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Eudaimonic Well-Being in the Work Context: Can Mindfulness-Based Interventions Foster Flow Experience and Work Engagement?

to obtain the academic degree

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by

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The present publication is a dissertation accepted by the Department of Psychology, Faculty of Human and Social Sciences, University of Wuppertal.

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Personal Motivation and Acknowledgments

Our minds hold incredible power in shaping the world we experience. Rather than perceiving things as they objectively are, we assign meaning and appraisal to them based on our context and past experiences. For instance, is a new project at work an exciting opportunity for growth or a source of uncertainty and stress? However, we learn to train our minds to appraise and perceive things differently, thereby fostering our well-being. I have always been intrigued by what makes people flourish, focusing on strengths and fostering well-being instead of merely reducing stress and disorders. Accordingly, this thesis delves into the principles of positive psychology, explaining the relationship between mindfulness, flow experience, and work engagement. In doing so, I aim to make a small contribution to a better understanding of how we can foster well-being in both work and private life.

Completing this PhD thesis has been a challenging yet rewarding journey, and I am deeply grateful to those who have supported me along the way. I would like to express my sincere gratitude to Professor Stefan Diestel for his invaluable feedback and mentorship. Your insights and encouragement have been instrumental in shaping this work. I am also very grateful to my colleagues Filiz Meidrodt, Elvira Radaca, and Patrik Fröhlich for their collaboration and support, continuing even after I have started working outside of the university! Over the past ten years, I have had the opportunity to learn from and work with outstanding teachers and colleagues across various universities and projects. A special thanks goes to my co-authors - writing these papers wouldn't have been possible without you! I also owe a special debt of gratitude to my family—my parents, my brother, and my partner—for their continuous support and belief in me throughout this time. Lastly, to my close friends, thank you for your understanding, your patience, and for always being there when I needed it most. Your support has meant more than words can express. Thank you all for your support and guidance during this time!

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List of Abbreviations

Abbreviation	Meaning	Page first mentioned
MMT	Mindfulness to Meaning Theory	3
TSF	Transactional theory of flow and stress	3
PSI	Personality-System-Interaction	3
MBSR	Mindfulness-Based Stress Reduction	3

List of Publications

Following the general introduction, this thesis entails three peer-reviewed articles. The results of these studies are summarized and discussed in a general discussion. Study I has been published in the Journal *Frontiers of Psychology*. Study II has been published in the *Journal of Occupational Health Psychology*. Study III is currently under review in the *Journal of Occupational Health Psychology*. Only minor changes in the formatting have been made when including the articles in this thesis (e.g., numbering of headers, captions of figures or tables). For Study III, the footnotes 2 and 3 have been added and marked accordingly. Psychological research usually involves collaborations between different researchers as we as co-authors for the publications. All co-authors and their contributions to the three peer-reviewed articles are listed below.

Study I:

Hohnemann, C., Engel, F., Peifer, C., & Diestel, S. (2024). Trajectories of mindfulness, flow experience, and stress during an online-based MBSR program: the moderating role of emotional exhaustion. *Frontiers in Psychology, 15*, Article 1385372. https://doi.org/10.3389/fpsyg.2024.1385372

I, Charlotte Hohnemann, and the co-authors Florian Engel, Corinna Peifer, and Stefan Diestel contributed to the theoretical conceptualization. Study design and data collection were performed by me and Florian Engel. I conducted the analyses and prepared the first draft of the manuscript. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Study II:

Hohnemann, C., Rivkin, W., & Diestel, S. (2024). An energizing microintervention: How mindfulness fosters subjective vitality through regulatory processes and flow experience at work. *Journal of Occupational Health Psychology, 29*(1), 45–56. https://doi.org/10.1037/ocp0000369

I, Charlotte Hohnemann, and the co-authors Wladislav Rivkin and Stefan Diestel contributed to the theoretical conceptualization. Study design and data collection were performed by Wladislaw Rivkin. I conducted the analyses and prepared the first draft of the manuscript. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Study III:

Hohnemann, C., Schweitzer, V., Aust, F., Peifer, C., & Diestel, S. (under review). Mindful Evenings: Unravelling the Social Benefits of a Brief Meditation on Perspective Taking, Individual Well-being, and Performance. *Department of Industrial and Organizational Psychology, University of Wuppertal.*

I, Charlotte Hohnemann, and the co-authors Vera Schweitzer, Fabienne Aust, Corinna Peifer, and Stefan Diestel contributed to the theoretical conceptualization. Study design and data collection were performed by me, Vera Schweitzer, and Fabienne Aust. I conducted the analyses with support from Vera Schweitzer. I prepared the first draft of the manuscript. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

English Abstract

Mindfulness holds great potential to foster flow experience and work engagement as indicators of eudaimonic well-being. Drawing from the mindfulness-to-meaning theory, mindfulness facilitates a more functional appraisal (i.e., meaning) of tasks or situations, promoting eudaimonic well-being by enhancing perceived alignment with personal interests or values and fostering a more accepting understanding of the situation and others. In order to assess the efficiency of mindfulness-based interventions to foster eudaimonic well-being, I extended the mindfulness-to-meaning theory and conducted three (quasi-) experimental studies. Drawing upon the transactional model of flow and stress, the first study involved a weekly assessment of 91 participants, participating in the Mindfulness-Based Stress Reduction program over eight weeks or an inactive control group. Results showed that the build-up of mindfulness over time relates positively to changes in flow experience and negatively to changes in stress, amplified by the trait level of emotional exhaustion. Based on the Personality Systems Interactions theory, the second study consisted of a daily diary study with 78 participants over ten days suggesting that a morning meditation, in comparison to an inactive control condition, fosters autonomous self-regulation and reduces effortful self-control, leading to increased flow experience at work and enhanced subjective vitality after work. The third study entailed a daily diary study with 64 participants over ten days indicating that an evening meditation, in comparison to an active control condition, fosters next-day perspective taking and subsequently work engagement and performance. Overall, the findings suggest that mindfulness-based interventions hold promise for promoting eudaimonic well-being in the workplace, with implications for employee well-being and performance.

German Abstract

Achtsamkeit birgt großes Potenzial zur Förderung von Flow und Work Engagement als Indikatoren des eudaimonischen Wohlbefindens am Arbeitsplatz. Basierend auf der Theorie *Mindfulness-to-Meaning* ermöglicht Achtsamkeit eine positiv-konnotierte und funktionale Bewertung von Aufgaben sowie Situationen, indem sie die wahrgenommene Übereinstimmung mit persönlichen Interessen oder Werten verbessert und ein akzeptierendes Verständnis der Situation und anderer Personen fördert. Um die Effizienz achtsamkeits-basierter Interventionen zur Förderung des eudaimonischen Wohlbefindens zu untersuchen, habe ich die *Mindfulness-to-Meaning* Theorie mit Annahmen anderer Theorien erweitert und drei (quasi-) experimentelle Studien durchgeführt. Basierend auf dem *Transaktionalen Modell zu Stress und Flow* ergab eine Wochenbuchstudie mit 91 Teilnehmenden, von denen die Hälfte ein achtsamkeitsbasiertes Stressbewältigungsprogramm über acht Wochen absolvierte, dass ein Anstieg von Achtsamkeit positiv mit einem Anstieg im Flow Erleben sowie einer Abnahme im Stresserleben zusammenhängt. Diese Zusammenhänge wurden durch das individuelle Maß an emotionaler Erschöpfung verstärkt. Basierend auf der *Persönlichkeitssysteminteraktions-Theorie* wurde zudem eine Tagebuchstudie mit 78 Teilnehmenden über zehn Tage durchgeführt. Diese zeigte, dass eine morgendliche Meditation im Vergleich zu einer inaktiven Kontrollgruppe die autonome Selbstregulation fördert und die anstrengende Selbstkontrolle reduziert, was zu einem gesteigerten Flow Erleben bei der Arbeit und einer verbesserten subjektiven Vitalität nach der Arbeit führt. Die zuletzt durchgeführte Tagebuchstudie mit 64 Teilnehmern über zehn Tage zeigte, dass eine Abendmeditation im Vergleich zu einer aktiven Kontrollgruppe die Perspektivübernahe am nächsten Tag fördert sowie anschließend Work Engagement und die Leistung. Insgesamt legen die Ergebnisse nahe, dass achtsamkeitsbasierte Interventionen vielversprechend sind, um eudaimonisches Wohlbefinden am Arbeitsplatz zu fördern.

1. Structure of the Thesis

Utilizing the mindfulness-to-meaning theory (MMT) as a meta-framework, this thesis explores whether and how mindfulness-based interventions can foster flow experience and work engagement as indicators of eudaimonic well-being. This cumulative thesis comprises three articles. Section 2 *Theoretical introduction* introduces the research question and the constructs of mindfulness, flow experience, and work engagement, along with their relationships. After discussing the MMT, I extend it by integrating the transactional theory of flow and stress (TSF), the Personality-System-Interaction (PSI) Theory, and the Mixed-Model of Perspective Taking, which guides the following articles. Section 3 *Trajectories of mindfulness, flow experience and stress during an online-based MBSR program: the moderating role of emotional exhaustion* presents the first article, published in Frontiers in Psychology, which examines changes in mindfulness, flow, and stress during Mindfulness-Based Stress Reduction (MBSR) Training, drawing from the TSF. Section 4 *An Energizing Micro-Intervention: How Mindfulness can Foster Subjective Vitality through Regulatory Processes and Flow Experience at Work* includes the second article, published in the Journal of Occupational Health Psychology, which describes a diary study investigating the effects of a brief morning mindfulness intervention on subjective vitality through regulatory processes and flow, based on the PSI theory. Section 5 *Mindful Evenings: Unravelling the Social Benefits of a Brief Meditation on Perspective Taking, Individual Well-being, and Performance* covers the third article, submitted to the Journal of Occupational Health Psychology, which investigates how an evening meditation impacts next-day perspective taking, work engagement, and performance, using the mixed-motive model. Finally, Section 6 *General Discussion* discusses how these articles contribute to current research and deepen our understanding of the MMT, addressing whether mindfulness-based interventions can effectively foster flow and work engagement as indicators of eudaimonic well-being.

2. Theoretical introduction

Whether presenting a crucial pitch during a busy day, managing multiple patients in a hospital ward, or handling demanding clients in customer support, mindfulness can play a key role in these demanding situations at work to reduce stress, enhance well-being and foster performance (Glomb et al., 2011; Good et al., 2016). Over the past two decades, a growing body of research has explored the benefits of mindfulness and related interventions at work (Ferreira & Demarzo, 2023; Jamieson & Tuckey, 2017). Mindfulness, rooted in ancient contemplative traditions, is the intentional cultivation of present-moment awareness with an attitude of openness and non-judgment (Bishop et al., 2004). It reduces stress, enhances emotional regulation, and boosts cognitive capacities like focused attention and working memory, making it a promising approach for fostering well-being and performance in the workplace (Chiesa et al., 2011; Glomb et al., 2011). The potential of mindfulness is particularly evident in the numerous mindfulness-based interventions that have been evaluated (Creswell, 2017; Eberth & Sedlmeier, 2012; Jamieson & Tuckey, 2017). These interventions, ranging from extended programs like the MBSR program to brief daily practices (Howarth et al., 2019; Khoury et al., 2015), seek to harness the power of mindfulness to improve individual well-being and performance.

Even though many studies confirmed the positive effects of mindfulness on well-being and performance, there is less consensus about the underlying mechanisms of mindfulness (Shapiro et al., 2006). Synthesizing previous research, the MMT was developed which presents a causal model to explain how mindfulness produces its profound benefits (Garland, Farb, et al., 2015a). According to MMT (Garland, Farb, et al., 2015a), savoring and cognitive reappraisal are key pathways through which mindfulness fosters eudaimonic meaning. At its core, eudaimonic meaning refers to the way patterns of information are organized and integrated within consciousness (Garland, Farb, et al., 2015b), encompassing

for example schemas, appraisals, and cognitive frameworks. It represents the core of eudaimonic well-being that, unlike hedonic approaches to well-being, does not depend on pleasure and positive emotions. Eudaimonic well-being is characterized by a sense of meaning and purposeful, positive engagement (Garland, Farb, et al., 2015a). It incorporates self-realization as well as growth showing positive relations to performance as well as hedonistic well-being (Peiró et al., 2019; Ryan & Deci, 2001). The MMT provides the meta-framework in this thesis when evaluating the effects of mindfulness-based interventions on eudaimonic well-being.

In the work context, flow experience and work engagement can be seen as indicators of momentary eudaimonic well-being, since both capture deep, intrinsically motivated involvement, working towards a meaningful result (Ibrahim et al., 2020; Medhurst & Albrecht, 2016; Waterman, 2004, 2007). Flow experience is defined by complete absorption in the current task, attention in the present moment, solving a challenge that accurately meets the individual's skills, feeling in control and losing the sense of time (Csikszentmihalyi, 2014a). Flow experience captures high intrinsic motivation and an autotelic experience, i.e. individuals strive for this feeling for its own rewarding sake (Engeser et al., 2021). Work engagement has been characterized by three dimensions. Vigor is defined as high energy, mental resilience, and persistence at work (Schaufeli & Bakker, 2004). Dedication involves feeling significant, enthusiastic, and inspired by one's work (Schaufeli & Bakker, 2004). Absorption means being deeply focused and immersed in work, with time seeming to pass quickly (Schaufeli & Bakker, 2004). The aspect of absorption in the current task is characteristic of both flow experience and work engagement, with each construct encompassing additional distinct factors. I first focus on the relationship between mindfulness and flow experience, as both emphasize strong attentional control in the present moment, for instance during a particular task (Marty-Dugas & Smilek, 2019; Sheldon et al., 2015). I then

expand the focus to work engagement, which involves a slightly broader timeframe and scope than flow, possibly spanning over multiple tasks (Digutsch & Diestel, 2021). By considering both indicators, this approach reflects different aspects of eudaimonic well-being and provides more nuanced insights into the effectiveness of mindfulness interventions.

Considering the MMT as a meta-framework and recognizing flow experience and work engagement as indicators of eudaimonic well-being, mindfulness-based interventions hold significant potential to enhance these states. These interventions firstly enhance state mindfulness and then, via increased frequency and intensity, can alter trait mindfulness (Jamieson & Tuckey, 2017). Previous research has already provided initial evidence for positive relations between mindfulness and flow experience as well as work engagement on the trait level (Dane & Brummel, 2014; Kee & Wang, 2008; Leroy et al., 2013; Marty-Dugas et al., 2023; Moore, 2013). However, less research investigated how the state-level constructs mindfulness, flow experience, and work engagement, showing considerable intra-individual fluctuations (Bakker, 2014; Hülsheger et al., 2018; Rivkin et al., 2016), relate to each other. The distinction between relations on the state and trait level is of particular relevance since the broad and accepting attention to all current stimuli including heightened self-awareness during mindfulness cannot be experienced simultaneously with an absorption in the current task as characteristic for flow and work engagement (Sheldon et al., 2015).

In my thesis, I build on and extend the MMT by integrating additional propositions from the TSF (Peifer & Tan, 2021), PSI theory (Kuhl et al., 2006) and mixed model of perspective taking to evaluate how mindfulness-based interventions can enhance flow experience and work engagement. Drawing from the MMT (Garland, Farb, et al., 2015b), I argue that mindfulness can facilitate flow experience and work engagement on the state level based on an altered perception of the present moment. In particular, it broadens the attentional field and enables an accepting perception of all stimuli in the present (Bishop et

al., 2004; Garland, Farb, et al., 2015b). In doing so, individuals perceive demands and negative stimuli as less intruding and can more easily savor positive aspects, creating a new meaning of situations and demands and eudaimonic well-being (Garland, Farb, et al., 2015b; Garland et al., 2009). However, the MMT leaves several aspects unspecified, such as (1) how the appraisal of specific stimuli contributes to creating new meanings that can foster eudaimonic well-being, (2) how mindfulness influences the regulation of thoughts, behaviors, and emotions beyond mere appraisal, and (3) how this internally focused theory impacts the daily social interactions that shape our everyday lives. To address these questions, I implemented three studies utilizing several established theories (i.e., TSF, dual mode of self-regulation as described in the PSI theory, and mixed-motive model of perspective taking).

Firstly, I drew from the TSF (Peifer & Tan, 2021), based on the transactional model of stress (Lazarus & Folkman, 1984), which emphasizes the (re-)appraisal of situations as either positive challenges or stressors as decisive to experiencing flow or stress, viewed as opposing states. It further specifies the appraisal as an interplay of how resources and demands are evaluated. Integrating insights from MMT and TSF, I propose that individuals in a mindful state, by acknowledging resources and accepting demands, are more likely to appraise situations as positive challenges, fostering flow and reducing stress (Good et al., 2016; Peifer & Tan, 2021; see section 2). My first study, therefore, explored whether the MBSR program can not only reduce stress but also enhance flow. Given the program's eight-week duration, I also examined change trajectories to determine if mindfulness fosters flow immediately or if effects take time to manifest. The results showed a simultaneous linear increase in mindfulness and flow experience during the MBSR training.

Secondly, to explore how mindfulness influences the regulation of thoughts, behaviors, and emotions beyond mere appraisal, I drew from the PSI theory. According to the PSI theory, autonomous regulation occurs when actions align with internal values, while

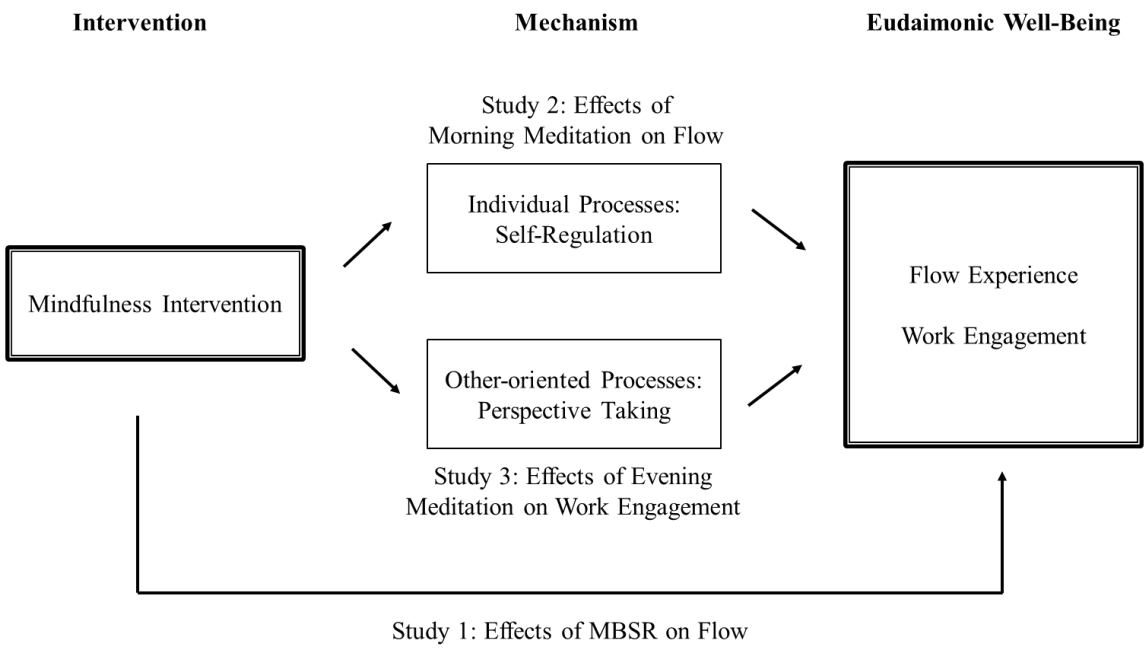
effortful self-control is needed when actions are misaligned and aspects of the self must be suppressed (Kuhl, 2010). By integrating MMT and PSI, I propose that mindfulness, by enhancing awareness of both internal and external stimuli, broadens the recognition of alignments between required actions and the self, thereby promoting autonomous regulation (Ludwig et al., 2020; Schultz & Ryan, 2015). Since autonomous regulation is closely linked to flow, this offers another pathway through which mindfulness can enhance eudaimonic well-being (see section 3). This theoretical basis guided my second study, which examined whether a brief morning meditation could improve day-specific flow through enhanced self-regulation. The study found that even short mindfulness practices significantly increased flow, offering a practical strategy for employees.

The third question explores how the internally focused MMT can be extended to the daily social interactions that define work life. To investigate this, I used the mixed-motive theory of perspective-taking (Ku et al., 2015), which highlights the importance of perspective taking during social interactions. Integrating the assumptions of the mixed-motive theory with MMT, mindfulness can enhance awareness of social cues during interactions with colleagues, customers, or others, fostering acceptance of their perspectives (Glomb et al., 2011; van Doesum et al., 2013). Since most tasks involve interactions with others (Lehmann-Willenbrock, 2024), increased perspective-taking can lead to more positive appraisals of work situations, promoting eudaimonic well-being (see section 4). Considering that social interactions are not only limited to one specific task, I chose work engagement as indicator of eudaimonic well-being capturing a broader scope than flow experience. Recognizing the importance of social interactions, my third study examined whether an evening meditation could be as effective as morning meditation in enhancing work engagement, investigating perspective-taking as a mediator and controlling for self-regulation as well as sleep quality.

In conclusion, my thesis aims to provide a comprehensive understanding of the mechanisms through which mindfulness interventions can enhance flow experience and work engagement, considering these constructs as momentary indicators of eudaimonic well-being. The conduction of three different studies, evaluating different interventions over different time spans, contributes to our understanding of how broadly applied mindfulness interventions in different forms can be utilized to foster eudaimonic well-being (see Figure *1*).

Figure 1.

Overview of studies addressing the effects of mindfulness interventions on eudaimonic well-being.



2.1 Benefits of mindfulness in the work context

Especially in the work context, it is important to evaluate interventions that can foster well-being and performance, ideally not only reducing stress but fostering intrinsic involvement. Mindfulness has often been investigated in the frame of positive psychology to enhance well-being and performance (Eberth & Sedlmeier, 2012; Jamieson & Tuckey, 2017), and has been considered a promising path to foster eudaimonic well-being (Deci & Ryan, 2008; Garland,

Farb, et al., 2015a). Mindfulness evolved based on a Buddhist tradition, finding more popularity in the western world during the last decades (Kabat-Zinn, 2003). Definitions of mindfulness vary but commonly include a strong focus on the present moment as well as an open and accepting perception of all internal and external stimuli such as thoughts, emotions, or a conversation (Bishop et al., 2004). While interindividual differences in trait mindfulness have shown significant relations to various indicators of well-being and performance (Mesmer-Magnus et al., 2017), several studies have shown that mindfulness also significantly varies within a person over several days or even within a day (e.g., Hülsheger et al., 2014; Hülsheger et al., 2018; Jamieson & Tuckey, 2017; Tuckey et al., 2018). Accordingly, despite the fact that it is often investigated on the trait level, mindfulness seems to be inherently a state (i.e., accepting present moment attention) that varies in intensity and frequency between individuals (Tuckey et al., 2018). Accordingly, to understand mechanisms and outcomes of mindfulness, such as day-specific well-being and performance, it is necessary to take these intra-individual changes into account. Further, Jamieson and Tuckey (2017) have outlined how mindfulness interventions firstly enhance state mindfulness, and over much longer timeframes via increased intensity, duration, and frequency can also alter trait mindfulness. Investigating mindfulness interventions as a possible pathway to foster eudaimonic well-being, I mainly focus on the relation of state mindfulness to flow experience and work engagement.

Several reviews have summarized the beneficial effects of mindfulness interventions on well-being and performance in the work context as well as the private context (Eberth & Sedlmeier, 2012; Glomb et al., 2011; Good et al., 2016; Hyland et al., 2015). Different mindfulness-based interventions have been implemented, starting from more extensive interventions over multiple weeks, such as the well-known MBSR training (Kabat-Zinn, 2003), to brief meditations of just five minutes (Howarth et al., 2019). The MBSR training

involves weekly group sessions over eight weeks covering psychoeducation about stress as well as mindfulness-based exercises, which proved significant reductions in stress and improvement in well-being due to increased mindfulness (Khoury et al., 2015; Vibe et al., 2017). Further, brief mindfulness interventions, that can be as short as just five minutes, have been shown to significantly enhance immediate as well as day-specific well-being (Howarth et al., 2019). Whereas some studies have shown positive effects of mindfulness interventions on work engagement (Coo & Salanova, 2018; Klatt et al., 2015; Knight et al., 2017), fewer studies have investigated the effects on flow experience in the work context (for an exception see Marty-Dugas et al., 2023; Sheldon et al., 2015). Further research is necessary to investigate whether these interventions are suitable to enhance momentary eudaimonic well-being over longer time frame such as multiple weeks (see section 3), within the same day (see section 4) or even spill over to the next day (see section 5).

2.2 Mindfulness-to-Meaning Theory

Even though many studies confirmed positive effects of mindfulness on well-being and performance, there is less consensus about the underlying mechanisms of mindfulness (Shapiro et al., 2006). As explaining mechanisms for the beneficial effects of mindfulness, researchers have mainly suggested re-perceiving or re-appraisal (Garland, Farb, et al., 2015b; Garland et al., 2009; Garland, Hanley, et al., 2015; Shapiro et al., 2006), improved regulation of thoughts, emotions, and behaviors (Bowlin & Baer, 2012; Friese & Hofmann, 2016; Glomb et al., 2011), and improved recovery processes such as sleep quality (Hülsheger et al., 2013; Hülsheger et al., 2015; Marzuq & Drach-Zahavy, 2012; Rusch et al., 2019). The MMT (Garland, Farb, et al., 2015b) builds on this research and represents one of the most comprehensive theories to explain the underlying mechanisms of mindfulness. According to MMT, savoring positive stimuli and reappraising negative situations are two primary pathways through which mindfulness can enhance eudaimonic well-being. However,

according to the MMT, these mechanisms are not exhaustive. Mindfulness might facilitate several top-down guided mechanisms and the ability to switch between them (Garland, Farb, et al., 2015b).

