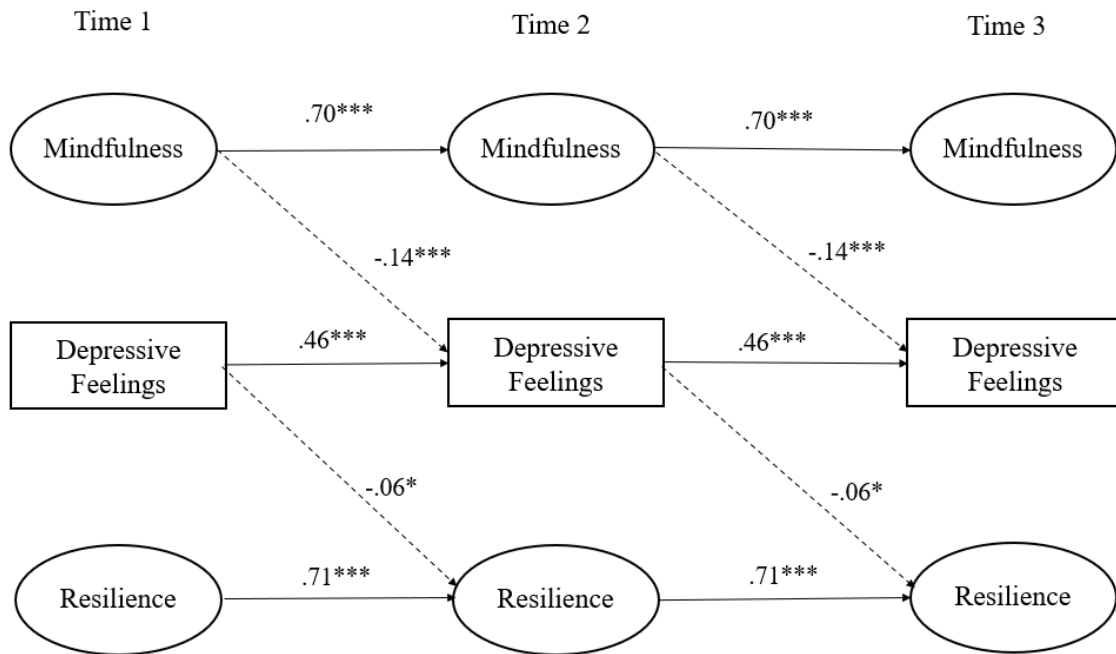
Note: Solid lines indicate paths tested in the stability model, and dashed lines are paths added in the causal (cross-lagged) model (MCaus). Parameter estimates are derived from a test of the proposed causal model (MCaus). Parameter estimates were constrained to be equal in the autoregressive effects and cross-lagged effects for parsimony. * $p < .05$; ** $p < .01$; *** $p < .001$. Two-tailed test.

Brief Discussion

Study 2 examines the effects of trait mindfulness on negative versus positively modulated states of mind in an equilibrium state, over a period of six months. The results from Study 2 show that mindfulness is negatively associated with depressive feelings during the subsequent measurement period, and depressive feelings are negatively associated with resilience in the subsequent measurement period, while controlling for baseline levels of all variables in all time points. The test of indirect effects shows that trait mindfulness is positively related to resilience six months later through reduced depressive feelings. This finding indicates that individuals who habitually engage in mindfulness become more resilient in the long run because they are better at eliminating depressing feelings than those who are typically less mindful. This finding complements Study 1's findings, in which we examined the effects of short-term mindfulness training.

General Discussion

The present research extends the theoretical understanding of the duality seen in the definitions and implications of mindfulness, namely, that mindfulness not only fosters an augmented capacity for objectivity and neutrality towards experiences, but that mindfulness also helps individuals become more propense to engage in positively modulated states of mind. To clarify how mindfulness affects a person's state of mind, we investigated whether mindfulness first eliminates negative states of mind, thereby creating space for positive states of mind to ensue. We examined this process within a short-term period of three weeks (Study 1), as well as a longer-term timespan of six months (Study 2).