The proposition of positive reappraisal at the core of this theory suggests that mindfulness is a meta-cognitive state that supports an adaptive process in which negative life events or circumstances can be (re-)perceived in a more positive and meaningful way. By decentering and broadening the attentional focus, mindfulness supports a more flexible awareness and allows the incorporation of new aspects and resources to enable a more positive focus and the creation of a new meaning (Garland, Farb, et al., 2015b). In this frame, meaning can be described as the generation of a narrative and a contextual interpretation of certain events, stimuli, or circumstances (Garland, Farb, et al., 2015b). In particular, mindfulness can foster the re-appraisal by becoming aware of automatic interpretations as well as the initial creation of a more positive focus and meaning. Further, the authors argue that mindfulness can not only reduce negative experiences to a neutral level but also foster savoring of positive ones (Garland, Farb, et al., 2015a). On the one hand, mindfulness can help to perceive positive aspects in the face of adversity and suffering (Bryant & Smith, 2015). For instance, a manager reflecting on a project that did not meet expectations might accept the disappointment more easily and realize how the experience highlights areas for team improvement, enabling growth and future success. On the other hand, mindfulness fosters the nuanced perception of positive experiences independent of adversity (Bryant & Smith, 2015). Savoring starts with the awareness of positive experiences but extends to fully attending to them noticing more subtle features and recognizing its emotional impacts (Garland, Farb, et al., 2015a). For instance, after successfully completing a presentation, an employee might take a moment to acknowledge their hard work, enjoy a sense of pride, and appreciate the positive feedback received. Therefore, a mindful perception of positive

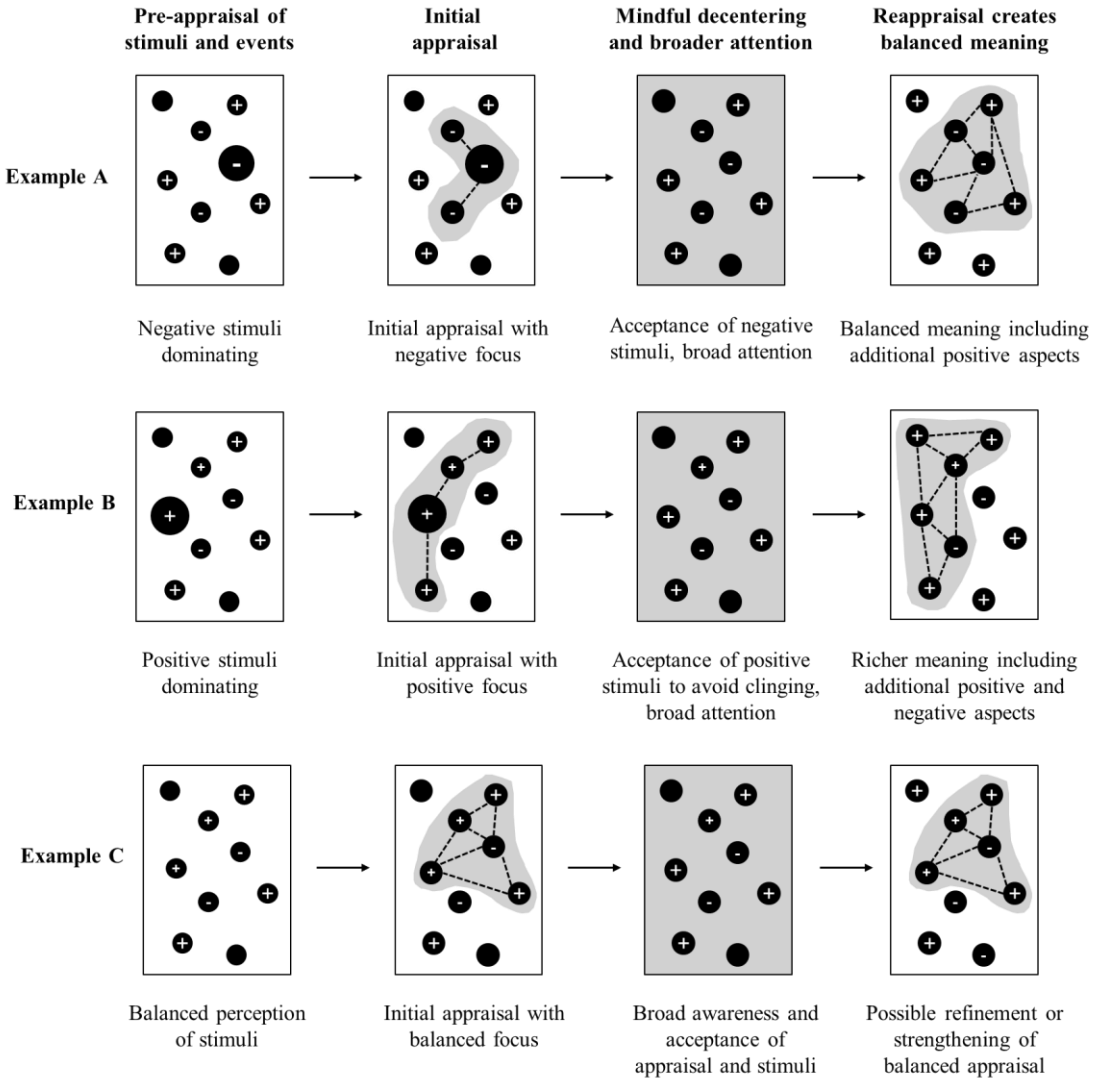
experiences deepens them as well as related positive emotional states. However, it is important to note that mindful savoring shall not involve clinging to these experiences since this could evoke suffering once the positive experience ends (Garland, Farb, et al., 2015a; Wallace & Shapiro, 2006). To summarise, by facilitating the positive (re-)appraisal of negatively-valenced experiences and savoring of positive ones, mindfulness supports eudaimonic well-being (Garland, Farb, et al., 2015a).

Figure *2* illustrates two examples of how mindfulness can support the creation of eudaimonic meaning through the reappraisal of situations and the savoring of positive experiences. Based on the example given by Garland, Farb, et al. (2015b), example A focuses on coping with negative experiences. In this example, mindfulness helps to recenter attention, allowing for the perception of positive stimuli that can enrich the appraisal and perception of the situation in a more meaningful way. Example B provides an addition in the frame of this thesis, integrating comments from Bryant and Smith (2015), and showing that mindfulness can support eudaimonic well-being also without facing adversity. Here, mindfulness allows for savoring, in particular attending to a positive experience and exploring additional positive aspects without clinging to them or avoiding negative stimuli. Therefore, it could help to shift the focus from hedonistic to eudaimonic well-being. Example C illustrates a case, where the individual already starts with a balanced appraisal and a meaningful perception of the situation. Mindfulness can support awareness of this appraisal and all surrounding stimuli, offering but not requiring the possibility of refinement. In this thesis, I follow the focus of the MMT and further explore “how mindfulness training fosters eudaimonic responses to stress that engender a sense of meaningfulness in life” (Garland, Farb, et al., 2015a, p. 295), further supporting a shift from stress to eudaimonic well-being in the work context. It is important to note that stress or adversity is not needed to create eudaimonic well-being (see Example B). However, especially at work, based on the high prevalence of stress at work (Ganster &

Rosen, 2013), it is highly relevant to further explore how to shift from potentially stressful situations to eudaimonic well-being.

Figure 2.

Examples of re-appraisal and savoring as part of MMT



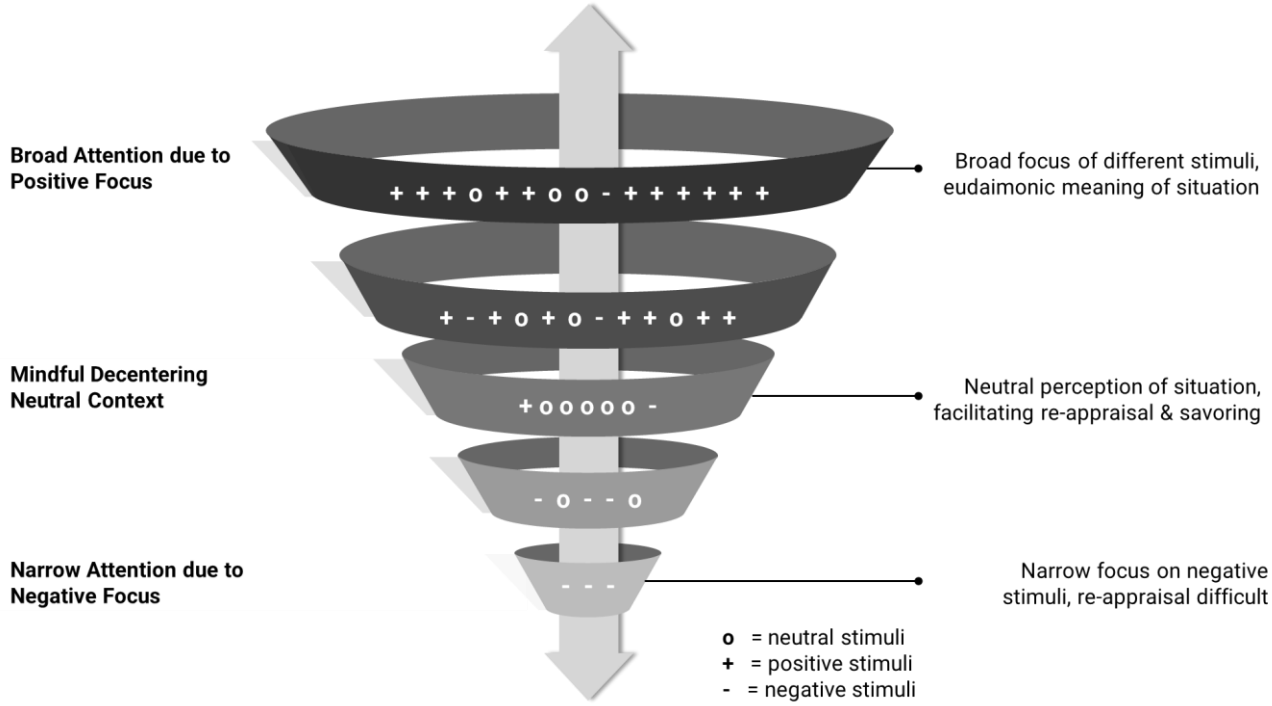
Note. Example A adapted and extended based on Garland, Farb, et al. (2015b)

The MMT further suggests that there is a positive re-enforcement between mindfulness and a positive (re-)appraisal as well as savoring, creating a positive up-wards spiral of resources (Garland, Farb, et al., 2015b). When individuals are in a positive state of mind, they tend to perceive a broader range of stimuli, facilitating positive and meaningful

(re-)appraisal as well as savoring. Conversely, a negative mindset narrows the focus toward negatively valenced stimuli, making re-appraisal more challenging. Mindfulness aids in re-centering emotional states, broadening perception to include more diverse stimuli and facilitating re-appraisal. Thus, it can interrupt a negative downward spiral and facilitate the conversation into an upwards spiral. Further, when already in a positive state, mindfulness can aid further savoring of positive experiences without clinging to them (Figure *3*).

Figure 3.

Mindfulness decentering aids the creation of eudaimonic meaning



Note. Figure adapted and extended based on Garland, Farb, et al. (2015b)

However, it is important to note that mindfulness involves decentering from thoughts and emotions without immediately appraising them (Garland, Farb, et al., 2015a; Good et al., 2016). This non-judgmental awareness allows individuals to observe their experiences from a distance, without getting caught up in their immediate reactions (Good et al., 2016). While this may seem at odds with the idea of a positive re-appraisal or savoring, it can facilitate it in a subsequent step. By first decentering, mindfulness creates the mental space needed to

reassess situations more objectively and attend to more stimuli as well as their details (Garland, Farb, et al., 2015a). This initial detachment can then pave the way for a more positive and meaningful re-appraisal, as it reduces the intensity of negative reactions and opens up the possibility for a more balanced perspective (Garland, Farb, et al., 2015a). Therefore, mindfulness does not equal re-appraisal or savoring but facilitates these mechanisms leading to eudaimonic well-being.

2.3 Eudaimonic well-being

The MMT suggests that mindfulness can foster eudaimonic well-being which has been defined as the thriving to realize one's full potential as a form of meaningful life (Garland, Farb, et al., 2015a; Ryff, 1989). In contrast, hedonistic well-being refers to the enjoyment and the experience of positive affect and pleasure (Ryff, 1989; Ryff & Keyes, 1995). Both concepts of well-being are moderately related to each other (Ryan & Deci, 2001). In terms of work, both hedonistic and eudaimonic well-being play an important role (Sonnentag, 2015). However, whereas hedonistic well-being would be caused by achieving a goal or a positive conversation with a colleague, eudaimonic well-being can be fostered by challenging goals in alignment with values and interests, showing a strong relation to intrinsic motivation (Ryan & Deci, 2001; Straume & Vittersø, 2012). Further, hedonistic well-being is strongly focused on the self and inner experiences, whereas eudaimonic well-being is based on cognitive sense-making of the external world (Costa et al., 2019). In doing so, especially eudaimonic well-being provides great potential in the work place to increase positive affect (i.e., hedonistic well-being) as well as performance and long-term growth (Ryan & Deci, 2001). Enhancing both well-being and performance simultaneously has long been a central objective in organizational psychology.

Imagine a programmer who works highly concentrated for hours on one code, driven by their personal interest and motivated to solve this challenge. Instead of heightened stress

levels, they can experience intrinsic motivation and heightened well-being while showing high performance. At this particular moment, the programmer is realizing their full potential. This momentary experience of eudaimonic well-being closely mirrors the states of flow and work engagement, which serve as indicators of eudaimonic well-being at work. In both states, individuals realize their full potential, experience intrinsic motivation, and completely focus on the task at hand (Engeser et al., 2021; Schaufeli et al., 2006). It is not merely about feeling good but about being fully engaged in meaningful activities that contribute to personal development and well-being in the workplace. In particular, flow experience describes an optimal experience, during which individuals feel at the peak of their abilities and are strongly intrinsically motivated (Csikszentmihalyi, 2014b). Even though it is not directly related to positive feelings during the activity (i.e., hedonistic well-being), it contributes to growth and self-realization (i.e., eudaimonic well-being; Engeser et al., 2021). Work engagement encompasses a similar experience of dedication to and absorption within the tasks (i.e. eudaimonic well-being; Schaufeli et al., 2006). Further, it incorporates subjective vitality which has been hypothesized to be closely related to self-actualization and eudaimonic well-being (Ryan & Frederick, 1997), whereas it also entails initial aspects of hedonic well-being such as the experience of positively valenced energy (Sonnentag, 2015). Further, whereas flow experience is focused on one specific task, work engagement can be experienced within a broader scope (Digutsch & Diestel, 2021; Medhurst & Albrecht, 2016). Accordingly, I consider flow experience and work engagement as indicators of momentary eudaimonic well-being at work. Both capture a state of optimal functioning, associated with increased well-being and performance. The consideration of both indicators allows for the reflections of different aspects of eudaimonic well-being and helps to generalize findings about the effectiveness of mindfulness interventions in fostering eudaimonic well-being.

2.3.1 Flow Experience and Work Engagement

Flow experience and work engagement are both closely related constructs that reflect eudaimonic well-being in the workplace, yet they differ in scope and emphasis. Flow, as originally conceptualized by Csikszentmihalyi (2014a), is characterized by an autotelic experience where individuals are fully immersed in a task, typically one that provides a high-level balance between demands and skills, clear goals, and immediate feedback (Engeser & Rheinberg, 2008; Nakamura & Csikszentmihalyi, 2014). However, the conditions that foster flow can vary depending on the situation and individual traits, highlighting its context-dependent nature (Hohnemann et al., 2022). Flow is often seen in peak experiences, where individuals lose track of time and self, leading to enhanced performance, positive emotions and job satisfaction (Peifer & Wolters, 2021; Rivkin et al., 2016). Despite these benefits, flow interventions in the workplace are still relatively rare (for an exception see Bartzik et al., 2021).

On the other hand, work engagement is a more persistent state, encompassing vigor, dedication, and absorption (Schaufeli & Bakker, 2004), with the latter showing conceptual overlap with flow experience. While flow emphasizes deep, effortless concentration on a single task (Marty-Dugas & Smilek, 2019), work engagement extends this focus to include motivational and energetic components, reflecting an ongoing, fulfilling state of mind across various work activities (Digutsch & Diestel, 2021; Schaufeli & Bakker, 2004). Work engagement is influenced by personal resources like self-efficacy and emotional competencies, as well as job resources such as organizational support and feedback (Lorente et al., 2014; Schaufeli & Bakker, 2004). These resources, along with a balance between job demands and resources, are crucial in fostering work engagement, similar to how flow is facilitated by an optimal balance between demands and skills (van Wingerden et al., 2017).

Both flow and work engagement are linked to improved job satisfaction, performance, and well-being (Neuber et al., 2022; Saks, 2019), but while flow is often linked to specific tasks, work engagement represents a slightly broader, more sustained involvement. Despite intraindividual fluctuation in can encompass multiple tasks or situations (Digutsch & Diestel, 2021). The overlap in their predictors—such as balance between demands and resources—suggests that interventions aimed at enhancing one may benefit the other. However, while different interventions, including mindfulness-based interventions, have shown positive effects in fostering work engagement (Knight et al., 2017), their impact on flow, particularly in the workplace, remains less explored, highlighting an area for further research and practical application.

2.3.2 Mindfulness and eudaimonic well-being

Aligned with the propositions of the MMT (Garland, Farb, et al., 2015a), research on mindfulness and eudaimonic well-being has already suggested that mindfulness practices can significantly enhance eudaimonic well-being, which goes beyond mere pleasure to include personal growth, meaning, and self-realization (Deci & Ryan, 2008). However, previous studies investigating the relations between mindfulness and flow as well as work engagement provided mixed results (e.g., Kee & Wang, 2008; Leroy et al., 2013; Sheldon et al., 2015; van Berkel et al., 2014). In comparing the constructs mindfulness, flow and work engagement, great similarities, such as the focus on the present moment, strong attentional control as well as an enhanced affect and performance, emerge (Dust, 2015; Kee & Wang, 2008; Sheldon et al., 2015). However, substantial differences appear in the width of the attentional focus and the awareness of inner stimuli (Sheldon et al., 2015). In particular, the distinct nature of complete absorption in flow and work engagement contrasts with the open awareness, encompassed in mindfulness which leads to an inability to experience both states of mind at the same time (Sheldon et al., 2015). This distinction has been emphasized for flow

experience, since flow involves the complete loss of self-awareness whereas mindfulness encompasses very high self-awareness (Sheldon et al., 2015). Therefore, mindfulness can not be experienced simultaneously with flow or work engagement. However, being completely dedicated to the current moment without any distraction from the past, future, or own emotions, allows employees to deeply engage with the current tasks, perceiving every single moment attentively. Further, the acceptance of demands and challenges without negative evaluation allows for a more objective assessment and the ideal use of resources, which can pave the path for flow experience (Good et al., 2016) and evoke a feeling of energy and vitality as indicated by high work engagement (Liu et al., 2019).

Supporting a positive relation between mindfulness and eudaimonic well-being, several studies found a positive correlation between mindfulness and flow or work engagement on the trait level. Focusing on flow, research indicates that more mindful individuals tend to experience flow more frequently (Kee & Wang, 2008; Marty-Dugas et al., 2023; Moore, 2013). Further, among students, flow in sports partially mediated the positive effects of trait mindfulness on well-being (P. Lin, 2023). Additionally, mindfulness interventions in sports have been shown to foster flow experiences (Scott-Hamilton et al., 2016). More recently, Marty-Dugas et al. (2023) provided further evidence for a positive correlation between trait mindfulness and flow experience as well as brief effects of a short mindfulness intervention on flow in a subsequent task. Similarly, mindfulness has been identified as a promising avenue to enhance work engagement, particularly due to its role in fostering psychological presence at work (Coo & Salanova, 2018; Kahn, 1990; Leroy et al., 2013). Positive effects of mindfulness interventions on work engagement have been observed, especially in the nursing sector (Coo & Salanova, 2018; Klatt et al., 2015) but also among diverse employee samples (Leroy et al., 2013). However, not all research supports these findings; some studies have failed to demonstrate significant effects (van Berkel et al.,

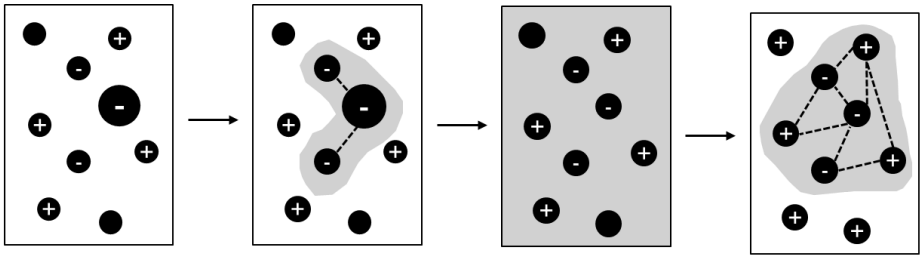
2014). Focusing on the state level, Tuckey et al. (2018) found that state work engagement predicted subsequent state mindfulness, but not vice versa, and suggested that missing variation in mindfulness may have caused these results. Therefore, a brief mindfulness intervention might still be able to increase state work engagement. Summarizing, there seems to be great potential for mindfulness and related interventions to facilitate flow experience and work engagement, but further exploration of underlying mechanisms and the relation on the state level along with the effectiveness of mindfulness interventions is needed, especially in the work context.

2.4 Theoretical integration and research questions

The MMT posits that mindfulness facilitates the transition from stress to eudaimonic well-being by altering one's perception of the present moment (Garland, Farb, et al., 2015a). By broadening attention and fostering an accepting awareness of all stimuli, mindfulness enables individuals to reinterpret challenges and negative experiences in a more positive light, thereby creating new meanings and enhancing well-being (Garland, Farb, et al., 2015a). However, the MMT leaves certain aspects underexplored. Specifically, it does not fully explain: (1) how the appraisal of specific stimuli contributes to the creation of new meanings that foster eudaimonic well-being, (2) the broader influence of mindfulness on the regulation of thoughts, behaviors, and emotions beyond appraisal, and (3) the impact of mindfulness as internally focused process within the social context. To gain more insights I present in the following how (1) the TSF, (2) the PSI theory, and (3) the mixed model of perspective taking align with the propositions of the MMT and help to address these questions, allowing for a better understanding of how mindfulness can foster eudaimonic well-being.

Figure 4.

Theoretical integration to explain the underlying mechanism of mindfulness



Mindfulness-to-Meaning Theory	Pre-appraisal of stimuli and events	Automatic appraisal	Mindful decentering and broader attention	Reappraisal and creating of new meaning
Transactional Model of Stress and Flow	Relevant demands or task	Primary appraisal as stressful	Acceptance and recognition of resources	Interpretation as challenge enabling flow
Self-Regulation vs Self-Control (PSI Theory)	Required regulation of thoughts, emotions or behaviours	Initial perception, requiring (partly) volitional self-control	Acceptance and recognition of values, goals and interests	Identification of alignments facilitating self-regulation
Mixed-Model of Perspective Taking	Social interaction with diverging motives	Interpretation coloured by own emotions and perspective	Acceptance and recognition of more social clues	Less biased understanding of the situation and others with new meaning

Note. Figure adapted and extended based on Garland, Farb, et al. (2015b)

2.4.1 The transactional model of stress and flow

The TSF (Peifer & Tan, 2021), as an adaptation of the transactional model of stress (Lazarus & Folkman, 1984), describes how the same situation or task can be experienced as stressful or as a positive challenge based on the appraisal of demands (first appraisal) and resources (second appraisal). First, if a task is evaluated as relevant, it can be further perceived as a threat, loss or positive challenge. Second, in case of a potentially stressful situation (i.e., threat or loss) the available resources for coping are evaluated. The task is then experienced as stressful (i.e., threat or loss) if the demands outweigh the available resources, or as a positive challenge if there are sufficient resources to meet the demands (Peifer & Tan, 2021). Potentially, there can be a re-evaluation of the demands and/or the resources altering the

subjective experience (reappraisal; Peifer & Tan, 2021). In the transactional model of stress, a challenge was described as a positive invigorating form of stress, that is perceived as pleasurable and associated with persistent coping and higher performance (Lazarus & Folkman, 1984; Lazarus et al., 1980), which mirrors important characteristics of flow. Whereas Lazarus et al. (1980) touches on flow experience as a positive state that can sustain coping efforts in a potentially stressful situation, the TSF specifically integrates flow into the theory and highlights that the interpretation of a relevant situation as a positive challenge facilitates the experience of flow (Peifer & Tan, 2021). This integration is supported by research on flow experience, that has identified the perceived balance between demands and skills as the main predictor of flow, which closely resembles the appraisal that sufficient resources are available for coping in the TSF (Nakamura & Csikszentmihalyi, 2014; Peifer & Tan, 2021).

The TSF can offer valuable insights into how a (re-)appraisal of a situation can facilitate eudaimonic meaning as described in the MMT (Garland, Farb, et al., 2015a). First, it highlights the role of demands and resources as crucial factors in shaping the appraisal of challenging work situations (Peifer & Tan, 2021). Second, it emphasizes that the appraisal as positive challenge can enable eudaimonic well-being, as indicated by flow, offering a more concrete example of how a meaningful appraisal can manifest (Peifer & Tan, 2021). Integrating TSF with mindfulness research, mindfulness can support individuals to accept high demands, overcome fear or worries, and recognize new resources based on a broad and accepting awareness (Garland et al., 2017; Glomb et al., 2011; Good et al., 2016). In doing so, it can facilitate the interpretation of a demand as a positive challenge and inhibit the appraisal as a stressor. In particular, by training an accepting present-moment attention and reducing the automatization of cognitive processes, individuals can evaluate situations more objectively without being influenced by emotions and automated thought patterns such as

worrying (Glomb et al., 2011). Therefore, demanding aspects are likely to be perceived as less threatening which reduces stress. Further, based on reduced automatization and broad attention span including possible resources and demands, mindfulness allows for more efficient resource allocation (Bishop et al., 2004; Glomb et al., 2011; Good et al., 2016). Accordingly, previous studies provided strong evidence that mindfulness can enhance coping with stress and perceive demanding situations as positive challenges (Beer et al., 2020; Garland et al., 2017; Jamieson & Tuckey, 2017; Sun et al., 2020). By becoming aware of an initial appraisal, it further supports the re-appraisal of a situation (Garland et al., 2009), which can support a shift from an initial appraisal as stressful situation to an appraisal as challenge.

Therefore, I argue that a build-up of mindfulness over time during an intervention can not only lead to a decrease in stress but also an increase in flow experience. Both, the MMT (Garland, Farb, et al., 2015b) as well as the TSF (Peifer & Tan, 2021), emphasize that appraisal of a situation or stimuli (i.e., the given meaning) is decisive for the experience and well-being, with the explicit option of re-evaluation. Whereas the MMT mainly emphasizes a positive (re-)appraisal as the core component of mindfulness (Garland, Farb, et al., 2015b), the TSF (Peifer & Tan, 2021) specifies this process and further clarifies which aspects are evaluated in demanding situations, focusing on the assessment of demands and resources as well as their balance (Peifer & Tan, 2021). The TSF additionally incorporates the outcomes of such appraisal or meaning, as in particular stress and flow. In doing so, the TSF showcases that perceiving a demanding situation as a positive challenge represents a meaningful appraisal that can foster flow as an indicator of eudaimonic well-being (Peifer & Tan, 2021). Both, the MMT (Garland, Farb, et al., 2015a) and TSF (Peifer & Tan, 2021), outline that demanding situations can be appraised initially as positive challenge (displayed in Figure *2*Figure 3, Example C) or that an initially negatively appraised situation can be re-appraised as positive challenge (displayed in Figure *2*, Example A). In doing so, both theories rather

focus on the coping with possibly negative or stressful experiences than the perception of positive ones (Garland, Farb, et al., 2015b; Peifer & Tan, 2021). While the MMT offers a broader conceptual framework, the TSF focusses on the specifics of how individuals cope with demands and stress in a more targeted context. Figure *4* shows how the different steps of the MMT and the TSF can align. In particular, mindful decentering and a broader attention allow for the acceptance of demands and recognition of resources, which leads to the meaningful re-appraisal of the situation as positive challenge, enabling flow. Taken together, mindfulness seems to be likely to foster flow experiences and reduce stress over time, despite the incompatibility between a broad field of attention as part of mindfulness and complete absorption during flow. Thereby, I delineate the first research question for my dissertation, addressed in section *3. Trajectories of mindfulness, flow experience and stress during an online-based MBSR program: the* moderating role of emotional exhaustion:

Research question 1: How can a mindfulness intervention reduce stress and foster flow experience over time?