Results from Study 1 suggest that individuals experience reduced negative feelings in weeks in which they are more mindful, suggesting that mindfulness immediately (i.e., in the same week) reduces negative states of mind. Changes in optimism, however, were only found when examining the developmental change trajectories of mindfulness and optimism. When mindfulness was increased due to an intervention, faster increases in optimism also occurred. This finding thus suggests that it takes time and practice (at least two weeks of mindfulness training) before the individual can reap stronger and consistent effects of mindfulness on a positive state of mind. Results from Study 2, with a cross-lagged design, show that trait mindfulness is related to increased general levels of resilience measured six months later through reduced general levels of depressive feelings measured three months after the baseline, which shows the long-term effects of mindfulness in an equilibrium state. Taken together, the findings of the two studies suggest that mindfulness first leads to a neutral state of mind (e.g., reduced negative affect, reduced depressive feelings) which creates space for positively states of mind (e.g., increased optimism, increased resilience) to arise.

Theoretical Implications

This research advances research on mindfulness by examining two distinct – some could argue even paradoxical – effects of mindfulness: increased neutrality towards experiences and increased positively modulated states of mind when facing experiences. We theorized that mindfulness would first remove negative thoughts and feelings, because this neutralizing-effect should be the individual's immediate response when they are being mindful, and that over time, a greater extent of exposure to mindfulness levels should lead the individual to have a greater propensity of engaging in

positively modulated states of mind. Our studies support our hypotheses both in a short-term (weeks) and longer-term (months) timeframe. This examination adds to the extant debate in the mindfulness literature around the fact that, although mindfulness is defined as a non-evaluative, pre-reflexive state of mind (Bishop et al., 2004; Brown & Ryan, 2003; Shapiro et al., 2006), mindfulness is often described as a practice that gives individuals agency to decide on how to interpret and respond to situations (e.g., Kay & Skarlicki, 2020; Reina & Kudesia, 2020, Zivnuska et al., 2016). Our findings inform this debate by suggesting that the neutralizing, non-evaluative state occurs first, so that the individual can then become more agentic to welcome positive interpretations of situations and events.

Our findings also respond to extant critique in the mindfulness literature positing that mindfulness may have a sedating effect in individuals (Purser, 2019), due to its promotion of a neutral, observant stance towards events. Although eliminating negative feelings promotes a neutral stance towards events, the processes we disentangled cannot be qualified as 'sedating'. Instead, the elimination of negative thoughts and feelings creates space for positive reappraisals and beneficial interpretations of events to ensue, which entails active cognitive involvement of the individual.

Practical Implications

Our research has two practical implications for employees and organizations. First, our findings show that mindfulness not only helps employees face experiences with greater neutrality but also increases employees' propensity to engage in positively modulated states of mind. In particular, our research shows that within the timeframe of three weeks, higher levels of mindfulness (induced by mindfulness training in the last two weeks) go together with fewer negative feelings in the same week, but that the relationship between mindfulness and enhanced optimism takes longer to occur. In a timeframe of six months, employees who are generally more mindful are also more resilient because they are able to reduce depressive feelings and thoughts. Therefore, this research may give employees greater confidence that practicing mindfulness will help them have a more positive outlook on life and work.

Second, our research supports offering mindfulness interventions in organizations, suggesting that such interventions can help reduce negative feelings and replace them with more positive ones. As such, mindfulness training can contribute to employees' subjective well-being, thriving and flourishing (Carver et al., 2010; Luthans &

Youssef, 2007; Youssef & Luthans, 2007). Up until now organizations have mainly focused on the stress-reducing effects of mindfulness interventions (Gelles, 2015), and our research suggests that mindfulness interventions may also lead to increases in a positive state of mind, reflected by optimism and resilience levels.

Limitations and Future Directions

Our research has notable strengths, including the following: the use of two studies with complementary findings; the use of Latent Growth Model (LGM) in Study 1 that allows us to examine both static and dynamic relationships between study variables; the use of interventions in Study 1 aimed at manipulating mindfulness levels; and, the use of cross-lagged design in Study 2 which allows us to analyze longitudinal data while controlling for baseline levels of all study variables (Cole & Maxwell, 2003).