2.4.2 Dual modes of regulatory processes

Utilizing research on regulatory processes, we can gain additional insights into how mindfulness can influence the regulation of thoughts, emotions, and behaviors beyond the mere appraisal of a situation. The PSI Theory (Kuhl et al., 2006) is a complex theory that aims to explain optimal human functioning and, among other components, distinguishes between autonomous self-regulation and volitional self-control. Self-regulation occurs when the regulation of thoughts, emotions, or behaviors aligns with internal values, goals, or interests, therefore increasing well-being (Kuhl, 2010). In contrast, self-control is necessary when the required thoughts, emotions, or behaviors are only aligned with external goals but require the suppression of internal values, goals, or interests, therefore impairing well-being

(Kuhl, 2010). Whereas self-control has been often considered an exhaustive process in which individuals have to invest resources to show a desired behavior or regulate their thoughts and emotions, autonomous self-regulation can even lead to increased resources and greater well-being due to the alignment of actions with internal values and goals (Moller et al., 2006; Muraven, 2008; Muraven et al., 2008; Ryan & Deci, 2008). The distinction between self-control and self-regulation is further supported by different articles and theories, such as the self-determination theory (Deci & Ryan, 2012; Koole et al., 2018). Further, the PSI theory proposes that strong negative affect evokes a limited focus on singular stimuli or experiences (e.g., problems, changes, differences) and inhibits access to broader self-presentation and inner motives (Kuhl, 2010). Accordingly, the reduction of negative affect facilitates the acceptance and integration of these singular experiences into the broader context and self-representation, fostering growth and eudaimonic well-being (second modulation hypothesis; Kuhl, 2010). Similarly, a reduction of positive affect allows one to focus on these singular stimuli and experiences to then integrate them instead of suppressing or neglecting them (first modulation hypothesis; Kuhl, 2010).

While the enhancement of regulatory processes has been often considered an important explanatory mechanism for the beneficial effects of mindfulness (Glomb et al., 2011; Good et al., 2016), most prior research has not considered the distinction between self-regulation and self-control (e.g., K. W. Brown et al., 2007; Glomb et al., 2011; Masicampo & Baumeister, 2007). However, initial evidence suggests that mindfulness might foster self-regulation and reduce the need for self-control. In particular, Ludwig et al. (2020) propose in their theoretical work that mindfulness may facilitate effortless regulation of individual health behaviors by increasing awareness of subjective experiences and inner values, leading to a re-evaluation of enacted behaviors, which has been also described in the MMT (Garland, Farb, et al., 2015b). Further, Friese and Hofmann (2016) revealed that individuals in a mindful state

experience less conflict between desires and other goals, reducing the need for effortful regulatory strategies such as suppression or self-stopping. However, mindfulness did not alleviate exerted restraints when desire was high, suggesting that it shifts the focus towards self-congruent aspects rather than improving regulatory capacity in challenging situations. Subsequently, based on the alignment between actions and interests or values as well as its close relation to intrinsic motivation, self-regulation is likely to foster intrinsic motivation and eudaimonic well-being, whereas self-control might impair it. Considering flow as indicator of eudaimonic well-being, that encompasses a peak of intrinsic motivation (Nakamura & Csikszentmihalyi, 2014), self-regulation is likely to foster flow experience. Further, previous research showed that mindfulness can increase work engagement via authentic functioning, which shows great conceptual overlap with self-regulation (Leroy et al., 2013).

Combining the PSI theory (Kuhl et al., 2006) with the MMT (Garland, Farb, et al., 2015b) enables new insights into our understanding of regulatory processes as well as mindfulness. While the MMT gives insights into how a situation can be perceived differently, it does not answer the question of how mindfulness influences regulatory processes beyond the appraisal of situations. Based on the MMT (Garland, Farb, et al., 2015b), mindfulness broadens attention and fosters acceptance of all negative as well as positive aspects, which allows individuals to more clearly identify points of alignment between their regulatory demands and personal values or interests. This alignment facilitates the creation of a new meaning and promotes autonomous self-regulation while reducing the need for effortful self-control (Koole et al., 2018; Kuhl, 2010). This, in turn, promotes eudaimonic well-being, where individuals are intrinsically motivated and able to maintain focus and engagement in their tasks, as indicated by flow experience. Further, mindfulness supports the downregulation of positive as well as negative affect by recentering attention and accepting

all experiences (see Figure *3*). According to the PSI theory, this allows for the acceptance of separate experiences as part of the self (Kuhl et al., 2015). The integrated self as defined in the PSI theory (Kuhl et al., 2015) shows conceptual overlap with eudaimonic well-being. It relies on autonomous self-regulation and is characterized by unconscious processing, extended resilience, extended trust, emotional connectedness, and incorporation of feedback, in addition to the integration of negative experiences (e.g., high demands; Kuhl et al., 2015), which together strongly resemble the experience of flow.

Through this theoretical integration, regulatory processes offer a more granular understanding of the mechanisms outlined in the MMT. Conversely, the MMT provides a comprehensive framework for understanding how mindfulness relates to regulatory processes, underscoring its importance in research on regulatory processes. Figure *4* shows in a simplified way how the predictions of the MMT and PSI theory can align. In particular, mindful decentring, broader attention, and down-regulation of emotions facilitate the identification of possible alignments between actions as well as aspects of the self, shifting from an initial appraisal requiring self-control to a more balanced appraisal facilitating self-regulation and eudaimonic well-being. Based on this theoretical deduction, focusing on flow experience as an indicator of eudaimonic well-being, the following research question can be deduced.

Research question 2: How can autonomous self-regulation and volitional self-control explain the positive effect of mindfulness on flow experience?

2.4.3 Mixed motive model of perspective taking

While most studies explaining the positive effects of mindfulness on eudaimonic well-being have focused on intraindividual mechanisms, such as self-regulation or recovery processes (Friese & Hofmann, 2016; Glomb et al., 2011; Ludwig et al., 2020), they did not

consider the importance of social interactions in the work context or private life (Lehmann-Willenbrock, 2024). Based on the relevance of social interactions for the individual's well-being and performance (Lehmann-Willenbrock, 2024; Litchfield & Gentry, 2010; Parker et al., 2008), I draw from the mixed-motive model of perspective taking to shed light on perspective taking as a possible mechanism for the positive effects of mindfulness in the work place (Ku et al., 2015). Further, while the appraisal of demands as well as the necessary regulation of thoughts, emotions, and behavior is closely related to a specific task, social interactions can more often occur between tasks, without relation to specific demands, or encompass multiple projects (e.g., in a team meeting). Similarly, while flow experience is limited to a specific task (Nakamura & Csikszentmihalyi, 2009), work engagement can more often occur between tasks and over a slightly broader time frame, such as a few hours (Digutsch & Diestel, 2021). Therefore, when testing perspective taking as an explaining mechanism for the positive effects of mindfulness on the actor's well-being and performance, I consider work engagement as main indicator of eudaimonic well-being since it captures a slightly broader scope (Digutsch & Diestel, 2021; Schaufeli & Bakker, 2004).

The mixed motive model (Ku et al., 2015) emphasizes perspective taking as a core process to manage social interactions with various motives effectively, striking a balance between cooperation for social bonding and self-protection in competitive situations (Ku et al., 2015). Thereby, perspective taking can be defined as understanding the thoughts, feelings, and viewpoints of others (Ku et al., 2015). This allows individuals to gain insight into their colleagues' perspectives and experiences (see also Longmire & Harrison, 2018; Parker et al., 2008). Perspective taking has been often considered part of empathy even though it encompasses solely the cognitive aspects of understanding others, excluding an emotional reaction (Longmire & Harrison, 2018). Within the frame of the mixed-motive model, cognitive capacity and motivation have been identified as antecedents of perspective taking

(Ku et al., 2015). Mindfulness improves cognitive capacity and encourages an open and non-judgmental perception of all emotional and social cues in the present moment (Bishop et al., 2004; Chiesa et al., 2011; van Doesum et al., 2013), which can facilitate unbiased interpersonal understanding and perspective taking at work (Ku et al., 2015). Previous studies have found initial evidence for a positive relationship between mindfulness and perspective taking, sometimes defined as part of empathy (Beitel et al., 2005; Dekeyser et al., 2008; Karremans et al., 2017; Nguyen et al., 2019), as well as an increase in perspective taking after mindfulness interventions (Birnie et al., 2010; Cheang et al., 2019). However, other studies could not provide evidence for the positive effects of mindfulness on empathy, entailing perspective taking as a subfacet (Galantino et al., 2005; Ridderinkhof et al., 2017). Taking intra-individual fluctuation in mindfulness and perspective taking into account, I aim to provide further insides into their relation.

Since social interactions, for instance with colleagues, customers, or leaders, represent an important part of work for most employees (Clark et al., 2019; Lehmann-Willenbrock, 2024; Longmire & Harrison, 2018), understanding other's perspectives better can help them to adapt their actions according to the environment. While perspective taking, which alters the way individuals perceive social situations as well as significant others, undoubtedly influences the actor's well-being and performance, research has mostly focused on benefits for interpersonal and group outcomes (Ku et al., 2015). Focusing on individual outcomes and in particular eudaimonic well-being, perspective taking can help to appraise social situations in a more functional way, enabling higher well-being and performance. Accordingly, social connection and support are pivotal factors in predicting work engagement (Lesener et al., 2020). Further, trait empathy, encompassing perspective taking, has shown positive effects on work engagement in the nursing sector (Cao & Chen, 2020). Imagine a scenario where a colleague frequently misses deadlines, causing frustration among the team. Practicing

mindfulness can help team members manage their own stress and maintain focus on their work, rather than getting caught up in negative emotions. By observing the situation mindfully, they might notice personal reasons or context factors, such as an unusually high workload. This awareness can prompt the team to set up a constructive meeting, where they compassionately explore possible solutions and offer support. This shift in perspective may provide a new meaning for the situation, enabling individuals to refocus on their tasks while potentially experiencing more eudaimonic well-being, as indicated by flow experience and work engagement.

The argumentation based on the mixed-motive model of perspective taking aligns well with the MMT as described earlier (see Figure *4*). While the mixed-motive model emphasizes the importance of understanding others' perspectives and adapting behavior accordingly (Ku et al., 2015), the MMT provides a framework for how individuals can achieve this by broadening their attentional field (Garland, Farb, et al., 2015a). Accordingly, individuals engaging in perspective taking can recall more information from significant others in social interactions (Ku et al., 2015). By shifting the focus away from solely their own perspective, individuals practicing mindfulness can perceive social cues more objectively and comprehensively, leading to a deeper understanding of the situation. This expanded awareness allows for the creation of new and more meaningful interpretations of events, contributing to enhanced eudaimonic well-being. Therefore, by mindful decentering and a broader attentional field, individuals can recognize more social clues, which supports shifting attention away from a self-centered perception towards a more holistic understanding of the (social) environment and greater eudaimonic well-being, as indicated by work engagement.

Research question 3: How can increased perspective taking explain the positive effect of mindfulness on work engagement?

3. Trajectories of mindfulness, flow experience and stress during an online-based MBSR program: the moderating role of emotional exhaustion

In the following part of this thesis, the first peer-reviewed paper is displayed that has been published in the Journal *Frontiers of Psychology*. Only minor formatting changes have been made. The paper mainly addresses the first research question, as described in section *2.4.1 The transactional model of stress and flow.*

Research question 1: How can a mindfulness intervention reduce stress and foster flow experience over time?

Acknowledging the potential of mindfulness intervention to enhance eudaimonic well-being as indicated by flow experience as well as the incapability to experience both states of mind simultaneously, I investigated whether an increase of state mindfulness over the training period of the widely known MBSR training cannot only evoke a decrease in stress but also an increase of flow experience over time.

Full Citation of the published article:

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3.1 Abstract

Despite numerous papers focusing on mindfulness at work, our knowledge about how flow experience and stress as indicators of optimal functioning and well-being at work evolve over time during the common mindfulness-based stress reduction (MBSR) program remains limited. Drawing from the transactional model of flow and stress, we argue that a build-up of mindfulness over the training duration not only leads to a decrease in stress but also an increase in flow experience. Thereby, we examine the moderating role of emotional exhaustion amplifying the beneficial effects of mindfulness. In a quasi-experimental study, 91 participants completed weekly questionnaires over the course of eight weeks. 46 participants in the experimental group took part in the MBSR program, while 45 participants were part of an inactive control group. Mindfulness and flow showed a significant linear increase over time, whereas stress exhibited a linear decrease. Those who participated in the MBSR training reported an increase in mindfulness that positively and negatively predicted the trajectories of flow and stress, respectively. Emotional exhaustion amplified the effects of the trajectory of mindfulness on the trajectories of flow and stress. These findings suggest that mindfulness can not only reduce stress but can also foster the autotelic experience of flow, especially for chronically depleted individuals.

Keywords: Mindfulness-Based Stress Reduction (MBSR), Flow Experience, Perceived Stress, Change Trajectories, Emotional Exhaustion.

3.2 Introduction

In the literature on stress and well-being, the concept of mindfulness has become a rising and staying star. Core topics in this research tradition have centered around the question of how mindfulness can be systematically fostered by specific training and interventions to enhance mental well-being (e.g., Bartlett et al., 2019; Jamieson & Tuckey, 2017). In particular, the

mindfulness-based stress reduction program (MBSR, Kabat-Zinn, 2003) has been successfully applied to reduce stress in the workplace (Khoury et al., 2015; Vibe et al., 2017). However, to craft a more enriching work experience that concurrently enhances performance and well-being, it is essential to shift the focus from stress reduction alone to the promotion of optimal functioning. One of the most important indicators of optimal psychological functioning at work is flow experience, which is characterized by an engrossing experience during intense concentration on the current task and therefore fosters well-being and performance simultaneously (Csikszentmihalyi, 1975). Previous research about the positive effects of mindfulness on well-being and motivation suggests that MBSR training could be utilized beyond a reduction of stress and foster optimal psychological functioning in the workplace (Khoury et al., 2015; Vibe et al., 2017). However, prior studies assessing the effects of mindfulness on flow experience have created mixed results (Sheldon et al., 2015). Hence, despite these potential benefits of mindfulness at work to foster flow experience and the widespread application of the MBSR training off-the-job and within companies (Bartlett et al., 2019; Grossman et al., 2004), our knowledge of whether the MBSR program can successfully enhance optimal experience in the work context, as indicated by flow experience, remains limited.

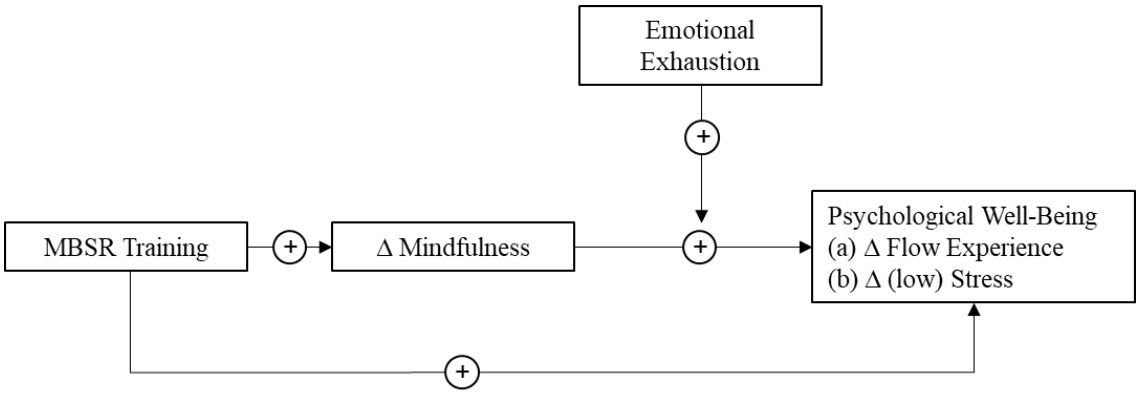
Even though scholars provided initial evidence that mindful individuals also tend to experience more flow (Kee & Wang, 2008; Moore, 2013), research also showed that mindful perception of the situation and the absorption during flow cannot be experienced simultaneously (Sheldon et al., 2015). Addressing this paradox, we focus on how a build-up in mindfulness over the training duration of several weeks can influence flow and stress. In doing so, we delineate our research model based on the TSF (Peifer & Tan, 2021), which extends the traditional transactional model of stress and coping (Lazarus & Folkman, 1984). In particular, we argue that a build-up of mindfulness over the training duration of the MBSR

training enables an increase in flow experience along with a decrease in stress. During the training, participants develop a clearer and more accepting perception of demanding situations as well as more efficient resource allocation (Glomb et al., 2011; Good et al., 2016), which facilitates flow and reduces stress as work situations are perceived as positive challenges rather than stressors (Lazarus & Folkman, 1984; Peifer & Wolters, 2021). Accordingly, with a weekly assessment of mindfulness, flow experience, and stress during the MBSR training and an inactive control group, we examine the change trajectories in these variables as well as their relations. In doing so, we extend previous research about the effects of the MBSR training that has mainly focused on the comparison between pre- and post-measurement (e.g., Bartlett et al., 2019; Dust et al., 2021; Lyddy et al., 2021).

Furthermore, the relations between the change trajectory of mindfulness and the trajectories of stress and flow experience at work are likely contingent upon the individual's level of resources, indicated by emotional exhaustion, which refers to a chronic state of depleted emotional and physiological resources (Cropanzano et al., 2003). If resources are depleted at work, for instance by job demands, and individuals show high emotional exhaustion, a more efficient allocation of remaining resources is especially important to prevent their interpretation as a stressor but positive challenge. Accordingly, we hypothesize emotional exhaustion to moderate (i.e., strengthen) the positive association between changes in mindfulness and changes in both stress and flow experiences. Figure *5* depicts our conceptual model.

Figure 5.

Conceptual model



Note. The symbol Δ indicates temporal changes (i.e. trajectories) in the corresponding variables during the mindfulness intervention.

In summary, our study extends the current state of research in at least three ways. Firstly, by focusing on a timeframe of several weeks, we provide new insights into whether mindfulness and related interventions can be utilized to promote flow experiences as critical indicators of optimal functioning at work. Despite certain dimensions of mindfulness and flow appearing incompatible (Sheldon et al., 2015), we contribute to the existing literature on workplace interventions by exploring the potential of the MBSR training to enhance flow experience, thereby opening up new opportunities for cultivating optimal functioning within the workplace. In doing so, our research not only enhances our understanding of the relations between mindfulness and flow but also holds promise for improving well-being and performance in work environments.

Second, while previous studies have primarily compared pre- and post-measurements of mindfulness interventions, our study takes a different approach by examining the shape of the trajectory of mindfulness, stress, and flow over time. By investigating the diverse change patterns, such as stable growth or quadratic trajectories, as well as their relationships, we offer new insights into the unfolding of the MBSR program and its effects on individuals in

the workplace. This longitudinal perspective enables us to provide a deeper understanding that can inform the development and implementation of more effective mindfulness-based interventions.

Lastly, we highlight the role of interpersonal differences in emotional exhaustion when examining the benefits of mindfulness intervention on flow and stress. As recent evidence suggests that mindfulness-based interventions may not always facilitate psychological health (Britton et al., 2021; Farias et al., 2020), a thorough investigation of how chronically depleted resources interact with changes in mindfulness adds to our understanding of stress prevention and long-term well-being stabilization. In other words, we provide novel insights into the interplay of interpersonal boundary conditions and intra-personal changes in mindfulness in predicting employees' well-being over time.

3.2.1 Effects of the MBSR Training on Flow and Stress over Time

Mindfulness is conceptualized as meta-cognitive awareness that involves an intentional observation of internal and external experiences at the present moment in an accepting and open manner (Good et al., 2016). By decoupling the self (e.g., self-concept, self-esteem, ego) from those experiences, individuals in a mindful state perceive their experiences neutrally (Glomb et al., 2011). The MBSR training is one of the most known mindfulness interventions that entails several mindfulness practices over the course of eight weeks reducing stress, depression as well as anxiety and fostering (self-)compassion, empathy, and mental health (Eberth & Sedlmeier, 2012; Khoury et al., 2015; for further details about the training program see Santorelli et al., 2017). Considering mindfulness as an explaining mechanism, several reviews and meta-analyses comparing pre- and post-measurements support the claim that the MBSR training reduces stress (e.g. Bartlett et al., 2019; Khoury et al., 2015; Vibe et al., 2017). In contrast, previous studies yield mixed evidence for the effects of mindfulness on the engrossing experience of flow (Kee & Wang, 2008; Sheldon et al., 2015), while the effects of

the MBSR training or similar mindfulness interventions have not been investigated yet. In particular, the distinct nature of complete absorption in flow contrasts with the open awareness encompassed in mindfulness (Sheldon et al., 2015). However, facets of mindfulness such as heightened attentional control and present-moment focus may facilitate the experience of flow (Kee & Wang, 2008; Moore, 2013). By resolving this discrepancy, we acknowledge that mindfulness and flow cannot be experienced simultaneously but anticipate that the development of mindfulness, including specific aspects like present-moment attention and sustained attention, throughout the multi-week MBSR training, will contribute to an increase in the frequency of flow experiences.

To further derive our predictions about how changes in mindfulness affect changes in stress and flow during the MBSR training, we draw on the TSF (Peifer & Tan, 2021), which integrates the transactional stress model (Lazarus & Folkman, 1984) and insights from the flow channel model (Csikszentmihalyi, 1975). These models highlight that a similar situation can be experienced as stressful or as positive challenge, depending on the individuals' perception of demands and available resources. When the perceived demands exceed available resources, individuals may appraise the situation as a threat and experience stress or anxiety (Peifer & Tan, 2021). In contrast, individuals may view a situation as positive challenge and experience flow, when they perceive a high-level balance between those (Peifer & Tan, 2021). Integrating these notions from the TSF with previous research that has repeatedly shown that mindfulness can improve coping with stress and view demanding situations as positive challenges (Beer et al., 2020; Garland et al., 2017; Jamieson & Tuckey, 2017; Sun et al., 2020), we assume that the development of mindfulness during the MBSR training evokes a decrease in stress as well as an increase in flow. In particular, by gradually increasing attention to present-moment experiences and reducing the automatization of cognitive processes during the MBSR program, individuals can evaluate situations more

composedly and be less influenced by emotions and automated thought patterns such as worrying. Hence, they can allocate cognitive resources more efficiently (Bishop et al., 2004; Glomb et al., 2011; Good et al., 2016). Further, with increasing mindfulness during the MBSR program, internal and external stimuli such as demands or emotions become more decoupled from initial judgments and observed in an accepting way (Glomb et al., 2011). Therefore, demanding aspects or situations are likely to be less threatening and intruding which reduces perceived stress over time (Beer et al., 2020). In contrast, individuals can concentrate all available resources on the task itself establishing a high-level balance between demands and skills and enabling more flow during the mindfulness training (Beer et al., 2020; Sun et al., 2020).

Despite the aim of the MBSR training to increase mindfulness and decrease stress over time, there is a scarcity of research investigating the specific patterns of change in these variables (Andreotti et al., 2018; Snippe et al., 2017). The MBSR training follows a structured program, which includes weekly training sessions with theoretical explanations and various mindfulness exercises (e.g., body scanning, and present-moment awareness; Santorelli et al., 2017). Participants develop and refine their mindfulness skills through these exercises, leading to a heightened state of mindfulness over time (Baer et al., 2012). Therefore, we expect a consistent and gradual increase in mindfulness, represented by a positive linear trajectory throughout the eight-week training duration. Supporting this prediction, Baer et al. (2012) found descriptive evidence for a linear increase in mindfulness over the training period. By integrating the anticipated linear changes in mindfulness with the established effects on stress and flow, we propose that increased mindfulness will lead to a similar linear increase in flow experience and a decrease in stress. Regarding stress, Snippe et al. (2017) supported a linear decrease over the entire training duration, whereas Baer et al. (2012) observed a (linear) change only after the third week. Positive indicators of optimal

functioning, such as the autotelic experience of flow, have not been examined to date. Accordingly, based on notions of the TSF and supported by initial empirical evidence for linear change patterns (Baer et al., 2012; Peifer & Tan, 2021; Snippe et al., 2017), we put forward the following hypotheses:

H1a: Mindfulness exhibits a linear increase over the training duration.

H1b: Flow experience exhibits a linear increase over the training duration.

H1c: Stress exhibits a linear decrease over the training duration.

Linking our predictions on trajectories to the proposed effects of MBSR training and mindfulness on flow and stress, we derive the following hypotheses. Because we consider mindfulness as the core mechanism of the effects of the MBSR training (Pascoe et al., 2017; Vibe et al., 2017), we propose changes in mindfulness to mediate the effects of the MBSR training on changes in flow and stress.

H2: The linear increase in mindfulness positively predicts (a) the linear increase in flow and (b) the linear decrease in stress.

H3: The MBSR training positively predicts (a) the linear increase in flow and (b) the linear decrease in stress via the trajectory of mindfulness.

3.2.2 Moderating effects of emotional exhaustion

Moreover, the effects of changes in mindfulness on changes in flow and stress are likely dependent on the individual level of emotional exhaustion. Emotional exhaustion represents the core dimension of burnout and results from prolonged strain that reflects chronically depleted resources due to high work demands (Demerouti et al., 2001). Whereas emotional exhaustion represents a relatively persistent state that can last over longer time periods (Toppinen-Tanner et al., 2002), fatigue and stress vary largely within individuals and are strongly influenced by current demands (e.g. Baethge & Rigotti, 2013; Hülsheger, 2016). Individuals with high emotional exhaustion have a lower baseline level of available

resources, making them more likely to perceive demanding work situations as stressors rather than positive challenges (Trougakos et al., 2015). Mindfulness can be especially helpful for individuals with low resource availability by promoting a clearer perception of the situation which is less influenced by negative experiences such as feeling overwhelmed (Good et al., 2016). Enhanced attentional control enables individuals to stay focused on the task at hand and overcome worries or negative emotions, which also facilitates a more efficient allocation of remaining resources (Glomb et al., 2011). Given the importance of overcoming negative states and effectively allocating limited resources for chronically depleted individuals, we expect the build-up of mindfulness over the training duration to exert stronger effects on changes in stress and flow experience for individuals with high emotional exhaustion compared to those with low emotional exhaustion. Accordingly, previous research has suggested that mindfulness is particularly beneficial for individuals with chronic feelings of depletion and recurring worries or negative moods (Baer, 2003; Creswell & Lindsay, 2014).

H4: Emotional exhaustion amplifies (a) the positive effects of the increase in mindfulness on the increase in flow and (b) the decrease in stress.

In conclusion, in the present study, we delineate and examine a moderated mediation model in which we predict that the MBSR program will lead to a linear increase in mindfulness which subsequently leads to a linear increase in flow experience as well as a linear decrease in stress. In addition, we propose that the positive effects of the increase in mindfulness on the increase in flow and the decrease in stress are amplified by individual levels of emotional exhaustion.

H5: Emotional exhaustion amplifies the indirect effects of the MBSR training on the increase in (a) flow and (b) the decrease in stress via the increase in mindfulness.

3.3 Materials and methods

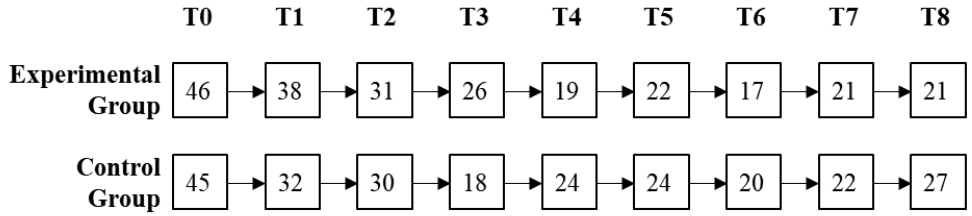
3.3.1 Sample and procedure

We conducted a quasi-experimental study with an experimental group participating in online-based MBSR classes and an inactive control group. Ethical approval was obtained from the ethical committee at the University of Wuppertal (No. MS/AH 200309). The experimental group consisted of participants who enrolled in certified German MBSR trainers' online classes conforming to the standardized eight-week structure. Informational material was forwarded to the participants by the trainers. The inactive control group was recruited through social media and personal contacts. Inclusion criteria were age of at least 18 years and no regular engagement in mindfulness training. Participants in the control group received 15€ for completing the study. A total of 48 participants in the experimental group and 49 participants in the control group completed the initial questionnaire (T0). Two participants from the experimental group were excluded as their MBSR class was conducted in person, not online, for consistency among all groups. Four participants from the control group were excluded because they reported regular mindfulness practice[1]. During the eight-week assessment period (T1-T8) following the pre-questionnaire, all participants received weekly questionnaires measuring mindfulness, flow experience, and stress. Figure *6* displays the final sample sizes for each questionnaire.

[1] Results show similar patterns and significance when all participants are included.

Figure 6.

Sample sizes in the experimental and control group at each point of measurement.



Note. T0 indicates the pre-questionnaire. T1 to T8 indicate weekly questionnaires over the training duration.

Participants included in the final analysis showed an average age of 39.98 years (SD = 14.77). 59 participants were female (65%), whereas 32 participants were male (35%). 68% of the participants were working, while 20% stated to be still in education (i.e., in school or university). The remaining participants took care of the household and family members (5%), were retired (5%), or were on job search (3%).

3.3.2 Measures

Mindfulness was measured retrospectively every week with the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) by Feldman et al. (2007). We translated the items from English into German based on the back-translation procedure (Brislin, 1970). The twelve items were rated on a scale ranging from 1 (almost never) to 4 (almost always) in relation to last week. An example item is “I could accept the thoughts and feelings I had”.

Flow experience was assessed retrospectively every week by 10 items of the flow frequency scale by Bartzik, Aust, and Peifer (2021). The scale consists of three sub-facets absorption, perceived skill-demand-balance, and enjoyment. Items were rated on a scale from 1 (never) to 6 ((almost) always). An example item is “In the last week, how often did you find yourself completely absorbed in an activity at work/study?”.

Stress was measured retrospectively every week with the Irritation Scale by Mohr et al. (2005) which assesses emotional as well as cognitive strain in the work context. The concept of irritation captures a psychological stress reaction with a medium intensity which is less influenced by the fluctuations of work demands but has been shown to capture intraindividual fluctuations in strain (e.g., Baethge & Rigotti, 2013; Dormann & Zapf, 2002). The eight items were rated from 1 (I don't agree at all) to 7 (I completely agree) in relation to the last week. An example item is "I found it hard to detach myself after work".

Emotional exhaustion was assessed during the pre-questionnaire with six items from the German version of the Maslach Burnout Inventory (MBI-D; Büssing & Perrar, 1992; Maslach et al., 1986). Items were rated from 1 (this feeling/situation does not occur at all) to 6 (this feeling/situation occurs very often). An example item is "I feel burnt out by my work".

3.4 Preliminary Analysis

3.4.1 Sample Characteristics and response rate

The program R was used for all following analyses (Version 1.4.; R Core Team, 2019). We tested whether the experimental and control groups significantly differed in demographic characteristics, study variables during the pre-assessment, and their response rate. Independent t-tests revealed that the experimental group was older than the control group ($t(88) = 3.50$, $p < .001$; experimental group: $M = 45.02$, $SD = 14.88$; control group: $M = 34.82$, $SD = 12.89$) and experienced higher stress during the pre-assessment ($t(87) = 2.33$, $p = .022$; experimental group: $M = 3.42$, $SD = 1.46$; control group: $M = 2.76$, $SD = 1.25$). All other variables (i.e., gender, emotional exhaustion, response rate, mindfulness, and flow experience during the pre-assessment) did not differ between both groups (all $p > .06$). In our analyses of the proposed between-person effects, we controlled for age, gender, as well as the baseline measure of mindfulness, flow experience, and stress to account for a possible influence on the examined trajectories.

3.4.2 Construct validity

In order to ensure construct validity, second-order multilevel confirmatory factor analyses were conducted using Maximum Likelihood. The model with separate factors for the variables mindfulness, flow experience (consisting of its three sub-facets), stress (consisting of its two sub-facets) and emotional exhaustion provided the best fit ($\chi 2$ (406) = 1597.19, $p <$ .001; RMSEA = 0.078, 90% CI [0.074; 0.082]; SRMR (within) = 0.062, SRMR (between) = 0.025, CFI = 0.892). Other models provided a worse fit (e.g. combining all sub-facets of flow and stress: $\chi 2$ (408) = 1886.77, $p <$ .001; RMSEA = 0.087, 90% CI [0.083; 0.091]; SRMR (within) = 0.114, SRMR (between) = 0.025, CFI = 0.866). These results provide support that our measured variables represent distinct constructs.

3.4.3 Intra Class Coefficients

Based on a Bayesian random-intercept model, we calculated Intra Class Coefficients (ICCs) for mindfulness (ICC = .29), flow (ICC = .23), and stress (ICC = .24; Chen et al., 2011; Dust et al., 2021). These results support considerable intra-individual variation and subsequently our analysis of change trajectories over the measurement period.

3.5 Analytical strategy

3.5.1. Analyses of change trajectories (within-person level)

Following recommendations from previous studies (Chen et al., 2011; Dust et al., 2021), we calculated mixed models with a random intercept and fixed slope to examine the change trajectories of mindfulness, flow experience, and stress. Slopes were fixed among participants since we aimed to examine a general trajectory for the whole sample (Dust et al., 2021). We added time as a level 1 predictor, where the baseline measure equaled zero and week eight equaled eight. To rule out non-linearity, we also tested for quadratic and cubic slopes in all outcomes. Table 2 provides information about the parameter estimates.

3.5.2 Analyses of the moderated mediation (between-person level)

For our analyses on the between-person level, we obtained the empirical Bayes estimates for each trajectory from linear mixed models with random intercept and random slope. The slope was allowed to vary among participants to obtain individual growth estimates for each participant. The individual trajectories of mindfulness, flow, and stress were saved as additional variables to allow for a simultaneous assessment of all propositions. This procedure follows previous work by Chen et al. (2011), which was adapted several times to integrate change trajectories in mediation models (e.g. Dust et al., 2021). Treatment was dummy-coded with one equalling participation in the experimental group and zero equalling participation in the control group. We grand-mean centered emotional exhaustion and the trajectory of mindfulness before including their interaction in our model to avoid multicollinearity (Mackinnon et al., 2004).

Firstly, we examined the effects of the MBSR training on the trajectory of flow and stress via the trajectory of mindfulness (model 1). As the next step, we included emotional exhaustion as a moderator (model 2). To test the proposed moderated mediation (see Figure 1), we additionally estimated four conditional indirect effects for higher and lower values of emotional exhaustion (± 1 SD). Initially, we controlled for age, gender, and the individual baseline of mindfulness, stress, and flow experience in both models. Because age and gender did not exert a significant effect on any outcome, we excluded them in the final analysis to avoid biases in parameter estimates due to non-essential covariances (Becker et al., 2016). Table 3 summarizes parameter estimates based on Bayes estimation for model 1 and model 2. Furthermore, we created Johnson-Neyman plots which display the band of significance for the simple slopes across the observed range of the moderator (Bauer & Curran, 2005; Preacher et al., 2006).

3.6 Results

Table 1 summarizes descriptive statistics of the measured variables including means, standard deviations, and Cronbach's alpha.

3.6.2 Analyses of change trajectories (within-person level)

In support of our first hypotheses, the mixed models with random intercepts and fixed slopes revealed a linear increase in mindfulness and flow experience over the training duration along with a linear decrease in stress (model 1). Neither the quadratic nor cubic slope reached significance for any of the outcomes (models 2 and 3). Please see Table *2* for information about parameter estimates

3.6.3 Analyses of the moderated mediation (between-person level)

As summarized in Table *3*, our results revealed a positive effect of the MBSR training on the trajectory of mindfulness in model 1 (b = 0.014, SE = 0.005, 95% CI [0.005; 0.023]). Further, in line with our second hypothesis, the present data provided support for the positive effects of the trajectory of mindfulness on the trajectory of flow and negative effects on the trajectory of stress because the corresponding credible intervals exclude zero (flow: b = 0.809, SE = 0.144, 95% CI [0.530; 1.094]; stress: b = -0.251, SE = 0.075, 95% CI [-0.396; -0.104]). In order to test the trajectory of mindfulness as a mediator in the relation of the MBSR training to the trajectories of flow and stress, we calculated indirect effects for both outcomes. In line with hypotheses 3a and 3b, we found evidence for a positive indirect effect of the MBSR training on the trajectory of flow (flow: b = 0.011, SE = 0.004, 95% CI [0.003; 0.020]) and a negative indirect effect of the MBSR training on the trajectory of perceived stress (stress: b = -0.004, SE = 0.002, 95% CI [-0.007; -0.0004]). Model 1 could explain 30% of the variance of the trajectory of mindfulness, 43% of the variance of the trajectory of flow experience, and 57% of the variance of the trajectory of stress.

As the next step, we tested the moderating effects of emotional exhaustion in model 2. Emotional exhaustion moderated the effects of the trajectory of mindfulness on the trajectory of flow (b = 0.237, SE = 0.104, 95% CI [0.030; 0.442]) and the trajectory of stress (b = -0.161, SE = 0.051, 95% CI [-0.261; -0.059]), supporting hypotheses 4a and 4b. The Johnson-Neyman plots (depicted in Figure *7* and Figure *8*) show that emotional exhaustion strengthens the positive and negative relationships between the trajectory of mindfulness and, respectively, the trajectory of flow and the trajectory of stress. Further, we calculated the conditional indirect effects of the MBSR training on the trajectories of flow and stress via the trajectory of mindfulness for higher and lower values of emotional exhaustion (± 1 SD). The results reveal a positive conditional indirect effect on the trajectory of flow for individuals with high emotional exhaustion (b = 0.015, SE = 0.006, 95% CI [0.004; 0.026]), but not for individuals with low emotional exhaustion (b = 0.007, SE = 0.004, 95% CI [-0.0005; 0.014]). Similarly, we found a negative conditional indirect effect on the trajectory of stress for individuals with high emotional exhaustion (b = -0.006, SE = 0.002, 95% CI [-0.011; -0.001]), but not for individuals with low emotional exhaustion (b = -0.0005, SE = 0.001, 95% CI [-0.003; 0.002]). Hence, our results support hypotheses 5a and 5b. Model 2 could explain 30% of the variance of the trajectory of mindfulness, 44% of the variance of the trajectory of flow experience (ΔR^2 = 0.02), and 61% of the variance of the trajectory of stress (ΔR^2 = 0.04).

Table 1.

Means, Standard Deviation, Correlations, and Cronbach's alpha .

	M	*SD* (between)	*SD* (within)	1	2	3	4	5	6	7	8	9
Within-Variables												
1. Weekly mindfulness (T0-T8)	2.78	0.45	0.23	*.80-.88*	**0.62**	**-0.62**						
2. Weekly flow experience (T0-T8)	3.83	1.09	0.52		*.94-.98*	**-0.42**						
3. Weekly stress (T0-T8)	2.87	1.26	0.57			*.84-.92*						
Between-Variables												
1. Baseline mindfulness	2.71	0.50		*.84*	**0.55**	**-0.47**	**-0.48**	0.22	0.29	**-0.34**	0.12	0.01
2. Baseline flow experience	3.78	1.09			*.95*	**-0.39**	-0.14	**0.46**	0.31	**-0.49**	0.10	0.02
3. Baseline stress	3.09	1.39				*.90*	0.16	-0.20	**-0.69**	**0.64**	-0.02	-0.01
4. Trajectory mindfulness	0.03	0.03					–	**0.39**	**-0.35**	0.03	0.07	-0.10
5. Trajectory flow experience	0.02	0.04						–	-0.06	**-0.34**	0.10	-0.09
6. Trajectory stress	-0.06	0.02							–	**-0.39**	-0.23	-0.01
7. Emotional exhaustion	2.67	1.20								*0.89*	-0.03	-0.14
8. Age	39.98	14.77									–	-0.15
9. Gender	1.35	0.48										–

Note. $N = 91$. Gender coded as 1 (female) and 2 (male). Significant correlation ($p < .05$) are printed in bold. Cronbach's alpha values are presented in italics on the diagonal.

Table 2.

Bayesian Mixed Models with random intercept and fixed slopes to examine trajectories of mindfulness, flow, and stress.

	Model 1				Model 2				Model 3			
	b	*SE*	95% CI_{low}	95% CI_{high}	*b*	*SE*	95% CI_{low}	95% CI_{high}	*b*	*SE*	95% CI_{low}	95% CI_{high}
Predicting trajectory of mindfulness												
Intercept	**2.71**	0.05	2.62	2.81	**2.81**	0.05	2.72	2.90	**2.81**	0.05	2.72	2.91
Linear change	**0.03**	0.01	0.02	0.04	**1.73**	0.29	1.16	2.29	**1.73**	0.29	1.16	2.29
Quadratic change					-0.36	0.28	-0.89	0.18	-0.35	0.28	-0.89	0.18
Cubic change									-0.25	0.27	-0.77	0.29
Predicting trajectory of flow experience												
Intercept	**3.78**	0.12	3.54	4.03	**3.85**	0.12	3.62	4.08	**3.85**	0.12	3.61	4.09
Linear change	**0.02**	0.01	>0.00	0.04	**1.31**	0.64	0.08	2.56	**1.31**	0.65	0.05	2.58
Quadratic change					-0.04	0.63	-1.26	1.20	-0.04	0.62	-1.24	1.21
Cubic change									0.08	0.62	-1.13	1.29
Predicting trajectory of stress												
Intercept	**3.02**	0.14	2.76	3.29	**2.80**	0.13	2.55	3.05	**2.80**	0.13	2.56	3.06
Linear change	**-0.06**	0.01	-0.09	-0.04	**-3.75**	0.69	-5.10	-2.40	**-3.77**	0.69	-5.12	-2.42
Quadratic change					1.23	0.67	-0.08	2.52	1.24	0.68	-0.11	2.57
Cubic change									-0.31	0.67	-1.63	0.98

Note. $N_{within} = 483$, $N_{between} = 91$. Estimates whose credible interval excludes zero are printed in bold.

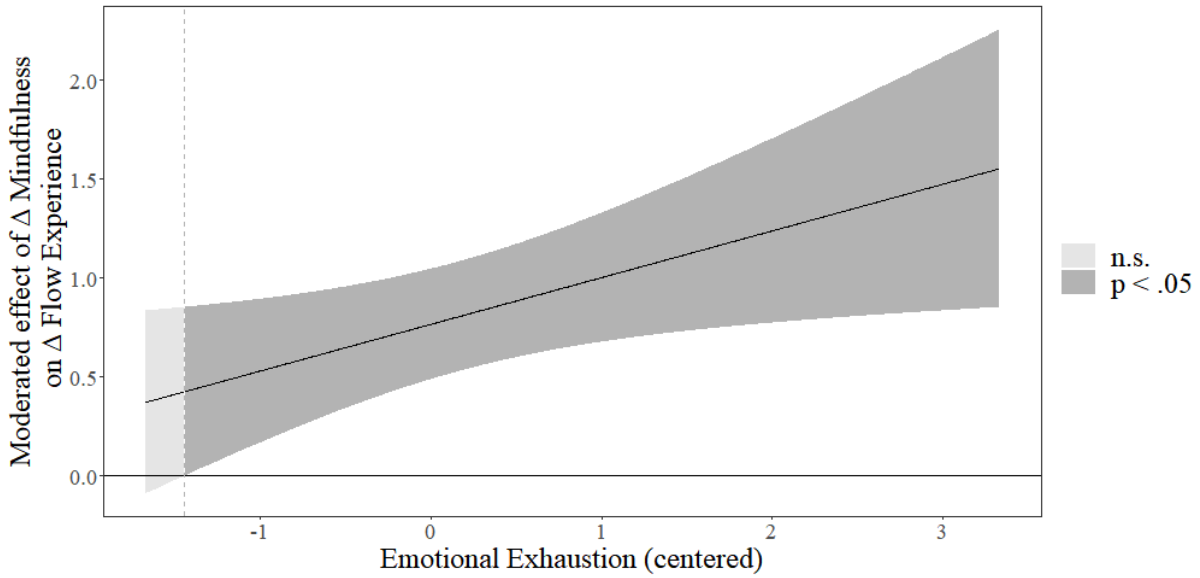
Table 3.

Bayesian estimates for the calculated path model

	Model 1				Model 2			
	b	*SE*	95% CI_{low}	95% CI_{high}	*b*	*SE*	95% CI_{low}	95% CI_{high}
Predicting trajectory of mindfulness								
Baseline mindfulness	**-0.022**	0.005	-0.031	-0.013	**-0.022**	0.005	-0.031	-0.013
MBSR Intervention	**0.014**	0.005	0.005	0.023	**0.014**	0.005	0.005	0.023
Predicting trajectory of flow experience								
Baseline flow experience	**0.013**	0.004	0.006	0.020	**0.012**	0.004	0.005	0.019
Baseline mindfulness	**0.018**	0.008	0.002	0.035	**0.017**	0.008	0.002	0.033
MBSR Intervention	0.001	0.007	-0.012	0.015	0.001	0.006	-0.011	0.014
Trajectory of mindfulness	**0.813**	0.144	0.530	1.094	**0.776**	0.142	0.501	1.053
Emotional exhaustion	-0.003	0.003	-0.009	0.003	-0.003	0.003	-0.009	0.002
Emotional exhaustion X Trajectory of mindfulness					**0.237**	0.104	0.030	0.442
Predicting trajectory of stress								
Baseline stress	**-0.011**	0.002	-0.014	-0.008	**-0.011**	0.001	-0.014	-0.008
Baseline mindfulness	**-0.009**	0.004	-0.017	-0.002	-0.008	0.004	-0.015	0.000
MBSR Intervention	-0.005	0.003	-0.012	0.001	-0.005	0.003	-0.011	0.002
Trajectory of mindfulness	**-0.251**	0.075	-0.396	-0.104	**-0.225**	0.071	-0.364	-0.086
Emotional exhaustion	0.000	0.002	-0.003	0.004	0.001	0.002	-0.003	0.004
Emotional exhaustion X Trajectory of mindfulness					**-0.161**	0.051	-0.261	-0.059

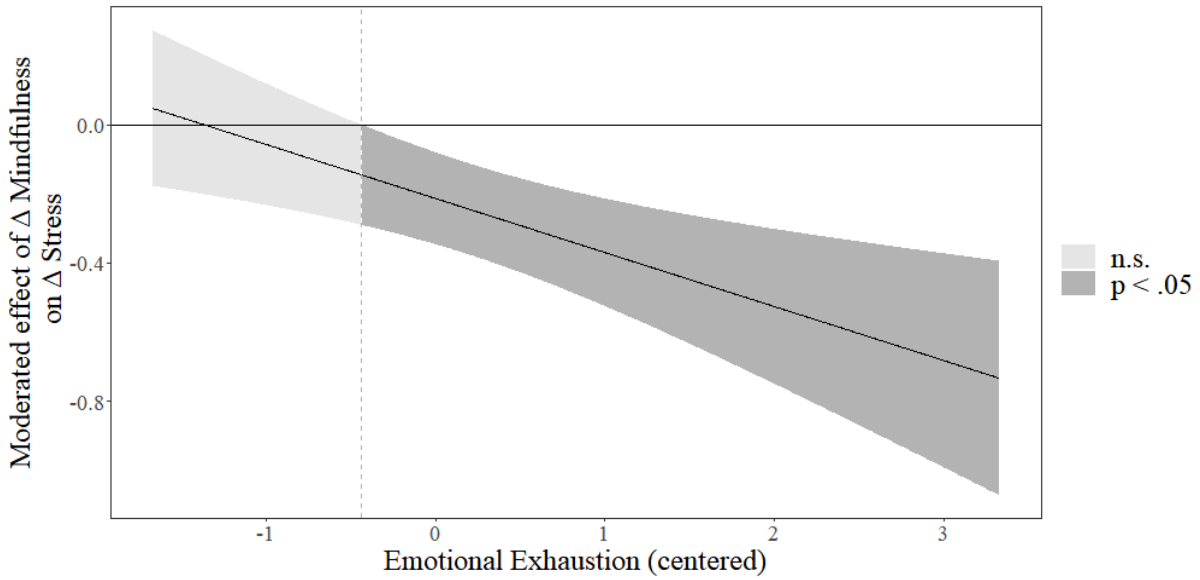
Note. $N = 91$. Estimates whose credible interval excludes zero are printed in bold.

Figure 7. *Johnson-Neyman plot showing the interaction between the trajectory of mindfulness and emotional exhaustion on the trajectory of flow experience*



Note. Simple slope estimates for the effect of the trajectory of mindfulness and the trajectory of flow experience are displayed on the y-axis depending on emotional exhaustion (x-axis). Emotional exhaustion is plotted only among the centred observed range (min = -1.67, max = 3.33). The moderated effect reaches significance for emotional exhaustion being greater than -1.44.

Figure 8. *Johnson-Neyman plot showing the interaction between the trajectory of mindfulness and emotional exhaustion on the trajectory of stress*



Note. Simple slope estimates for the effect of the trajectory of mindfulness and the trajectory of flow experience are displayed on the y-axis depending on emotional exhaustion (x-axis). Emotional exhaustion is plotted only among the centred observed range (min = -1.67, max = 3.33). The moderated effect reaches significance for emotional exhaustion being greater than -0.46.

3.7 Discussion

Our study explored the temporal changes in mindfulness, stress, and flow experience during the MBSR program as well as their relations. Building on previous research, we found a consistent linear increase in mindfulness and a linear decrease in stress over the training duration. Additionally, based on the TSF (Peifer & Tan, 2021), our findings supported the notion that the MBSR training can promote optimal functioning, as indicated by a linear increase in flow experience. Moreover, we investigated the moderating role of emotional exhaustion and revealed that individuals with high emotional exhaustion benefited more from the effects of mindfulness on flow experience and stress reduction.

Whereas some interventions have been implemented in sports to foster flow experience (e.g. Koehn et al., 2014; Scott-Hamilton et al., 2016), only a few have been developed for the workplace (for an exception see Bartzik et al., 2021). Our findings support the idea that mindfulness and related interventions, such as the MBSR training, have the capacity to foster flow, despite certain dimensions appearing incompatible. While flow and mindfulness have been regarded as conceptually divergent, with mindfulness involving broad attentional awareness and self-awareness while flow entails a narrow focus without self-awareness (Sheldon et al., 2015), our study supports the proposition that the development of mindfulness over time can facilitate flow. By cultivating a clearer perception of demanding situations and efficient allocation of cognitive resources, individuals can gradually shift their interpretation of these situations as positive challenges rather than stressors. This notion from the TSF (Peifer & Tan, 2021) is also supported by previous research indicating the positive impact of mindfulness on the reappraisal of situations (Garland, Hanley, et al., 2015; Garland et al., 2017). By revealing a positive relationship between temporal changes in mindfulness and flow during the MBSR training, our study bridges the gap between the incompatibility of certain dimensions of mindfulness and flow and the potential of mindfulness to enhance flow.

Taking a longitudinal perspective in investigating the effects of mindfulness on flow, we extend previous research that primarily relied on pre- and post-measurements of mindfulness interventions and enhance our understanding of the dynamic relationship between these constructs, which can inform the development of more effective mindfulness-based interventions to promote optimal functioning at work. In future research, it is important to explore and compare the effects of different mindfulness-based interventions on flow, considering factors such as the duration of interventions, specific exercises employed (e.g., breathing exercises, body scans, meditation), and the target audience (e.g., employees, leaders), to further enhance our knowledge in this area.

Furthermore, our study adds to the current literature on the effects of mindfulness interventions by investigating the shape of the trajectories of mindfulness, stress, and flow over time. Previous research has largely overlooked the diverse change patterns and their relationships within mindfulness interventions. By examining the shape of trajectories of these variables, we provide a deeper understanding of how the MBSR program unfolds and its effects on individuals in the workplace. Our results indicate a positive linear increase in mindfulness and a linear decrease in stress over the training duration, aligning with previous studies that have also observed a gradual increase in these variables during MBSR training (Baer et al., 2012; Snippe et al., 2017) and other mindfulness-based interventions over several weeks (Andreotti et al., 2018; Garland et al., 2017). Contrary to results from Baer et al. (2012), who revealed a reduction in stress only starting in the third week, and the findings from a qualitative analysis by Isbel et al. (2020), who revealed greater effort towards the beginning and greater benefits towards the end of a long-term intervention, a linear change implies a continuous growth of mindfulness and reduction of stress, independently of the current time point. Despite the aim of most mindfulness-based interventions to increase optimized functioning (Good et al., 2016; Kabat-Zinn, 2003), surprisingly, the temporal

changes in flow experience during the MBSR program have not been extensively examined. Our study fills this gap by revealing a linear increase in flow experience, expanding our understanding of the effects of mindfulness interventions on individuals' overall well-being. In light of previous research showing curvilinear trajectories in other well-being indicators such as rumination and heart rate variability (Andreotti et al., 2018; Krick et al., 2021), future studies shall continue to explore the trajectories of various indicators of well-being separately. Accordingly, future studies may also assess how other indicators of well-being and optimal functioning that have been investigated as outcomes of the MBSR training, such as emotional regulation, quality of life, or physical health (Eberth & Sedlmeier, 2012; Vibe et al., 2017), develop during the training duration.

Lastly, as predicted by our fourth hypothesis, emotional exhaustion amplified the positive effect of the trajectory of mindfulness on the trajectory of flow experience as well as the negative effect on the trajectory of stress. Especially in demanding sectors, such as health care or education, where emotional exhaustion tends to be concerningly high (Bridgeman et al., 2018; Park & Shin, 2020), a mindfulness-based intervention can be helpful to reduce stress and enable the experience of flow, which has been associated with higher well-being and performance (Peifer & Wolters, 2021). These results are particularly important in light of recent research that revealed potential negative effects of mindfulness and meditation such as increased stress, anxiety, or negative affect under certain circumstances (e.g. Britton, 2019; Britton, Lindahl, et al., 2021; Farias et al., 2020). By examining the impact of the MBSR training on the well-being of chronically depleted individuals, we ensure that those who may be vulnerable to side effects can still benefit from the intervention, leading to enhanced well-being rather than diminished outcomes. Furthermore, in the long term, higher levels of mindfulness may also reduce emotional exhaustion (Good et al., 2016; Hülsheger et al., 2013). In line with this, in a randomized controlled trial, Verweij et al. (2018) could reveal a

negative effect of the MBSR training on emotional exhaustion for individuals with high baseline levels of emotional exhaustion. These results conform with our proposition that the MBSR training is more beneficial for chronically depleted individuals and additionally imply circular effects (i.e., the intervention reduces emotional exhaustion which in turn reduces the beneficial effects of the intervention on emotional exhaustion). Further, emotional exhaustion and flow experience show a negative relationship (Aust et al., 2022), so that the training might be even more effective to increase optimal functioning for depleted individuals. Future studies that investigate the effects of mindfulness-based interventions on indicators of well-being and performance should take these results into account and test for possible baseline interactions as well as circular effects.

3.7.2 Limitations

In the following, we discuss several limitations of the present research. First, since our participants were not randomly allocated to the experimental and control groups, a selection bias might lead to systematic differences between the two groups such as different interests in participation in a mindfulness-based stress reduction training. Even though both groups did not statistically differ in their age, the initial level of mindfulness, flow, or emotional exhaustion and we controlled for age, gender as well as possible baseline effects, future studies should consider an experimental design with randomization and an active control group. Second, all data has been collected retrospectively each week via self-report. Thus, the common method bias and memory biases could lead to a potential measurement error (Podsakoff et al., 2003). Further studies could additionally assess physiological correlates over longer time periods of flow experience and stress, such as heart rate variability or cortisol levels, to overcome this limitation (e.g., Peifer & Tan, 2021). Further, neuroplasticity represents an important physiological indicator of mindfulness that is not directly linked to stress responses and might be integrated into further research as well (Good et al., 2016).

Third, we measured mindfulness, flow experience, and stress simultaneously over the duration of eight weeks. Even though the MBSR training allows us to manipulate mindfulness, we cannot ensure a causal effect of mindfulness on flow experience and stress with our design. A bi-directional relation should be investigated in future studies. Fourth, due to the longitudinal design of our study, we measured mindfulness with the CAMS-R questionnaire as a relatively short questionnaire (Feldman et al., 2007). However, the questionnaire does not allow a separate investigation of different sub-facets. Because different facets such as acceptance or attentional control might have a different influence on flow experience and stress, future research should investigate those separately. Despite the limitations discussed, the current study provides an important starting point to better understand how and for whom long-term mindfulness interventions foster flow experience and reduce stress over time.