Despite the benefits of a rigorous two-study design, our research also has limitations. First, although LGM is an effective analytical approach to examine the dynamic relationship between the rates of change of variables over time, the relationship between the slopes is measured concurrently and may therefore be considered cross-sectional, which limits causal interpretations. Furthermore, because our data were measured at the same time in Study 1 (i.e., afternoon log), there may be the possibility of common methods bias influencing the relationships under study (Podsakoff et al., 2003b). However, our use of the experience sampling method data allowed for the analysis of the growth and decline of variables over time, which weakens potential common method bias associated with a single measurement moment (Choi, Leroy, et al., 2022). Furthermore, the use of interventions in Study 1 suggests that changes in mindfulness are a function of our intended design (Choi, Leroy, et al., 2022), as per the findings of our manipulation check.

Another limitation is that our studies use single-source data, which may also raise concerns regarding common method bias (Podsakoff et al., 2003a). However, self-reported data are appropriate for constructs such as mindfulness, depressive feelings, negative affect, resilience, and optimism given that these constructs capture one's internal feelings and experiences. Because one's attitudes do not necessarily show through one's behavior (Fishbein & Ajzen, 1975), employees' attitudes may be best captured by employees' own self-reports, rather than by other-reported ratings (Podsakoff et al., 2003a).

Because our research designs do not allow us to make causal inferences

between the study variables, questions remain concerning the causal direction of the relationships tested. We relieved some of this concern by testing a reversed causal model in Study 2, which showed that the reversed relationship between depressive feelings and mindfulness was not significant. Nevertheless, future experimental research could investigate the fine-grained causal steps between mindfulness and a neutral state of mind at the moment-level, and mindfulness and a positively state of mind in the short run. Mindfulness scholars could implement an experimental design with random assignment to two conditions taking place over a few weeks – a daily mindfulness intervention and a wait listed control group with no daily intervention –, then measure both negative affect and optimism levels immediately after the daily mindfulness exercise has taken place, to examine the *immediate* effects of the mindfulness exercise, and also measure optimism levels at other different time points throughout the day to examine potential effects on optimism levels that may emerge at different time points after the mindfulness exercise has taken place. This design would allow researchers to see whether there are increases in optimism levels within the same day of the mindfulness exercise, or over a few weeks, thereby providing insight into the specific extent of mindfulness training that is necessary for an individual to start adopting a positive state of mind. This design would also allow researchers to compare participants in the mindfulness condition with participants in the control group, which would give greater confidence that the effects seen in the mindfulness condition are in fact caused by the mindfulness intervention.

       Future studies could also investigate whether the positive upward spiral of optimism generated by increases in the rate of change of mindfulness reaches a point where too much optimism may become detrimental to the employee, since it has been argued that there may be such a thing as "too much of a good thing", in that a positive phenomenon may reach an inflection point where they start to become detrimental to the individual (Grant & Schwartz, 2011). For example, it has been shown that excessive cheerfulness is associated with riskier behaviors and reduced longevity (Friedman et al., 1993; Martin et al., 2002). Furthermore, future studies could also investigate if the proposed positive upward spiral generated by mindfulness may also affect other positively modulated states of mind among employees, in addition to optimism and resilience, such as whether state and trait mindfulness could also lead to increased positive appraisals of work-related events (short-term), and work engagement (long-term). Finally, future research could explore whether an individual's ability to positively

reframe and reappraise situations would be strengthened more quickly if the individual practices mindfulness using a mindfulness intervention that emphasizes skills related to cognitive reappraisal (e.g., Garland et al., 2020).

Conclusion

Our research advances the mindfulness literature by providing evidence from two studies suggesting that mindfulness is first related to a neutral state of mind (e.g. reduced negative affect, reduced depressive feelings), and later related to increases in a positively modulated state of mind (e.g., increased optimism and resilience). This research offers insight into the duality seen in the effects of mindfulness, and specifies that mindfulness first fosters objectivity and neutrality towards experiences so that positively modulated states of mind can develop with time.