3.8 Conclusion

In conclusion, we were able to shed light on how an MBSR intervention enhances well-being in the work context and for whom mindfulness is most beneficial. Based on the TSF, we provide a profound theoretical explanation of how increases in mindfulness are associated with increases in flow and decreases in stress during the MBSR training. In doing so, this research expands the application of mindfulness in the workplace by examining flow experience as an indicator of optimal psychological functioning. Additionally, we demonstrate that the program is particularly beneficial for individuals with high emotional exhaustion. These findings highlight the potential of the MBSR intervention to support the well-being and mental health of depleted employees.

4. An Energizing Micro-Intervention: How Mindfulness can Foster Subjective Vitality through Regulatory Processes and Flow Experience at Work

In the following part of this thesis, the second peer-reviewed paper is displayed which has been published in the *Journal of Occupational Health Psychology*. Only minor formatting changes have been made. The paper mainly addresses the second research question, as described in section *2.4.2 Dual modes of regulatory processes.*

Research question 2: How can increased self-regulation and reduced self-control explain the positive effect of mindfulness on flow experience?

Since the first peer-reviewed paper has shown evidence that a longer mindfulness intervention can enhance flow experience (see section 3 for more information), I aimed to extend these results in the second study. In doing so, I examined a shorter mindfulness intervention to increase practicality, considered daily fluctuations to investigate intraindividual changes on a more detailed level, and examined regulatory processes as possible explaining mechanisms.

Full Citation of the published article:

Hohnemann, C., Rivkin, W., & Diestel, S. (2024). An energizing microintervention: How mindfulness fosters subjective vitality through regulatory processes and flow experience at work. *Journal of Occupational Health Psychology, 29*(1), 45–56.

https://doi.org/10.1037/ocp0000369

4.1 Abstract

Can adopting one's morning routines influence employees' experiences throughout the day? To answer this focal question, we examine the daily effects of a brief meditation in the morning on well-being throughout the day considering spill-over effects from the home to the work domain and back. To identify the dominant underlying mechanisms of this daily spillover, we draw on the Personality Systems Interactions theory that distinguishes between autonomous self-regulation and effortful self-control as two psychological processes that reflect the regulation of thoughts, emotions, and behaviors in alignment or contradiction with one's interests, values, and goals. Accordingly, we hypothesized that meditating in the morning before work fosters autonomous self-regulation and reduces effortful self-control in the work domain, which subsequently facilitates the experience of flow at work and hence fosters subjective vitality in the home domain after work. A quasi-experimental daily-diary study over ten days with a brief ten-minute mindfulness intervention during the final five days with 78 participants (588 day-level data points) supported most of our predictions. More specifically, our data suggests a positive indirect effect of the intervention on subjective vitality in the evening via self-regulation and flow experience. However, there was no indirect effect of the intervention on subjective vitality via self-control. The results help to clarify how a mindfulness-based intervention can influence distinct regulatory processes and well-being, crossing boundaries between the work and home domains.

Keywords: Diary study; Flow experience; Meditation; Mindfulness; PSI theory; Self-regulation; Subjective vitality

4.2 Introduction

The morning makes your day. This famous saying has been supported by an increasing body of recent research, demonstrating the effects of the morning commute or the weather in the

morning on well-being during the whole day (Binnewies et al., 2009; Dettmers et al., 2020; Rothbard & Wilk, 2011; Venz & Pundt, 2021). Since most of these studies focused on external events or experiences that are not particularly malleable for individual employees, expanding our understanding of how individual routines in the morning can facilitate employees' mental and physical well-being throughout the day could be highly valuable for employees and organizations (Dettmers et al., 2020). Given that employees engage in daily transitions between the home and work domains, it is of particular relevance to scholars and practitioners alike whether the effects of changing one's morning routines remain in the home domain or may transition across domains and have longer-term implications during the day. These transitions reflect spillover effects, where psychological states experienced in one domain transmit and impact states in another domain within the same person (Edwards & Rothbard, 2000). In our study, we aim to investigate whether adopting one's morning routines in the home domain can spill over into the work domain, subsequently influencing employee well-being after work back in the home domain.

Given the limited time available to employees in the morning, short micro-interventions (i.e., 10 minutes or less) are particularly suitable to enhance an employee's morning routine. These short time requirements make it easier for employees to adopt a micro-intervention into their morning routine without having to wake up earlier or leave home later. As research has already demonstrated the immediate positive effects of mindfulness micro-interventions on well-being (Arch & Craske, 2006; Howarth et al., 2019; Wolever et al., 2012), our study aims to examine whether integrating such a brief mindfulness intervention into one's morning routine at home can exert spillover effects from the home domain in the morning to the work and back to the home domain in the evening shaping employees motivation and well-being throughout the whole workday.

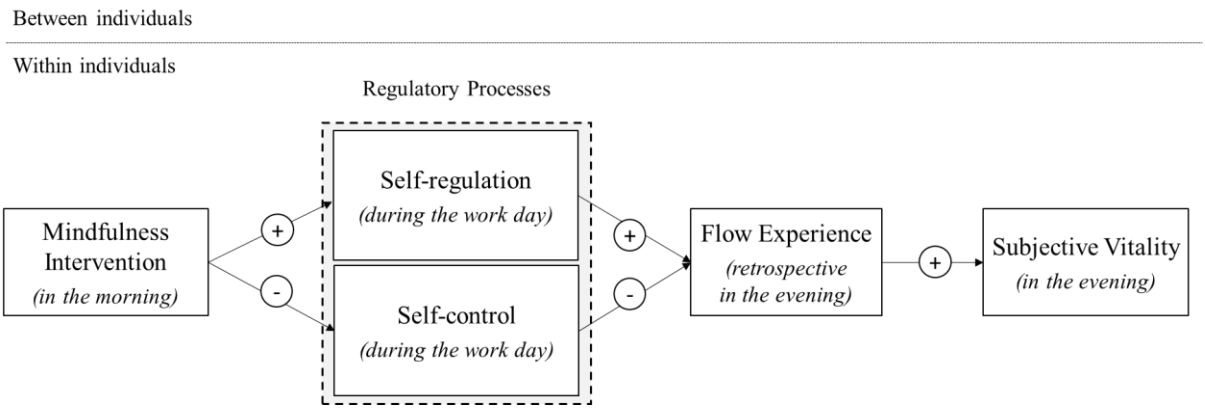
As mindfulness has been previously suggested to facilitate regulatory processes when engaging in goal-directed actions (e.g., Glomb et al., 2011; Masicampo & Baumeister, 2007), we integrate the spillover literature (Edward & Rothbard, 2000) with the Personality System Interaction (PSI) Theory to disentangle the regulatory processes underlying the daily spillover effects of a brief mindfulness intervention in the morning to well-being after work. In particular, PSI Theory distinguishes between autonomous self-regulation and effortful self-control as two focal regulatory processes (Kuhl et al., 2006). Autonomous self-regulation occurs when actions are self-congruent and thus align with internal goals, values, and interests (Kuhl, 2010), whereas effortful self-control reflects individuals having to suppress desires, goals, or values to align their actions with external goals (Kuhl, 2010). Previous research has already linked mindfulness to either increased self-regulation or reduced self-control (Friese & Hofmann, 2016; Hülsheger et al., 2013; Ludwig et al., 2020; Schultz & Ryan, 2015). However, it remains unclear whether both regulatory processes are equally important in explaining the beneficial consequences of mindfulness or whether one of the two processes reflects a more dominant mechanism. PSI theory further argues that autonomous self-regulation and effortful self-control are associated with different motivational states (Hanfstingl et al., 2010; Kuhl, 2010). When employees rely more strongly on self-regulation and less strongly on self-control when engaging in their daily work tasks they are more likely to experience flow - a peak state of intrinsic motivation characterized by a strong, effortless focus on the current task (Csikszentmihalyi & LeFevre, 1989; Nakamura & Csikszentmihalyi, 2014). Since flow experiences reflect highly pleasant states, they positively relate to employees' psychological and physiological well-being as indicated by subjective vitality (Rivkin et al., 2016; Ryan & Frederick, 1997).

Accordingly, we propose spillover effects of a morning intervention in the home domain to regulatory processes and flow experiences in the work domain as well as

subjective vitality in the evening in the home domain (Figure *9*). To illustrate, when completing tasks during the workday such as helping a coworker review an Excel spreadsheet, we propose that starting the day with a brief meditation in the home domain allows employees to experience higher self-regulation and lower self-control in the work domain. This is because meditation helps employees to recognize more self-congruent aspects (e.g., providing social support) and accept as well as reframe self-incongruent aspects of tasks (e.g., focusing on required diligence instead of complaining monotony). Subsequently, higher self-regulation and lower self-control make it more likely that employees experience flow and associated well-being in the evening in the home domain. Considering that adopting one's morning routines, which can vary from day-to-day and associated forms of action regulation exhibit considerable within-person (i.e., daily) variation, we examine the proposed model in a daily diary study across 10 workdays.

Figure 9.

Theoretical framework



Our study provides at least three contributions to the current literature. First, by examining the spillover of a brief mindfulness-based micro-intervention that can be easily incorporated into one's morning routine to day-specific well-being in the home domain after work, our study expands our understanding beyond the immediate effects of the effectiveness of micro-

interventions that facilitate mindfulness (Howarth et al., 2019). By considering the full sequence of a typical workday our research may demonstrate that the beneficial effects of a brief meditation in the home domain not only remain within this domain but shape experiences in the work domain culminating in high well-being in the evening at home.

Second, by integrating spillover literature (Edwards & Rothbard, 2000) and the PSI theory, our study helps to provide a more comprehensive picture of the processes underlying the spillover effects of a brief mindfulness intervention to well-being in the home domain. By directly comparing self-regulation and self-control, our study reveals whether both psychological processes are equally relevant in linking mindfulness to employee well-being or whether one of the two regulatory processes is dominant in this relationship. In doing so, we identify opportunities to further improve the effectiveness of such interventions by focusing on the most important regulatory process (K. W. Brown et al., 2007; Mackenzie & Baumeister, 2015; Masicampo & Baumeister, 2007).

Third, our study also contributes to the current literature on mindfulness by utilizing a within-person intervention design. By examining each participant as their own control, we can control for between-person variance and thus increase the accuracy of the estimates (Schmiedek & Neubauer, 2020). Further, within-person interventions are more sensitive to detecting change over time because they can account for day-to-day fluctuations and individual differences in response to the intervention (Schmiedek & Neubauer, 2020). Hence, with this design, we can more confidently attribute changes in self-regulation, flow experiences, and well-being to the intervention rather than individual differences between participants.

Our research also holds practical implications by allowing employees to make more informed decisions about whether investing time in a short morning meditation is worth the

additional time constraints and organizations to make practical recommendations to employees in terms of how to shape their morning routines to improve well-being.

4.2.1 How a mindfulness intervention in the morning at home spills over to shape regulatory processes at work

Particularly in the morning, time is scarce for employees as they may have to prepare themselves and potentially their children for work, have breakfast, and leave home to be on time for work. Accordingly, most employees develop set morning routines in the home domain to be effective in managing this constrained timeframe (McClean et al., 2021). While previous research has convincingly demonstrated that longer mindfulness interventions facilitate employee well-being over the course of several weeks or months (for reviews see Bartlett et al., 2019; Creswell, 2017) such interventions may be inefficient for employees in the morning as they may not be easily integrated into their morning routines. In comparison, mindfulness-based micro-interventions, which require ten minutes or less, are much more suitable as these can be more seamlessly adopted into an employee's morning routine. But can these short interventions enhance employee well-being throughout the day spilling over from the home to the work domain and back to the home domain? Previous research has already revealed that mindfulness-based micro-intervention have immediate positive effects on mindfulness, calmness, and sleep quality alongside reductions of stress and anxiety (e.g., Berghoff et al., 2017; Howarth et al., 2019; Huffziger et al., 2013; Wolever et al., 2012). However, since research on micro-interventions only demonstrated short-term benefits so far (Howarth et al., 2019), we aim to extend this stream of research by going beyond immediate consequences and investigating whether the potential benefits of a mindfulness-based micro-intervention spill over to the work and subsequently the home domain to enhance employee well-being after work.

Furthermore, to disentangle the mechanisms that underlie these beneficial spillover effects, we draw on PSI theory which reflects a comprehensive theory of human functioning that integrates a broad set of theoretical propositions. As explaining all aspects of PSI theory goes beyond the scope of the present study, we focus on one of its core elements namely the distinction between self-regulation and self-control as two independent regulatory processes (Koole et al., 2018; Kuhl, 2010; Kuhl et al., 2021). Previous research has proposed regulatory processes as important explaining mechanisms that can determine the beneficial effects of mindfulness on well-being (e.g., Friese & Hofmann, 2016; Glomb et al., 2011), but our knowledge of whether a brief mindfulness intervention is sufficient to enhance regulatory processes during the day remains limited. Further, when investigating the relationship between mindfulness and regulatory processes, prior studies often neglected whether pursued goals are aligned with internal values and therefore did not distinguish between self-regulation and self-control (e.g., Bowlin & Baer, 2012; Glomb et al., 2011; Mackenzie & Baumeister, 2015). A few studies exclusively focused on situations that evoke effortful self-control (Friese & Hofmann, 2016; Hülsheger et al., 2013) or autonomous self-regulation (Ludwig et al., 2020; Schultz & Ryan, 2015), but did not assess these distinct processes simultaneously. Only a direct comparison between daily self-regulation and self-control enables a more advanced understanding of whether a brief mindfulness intervention can enhance regulatory processes by enabling a greater alignment of external goals with internal values (i.e., fostering self-regulation) or by accepting non-congruent aspects of a given task (i.e., reducing self-control). Even though self-regulation and self-control may intuitively represent bipolar opposites of one construct, employees face many situations in the work context that entail self-congruent and non-congruent aspects leading to simultaneous activation of both regulatory processes. For example, delivering an important presentation can align with the goal of persuading others (fostering self-regulation), while simultaneously

requiring coping with the stress of public speaking (evoking self-control). Since a brief mindfulness intervention contains great potential to improve employees' daily well-being, we seek to advance our understanding of whether a brief mindfulness intervention in the morning can predict both higher self-regulation and lower self-control during the day at work.

Based on notions from the PSI theory (Kuhl et al., 2006), we propose that starting the day with a brief mindfulness-based meditation facilitates the daily spillover of mindfulness into the work domain where such a state can help an employee recognize more self-congruent actions and identify with their work tasks, resulting in higher self-regulation, and at the same time accept and reframe self-incongruent actions reducing the feeling of fulfilling external expectations and accordingly the need for self-control. To illustrate, after the meditation, employees become more aware of their own thought patterns, values, and emotions along with their behaviors (Good et al., 2016). For instance, when helping a co-worker with reviewing an Excel spreadsheet, mindful attention promotes a clear perception of all aspects of the task and required actions (e.g., providing social support, high diligence required) and a strong awareness of inner values and goals (e.g., helping others, performing well; Good et al., 2016). A morning meditation that facilitates mindfulness can thus help identify self-congruent aspects of this task (e.g., providing social support to a co-worker) and hence foster self-regulation. Further, mindfulness reduces the focus on and the reactivity towards aspects that are incongruent with the self (e.g., repetitive actions despite the desire to perform autonomous tasks and find innovative solutions; Good et al., 2016). Accordingly, after the meditation, it is easier to accept or even reframe task requirements that are not aligned with one's goals, desires, or values and overcome inner resistance towards completing such tasks, which is associated with reduced self-control (Glomb et al., 2011). Previous research provided some initial support for the proposed effects of mindfulness on either self-regulation and self-control. In particular, Friese and Hofmann (2016) demonstrate that individuals in a

mindful state experience less conflict between desires and other goals reducing the use of effortful regulatory strategies such as suppression or avoidance. Further, focusing on daily emotion regulation, Hülsheger et al. (2013) show that mindfulness reduces surface acting (i.e., the effortful suppression of own emotions to show socially desirable behaviors) as a form of volitional self-control (Yam et al., 2016). In support of a positive relationship between mindfulness and self-regulation, Schultz and Ryan (2015) as well as Ludwig et al. (2020) argue that mindfulness enables the regulation of thoughts and behaviors in alignment with inner values as well as a stronger focus on self-aligned goals. Based on our theorizing and corresponding empirical evidence, we propose that a brief meditation in the morning to foster self-regulation and reduce self-control during the workday.

H1a: A mindfulness-based micro-intervention in the morning exerts a positive day-specific effect on self-regulation at work.

H1b: A mindfulness-based micro-intervention in the morning exerts a negative day-specific effect on self-control at work.

4.2.2 The role of flow experiences in facilitating the work-to-home spill-over of regulatory processes to employees' vitality

Further expanding on PSI theory (Kuhl et al., 2021), we predict that the mindfulness-based intervention facilitates subjective vitality in the evening via both regulatory processes and associated flow experiences. Our predictions of these indirect effects derive from findings that self-regulation and self-control differentially relate to flow experiences and well-being. In particular, whereas self-regulation enhances well-being, self-control has been shown to negatively predict well-being (Kuhl, 2010; Moller et al., 2006; Muraven, 2008; Muraven et al., 2008; Nix et al., 1999; Ryan & Deci, 2008). Although the distinct relationships of regulatory processes and well-being have been consistently shown, the mechanisms underlying these effects are still not fully understood. A deeper understanding is

crucial to enable employees to stabilize and enhance their well-being with different regulatory processes at work. Drawing on the PSI theory, we propose flow experiences as a potential mechanism explaining the relationships between regulatory processes and well-being. More specifically, PSI theory suggests that regulatory processes influence individuals' subsequent motivational states, which can range from more extrinsic motivation, which requires more effort, to more intrinsic motivation, which is pleasant and effortless (Hanfstingl et al., 2010; Kuhl, 2010). Correspondingly, flow experiences reflect a peak form of intrinsic motivation that is inherently enjoyable and thus facilitates employee well-being (Nakamura & Csikszentmihalyi, 2009). This is particularly characterized by one of the core facets of flow where individuals experience hours passing by like minutes (Nakamura & Csikszentmihalyi, 2009). Furthermore, during flow employees exhibit an intense and focused concentration on their current task (Nakamura & Csikszentmihalyi, 2014), and associated merging of action and awareness, where individuals become fully absorbed in their tasks and lose self-consciousness (e.g., not being aware of personal feelings). Even though focused concentration during flow requires energy, its autotelic and enjoyable experience refills energy after being immersed in a task (Gerpott et al., 2022). This theoretical premise is also supported by corresponding empirical evidence linking daily flow experiences to vitality (Rivkin et al., 2016).

We argue that self-regulation and self-control are differentially linked to employees' motivation and well-being because these regulatory processes differ in the alignment or suppression of inner values, goals, or interests when engaging in work tasks (Kuhl, 2010). In particular, when relying on self-regulation, employees align current work activities with their values, interests, and goals. Hence, they are more likely to fully concentrate on the task at hand, ignore possible distractions, and become absorbed in their current actions. PSI theory suggests that this alignment involves unconscious cognitive processing (Kuhl et al., 2015),

which contributes to the loss of self-awareness experienced during flow. For instance, being in a mindful state and focusing more on the self-congruent aspect of helping others during a rather repetitive task (experiencing high self-regulation rather than effortful self-control) an employee is more likely to experience intrinsic motivation and thus work with intense focus on the task. This employee is also less likely to be distracted by other thoughts and temporarily lose the awareness of being slightly hungry or cold. Instead, they are more likely to merge with their actions and have the feeling that time is just flying by.

In contrast, when engaging in self-control, individuals are less likely to focus on a possible alignment with internal values or interests when performing tasks but rather on extrinsic factors such as external circumstances and expectations (Kuhl, 2010). While effortful self-control can be beneficial for the achievement of external or long-term goals through the delay of gratification, it is driven by a goal conflict that requires high efforts to overcome and mentally distracts from the task at hand (Kuhl, 2010; Weber, 2013). Furthermore, individuals seem to be less committed to goals that cannot be aligned with self-related aspects (Ryan & Frederick, 1997). Being unable to invest their full resources in the task makes it more difficult to experience flow and be completely engaged as well as absorbed when working on a task (Nakamura & Csikszentmihalyi, 2014). Coming back to the example of reviewing the Excel spreadsheet, the employee may feel frustrated about the task and get distracted or start mind-wandering more easily while being aware that high diligence is required to successfully complete this task. This inner conflict causes them to engage in self-control which diverts mental resources away from the task at hand, inhibiting his or her ability to fully engage and experience flow.

On the basis of these theoretical arguments, we expect self-regulation to be positively, and self-control to be negatively associated with flow. Subsequently, flow experience facilitates subjective vitality as an indicator of well-being in the evening (Rivkin et al., 2016).

Taken together with the previously outlined effects of self-regulation and self-control on well-being, we hypothesize flow experience to mediate the effects of self-regulation and self-control on employees' vitality.

H2a: Self-regulation at work exerts a positive day-specific indirect effect on subjective vitality in the evening via flow experience.

H2b: Self-control at work exerts a negative day-specific indirect effect on subjective vitality in the evening via flow experience.

By linking mindfulness to regulatory processes, flow experiences, and well-being, we expect that a mindfulness intervention in the morning – which enables employees to align their actions at work with individual interests and goals due to high self-regulation and low self-control – fosters the experience of flow and subsequently subjective vitality in the evening after work. Hence, by integrating Hypotheses 1 and 2, we delineate Hypothesis 3.

H3a: A mindfulness-based micro-intervention in the morning exerts a positive day-specific indirect effect on subjective vitality in the evening via self-regulation and flow experience.

H3b: A mindfulness-based micro-intervention in the morning exerts a positive day-specific indirect effect on subjective vitality in the evening via self-control and flow experience.

4.3 Method

4.3.1 Procedure and manipulation

We conducted a daily diary study over ten workdays to test our predictions. The study started with a pre-survey, where participants provided demographic information and stated their working hours for the following ten days. During the study period, participants received three surveys each day over a span of ten workdays. The first survey, sent at 5 AM, provided instructions for the intervention (passive control or brief mindfulness intervention). The

second survey sent four hours after the start of work measured mindfulness, self-regulation, and self-control in the work context. Participants had four hours to complete this survey before the third survey was sent. The third survey sent eight hours after the start of work assessed retrospective flow experience during working hours and subjective vitality in the evening at home. All data were collected through the online platform SoSci Survey, which included digital time stamps for accurate tracking (Leiner, 2019).

In the second week (days six to ten), participants started their day with an audio-guided meditation at home lasting ten minutes. The intervention was implemented during the second week rather than on random days to preclude spill-over effects to the next day and to prevent participants from voluntarily meditating on intervention-free days. Participants were told to take part in the guided meditation before work. In the meditation, they were instructed to sit comfortably in a quiet room, focus on their breath, perceive upcoming thoughts without any judgment, and always return their attention to the breath. Participants were encouraged to integrate this attitude into their subsequent workday.

We recruited participants via personal contacts and social media announcements in Germany. 104 participants completed the pre-questionnaire. We excluded participants who did not fill out any daily survey resulting in a final sample of 78 participants who provided data for 588 single days (i.e., 317 in the first and 271 days in the second week). Response rates were 65% for the questionnaire sent during the day (measuring self-regulation and self-control), and 68% for the questionnaires sent in the evening (measuring flow experience and subjective vitality). Participants stated an average age of 33.69 years (SD = 11.46). 56 women (72%) took part in the study. Participants worked in different sectors such as health care (21%), teaching (17%), finance (7%), and retail (7%). 47% of the participants indicated computer work as their core work activity, 22% worked with customers, 13% worked in teaching, 12% executed care tasks, and 6% had mainly creative tasks.

4.3.2 Measures

State mindfulness was assessed as a manipulation check four hours after the start of work with six items from the modified version of the Mindful Attention and Awareness Scale (Höfling et al., 2011). Items were rated on a five-point Likert scale with 1 = “Not at all” and 5 = “A great deal”. Example items include “Right now it was easy for me to stay focused on the present” and “Right now I was doing my activities mostly automatically without being aware of what I was doing”.

Self-regulation and self-control were assessed four hours after the start of work with four or three items from the self-regulation inventory, respectively (Fröhlich & Kuhl, 2003). Items were rated on a five-point Likert scale with 1 = “Not at all” and 5 = “A great deal”. Example items include “I fully identified with what I did at work today” (self-regulation) and “I felt I had to meet the expectations of others in my work today” (self-control).

Flow experience was assessed with the Flow Scale (Rheinberg et al., 2003) retrospectively at the end of the workday. The ten items capturing absorption as well as enhanced subjective experience were rated on a seven-point Likert scale (1 = “Strongly disagree”, 7 = “Strongly agree”). Example items include “Today at work, I was totally absorbed in what I was doing“ and „Today at work, I felt I had everything under control“.

Subjective vitality was assessed with four items by Rivkin et al. (2016) who adapted the original scale by Ryan and Frederick (1997). Items were rated in the evening on a seven-point Likert scale with 1 = “don’t agree at all” and 7 = “agree completely”. Example items include “Right now, I feel alive and vital” and “Right now, I feel energized”.

4.3.3 Construct validity

In order to assess construct validity, we conducted second-order multilevel confirmatory factor analyses. The model with four distinct factors for self-regulation, self-control, flow experience (consisting of its two facets absorption and enhanced subjective experience), and

subjective vitality fitted our data the best (χ^2 (181) = 566.58, p < .001, RMSEA = 0.069, SRMR (within) = 0.059, SRMR (between) = 0.000, CFI = 0.926, TLI = 0.915, AIC = 25760.72, BIC = 26052.63). Other models combining different constructs in one factor fitted the data worse (e.g., combining self-regulation and self-control: χ^2 (184) = 1248.21, p < .001, RMSEA = 0.113, SRMR (within) = 0.091, SRMR (between) = 0.000, CFI = 0.797, TLI = 0.768, AIC = 26629.54, BIC = 26909.12). More information about the conducted confirmatory factor analyses can be found in Appendix A. Concluding, our results support the distinctiveness of our day-level measures.

4.3.4 Experimental manipulation and manipulation check

In our diary study, we included an experimental manipulation of mindfulness on the within-level by implementing the mindfulness-based micro-intervention on days six to ten for every participant. The use of a within-person manipulation increases statistical power by freeing residual variance from between-person effects (Schmiedek & Neubauer, 2020). It further allowed us to examine the intraindividual variation of training effects on different days. As a manipulation check, we assessed whether participants showed higher levels of mindfulness on days with the intervention in comparison to days with the passive control condition. Based on the nested data structure of our diary study, in which multiple data points (Level 1) exist for every individual (Level 2), we estimated a random-intercept model with a dummy-coded variable indicating the occurrence of the intervention (1 = intervention, 0 = no intervention) predicting mindfulness. The effect of the intervention was modeled as a fixed (Friese & Hofmann, 2016) slope to assess a general trend over the sample. Results revealed a significant effect of the intervention on self-reported state mindfulness (Level 1; $b = 0.20$, $SE = 0.04$, $t(432) = 4.49$, $p < .001$; $n_{within} = 510$, $n_{between} = 77$).

4.3.5 Analytical procedure

The following analyses were conducted with Mplus 8.4 (Muthén & Muthén, 2017).

Due to the nested data structure, we used multi-level structural equation modeling based on maximum likelihood estimation with robust standard errors to test our conceptual model (see Figure 1). In doing so, we account for the interdependence of both levels (Hox, 2002). Due to the high demands of a diary study, not all participants were able to respond to all questionnaires leading to construct-level missings (Newman, 2014). Following Newman's (2014) recommendations, we used maximum likelihood estimation based on all available data for our analyses. As before, the intervention was dummy-coded with 1 = intervention and 0 = no intervention. We centered the intervention variable as the only endogenous variable on Level 1 around its group mean and specified all exogenous variables on both levels (Enders & Tofighi, 2007). Additionally, we controlled for the linear and quadratic effects of the weekday Monday to Friday (coded as 1 to 5 and group-mean centered) on all exogenous variables (Gabriel et al., 2019). The effects of the mindfulness-based micro-intervention on subjective vitality via self-regulation, self-control, and flow experience were modeled as a 1-1-1-1 multilevel mediation model. All direct effects were modeled as fixed slopes. The proposed indirect effects were calculated based on Monte Carlo Simulation due to the non-normal distribution of indirect effects and computational advantages of this method (Preacher & Selig, 2012).

4.4 Results

Table 4 depicts the means, standard deviations, Cronbach's alpha (Geldhof et al., 2014), and correlation estimates for the assessed variables. For the within-variables, we additionally calculated Intra Class Coefficients (ICCs) to assess the ratio of between- and within-person variance (Hox, 2002). The within-person variance ranged from .54 to .59 supporting our decision to conduct multi-level analyses (see Table 4).

Table 4.

Mean, standard deviation, Cronbach's alpha, ICCs, and correlations

Variable	1	2	3	4	5	6	7	8
1. Intervention	-	**0.19**	**0.12**	**-0.13**	**0.13**	**0.22**		
2. Mindfulness		*.54 / .85*	**0.43**	**-0.22**	**0.47**	**0.35**		
3. Self-regulation		**0.46**	*.86 / .94*	**-0.36**	**0.48**	**0.38**		
4. Self-control		**-0.31**	-0.27	*.86 / .97*	**-0.23**	**-0.23**		
5. Flow Experience		**0.44**	**0.56**	-0.10	*.90 / .95*	**0.58**		
6. Subjective Vitality		**0.50**	**0.61**	-0.21	**0.67**	*.89 /.94*		
7. Age		**0.40**	0.21	-0.11	0.22	**0.25**	-	
8. Gender		**0.28**	**0.30**	-0.15	0.12	0.19	0.02	-
M (between)	0.50	3.29	4.18	3.17	4.44	4.27	33.69	1.28
SD (between)	0.00	0.49	0.74	0.93	0.81	1.04	11.46	0.45
SD (within)	0.11	0.61	0.82	0.96	0.74	0.90		
1-ICC(1)		0.55	0.57	0.54	0.59	0.59		

Note. Intervention coded as 0 (no intervention) and 1 (intervention). Gender coded as 1 (female) and 2 (male). Correlations on the between-person level are presented below the diagonal *(N* = 74-78). Correlations on the within-person level are presented above the diagonal *(N* = 451-588). Numbers in bold are $p < .05$. Along the diagonal, in italics, Cronbach's Alpha values on the within / between level are displayed. 1-ICC(1) reflects the proportion of within-person variance.

Table *5* provides a summary of the direct and indirect effects observed in our multi-level path model. As anticipated in our first hypothesis, the morning mindfulness-based micro-intervention exhibited a positive day-specific influence on self-regulation (b = 0.22, SE = 0.08, p = .009) and a negative effect on self-control (b = -0.26, SE = 0.09, p = .004). Moreover, the intervention directly predicted subjective vitality in the evening (b = 0.27, SE = 0.10, p = .005). Our results revealed that self-regulation was significantly associated with flow experience (b = 0.56, SE = 0.06, $p < .001$), while no significant relationship was found between self-control and flow (b = 0.00, SE = 0.05, p = .966). Notably, flow experience exhibited a significant positive relationship with subjective vitality (b = 0.65, SE = 0.07, $p <$ .001).

As hypothesized in 2a, our findings supported a significant indirect effect of self-

regulation on subjective vitality via flow experience (b = 0.08, SE = 0.03, 95% CI [0.02; 0.15]). However, the indirect effect of self-control on subjective vitality via flow experience was non-significant (b = 0.00, SE = 0.01, 95% CI [-0.02; 0.02]), in contrast to hypothesis 2b. In investigating hypotheses 3a and 3b, we examined regulatory processes (self-regulation and self-control) and flow experience as serial mediators in the relationship between the mindfulness intervention and subjective vitality. As anticipated by hypothesis 3a, the intervention exhibited a positive indirect effect on subjective vitality through self-regulation and flow experience (b = 0.36, SE = 0.04, 95% CI [0.28; 0.45]). However, the indirect effect of the intervention on subjective vitality through self-control and flow experience was not statistically significant (b = 0.00, SE = 0.03, 95% CI [-0.07; 0.06]), contrary to hypothesis 3b.

Further, the linear effects of the weekday on self-control (b = -0.08, SE = 0.04, p = 035), flow experience (b = 0.06, SE = 0.03, p = .018), and subjective vitality (b = 0.08, SE = 0.03, p = .003) were significant, suggesting that participants experienced less self-control as well as more flow experience and subjective vitality towards the end of this week. Quadratic effects of the weekdays were not significant. Overall, our model accounted for 46% of the within-person variance in subjective vitality, 31% of the variance in flow experience, and 2% each in self-regulation and self-control (Hedeker & Gibbons, 2006).

Table 5.

Multilevel estimates predicting self-regulation, self-control, flow experience, and subjective vitality

	Self-regulation (midday)			Self-control (midday)			Flow experience (evening)			Subjective vitality (evening)		
Direct effects (within-person)	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*	*b*	*SE*	*p*
Mindfulness Intervention	**0.22**	**0.08**	**.009**	**-0.26**	**0.09**	**.004**	0.11	0.08	.190	**0.27**	**0.10**	**.005**
Self-regulation							**0.56**	**0.06**	**.000**	**0.25**	**0.09**	**.003**
Self-control							0.00	0.05	.966	-0.09	0.06	.118
Flow experience										**0.65**	**0.07**	**.000**
Weekday (linear)	0.05	0.03	.080	**-0.08**	**0.04**	**.035**	**0.06**	**0.03**	**.018**	**0.08**	**0.03**	**.003**
Weekday (quadratic)	-0.01	0.02	.685	-0.05	0.03	.088	0.01	0.02	.805	0.04	0.02	.072
Residual Variance	**1.08**	**0.15**	**.000**	**1.56**	**0.15**	**.000**	**0.76**	**0.10**	**.000**	**1.01**	**0.09**	**.000**
R^2		0.02			0.02			0.31			0.46	

Indirect effects (within-person)	*b*	*SE*	*LL 95% CI*	*UL 95% CI*
Self-regulation → Flow → Vitality	**0.08**	**0.03**	**0.02**	**0.15**
Self-control → Flow → Vitality	0.00	0.01	-0.02	0.02
Intervention → Self-regulation → Flow → Vitality	**0.36**	**0.04**	**0.28**	**0.45**
Intervention → Self-control → Flow → Vitality	0.00	0.03	-0.07	0.06

Note. $N_{between}$ = 78; N_{within} = 588. Fixed effects on the within-person level are shown. Indirect effects were calculated based on Monte Carlo. LL = Lower Limit. UL = Upper Limit. Significant effects are printed in bold.

4.5 Discussion

Morning routines can strongly color employees' experiences during the whole day (Binnewies et al., 2009; Rothbard & Wilk, 2011). Given that employees' time in the morning is limited, we examined whether a mindfulness-based micro-intervention can spill over to affect employee well-being in the evening in the home domain. More specifically, our study integrates the spillover literature (Edwards & Rothbard, 2000) and the PSI theory (Kuhl et al., 2006) to disentangle the regulatory and motivational mechanisms that underlie the day-specific spillover of a brief mindfulness-based meditation in the morning. Our results demonstrate that a brief meditation in the morning can foster self-regulation and reduce self-control in the work domain. Furthermore, our data support a positive spillover effect of the mindfulness-based micro intervention to vitality in the home domain. While this relationship was mediated by self-regulation and flow in the work domain, we found no corresponding relationship between self-control and associated flow experiences. Hence, despite the additional time constraints, a brief mindfulness meditation in the morning unlocks significant benefits when it is incorporated into employees' morning routines.

4.5.1 Theoretical contributions

Our study makes several significant theoretical contributions by integrating literature on spillover with literature on the effects of mindfulness-based interventions. Firstly, by examining the spillover effects of a brief mindfulness intervention from the home domain to the work domain and subsequently to well-being in the evening at home, our study expands our understanding of how mindfulness-based micro-interventions affect employees' functioning. This finding adds to the literature by providing evidence for the potential spillover effects of morning routines over the whole day and the benefits of incorporating mindfulness into daily practices. For example, Greenhaus and Powell

(2006) already demonstrated that positive experiences in one domain can spill over and enhance well-being in other domains. Our study builds upon this notion by specifically examining the spillover effects of a morning intervention. By focusing on the sequential nature of a workday, we contribute to a deeper understanding of how morning routines in the home domain can spill over and relate to subsequent experiences and well-being in the work- and home domains. Our perspective on different within-day episodes highlights the interconnectedness of different life domains and the potential for positive spillover effects based on individual routines. Understanding the spillover effects between the home and work domains is particularly relevant due to the increasing recognition of work-life integration and the impact of one's well-being in different life domains (Edwards & Rothbard, 2000). Further, by taking the spill-over effects between the home and work domains into account, we extend the previous literature on the effects of mindfulness-based interventions (Bartlett et al., 2019; Howarth et al., 2019). Based on the investigation of the effects of a brief mindfulness intervention that can be easily integrated into individuals' morning routines, we demonstrate that even with limited time in the morning, a brief 10-minute intervention can foster regulatory processes and well-being, spilling over from the home domain to the work domain.

Secondly, our study not only explores the spillover effects of a morning mindfulness intervention but also expands on the underlying mechanisms that mediate the relationship between mindfulness and employee well-being. By integrating the spillover literature (Edwards & Rothbard, 2000) with the PSI theory (Kuhl et al., 2006), we distinguish between self-regulation and self-control to enhance our understanding of how mindfulness interventions improve well-being. Our findings indicate that mindfulness promotes acceptance of self-congruent aspects of work tasks, fostering self-regulation, while also facilitating acceptance of non-aligned aspects, reducing the

need for self-control. These findings not only extend initial empirical evidence about the negative daily effect of mindfulness on effortful self-control by implementing a short intervention in the morning (Friese & Hofmann, 2016) but also align with theoretical work based on the self-determination theory suggesting that mindfulness fosters the alignment of inner values and actions (Ludwig et al., 2020; Schultz & Ryan, 2015). Since the core propositions of PSI theory and self-determination are inherently linked (Koole et al., 2018) and self-regulation and self-control are closely related to intrinsic and extrinsic motivation as described in the self-determination theory, a more in-depth view of how different self-regulatory processes are related to underlying mechanisms of need satisfaction or frustration is a promising avenue for future research (Deci & Ryan, 2012).

Moreover, our study highlights the positive relationship between self-regulation and flow experiences at work, while the results could not support a significant relationship between self-control and flow. Accordingly, self-regulation may play a more prominent role as an underlying mechanism in explaining the beneficial effects of mindfulness-based micro-interventions than self-control. These findings align with previous research emphasizing the importance of self-regulation as a prerequisite for experiencing flow (Baumann, 2021; Medhurst & Albrecht, 2016; Rheinberg & Engeser, 2012). By providing empirical evidence for the positive relation of self-regulation to flow, considering day-specific fluctuations, our study contributes to the understanding of the regulatory processes underlying flow experiences. Interestingly, contrary to our predictions based on the PSI theory, we did not find a significant relationship between the temporary inhibition of self-related aspects when exerting self-control and the experience of flow. Possibly the inhibition of self-related aspects may only be sustained briefly during one task but does not influence the experience of flow afterwards.

Additionally, the depleting effects of self-control might not be essential for flow as long as employees are inclined to autonomously regulate themselves. This interpretation is in line with Rivkin et al. (2016) who found that daily flow experiences buffer the negative relationship between self-control demands and indicators of well-being (such as work engagement and vitality). Future research should further explore the relationship between self-control and flow experience, considering potential boundary conditions such as time constraints, since the effects of self-control might manifest only in certain time frames.

Lastly, our study contributes to research on mindfulness by employing a diary study design with an experimental manipulation of mindfulness and multiple daily measurement points, which enables us to investigate the day-specific effects of a brief mindfulness intervention on work-related processes and well-being. Because we were able to control for between-person variance and treat each participant as their own control, we increased the accuracy of the estimates (Schmiedek & Neubauer, 2020) by isolating the effects of the mindfulness intervention and reducing the influence of individual differences. Since within-person designs are relatively rare in mindfulness research, we offer valuable insights into the effectiveness of interventions and their impact on individual experiences. In doing so, we provide support for the causal effect of the intervention on self-regulation, alleviating concerns that individuals with higher self-regulatory competencies may be more likely to engage in mindfulness, as discussed recently by Goldberg et al. (2020). In conclusion, a short meditation in the morning serves as a crucial starting point that can trigger positive spill-over effects throughout the day, including improved self-regulatory competencies and increased flow experiences in the work domain, as well as enhanced well-being in the home domain.

4.5.2 Limitations and Suggestions for Future Research

Despite its contributions, we have to discuss several limitations of our study that may inform future research. First, participants were embedded in a passive control condition during the first week of our diary study and engaged in a short mindfulness intervention during the second week. Although this procedure avoids informing participants about the meditation script and prevents participants from voluntarily engaging in this meditation during the first week, we cannot completely exclude the possibility that some participants with prior mindfulness experience may have engaged in mindfulness activities on the intervention-free days. This could lead to a more conservative estimation of the intervention effects. Additionally, without an active control condition, there may be other confounding influences that cannot be ruled out. Factors such as completing the surveys, awareness of desired outcomes (e.g., intend-to-treat effect), and repeated reflection on the variables of interest could have potentially influenced the results (Gochmann et al., 2022). Despite profound evidence for the effectiveness of brief mindfulness interventions (e.g., Bartlett et al., 2019), further studies could randomize the two conditions to test the robustness of our findings while controlling for non-compliance with the instructions and unintended mindfulness practice and implementing an active rather than passive control condition to strengthen the evidence on the daily effectiveness of including a brief mindfulness intervention into one's morning routines.

Second, the mindfulness intervention could only explain a relatively small but nevertheless significant portion of the variance of self-regulation and self-control. Investigating regulatory processes and flow experience as mediators for the positive day-specific effect of mindfulness on well-being is strongly rooted in the PSI theory and the explained variance of vitality in the home domain (i.e., 46% for vitality) underpins

this notion. However, the small amount of explained variance in regulatory processes may also imply that it is important to consider other daily mechanisms that can explain the beneficial effects of the intervention on subjective vitality such as motivational processes underlying need satisfaction as suggested by the self-determination theory (Deci & Ryan, 2012). Further research could directly compare different mechanisms and additionally investigate the moderating role of personal and organizational factors that have been associated with regulatory processes in general (e.g., trait self-control, sleep quality, job crafting, and work demands; Bakker & Oerlemans, 2019; Diestel et al., 2015; Diestel & Schmidt, 2011; Externbrink et al., 2019).

Third, even though our diary study included an experimental manipulation of mindfulness and two measurement points per day, the design of our study does not allow us to draw causal conclusions for all hypothesized relationships. Whereas our study supports the effects of a mindfulness intervention on regulatory processes, the associations between regulatory processes, flow experience, and vitality remain correlational. This is especially due to the fact that flow and vitality were measured at the same time (evening). While we have temporarily separated both self-regulatory processes from flow and vitality, we cannot directly test the proposed direction of "true causality". For instance, despite a positive association between self-regulation measured during the day and flow experience measured in the evening, flow experience might have been already higher in earlier measurement points which may facilitate perceived self-regulation as well. Further studies could test for these reciprocal effects or eliminate these concerns through the implementation of interventions fostering self-regulation and associated flow experience.

Fourth, our study primarily relied on self-reported measurements to assess self-regulation, self-control, flow experience, and subjective vitality, which may be

susceptible to common method bias and memory bias (Podsakoff et al., 2003). However, we implemented multiple measurement points per day in our diary study to reduce potential memory bias. Additionally, since we found differential effects for self-regulation and self-control, our study design had sufficient power to detect distinct effects. Whereas it is difficult to assess regulatory processes with physiological correlates, further research could include physiological correlates of flow experience and subjective vitality, such as heart rate variability or cortisol levels (e.g., Abbott et al., 2014; Matousek et al., 2010; Peifer et al., 2020; Ryan & Frederick, 1997).

4.5.3 Practical implications

With regard to practical implications, our study revealed that a brief mindfulness-based intervention lasting only ten minutes that can be easily incorporated into daily routines without prior experience fosters regulatory processes and well-being throughout the whole day. Accordingly, our results support the importance of morning routines for daily well-being. Hence, individuals could implement a short meditation in their morning routine or engage in different exercises that increase mindfulness in the morning (e.g., mindful eating, body scan, Hülsheger et al., 2015). Since employees interested in implementing a short meditation in the morning were more likely to participate in our study, similar self-selection effects are likely to apply when companies offer these interventions to their workforce. Recognizing the importance of time efficiency, it is valuable for individuals and organizations to prioritize interventions that can be easily integrated into the morning routine. By offering accessible and time-effective mindfulness practices, individuals can benefit from enhanced self-regulation and well-being without placing a significant burden on their daily schedules. Organizations could support this process by offering audio instructions for similar mindfulness-based interventions and encouraging their employees to engage

with them in the morning, for instance by allowing for a more flexible start to work or by introducing brief mindfulness-based exercises at work. Additionally, it could be beneficial to implement short informative workshops about the impact of morning routines on well-being and performance (McClean et al., 2021; Sonnentag et al., 2020) as well as resource transfer training to facilitate positive spill-over effects from one domain to another (Heskiau & McCarthy, 2021).

In addition, based on the identified mechanisms underlying the relation of mindfulness to well-being, individuals, and organizations could directly facilitate self-regulatory processes as well as flow experience to foster the feeling of vitality. In order to enable self-regulation and reduce the need for self-control, individual interests and needs of employees have to be aligned with the assigned tasks and goals (Kuhl, 2010). It is important to note that while the explained variance in self-regulation and self-control in our study may not be exceedingly high, these processes contribute to a significant amount of variance in later outcomes. Therefore, fostering these regulatory mechanisms directly can be a relevant mechanism to promote flow and well-being. Besides mindfulness, reframing assigned tasks could help employees to focus on the aligned aspects fostering energizing regulation. Organizations can foster this process for instance by allowing for and supporting job crafting (Tims & Bakker, 2010; Tims et al., 2013). Additionally, various interventions in an individual sphere (e.g., positive feedback to increase self-efficacy, limited e-mail access in the evening to increase detachment) or organizational sphere (e.g., task variety at work, regular feedback and setting clear goals during appraisals) can help to facilitate the experience of flow at work as an important predictor of well-being (Peifer & Wolters, 2021).

4.6 Conclusion

Taken together, this study sheds light on the day-specific effects of a brief mindfulness-

based intervention in the morning on work-related processes and well-being in the evening. Integrating the literature on spillover and the PSI theory (Kuhl et al., 2006), our results suggest that a brief meditation in the home domain can support energizing self-regulation and reduce effortful self-control in the work domain. Self-regulation further facilitated the experience of flow as an indicator of optimal functioning, culminating in increased vitality back in the home domain. Based on these results, considering spill-over effects between the work and home domain, organizations may recommend interventions encouraging employees to introduce a brief meditation in their morning routine to foster overall well-being.

5. Mindful Evenings: Unravelling the Social Benefits of a Brief Meditation on Perspective Taking, Individual Well-being, and Performance

In the following part of this thesis, the third paper is displayed which is currently under review in the *Journal of Occupational Health Psychology*. Only minor formatting changes have been made, and the footnotes 2 and 3 have been added. The paper mainly addresses the third research question, as described in the previous paragraph *2.4.3 Mixed motive model of perspective taking.*

Research question 3: How can increased perspective taking explain the positive effect of mindfulness on work engagement?

With this study, I aim to build upon my previous research that demonstrated positive effects of brief morning mindfulness interventions on flow experience through self-regulation (see section 4 for more information). Here, the focus shifts to exploring the effectiveness of an evening meditation, which offers greater flexibility for employees due to its timing. Utilizing a randomized design with an active control group, the study assesses whether evening meditation can replicate the positive outcomes observed in the morning sessions (see section 4). Additionally, this study delves into the role of perspective taking as a social mechanism underlying the effects of the intervention on eudaimonic well-being. Since social mechanisms are not necessarily directly related to a specific task, I considered work engagement as a main indicator of eudaimonic well-being in this study broadening the time frame and scope. However, as described in the footnotes 2 and 3, the results are also robust with the consideration of flow experience as additional outcome.

5.1 Abstract

Can a brief meditation in the evening reshape our understanding of others at work during the next day, thereby enhancing the actor's performance and well-being? To address this question, we examine spill-over effects of a brief meditation in the evening on next-day extra-role performance, in-role performance, and work engagement, considering perspective taking as explaining mechanism. 64 participants from different sectors in Germany took part in our within-person field experiment over ten days (468 day-level data points), receiving a seven-minute mindfulness intervention on 5 days and an active control intervention on the other days. Our results supported a positive effect of the mindfulness intervention on next-day perspective taking, while the control intervention showed no effect. In turn, perspective taking predicted day-specific extra-role performance, in-role performance, and work engagement. The mindfulness intervention exerted significant indirect effects on all outcomes via perspective taking. These results help to clarify how an evening meditation enhances our understanding of others at work, improving the actor's performance and well-being. They further support employees in making an informed decision about whether they want to engage in evening meditation.

Keywords. Mindfulness; Intervention; Perspective Taking; Diary Study; Performance; Work Engagement

5.2 Introduction

Could a brief mindfulness-based meditation in the evening be effective enough to improve our understanding of others at work during the next day, thereby enhancing performance and well-being? Mindfulness, characterized by present-moment attention with an open and non-judgmental focus (Bishop et al., 2004), has gained relevance in

the work context for improving employees' performance and well-being (Bartlett et al., 2019; Good et al., 2016). When exploring underlying mechanisms for the positive effects of mindfulness on individual performance and well-being in the work context, research has mainly focused on intra-individual processes, such as self-regulation or recovery processes (Friese & Hofmann, 2016; Glomb et al., 2011; Ludwig et al., 2020). However, mindfulness also entails a greater attentiveness and acceptance towards external stimuli (Bishop et al., 2004), for instance during social interactions at work, which are shown highly relevant to employees' performance and well-being (Lehmann-Willenbrock, 2024). Being mindful in social interactions can increase the awareness of relevant social as well as emotional cues and foster the acceptance of all emotions and perspectives, even if they differ from one's own (Good et al., 2016). Accordingly, we suggest that mindfulness is likely to facilitate perspective taking (Good et al., 2016; Winning & Boag, 2015) which is, based on the mixed motive model of perspective taking, defined as the process of taking others' viewpoints to understand their thoughts, intentions, motivations, and emotions (Ku et al., 2015). Since perspective taking is likely to also influence the actor's performance and well-being based on an altered perception of others and the situation (Clark et al., 2019; Ku et al., 2015; Parker et al., 2008), we consider perspective taking as important explaining mechanism for the positive effects of mindfulness on employees' performance and well-being.

Many companies have aimed to utilize the possible benefits of mindfulness interventions offering programs like the mindfulness-based stress reduction program to their employees (Vibe et al., 2017). However, these long-lasting programs over multiple weeks often require a significant time commitment and can be costly for companies to implement. In contrast, brief mindfulness interventions that can be as short as five to ten minutes, offer a more accessible alternative for companies and employees (Hohnemann

et al., 2024; Howarth et al., 2019). Previous research has provided evidence for the effectiveness of a brief morning meditation (Hohnemann et al., 2024), while evening meditations were not thoroughly investigated. However, the evening often provides employees with greater flexibility than the morning and allows for better detachment from work (Sonnentag & Kühnel, 2016), with both aspects enabling a more focused engagement with the intervention. A recent meta-analysis demonstrates that mindfulness-based micro-interventions positively predict performance and well-being (Howarth et al., 2019), but could not answer the question of whether these short interventions are effective enough to yield effects from day to day. Accordingly, we aim to address the question of whether dedicating just ten minutes to meditation in the evening could significantly foster employees' next-day perspective taking.

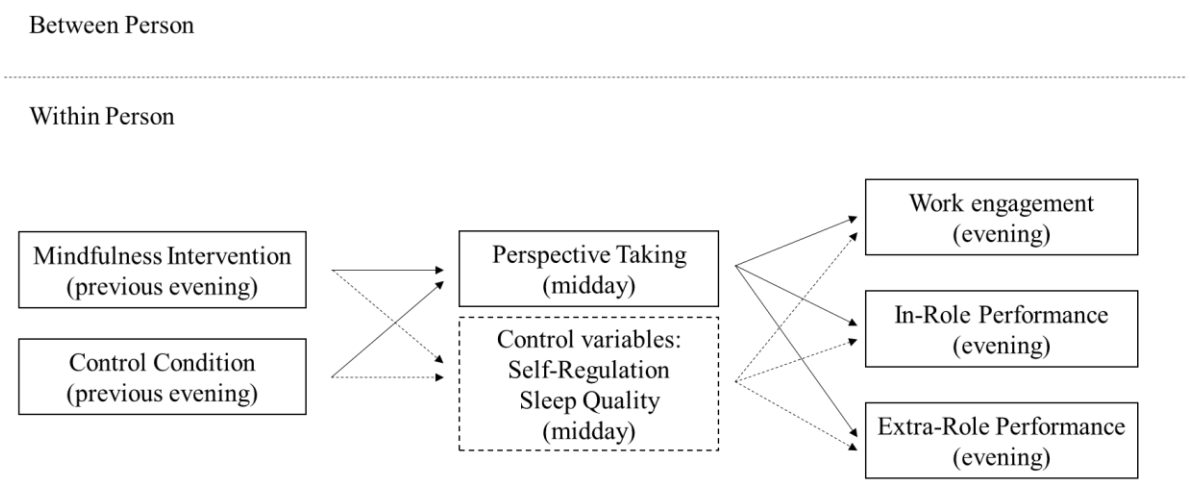
Further, since perspective taking affects how the actor thinks or feels about significant others as well as the situation (Parker et al., 2008), we assess the day-specific effects of perspective taking at work on performance and well-being. While existing research has mostly explored the impact of perspective taking on interpersonal outcomes, including for instance its effects on coworker support (Fasbender et al., 2020; McNeely & Meglino, 1994; Parker et al., 2008), there is a gap in understanding how it can influence the actor's individual performance and well-being. Even though perspective taking may demand individual resources (Fasbender et al., 2023), the mixed-motive model of perspective taking suggests that it can increase individual performance and well-being based on more successfully navigated social interactions (Ku et al., 2015). When assessing these effects, we consider extra-role performance (actions beyond the formal job description helping colleagues or the organization) as well as in-role performance (formally required job-related behaviors) separately to capture both prosocial and core aspects of performance. Further, we consider work

engagement as a key indicator of well-being and optimal functioning at work, defined as a fulfilling state of mind characterized by absorption, vitality, and strong dedication to one's work (Schaufeli et al., 2006).

Taking together the positive effect of a brief mindfulness meditation in the evening on next-day perspective taking as well as the subsequent effect on performance and well-being, we examine perspective taking as mechanism that can explain the day to day effects of a brief mindfulness intervention on performance and well-being (see Figure *10*). In doing so, we show that perspective taking can explain these effects above intraindividual mechanisms such as self-regulation and sleep quality (e.g., Bowlin & Baer, 2012; Friese & Hofmann, 2016; Glomb et al., 2011; Hülsheger et al., 2015; Jamieson et al., 2022). For instance, after meditating in the evening, which helps to process and accept own emotions, an employee may enter the next day with greater awareness and focus, allowing them to better understand colleagues' perspectives in a work meeting. This enhanced understanding, such as a more accurate recognition of intentions, tasks, and workload, can improve their extra-role performance (e.g., offering help to colleagues) as well as their in-role performance (e.g., finding optimal solutions), and boost their own work engagement (e.g., feeling of belonging and immersion in work).