General Discussion

Taken together, the findings from the three papers extend the theoretical understanding of how mindfulness operates and how it brings about its beneficial effects in the workplace. Each of the three papers builds on the previous one to contribute to my exploration of the mechanisms of mindfulness. In Paper 1, I explore stress appraisal (i.e., increased challenge appraisal; reduced threat appraisal) as a core mechanism of mindfulness that explains how mindfulness reduces stress. In doing so, I began to shape my research program consisting of investigating whether mindfulness can lead both to a reduced negative state of mind (i.e., reduced threat appraisal) as well as to a positively modulated state of mind (i.e., increased challenge appraisal). Paper 1's findings suggest that mindfulness decreases stress because mindfulness reduces employees' threat appraisal. Paper 1 also shows that mindfulness is related to increased challenge appraisal, even though challenge appraisal was not related to stress. Although in Paper 1 I tested challenge and threat appraisals as parallel mediators, I later came to notice that much of my theoretical rationale supporting the positive relationship between mindfulness and challenge appraisal alluded to a sequential effect of mindfulness first promoting a neutral state of mind which then creates space for new interpretations and (challenge) appraisals to emerge.

Paper 2 then builds upon my realization from Paper 1 that there may be a sequence of psychological mechanisms of mindfulness, whereby mindfulness first promotes a neutral state of mind and later promotes positive states of mind. Building on this idea, I then conducted Paper 2's systematic review with the goal to investigate how mindfulness scholars were theorizing about and testing mindfulness mechanisms in the literature. Based on insights from that review, in Paper 2 I propose a theoretical model that explains how mindfulness operates. In this theoretical model, I argue that the passage of time is an important determinant of the different, and at-first-sight contradictory, psychological processes that unfold from one's being mindful. Specifically, I posit that mindfulness can generate non-evaluative experiences, modulated experiences, and increased personal agency due to the processes of dereification, reorientation, and assimilation, which occur with the passage of time.

Finally, Paper 3 builds on Paper 2 by empirically testing the theoretical model that I put forward in Paper 2. In particular, in Paper 3 I empirically test the first two psychological processes of dereification and reorientation. Findings from Paper 3

confirm my theoretical assertions from Paper 2. Paper 3's findings suggest that mindfulness first leads to a neutral state of mind which creates space for positive states of mind to arise, both in the short run, with short-term mindfulness training, as well as in the long run, with individuals having high versus low levels of trait mindfulness.

Taken together, the insights provided by the three papers show that the apparent contradiction in the fact that mindfulness is frequently described in the literature as a tool that promotes positive changes in thoughts, emotions, and behaviors, while it is defined as a non-evaluative, pre-reflexive state of mind, can be explained by the fact that the immediate outcome of mindfulness is indeed neutrality towards situations, which is in line with the definition of mindfulness as being non-evaluative and pre-reflexive. The arising of positive states of mind is an outcome that appears later in the process, as a second-order effect of mindfulness that results from that immediate neutrality.

Theoretical Implications

Taken together, findings from the three papers add theoretical precision to the understanding of how mindfulness operates, shedding light on *how* mindfulness brings about its effects. Paper 1 draws on a well-established theory of stress (i.e., Transactional Model of Stress) to explain the stress-reducing effects of mindfulness, thereby connecting nascent theory of mindfulness with the well-established literature of stress and coping. Paper 1 offers a strong theoretical framework for mindfulness, by suggesting stress appraisal as a core mechanism that explains the stress-reducing effects of mindfulness at work.

While in Paper 1 I "zoom in" on the mechanisms of mindfulness that particularly explain the outcome of stress, in Paper 2 I "zoom out" to provide a systematic review of *all* mindfulness mechanisms studied by the mindfulness literature. As a result of that systematic review, I then develop an overarching conceptual model of mindfulness. The theory proposed in Paper 2 suggests that the seemingly contradictory psychological processes generated by mindfulness unfold over time. The proposed theory gives mindfulness scholars a foundation and insight on how to design future empirical studies testing the mechanisms of mindfulness.