Figure 10.

Theoretical Model



This research provides at least three contributions to the literature on mindfulness, perspective taking, and well-being in the work context. First, we demonstrate that the positive effects of mindfulness on the actor's performance and well-being are partly transmitted through enhanced perspective taking. While previous research has often emphasized internal processes like self-regulation and sleep quality (e.g., Glomb et al., 2011), we controlled for these factors and showed the additional relevance of perspective taking as an outward-focused process. By applying the mixed motive theory of perspective taking (Ku et al., 2015), we show that a brief mindfulness intervention improves the understanding of others, which in turn enhances the actor's performance and well-being. This highlights that the mechanisms underlying positive effects of mindfulness extend beyond the individual, also influencing the perception of others in the workplace.

Secondly, we evaluate the day-to-day effects of a brief and practical mindfulness intervention that can be easily implemented in employees' evenings. Our intervention offers a time-efficient alternative to intensive mindfulness programs. By examining the spill-over effects of this evening meditation on next-day perspective taking, well-being,

and performance, we shed light on the potential mid-term benefits of brief mindfulness interventions for employees. In doing so, we follow the call of Ku et al. (2015) and evaluate an intervention to effectively foster perspective taking at work. Accordingly, based on these results, employees can make a more informed choice whether they want to engage in evening meditations considering not only limited immediate but also day-to-day benefits.

Thirdly, we contribute to a better understanding of the impact of perspective taking on individual outcomes. While its effects on cooperation, coordination, and negotiation outcomes are well-established (Ku et al., 2015; Parker et al., 2008), research on its specific effects on in-role performance and individual well-being remains limited. While perspective taking demands individual resources (Fasbender et al., 2023), understanding others' motives allows employees to adapt accordingly and enhance their own performance and well-being (Ku et al., 2015). By investigating perspective taking as a mechanism for the effects of evening meditation on the actor's performance and well-being, we shed light on how considering others' perspectives at work benefits the actor.

5.2.1 Perspective taking as explaining mechanisms for the beneficial effects of mindfulness

Research over the last years has consistently demonstrated positive effects of mindfulness on various outcomes, including physical and mental health (e.g., reduced pain, stress, and anxiety), cognitive abilities (e.g., attention, task switching, working memory), affect regulation (e.g., reduced rumination), and interpersonal outcomes (e.g., better relationships and prosocial behaviors; Creswell, 2017). In the workplace, it notably enhances employees' performance and well-being (Bartlett et al., 2019; Creswell, 2017; Good et al., 2016; Jamieson & Tuckey, 2017). While there is high

consensus about the beneficial effects of mindfulness in the workplace, the underlying mechanisms driving these benefits are less clear. When explaining these positive outcomes of mindfulness interventions, most research concentrated on intra-individual processes, such as the regulation of thoughts, emotions, and behaviour or recovery during sleep (e.g., Bowlin & Baer, 2012; Friese & Hofmann, 2016; Glomb et al., 2011; Hülsheger et al., 2015; Jamieson et al., 2022). While these internal processes are undoubtedly important, it should not be overlooked that most phenomena in the workplace, including performance and well-being, are at least partly influenced by dynamic interpersonal processes in the organization, such as leadership, collaborations, interactions with customers, and more (Lehmann-Willenbrock, 2024). Therefore, when explaining the beneficial effects of mindfulness, we emphasize that its broad and non-judgmental awareness in the present moment also extends to external stimuli, enabling individuals to perceive socially and emotionally relevant cues in personal interactions more accurately (Good et al., 2016). In doing so, mindfulness provides an ideal starting point to enhance the understanding of others (i.e., perspective taking), which is likely to further affect the actor's performance and well-being.

We draw from the mixed motive model (Ku et al., 2015) to elaborate on perspective taking as a key mechanism explaining the relationship between mindfulness and its positive effects on performance and well-being. Perspective taking has been defined as the process of understanding the thoughts, feelings, and viewpoints of others (see also Longmire & Harrison, 2018; Parker et al., 2008). While sometimes categorized as a component of empathy, perspective taking is distinct in that it focuses on understanding others' perspectives without necessarily involving an affective response (i.e., imagining their world from their perspective; (Longmire & Harrison, 2018). Numerous studies have explored antecedents of perspective taking in the

workplace, which can be clustered into factors related to cognitive capacity and motivation (Ku et al., 2015; Litchfield & Gentry, 2010; Parker et al., 2008). Despite calls to implement and evaluate interventions to enhance perspective taking (Ku et al., 2015), this gap remains unaddressed. Given that mindfulness increases cognitive capacity (e.g., working memory, emotional regulation; Chiesa et al., 2011) and fosters the acceptance of diverse thoughts and emotions (Bishop et al., 2004; Glomb et al., 2011), mindfulness interventions represent a promising path to foster perspective taking. Specifically, the ability to process one's own experiences in a non-judgmental manner reduces the influence of personal emotions, enabling individuals to perceive their colleagues' reactions with greater clarity during workplace interactions. Additionally, mindfulness's broadened awareness and present-moment focus enhance individuals' ability to detect socially and emotionally relevant cues in interactions. This heightened awareness allows individuals to transcend their own perspectives more flexibly, becoming more attuned to their colleagues' thoughts and viewpoints. As a result, mindfulness can foster an elevated cognitive understanding of others (Glomb et al., 2011). Accordingly, previous research showed initial evidence for positive effects of mindfulness on perspective taking (Krasner et al., 2009; Pratscher et al., 2018; Winning & Boag, 2015). Therefore, building further on this research and the prepositions of the mixed-motive model, we expect mindfulness interventions to exert positive effects on perspective taking.

However, the majority of mindfulness interventions have been of substantial length and may not be easily accessible to all employees, particularly those with limited resources or time constraints. While brief morning meditations have shown beneficial day-specific effects on well-being (Hohnemann et al., 2024), the potential benefits of evening meditations remain unexplored. Shifting the focus to evening interventions,

which has been dominant in research on recovery experiences (Sonnentag et al., 2017), may offer a more relaxed environment to fully immerse themselves in the practice without typical time pressure in the morning. The upcoming sleep may enable the mind to better consolidate this accepting state overnight (Landmann et al., 2014) than the morning which is already often colored by re-attachment to work (Sonnentag et al., 2020). Imagine an employee engaging in an evening meditation session. As they cultivate a more mindful and non-judgmental attitude towards their own emotions and those of others, they begin to process the experiences and emotions of the day. This reflective process, consolidated during the following hours, allows them to approach the next day with greater openness and clarity. During a team meeting, for example, they may find themselves less influenced by their own emotions, enabling them to more openly perceive their colleagues' ideas and thoughts. By fully concentrating on the present moment, they become more attuned to relevant social cues, allowing them to perceive the perspectives of others with greater clarity and understanding.

H1: A brief mindfulness meditation in the evening will exert positive effects on next-day perspective taking.

According to the mixed-motive model (Ku et al., 2015), perspective taking plays a crucial role in the work context, when navigating social interactions with potentially mixed motives. Individuals adapt their actions based on the perceived intentions of their interaction partners, cooperating when appropriate and protecting themselves when faced with competitive intent (Ku et al., 2015). This is especially relevant in the workplace characterized by high diversity of personalities and motives (Longmire & Harrison, 2018; Parker et al., 2008). While Parker et al. (2008) outlined that perspective taking changes how the actor feels about and perceives the situation as well as significant others, research provided mainly evidence for positive effects of perspective

taking on interpersonal outcomes in the workplace (Fasbender et al., 2020; McNeely & Meglino, 1994). Focusing on extra-role performance, a greater understanding of each other's perspectives has been shown to inspire individuals to go beyond their job requirements and increase extra-role performance. Being able to recognize and genuinely care about others' emotions causes employees to engage in actions that benefit colleagues and the organization as a whole. In several studies, perspective taking and related interventions have been shown to directly increase prosocial behavior (Parker et al., 2008), with a few studies focusing on the work context (Axtell et al., 2007; Settoon & Mossholder, 2002). Just recently, Fasbender et al. (2020) revealed positive effects of co-worker-oriented perspective taking and empathic concern on co-worker support after two weeks. Our aim is to expand upon these results by exploring the daily effects of perspective taking on extra-role performance, often indicated by organizational citizenship behavior.

Moreover, perspective taking holds the potential to also significantly boost in-role performance. While previous research has only argued for positive effects of general empathy on in-role performance in specific sectors, such as the teaching sector (Singh, 2014) and for leaders (Kellett et al., 2002), similar effects of perspective taking are likely to manifest across a wide array of industries and job roles. Understanding others' perspectives allows employees to align their actions with the expectations and needs of their colleagues, supervisors, or clients, thereby enhancing task efficiency and effectiveness. By recognizing and responding to the emotional and practical needs of others, employees can improve communication, resolve conflicts more effectively, and contribute to smoother workflows. Perspective taking fosters a deeper understanding of team dynamics (Parker et al., 2008), enabling employees to anticipate potential challenges and proactively address them. Since perspective taking has been

conceptualized as a process that can vary across situations and days within individuals (Ku et al., 2015; Parker et al., 2008), we aim to extend the current research by considering different sectors as well as day-specific fluctuations.

Based on the mixed-motive model (Ku et al., 2015), we anticipate that perspective taking can boost also individual well-being as indicated by work engagement. Even though perspective taking requires some individual resources which can diminish daily subjective vitality (Fasbender, 2023), we argue that understanding others deepens one's involvement at work and enhances well-being and motivation through a clearer understanding of social dynamics. Previous research has demonstrated positive effects of trait empathy, including perspective taking, on work engagement in the nursing sector (Cao & Chen, 2020). Since perspective taking has a strong relation to social connection and support, which are pivotal factors in predicting work engagement (Lesener et al., 2020), these effects are likely to prevail across sectors. By understanding colleagues' perspectives, employees can create more meaningful interactions (e.g., helping each other, better understanding feedback, improved stakeholder management) which strongly drives work engagement. Underlining the importance of perspective taking within these social interactions, work engagement has been shown to cross over among employees, presumably by unconscious mimicking as well as by the cognitive process of understanding others and tuning in on their emotional state (Bakker & Xanthopoulou, 2009). At the same time, perspective taking can also facilitate managing interactions with opposing motives (e.g., negotiations between employee council and employer representatives) through a deeper understanding of each perspective. It could even facilitate the recognition of interactions driven by negative intent (e.g., hostility), allowing for adaptive behaviors (e.g., taking personal distance or reporting the situation). Accordingly, despite the necessary investment of individual resources

(Fasbender et al., 2023), we assume positive day-specific effects from perspective taking on work engagement.

H2: Perspective taking is positively related to (a) extra-role performance, (b) in-role performance, and (c) work engagement.

Integrating our previous arguments, we assume perspective taking to mediate the positive day-to-day effects of a brief evening meditation on performance and well-being (i.e., extra-role performance, in-role performance, and work engagement). Given the substantial influence of social interactions on employees' performance and well-being (Clark et al., 2019; Lehmann-Willenbrock, 2024; van Lange & Balliet, 2015), we extend the current research that has mostly focused on individual processes as underlying processes of mindfulness, such as improved self-regulation as well as recovery (Friese & Hofmann, 2016; Glomb et al., 2011; Ludwig et al., 2020). Based on the mixed-motive model (Ku et al., 2015), we assume that a relevant part of the beneficial effects of mindfulness on performance and well-being can be explained by perspective taking, in addition to these individual mechanisms. In particular, a brief meditation in the evening enables a non-judgmental and neutral perception of emotional cues and information during the next workday, which manifests in heightened perspective taking when interacting with others. This increased understanding of others' interests and motives, as we posit, contributes significantly to the augmentation of extra-role and in-role performance as well as increased well-being. For instance, when working in a project team, understanding their team members' intentions and circumstances, such as an interest in specific tasks or a high workload, allows employees to adapt their actions accordingly, for instance offering support where it's most needed (i.e., enhancing extra-role performance), improving collaboration and stakeholder management (i.e., boosting in-role performance), and experiencing better

sense of belonging and motivation (i.e., enhancing work engagement). Thus, integrating our previous arguments, we propose the following hypotheses.

H3: Increased next-day perspective taking mediates the positive effects of an evening meditation on next-day (a) extra-role performance, (b) in-role performance, and (c) work engagement.

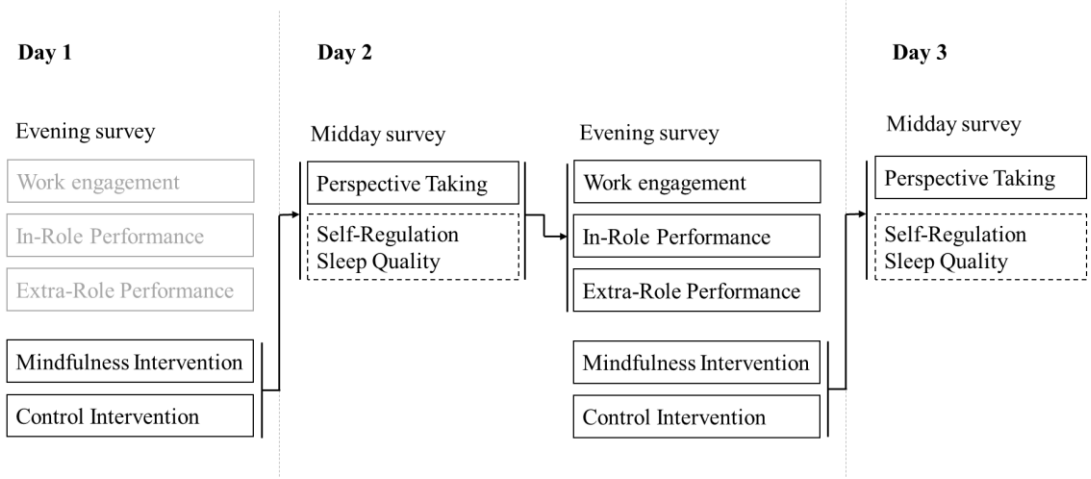
5.3 Method

5.3.1 Procedure and Manipulation

We conducted a ten-day daily diary study that began with a pre-questionnaire gathering demographic information and securing informed consent. Participants received two daily surveys during the study (see Figure *11*). The first daily survey, sent four hours after the start of the workday, assessed perspective taking and the control variables self-regulation and sleep quality. The second daily survey, administered 30 minutes after work, consisted of two parts. Firstly, extra-role performance, in-role performance, and work engagement were assessed retrospectively for the day. Secondly, participants saw instructions for the meditation or control condition. A reminder for both surveys was sent out 60 minutes afterwards. Participants were randomly assigned to two groups: the experimental group received daily instructions for a brief meditation during the first week and short audio prompts during the second week, while the control group listened to audio prompts during the first week and received meditation instructions during the second week. Data collection occurred via the online platform SoSci Survey, with digital time stamps for precise tracking (Leiner, 2019).

Figure 11.

Research Design



The daily mindfulness interventions involved different audio instructions lasting six to seven minutes prompting participants to focus on their breath or their body in the present moment while accepting all upcoming experiences. The meditation was provided by the Zentrum für Achtsamkeit Köln (eng.: Mindfulness Center Cologne; Tofahrn & Kirsten, 2023). Control questions ensured active engagement with the audio. In the control intervention, participants listened to a six to seven-minute ongoing audio narration of the story of Alice in Wonderland. This control condition maintained a similar setup (same duration, time, and listening to a female voice) while guiding participants' thoughts, serving as an effective control measure.

We recruited participants via personal contacts and social media announcements in Germany. Convenience sampling has the advantage of recruiting a diverse sample across different occupations but can also lead to lower response rates. 77 participants completed the pre-questionnaire, from which we excluded 13 participants because they did not complete any daily questionnaire. Of the remaining 64 participants, 30 were allocated to the experimental group and 34 to the control group. Response rates were 32% for the questionnaire sent during the day, and 72% for the questionnaires sent in the evening. Accordingly, we collected data for 468 single days (i.e., 111 days with the

mindfulness intervention during the previous evening, 120 days with the control intervention, and 237 days without an intervention). Participants stated an average age of 34.64 years (*SD* = 13.01) and worked 34.64 hours per week (*SD* = 13.01). 43 women (67%) took part in the study. 9% of the sample stated a middle-school and 44% a high school degree as highest educational level. 22% stated a bachelor's degree and 17% a master's degree, diploma, or PhD as highest degree. 67% of the sample reported regular computer usage, while 45% mentioned having interactions with customers, and 23% engaged in physical activity.

5.3.1 Measures

All constructs were assessed with previously validated scale. For each scale, we calculated the mean score of all items. We measured perspective taking with four items from the Brief Form of Interpersonal Reactivity Index (Ingoglia et al., 2016), translated to German by Koller and Lamm (2015), that were adapted to the work context and the last hours. The items were rated on a five-point Likert scale ranging from "Does not apply" to "Totally applies". Participants could state that the situations did not occur as alternative option. Example items include "I sometimes tried to understand a person at work better by imagining how things would look from their perspective". We measured extra-role performance as indicated by Organizational Citizenship Behaviour with ten different items on a five-point Likert scale (Spector et al., 2010). Example items include "I helped a co-worker to learn new skills or shared job knowledge". Intra-role performance was assessed retrospectively for the workday by four items from Williams and Anderson (1991) on a seven-point Likert scale. Example items include "At work I completed my assigned duties adequately." We measured work engagement with three items suggested by Schaufeli et al. (2019), which were translated to German following

guidelines from Brislin (1970). Participants stated their agreement on a seven-point Likert scale. Example items include “At my work, I feel bursting with energy”.

Additionally, we measured self-regulation and sleep quality as control variables. Following a recent study by Hohnemann et al. (2024), which showed self-regulation as important mechanism for the positive effects of a brief meditation, we measured self-regulation with ten items on a four-point Likert scale (Fröhlich & Kuhl, 2003). Items were adapted to the last hours and included for example “I was able to focus on the positive aspects of difficult work activities” or “I was able to motivate myself well, even if my determination faded”. Further, because our intervention was conducted in the evening, exerting effects on the following day, we considered sleep quality as control variable. Following research on recovery experience (Hülsheger et al., 2015; Sonnentag et al., 2008), sleep quality was assessed with the corresponding item from the Pittburgh Sleep Qualitiy Index (Buysse et al., 1989) “Overall, how would you rate your sleep last night?” on a four-point Likert scale.

5.3.2 Construct Validity

In order to assess construct validity, we conducted multilevel confirmatory factor analyses (see Table 6). In doing so, we showed that Model 1a with separate factors for the mediators perspective taking, sleep quality, and self-regulation provided a better fit than other models in which certain constructs were combined, such as perspective taking and self-regulation (Model 1b). Further, we calculated Model 2a in which all outcomes (i.e., work engagement, in-role performance, and extra-role performance) were modelled as separate factors. This model fitted the data better than when different outcomes, such as in-role and extra-role performance (Model 2b), were combined. Concluding, our results support the distinctiveness of our day-level measures.

Table 6.

Second-Order Confirmatory Factor Analyses

Models	χ^2	df	RMSEA	SRMR	CFI	TLI	AIC	BIC
Model 1a	290.91	88	0.07	0.06	0.89	0.87	9494.58	9688.24
Model 1b	344.66	90	0.08	0.10	0.86	0.83	9577.99	9763.40
Model 2a	320.39	114	0.07	0.08	0.86	0.83	17205.41	17419.66
Model 2b	352.99	115	0.08	0.11	0.84	0.81	17249.02	17459.45

Note. Model 1a contains three separate factors for perspective taking, self-regulation and sleep quality on the within level. Model 1b consolidates perspective taking and self-regulation into one factor. Model 2a contains three separate factors on the within level for work engagement, in-role performance, and extra-role performance (as second-order factor consisting of both facets). Model 2b consolidates in-role performance and extra-role performance into a second-order factor. RMSEA = Root Mean Square Error of Approximation. CFI = Comparative Fit Index. TLI = Tucker–Lewis Index. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

5.3.3 Analytical procedure

We constructed a 1-1-1 multilevel mediation model using Mplus 8.7 (Muthén & Muthén, 2017) to examine how meditation and control interventions affected performance and well-being via perspective taking. Given the nested data structure (i.e., multiple days per individual), we applied multilevel structural equation modeling to address interdependence between these levels (Hox, 2002). Missing values from incomplete diaries were handled using maximum likelihood estimation with robust standard errors (Newman, 2014). We used dummy coding for both interventions, whereby no participation in any intervention during the previous evening was defined as a reference category. This allowed us to include data, even when the previous intervention in the evening was not completed, comparing our experimental condition with an active control intervention and no intervention. Given the counterbalanced within-subjects design, where each participant was exposed to both the experimental and control conditions in different orders, we applied group-mean centering of the intervention variables to focus on intra-individual effects of the interventions (Enders & Tofighi, 2007). Furthermore, we specified all exogenous variables on both levels (i.e.,

perspective taking, work engagement, performance) to allow for variance within each participant as well as between participants. We included sleep quality and self-regulation as control variables, considering them potential mediators for the effects of the interventions on work engagement and performance. However, the results show a similar pattern and significance levels even without these variables. All direct effects were modelled as fixed slopes. To calculate the intended indirect effects, we utilized Monte Carlo due to the computational advantages considering the non-normal distribution of indirect effects (Preacher & Selig, 2012).

5.4 Results

Table *7* presents the descriptive statistics, including means, standard errors (SE), and internal consistencies (Omega; Lai, 2021), as well as correlation estimates for all study variables. Additionally, Intra-Class Coefficients (ICCs) were computed to evaluate the proportion of variance attributed to between-person and within-person differences (Hox, 2002). The within-person variance (1-ICC) ranged from .32 to .61, highlighting the appropriateness of conducting multi-level analyses.

Table 7.

Descriptive Statistics

Variable		1	2	3	4	5	6	7	8	9	10
1.	Mindfulness-Intervention (dummy-coded)	-	**-0.43**	**0.27**	0.09	0.01	0.07	0.06	0.00		
2.	Control-Intervention (dummy-coded)	**0.42**	-	**-0.13**	-0.11	-0.06	**-0.18**	-0.01	0.04		
3.	Perspective Taking	-0.22	-0.03	*.66/.77*	**0.47**	**0.22**	**0.26**	**0.30**	0.01		
4.	Work Engagement	0.05	0.09	**0.37**	*0.77/.83*	**0.29**	**0.29**	**0.40**	0.06		
5.	In-Role Performance	0.04	0.12	0.12	**0.38**	*.65/.64*	0.06	**0.19**	0.08		
6.	Extra-Role Performance	0.10	0.00	**0.33**	**0.35**	-0.16	*.77/.75*	**0.13**	0.00		
7.	Self-Regulation (Control)	-0.02	0.06	**0.46**	**0.78**	0.22	**0.35**	*.83/.89*	0.07		
8.	Sleep Quality (Control)	-0.17	0.09	**0.30**	0.14	0.04	0.02	**0.37**	-		
9.	Gender	0.10	-0.03	-0.18	0.02	**-0.33**	0.17	-			
10.	Age	0.20	**0.35**	-0.15	0.20	0.13	0.24	0.04			
	M (between)	0.20	0.21	3.95	4.10	5.62	2.47	2.77	2.93	1.33	34.64
	SD (between)	0.17	0.17	0.72	1.32	1.07	0.67	0.59	0.59	0.47	13.01
	SD (within)	0.40	0.41	0.47	0.76	0.67	0.50	0.39	0.57		
	1-ICC(1)			0.47	0.32	0.37	0.46	0.37	0.61		

Note. Mindfulness and Control-Intervention coded as 0 (no intervention) and 1 (intervention). Gender coded as 1 (female) and 2 (male). Correlations on the between-person level are presented below the diagonal *(N* = 48-64). Correlations on the within-person level are presented above the diagonal *(N* = 107-401). Numbers in bold are $p < .05$. Along the diagonal, in italics, Internal consistencies (Omega) are displayed on the within/between level. 1-ICC(1) reflects the proportion of within-person variance.

Table 8.[2]

Multilevel estimates predicting Perspective Taking, Self-Regulation, Sleep Quality, Work Engagement, In-Role Performance, and Extra-Role Performance

	Perspective Taking			Self-Regulation (control)			Sleep Quality (control)			Work Engagement			In-Role Performance			Extra-Role Performance		
	b	*SD*	*p*	*b*	*SD*	*p*	*b*	*SD*	*p*	*b*	*SD*	*p*	*b*	*SD*	*p*	*b*	*SD*	*p*
Within-Person																		
Mindfulness Intervention	**0.27**	**0.12**	**.020**	0.06	0.05	.309	0.04	0.09	.711	-0.08	0.12	.510	-0.14	0.10	.133	-0.10	0.10	.307
Control Intervention	-0.10	0.09	.234	0.01	0.08	.883	0.07	0.10	.467	-0.02	0.11	.856	-0.06	0.08	.469	**-0.17**	**0.06**	**.004**
Perspective Taking										**0.63**	**0.11**	**.000**	**0.39**	**0.16**	**.018**	**0.30**	**0.13**	**.020**
Sleep Quality (Control)										0.06	0.09	.500	0.09	0.07	.185	0.02	0.05	.710
Self Regulation (Control)										**0.75**	**0.16**	**.000**	**0.34**	**0.10**	**.001**	0.12	0.10	.233
Residual Variance	**0.31**	**0.06**	**.000**	**0.19**	**0.03**	**.000**	**0.38**	**0.05**	**.000**	**0.45**	**0.06**	**.000**	**0.46**	**0.09**	**.000**	**0.26**	**0.04**	**.000**
R^2		0.06			0.00			0.00			0.35			0.14			0.13	
Between-Person																		
Variance	**0.38**	**0.13**	**.003**	**0.28**	**0.05**	**.000**	**0.24**	**0.06**	**.000**	**1.27**	**0.29**	**.000**	**0.87**	**0.16**	**.000**	**0.34**	**0.06**	**.000**

Note. $N_{between}$ = 64; N_{within} = 468. Fixed effects on the within-person level are shown. Significant effects are printed in bold.

[2] Similar result patterns can be found when considering flow experience as additional outcome. Direct effects of Perspective Taking (b = 0.40, SD = 0.10, p < .001) and Self-Regulation (b = 1.01, SD = 0.21, p < .001) on Flow Experience were significant. Direct effects of Mindfulness Intervention, Control Intervention, Sleep Quality on Flow experience not significant (p > .176) [footnote added for the dissertation, not included in the submitted manuscript]

Table 9. [3]

Indirect effects on the Within-Level

	b	*SE*	*LL 95% CI*	*UL 95% CI*
Mindfulness Intervention - Perspective Taking - Work Engagement	**0.17**	**0.08**	**0.028**	**0.329**
Mindfulness Intervention - Perspective Taking - In-Role Performance	**0.11**	**0.07**	**0.003**	**0.272**
Mindfulness Intervention - Perspective Taking - Extra-Role Performance	**0.10**	**0.05**	**0.016**	**0.198**
Control Intervention - Perspective Taking - Work Engagement	-0.07	0.06	-0.184	0.043
Control Intervention - Perspective Taking - In-Role Performance	-0.04	0.04	-0.145	0.022
Control Intervention - Perspective Taking - Extra-Role Performance	-0.04	0.03	-0.103	0.032

Note. Indirect effects were calculated based on Monte Carlo. LL = Lower Limit. UL = Upper Limit. Significant effects are printed in bold.