Then, by empirically testing Paper 2's theoretical model, Paper 3 advances research on mindfulness by examining two distinct – at first sight contradictory – effects of mindfulness: increased neutrality towards experiences and increased positively modulated states of mind when facing experiences. Paper 3's findings respond to extant

critique in the mindfulness literature positing that mindfulness may have a sedating effect in individuals (Purser, 2019), due to its promotion of a neutral stance towards events. Although mindfulness promotes a neutral stance towards events as the immediate effect, findings from Paper 3 suggest that this neutrality later gives space to positive experiences and states of mind.

Practical Implications

This research has various practical implications for employees and organizations. The findings show that mindfulness helps employees during work hours, since it is related to more favorable appraisal of work tasks. Thus, employees do not need to wait until after work to be able to benefit from mindfulness, as is the case when mindfulness is used as a relaxation practice at home after the end of a workday. Instead, employees can practice mindfulness at work to prevent stress from escalating. This research also gives employees greater confidence that practicing mindfulness will help them have a more positive outlook on life and work, instead of making them feel "sedated".

This research supports offering mindfulness interventions in organizations. Up until now organizations have mainly focused on the stress-reducing effects of mindfulness interventions (Gelles, 2015), and our research suggests that mindfulness interventions may also lead to increases in a positive state of mind, reflected by optimism and resilience levels. As such, mindfulness training can not only reduce stress, but also contribute to employees' overall thriving and flourishing.

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Appendix A. Paper 1. Complete items used to measure task appraisal in Study 1 and Study 2

Challenge Task Appraisal	Threat Task Appraisal
Study 1[5] (primer: During the past month)	
1. I felt that my work could have a positive impact.	5. I felt anxious about doing my tasks.
2. I was eager to tackle my tasks.	6. I felt that my work could have a negative impact.
3. I felt I could become stronger by completing my tasks	7. I was afraid that my work would have a negative outcome.
4. I was excited about the possible outcome of my work.	8. I felt reluctant to do my tasks[6].
Study 2 (primer: rate for the task you are currently working on)	
1. I see this task as a positive challenge.	5. I dread doing this task.
2. I am eager to tackle this task.	6. I feel anxious about doing this task.
3. I have the ability to do well in this task.[7]	7. This task makes me feel hopeless.[8]
4. I have the skills necessary to perform this task.	8. The problem I deal with is unresolvable.

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[5] To assess the psychometric soundness of these two scales in Study 1, we conducted a two-factor confirmatory factor analysis (CFA) to assess the factor loadings of the items onto the two proposed latent variables (i.e., challenge and threat.) Results show that the standardized factor loadings onto the expected latent variables were generally strong. All items showed strong loadings onto the expected latent variables, except for one item that showed *moderate* loading onto the expected latent variable. For comparison, we also conducted a single-factor CFA analysis where all items loaded onto the same latent variable. Results of this alternative model show that many of the loadings became weak. Finally, we also computed a Chi-square difference test between the two competing models ($\chi^2_{diff} = 531.7$, $df_{diff} = 1$), which indicates that the two-factor CFA model fits the data better than the single-factor model. Therefore, we can conclude that the scales used for threat and challenge appraisals are psychometrically sound.

[6] This item replaced the original item "threatening situation" from Peacock and Wong (1990) to ensure that the participants appraised their work task, rather than their work situation, and to make the item more applicable to a broader set of work tasks.

[7] Items 3 and 4 in Study 2 belong to the "controllable" dimension of Peacock and Wong's (1990) appraisal scale. The items fit closely with the definition of a challenge appraisal, which is a condition where one needs to master their skills to overcome obstacles and thus one can grow and expand as a result (Lazarus, 1991). An exploratory factor analysis (EFA) with all eight task appraisal items confirmed that only two factors with Eigen values above 1.0 were distinguished, with the challenge and controllable items loading on one factor, and the threat and uncontrollable items loading on a second factor.

[8] Items 7 and 8 in Study 2 belong to the "uncontrollable" dimension of Peacock and Wong's (1990) appraisal scale. The definition of threat appraisals focuses on the outcome of a situation – the perception of threat results from an anticipation of potential harm in the future (Lazarus, 1991). Threats have therefore been defined as stressors that negatively impact the self or relate to personal loss (Tuckey et al., 2015). The items used to measure threat appraisal are similar to the items used for the dimensions "uncontrollable", in the sense that they all point at situations that might be harmful or could result in loss. We ran an additional EFA for just the four items (threat and uncontrollable), which extracted only one factor with an Eigen value of 2.30 and all items had factor loadings above .719. These results suggest that, in our data, it is difficult to differentiate between the dimensions threat and uncontrollable. Instead, the four items seem to capture the same construct. Hence, we combined the four items and labeled them as threat appraisal.

Appendix B. Paper 1. Results of Confirmatory Factor Analyses (CFA) for the Mindfulness and Task Appraisal scales in Study 1.

1. CFA for Mindfulness

We conducted a CFA for the abbreviated version of the Five Facet Mindfulness Questionnaire (FFMQ) used in Study 1, to ensure psychometric soundness of the scale. The abbreviated 11-item scale includes three facets with three items each – *Non-reactivity to inner experiences*, *Acting with awareness*, and *Describing* –, and two facets with one item each – *Observing* and *Non-judging of experiences.* Given the number of items per facet, we conducted a three-factor CFA only including the facets that had three items each, *Non-reactivity to inner experiences*, *Acting with awareness*, and *Describing*.

The CFA model showed good fit ($\chi^2_{[24]}$ = 88.04, p < .001, CFI = .96, RMSEA = .07). All scale items showed strong standardized factor loadings onto the expected latent variables, which shows the psychometric soundness of these three scales. The table below shows the standardized factor loadings:

Item	Non-reactivity to inner experiences	Acting with awareness	Describing
When I had distressing thoughts or images, I "stepped back" and was aware of the thought or image without getting taken over by it.	0.69		
When I had distressing thoughts or images, I was able just to notice them without reacting.	0.67		
When I had distressing thoughts or images, I just noticed them and let them go.	0.71		
I didn't pay attention to what I was doing because I was daydreaming, worrying, or otherwise distracted. *(r)*		0.59	
I did jobs or tasks automatically without being aware of what I was doing. *(r)*		0.78	
I found myself doing things without paying attention. *(r)*		0.87	

98

			0.82
I was good at finding words to describe my feelings.			0.82
I had trouble thinking of the right words to express how I felt about things. *(r)*			0.85
Even when I was feeling terribly upset I could find a way to put it into words.			0.67

Since we did not have specific theoretical arguments to expect different relationships between each mindfulness facet and stress appraisal, in Study 1 we considered mindfulness levels as a single score. Moreover, the results of a post-hoc analysis show that the three mindfulness dimensions relate similarly to our mediator and outcome variables. Because, statistically, a more parsimonious model has more power, we report the analysis of the more parsimonious model in the manuscript (i.e., mindfulness levels being represented by a single score).

2. CFA for Threat/Challenge Appraisal

We conducted a two-factor CFA for the threat and challenge appraisal scales used in Study 1, to assess the factor loadings of the items onto the two proposed latent variables (i.e., challenge and threat). The model showed adequate fit ($\chi^2_{[19]}$ = 203.03, $p < .001$, CFI = .89, RMSEA = .13). Results show that the standardized factor loadings onto the expected latent variables were generally strong. All items showed strong loadings onto the expected latent variables, except for one item that showed *moderate* loading onto the expected latent variable. The table below shows the standardized factor loadings.

Item	*Threat*	*Challenge*
I was reluctant to do my tasks.	0.35	
I felt anxious about doing my tasks.	0.54	
I felt that my work could have a negative impact.	0.81	
I was afraid that my work would have a negative outcome.	0.90	
I felt that my work could have a positive impact.		0.83
I was eager to tackle my tasks.		0.68

I felt I could become stronger by completing my tasks.		0.61
I was excited about the possible outcome of my work.		0.86