[3] Similar result patterns can be found when considering flow experience as additional outcome. Indirect effect of Mindfulness Intervention via Perspective Taking on Flow Experience: b = 0.109, SE = 0.057 LL = 0.013, UL = 0.235; Indirect effect of Control Intervention via Perspective Taking on Flow Experience: b = 0.109, SE = 0.057 LL = 0.013, UL = 0.235 [footnote added for the dissertation, not included in the submitted manuscript]

Table *8* summarizes the direct effects of our multi-level path model. Hypothesis 1 captures the intervention effects on perspective taking. Our findings indicate that the mindfulness intervention significantly enhanced perspective taking (b = 0.27, SE = 0.12, p = .020), whereas the control intervention did not exert significant effects (b = -0.10, SE = 0.09, p = .243), supporting Hypothesis 1. According to Hypothesis 2, perspective taking should be positively related to performance and work engagement during the same day. Supporting Hypotheses 2a-c, perspective taking was positively related to (a) extra-role performance (b = 0.30, SE = 0.13, p = .020), (b) in-role performance (b = 0.39, SE = 0.16, p = .018), and (c) work engagement (b = 0.63, SE = 0.11, p < .001). The results of all indirect effects are summarized in Table 4. Hypotheses 3a-c posited that increased next-day perspective taking would mediate the positive effects of an evening meditation on next-day work engagement, in-role performance, and extra-role performance. The indirect effects of the evening meditation via perspective taking on extra-role performance (b = 0.10, 95% CI [0.016; 0.198]), in-role performance (b = 0.11, 95% CI [0.003; 0.272]), and work engagement (b = 0.17, 95% CI [0.028; 0.329]) were significant since the confidence intervals did not include zero. Accordingly, our findings strongly support Hypotheses 3a-c. The control intervention, as indicated in Table 4, did not yield significant effects on work engagement, in-role performance, or extra-role performance through perspective taking.

5.5 Discussion

Given the rising practical and scholarly interest in mindfulness and meditation practices to improve employees' performance and well-being at work, we investigated the effects of evening mindfulness and control interventions on next-day performance and well-being in the workplace via day-specific perspective taking. Our findings revealed that the mindfulness intervention in the evening enhanced next-day perspective

taking, whereas no effects of the control intervention were observed. Day-specific perspective taking had a positive impact on in-role as well as extra-role performance and well-being (i.e., work engagement). Accordingly, perspective taking served as a significant mediator between the evening meditation and next-day performance and well-being.

Our results underscore the importance of considering not only internally directed thought processes but also those directed towards others when explaining the positive effects of mindfulness interventions. In particular, mindfulness' open perception of all stimuli includes greater attention to social cues and acceptance of others' emotions and thoughts, which enhances interpersonal understanding (Good et al., 2016). Further, enhanced interpersonal understanding changes how the actor feels and thinks about others as well as the situation which allows for adaptive actions improving their performance and well-being (Ku et al., 2015). This integrative approach highlights the importance of interpersonal processes alongside intrapersonal ones in realizing the full benefits of mindfulness interventions in the workplace. The results further support the recent call from Lehmann-Willenbrock (2024) to more strongly consider interpersonal processes that influence many of the investigated phenomena at work such as performance and well-being. Further research could compare different interpersonal processes (e.g., conflict resolution, collaboration, negotiation) to explain the effects of mindfulness on the actor's performance and well-being in relation to perspective (Lehmann-Willenbrock, 2024). Moreover, it might be interesting to investigate the closeness and familiarity to others (Tschan et al., 2004) as well as the frequency of interactions within various groups as moderating factors (Lehmann-Willenbrock, 2024).

Since previous research has highlighted the importance of intra-individual processes (e.g., Friese & Hofmann, 2016; Glomb et al., 2011), we controlled for self-

regulation as well as sleep quality when assessing perspective taking as explaining mechanism. Interestingly, our evening meditation did not significantly influence self-regulation or sleep quality, but perspective taking. Even though the effects of meditation on improved self-regulation have been confirmed in several studies on the trait level and during the same day (Friese & Hofmann, 2016; Glomb et al., 2011), more research seems to be necessary to better understand how long these effects last and which circumstances are needed to carry them over to the next day. Future studies could investigate whether certain aspects of mindfulness (e.g., focus on the present moment or acceptance) last across different time spans (Mattes, 2019) or whether required mental resources for self-regulation and perspective taking influence the duration of notable effects (e.g., Fasbender et al., 2023; Muraven & Baumeister, 2000). Perspective taking showing explanatory value over self-regulation, which has been often considered a key mechanism for the beneficial effects of mindfulness (Bowlin & Baer, 2012; Friese & Hofmann, 2016; Glomb et al., 2011; Hohnemann et al., 2024; Ludwig et al., 2020), highlights that not only the employees' ability to regulate their own thoughts, emotions, and behaviors, but especially the ability to understand others' perspective can improve their performance and well-being. Further, since our meditation was implemented in the evening and recovery processes have been a widely shown benefit of mindfulness interventions (Hülsheger et al., 2015; Hülsheger et al., 2014), we considered sleep quality as control variable. However, our results could not confirm the expected effects of our meditation on sleep quality. This lack of effect might be due to the meditation being implemented 30 minutes after work and not directly before sleep, but more research is necessary to identify the ideal timing of such meditation in the evening. Nevertheless, in line with existing literature (De Ridder et al., 2012), self-regulation exhibited a notable day-specific impact on both work engagement and performance.

Moreover, our study presents a brief and practical mindfulness intervention that can be seamlessly integrated into employees' evening routines. This alternative approach addresses the limitations of intensive mindfulness programs, which often require substantial time commitments and resources (Bartlett et al., 2019). By demonstrating spill-over effects on next-day perspective taking, our research highlights the practical viability of such a time-efficient intervention. In recognizing the essential role of social interactions and the significant impact of perspective taking on in-role as well as extra-role performance and well-being, our findings underscore the effectiveness of this brief evening meditation in fostering sustained positive outcomes during the subsequent workday. This supports the notion that even a minimal time investment in mindfulness practices can yield meaningful and lasting improvements in employee performance and well-being. However, while the mindfulness intervention could enhance next-day performance and well-being by promoting perspective taking as shown by a significant indirect effect, the direct effects of the intervention on these outcomes did not reach statistical significance. A missing direct or total effect in light of a significant indirect effect does not negate a mediation but may imply that additional mechanisms contradict or suppress the investigated effects or the existence of moderating conditions (Hayes, 2009). Future research shall investigate additional mechanisms for the effects of a mindfulness intervention on next-day performance and well-being besides perspective taking (e.g., conflict resolution or decision making) as well as moderating personality and organizational factors (e.g., job autonomy, workload, resilience).

In addition, the mindfulness intervention showed distinct effects in comparison to the control intervention, consisting of an audio play about the story of ‘Alice in Wonderland’ with a similar setup (i.e., female voice and same length). Audio plays have

been previously used as active control intervention in comparison to meditations (Zeidan et al., 2010). Supporting the discriminant validity of the applied mindfulness intervention, the control intervention did not yield significant effects on perspective taking, work engagement, or in-role performance. However, the control intervention, featuring the narrative of 'Alice in Wonderland,' unexpectedly exerted a significant negative effect on extra-role performance during the next day. The audio play may have introduced elements that influenced participants' cognitive or emotional states. Since narratives, even fictional ones, can evoke various emotions, thoughts, and mental imagery (Green et al., 2003), certain aspects of the 'Alice in Wonderland' story could have triggered cognitive processes or emotional responses that, in turn, affected participants' inclination to engage in extra-role activities at work the next day. For instance, the beginning of ‘Alice in Wonderland’ focuses strongly on her own thoughts trying to understand the new world she found herself in, which could evoke a stronger self-focus in participants as well. Further research is necessary to delve into the specific aspects of the audio play that contributed to this effect and to refine control conditions for future studies.

Moreover, as our current comprehension of how perspective taking influences the actor’s performance and well-being remains limited (e.g., Fasbender et al., 2023; S.-H. J. Lin et al., 2022), our study contributes by exploring the impact on in-role and extra-role performance as well as work engagement within the same day. Whereas Ku et al. (2015) stated that perspective taking changes the way individuals think and feel about others as well as the situation, only a few studies have explored its effect on performance and well-being (for an exception see Fasbender et al., 2023). Accordingly, in several reviews on perspective taking (e.g., Ku et al., 2015; Parker et al., 2008), no effects on common indicators of individual performance and well-being were noted.

However, our results show that perspective taking positively relates to day-specific work engagement, in-role, and extra-role performance. Our results suggest that understanding the perspectives and viewpoints of others facilitates navigating and succeeding in the intricate social dynamics of the workplace immediately. Specifically, the ability to anticipate others' needs and interpret their intentions, thoughts, and emotions fostered individual well-being, supported individual performance, and in line with previous research (Parker et al., 2008), enhanced extra-role performance. These findings complement the results of Fasbender et al. (2023), who demonstrated a negative effect of perspective taking on subjective vitality via resource depletion, and show that perspective taking can also positively impact individual well-being, as indicated by work engagement. Concluding, these findings contribute to our comprehension of the advantages of cultivating perspective taking in the workplace through a brief evening meditation. They highlight the potential benefits of a mindfulness intervention as a strategy for enhancing performance and well-being via perspective taking.

5.5.1 Practical implications

Our study highlights several practical implications, both for employees and the companies aiming to support their workforce. For employees, our brief and practical evening mindfulness intervention is a valuable tool because it does not require substantial time commitment. In just a few minutes each evening, employees can engage in this mindfulness practice without disrupting their daily routines significantly. This accessibility makes it feasible for individuals with busy schedules, offering them a simple and effective way to promote perspective taking, performance, and well-being during the next workday.

For companies, our intervention carries substantial advantages as well. It provides an opportunity to support employees' performance and well-being without incurring high costs. Small and medium-sized enterprises, in particular, can benefit from this low-cost approach, extending the reach of mindfulness programs to a broader spectrum of their workforce. Promoting short mindfulness interventions to employees and supporting their implementation for instance by high job control or workplace flexibility, contributes to a greater understanding within the workforce. When employees understand each other’s perspective, emotions, and actions in more depth, they become more motivated, focused, and willing to go the extra mile in their roles.

5.5.2 Limitations

Firstly, although the effects of mindfulness and control interventions were experimentally manipulated, we relied on self-report measures for perspective taking, well-being, and performance, introducing potential common method bias (Podsakoff et al., 2003). While common in psychological research, self-report measures are susceptible to subjectivity, response bias, and social desirability (Donaldson & Grant-Vallone, 2002). Future research could incorporate supervisor ratings or alternative methodologies to mitigate these concerns and enhance result robustness. Secondly, our diary study faced relatively high dropout rates during day-specific questionnaires. Collecting daily data poses challenges in maintaining participant engagement over time (Gochmann et al., 2022). Relying on a natural sample, participants may face time constraints or forgetfulness, leading to incomplete data (Gochmann et al., 2022). Despite reminders, especially the midday survey assessing perspective taking had a relatively low response rate of 32%, impacting the generalizability and precision of our day-specific findings. Researchers should consider these challenges and explore ways to minimize dropouts in future diary studies. Thirdly, our study did not systematically

consider organizational boundary conditions or mediating mechanisms that could influence how perspective taking translates into performance and well-being outcomes. Workplace environments vary, which can shape the impact of perspective taking on individual and organizational outcomes. Future research should explore organizational factors as potential moderators (e.g., supportive climate, job autonomy) and mediators (e.g., conflict resolution or decision making) to better understand when and how empathy leads to positive effects in the workplace.

5.6 Conclusion

Our study revealed the positive impact of a brief and practical evening mindfulness intervention on next-day work engagement, in-role and extra-role performance in the workplace via increased perspective taking, even when controlling for self-regulation and sleep quality. These results not only contribute to the growing body of research on mindfulness and perspective taking but also address practical needs by providing a time-efficient intervention that seamlessly integrates into their daily routines.

Table 10.

Main characteristics of the conducted studies

Guiding question: Can mindfulness-based interventions foster flow experience and work engagement as indicators of eudaimonic well-being?			
	Study I	Study II	Study III
Research questions	Can a mindfulness intervention foster flow?	Can a brief mindfulness intervention in the morning foster flow experience? Does self-regulation serve as mediator?	Can a brief mindfulness intervention in the evening foster work engagement? Does perspective taking serve as mediator?
Intervention	Online-based MBSR program	Brief meditation in the morning	Brief meditation in the evening
Explaining mechanisms		Self-control & Self-regulation	Perspective taking (controlling for self-regulation and sleep quality)
Focal Outcome	Flow Experience	Flow Experience	Work Engagement
Theory	Flow Theory	PSI-Theory	Mixed-Motive Model of Perspective Taking
Study Design	Quasi-experimental study with weekly assessment	Diary Study with within-person manipulation (inactive control condition)	Diary Study with randomized between-person intervention and active control condition
Statistics	Change Trajectories (Bayesian Statistics)	Multi-Level Modeling (Maximum Likelihood)	Multi-Level Modeling (Maximum Likelihood)
Key findings	Positive relation between linear trajectory of mindfulness and linear trajectory of flow	Positive day-specific effects of a brief meditation in the morning on flow experience and subsequently vitality via self-regulation	Positive spill-over effects of a brief meditation in the evening on next-day work engagement and performance via perspective taking

6. General Discussion

The previous articles presented aimed to address the question of whether mindfulness interventions are suitable to enhance momentary eudaimonic well-being, as indicated by flow experience and work engagement. My first paper provided evidence that the MBSR training as one of the most common mindfulness interventions can not only reduce stress but also foster flow experience. In particular, positive changes over time in mindfulness were associated with positive changes in flow experience (and negative changes in stress). Accordingly, the first study with weekly measures of all constructs of interest during the intervention over eight weeks provided evidence for the potential of a mindfulness intervention to enhance eudaimonic well-being. Further, the results showed that the relation was stronger for individuals with high levels of emotional exhaustion. However, an eight-week-long intervention is not always practical and might require many resources from employees and companies. Accordingly, I tested the effects of a brief mindfulness meditation in the morning on day-specific flow experience, considering regulatory processes as mediating mechanisms, and subjective vitality as an outcome of flow. The results showed that a brief meditation leads to increased autonomous self-regulation and reduced effortful self-control, with the former leading to more flow experience and subsequently increased vitality in the evening. Lastly, with my third study, I aimed to test whether a brief meditation in the evening would be sufficient to evoke positive effects on next-day eudaimonic well-being, as indicated by work engagement. Due to the relevance of social interactions, I showed that increased perspective taking could explain the positive effects of an evening meditation on next-day work engagement and performance. Concluding, my research shows great potential for mindfulness interventions to increase eudaimonic well-being, as indicated by flow experience and work engagement, considering individual regulatory processes as well

as other-oriented processes as explaining mechanisms. The most important characteristics of the conducted studies are summarized in Table *10*.

6.1 Theoretical extension of the MMT

In section 2.4 *Theoretical integration and research questions*, I outlined a comprehensive framework elaborating on the mechanisms through which mindfulness interventions can enhance eudaimonic well-being as indicated by flow experience and work engagement. Central to this framework is the MMT, which suggests that mindfulness facilitates a more functional appraisal of stimuli and events by promoting mindful decentering and broader attention, ultimately leading to reappraisal and the creation of new meaning (Garland, Farb, et al., 2015b). Integrating insights from the TSF (Peifer & Tan, 2021), the PSI theory (Kuhl et al., 2006), and the mixed model of perspective taking (Ku et al., 2015), this thesis extends on the MMT proving insights into (1) how the appraisal of specific stimuli contributes to the creation of new meanings that foster eudaimonic well-being, (2) the broader influence of mindfulness on the regulation of thoughts, behaviors, and emotions beyond appraisal, and (3) the impact of mindfulness as internally focused process within the social context.

6.1.1 Propositions of the TSF (Study I)

The TSF complements the propositions of the MMT, which suggests that mindfulness facilitates a more adaptive appraisal of stimuli and events through decentering and broadened attention (Garland, Farb, et al., 2015a), by focusing on the specific appraisal processes related to demands and resources and how these appraisals lead to either stress or flow experiences (Peifer & Tan, 2021). By integrating these theories, we gain a deeper understanding of how mindfulness transforms the perception of demanding situations. In a typical work scenario, a task or situation may initially be appraised as stressful when perceived demands exceed available resources. Mindfulness

can influence this process in two keyways. First, it impacts the perception of demands by fostering acceptance of all stimuli, including high demands. This acceptance reduces the intrusiveness of such demands and mitigates automatic processes like worrying or rumination (Good et al., 2016). Second, mindfulness enhances the ability to recognize and utilize available resources by broadening the attentional field, allowing one to shift from a negative focus to an open perception of the situation, integrating positive aspects and resources more easily (Garland, Farb, et al., 2015b; see Figure 3). These amended perceptions of demands and resources can shift the balance toward viewing situations as challenges rather than threats (see section 3). Whereas the MMT focuses on a more meaningful appraisal in general (Garland, Farb, et al., 2015b), the TSF specifies this by highlighting the concrete case of perceiving demands as challenges, demonstrating how such appraisals can enhance eudaimonic well-being, as indicated by more flow experience (Peifer & Tan, 2021).

The results of Study I, showing that the linear increase in mindfulness corresponds with a linear increase in flow and a linear decrease in stress, provide initial evidence to support the propositions outlined above. In particular, the results indicate that as individuals develop greater mindfulness over time, they become more adept at (re-)appraising situations as challenges, leading to more frequent experiences of flow and reduced stress. However, further research is necessary to provide more nuanced insights and rule out alternative explanations. Firstly, our findings of a linear increase in flow alongside a linear decrease in stress align with the TSF's proposition that demanding situations are perceived as either challenges or stressors (Peifer & Tan, 2021). Even though this explanation is compelling, as it is grounded in the integration of MMT and TSF, further research shall rule out alternative explanations. For instance, these results might also reflect the broader correlational effects of mindfulness, which

could increase flow in some situations while reducing stress in others. Secondly, focusing on the underlying mechanisms for the relation between mindfulness and flow experience, the integration of MMT and TSF suggests that employees accept high demands more easily (possibly indicated by less rumination and worrying) and recognize more suitable resources, which then ultimately shift the balance between demands and resources enabling a more meaningful appraisal as challenge and flow experience. However, while our study provides first evidence that mindfulness can improve flow experience, it does not test these underlying mechanisms. A more fine-grained assessment on a daily or even task-based level could provide more insights into mediating processes as mentioned above as well as their temporal order and importance. Further, mindfulness could either influence the initial appraisal of demands and resources or foster their re-appraisal (Garland, Farb, et al., 2015a). Future studies could investigate where mindfulness enacts a stronger influence and whether this might shift during the course of the MBSR training. In summary, while our study offers an initial integration of the MMT and TSF and provides evidence that mindfulness can enhance flow experiences, further research is essential to deepen our understanding of the mechanisms underlying this relationship.

6.1.2 Propositions of the PSI (Study II)

The PSI theory (Kuhl et al., 2006) complements the MMT by (1) specifying an alignment between internal and external goals as an important characteristic of a meaningful appraisal to foster eudaimonic well-being and (2) offering a detailed perspective on the underlying regulatory processes. The PSI theory aims to explain optimal human functioning and distinguishes between autonomous self-regulation and volitional self-control as two distinct processes of thought, emotion, and behavior regulation (Kuhl et al., 2006). It further emphasizes that the down-regulation of positive

as well as negative affect plays a crucial role in enhancing eudaimonic well-being as it allows for the acceptance and integration of diverse and sometimes contradictory experiences into the self (Kuhl et al., 2015). Integrating these propositions with the MMT deepens our understanding of how mindfulness supports the regulation of demanding situations to promote well-being. In work contexts, tasks often require significant cognitive and emotional regulation. Initially, such demands may necessitate volitional self-control, especially when external expectations conflict with internal goals (Kuhl, 2010). Through mindfulness, there can be greater acceptance and recognition of one's values, goals, and interests, as well as a more objective (less emotionally colored) perception of the situation, which helps to identify alignments between values or internal goals and regulatory demands creating a new meaning (MMT; Garland, Farb, et al., 2015a). The PSI theory emphasizes that this alignment between internal values or goals and regulatory demands is crucial to enable autonomous regulation providing the base for eudaimonic well-being, resembling (Kuhl, 2010).

The findings from Study II provide initial empirical evidence for these propositions. Specifically, morning mindfulness practice significantly influenced autonomous self-regulation, facilitating flow experiences throughout the workday and enhancing subjective vitality at home (see section 4). The positive day-specific effect of mindfulness on self-regulation, alongside its negative effect on self-control, supports the assumption that mindfulness fosters alignment between regulatory demands and inner values or goals. This alignment reduces the effort required for self-control, enabling stronger autonomous self-regulation. These findings are consistent with previous research showing that mindfulness reduces inner conflicts in the face of regulatory demands rather than enhancing self-control capacity (Friese & Hofmann, 2016). We examined the effects on self-regulation and self-control separately because previous

research had not clarified whether both processes equally contribute to the positive outcomes of mindfulness or whether one serves as a more dominant mechanism. While mindfulness influenced both processes as hypothesized, only self-regulation was directly associated with enhanced eudaimonic well-being, as indicated by flow. This suggests that autonomous self-regulation is the more dominant mechanism in explaining the beneficial effects of mindfulness on eudaimonic well-being. Accordingly, aligning regulatory demands and actions with internal values and goals seems to provide an important characteristic of a meaningful appraisal fostering autonomous regulation and subsequently eudaimonic well-being. Concluding, the results highlight that mindfulness not only influences cognitive appraisal as described in the MMT (Garland, Farb, et al., 2015a) but also enables autonomous self-regulation (Kuhl, 2010).

While Study II provides promising evidence for the integration of MMT and PSI theory, further research is required to fully understand the mechanisms underlying these investigated effects. While we argue in line with previous research that mindfulness facilitates the alignment between regulatory demands and inner values and goals, we did not specifically measure the underlying cognitive process, such as the awareness and recognition of an alignment between internal and external goals. A task-based approach could investigate how mindfulness facilitates alignment between external demands and personal values at a more granular level. Such studies could measure participants' real-time appraisals of tasks, capturing shifts from requiring self-control to enabling self-regulation. Further, more research is required to examine the temporal relation between regulatory processes and flow experience as indicator of eudaimonic well-being. Despite a positive association between self-regulation measured during the day and flow experience measured in the evening, our study does not provide sufficient evidence for a clear direction of effect. Flow experience might have been already higher in earlier

measurement points which may facilitate perceived self-regulation, possibly via task selection that corresponds with intrinsic motivation or enhanced perception of competence. While we propose based on the PSI theory that self-regulation enables flow experience, aligning with previous studies that highlight self-regulation as a prerequisite for experiencing flow (Baumann, 2021; Medhurst & Albrecht, 2016; Rheinberg & Engeser, 2012), our study does not allow to exclude alternative explanations, requiring further research.

6.1.1 Propositions of the Mixed Motive Model (Study III)

The mixed-motive model of perspective taking (Ku et al., 2015) complements the propositions of the MMT by outlining how mindfulness can improve eudaimonic well-being under the consideration of the social context and interactions. The mixed-motive model focuses on perspective taking, highlighting its role in effectively navigating social situations in the workplace. As emphasized by Lehmann-Willenbrock (2024) in their current review, social processes play an important role in most phenomena in the workplace including performance and well-being. In typical social interactions at work, individuals naturally appraise situations through a self-centered lens, focusing on their emotions, goals, or values. For instance, a colleague's delayed response might initially be appraised as inconsiderate or disruptive. Mindfulness can influence this process in three key steps as outlined in the MMT (see Figure 4). Firstly, mindfulness enhances emotional regulation which helps to recognize and accept own emotions (Good et al., 2016; Iani et al., 2019). Reducing automated emotional reactions such as frustration reduces their intrusiveness and allows for a clearer perception of others' emotions (Thompson et al., 2019). Secondly, it helps to broaden attention and recognize additional social cues (Good et al., 2016). In particular, mindfulness enhances awareness of non-obvious or subtle social cues by encouraging a nonjudgmental

perception of all stimuli in the present moment (van Doesum et al., 2013). Individuals are less distracted by their own emotions and thoughts focusing fully on the present. Thirdly, mindfulness fosters acceptance of others' emotions and actions creating a new more meaningful appraisal of the situation (Garland, Farb, et al., 2015a). This process reduces bias and fosters a more objective understanding of others' perspectives, which can shift appraisals of social situations to more constructive interpretations (Garland, Farb, et al., 2015b). Subsequently, the mixed model of perspective taking highlights that understanding others provides the basis for successfully navigating social interactions, and enhancing individual well-being and performance (Ku et al., 2015).

The results of our study support this theoretical integration by demonstrating that mindfulness interventions enhance next-day perspective taking, which, in turn, improves extra-role performance, in-role performance, and work engagement. This study is among the first to explicitly consider the social context when investigating the positive effects of mindfulness on individual well-being and performance. Specifically, the findings highlight that mindfulness' accepting perception of all stimuli extends to the social context enabling individuals to better understand others' viewpoints and adapt their actions accordingly. However, our study did not specifically measure the underlying mechanisms proposed in the MMT (Garland, Farb, et al., 2015b) and mixed model of perspective taking (Ku et al., 2015; see section 2.4.3), such as the broadened attention, recognition of additional social cues or emotional regulation. Previous research provides substantial evidence for the positive effects of mindfulness on emotional regulation (Good et al., 2016; Iani et al., 2019) and enhanced awareness and attention span (Chiesa et al., 2011), which are important predictors of perspective taking (Ku et al., 2015) and highly influential in social interactions (van Doesum et al., 2013). Future research could test these processes as mediating mechanisms, which may explain

how mindfulness enables better perspective taking. Additionally, since the MMT (Garland, Farb, et al., 2015b) emphasizes the role of meaningful appraisals to foster eudaimonic well-being, it would be interesting to explore which characteristics are most important for these appraisals. A meaningful appraisal is likely to differ across specific social scenarios yet may share common characteristics within interpersonal interactions. Further, future studies might investigate how important characteristics of social interactions, such as hierarchical status (Anderson & Brown, 2010) or similarity between actors and their interaction partners (Batson et al., 2005), influence these processes leading to differences across interaction groups, such as colleagues, leaders, and customers.

Moreover, while replicating the effects of perspective taking on Organizational Citizenship Behaviour (Axtell et al., 2007; Settoon & Mossholder, 2002), we also demonstrated its benefits for task performance and work engagement. Similar results have been shown when considering flow experience as an additional outcome (see footnotes 2 and 3). The simultaneous enhancement of in-role performance, extra-role performance, work engagement, (and flow) provides strong evidence for improvements in momentary eudaimonic well-being, as outlined in the MMT (Garland, Farb, et al., 2015b). Further research shall investigate different indicators of eudaimonic well-being as well as its different facets when testing the positive effects of perspective taking on individual well-being and performance. In conclusion, our study provides compelling evidence to consider outward-focused mechanisms and the social context when explaining the benefits of mindfulness. It highlights perspective taking as a critical mechanism through which the mindful perception of social situations can enhance eudaimonic well-being. Future research should delve deeper into the underlying mechanisms described in the MMT and the mixed-motive model of perspective taking,

further advancing our understanding of the pathways through which mindfulness promotes individual and interpersonal flourishing.

6.1.2 Summarizing discussion

By integrating propositions for the TSF (Peifer & Tan, 2021), PSI (Kuhl et al., 2006), and the mixed motive model of perspective taking (Ku et al., 2015) into the MMT , we gain a holistic view of how mindfulness can foster eudaimonic well-being. In particular, mindfulness helps to broaden the attention span, allowing individuals to perceive and accept all available stimuli without assigning automated meanings (Garland, Farb, et al., 2015b). This reduces the intrusiveness of negative (or positive) stimuli. It also brings a broader range of aspects to awareness, such as additional resources or facets of tasks. Individuals can appraisal the given situation in a more meaningful way, enabling eudaimonic well-being (Garland, Farb, et al., 2015b). Focusing on demanding situations at work as a common source of stress, individuals are more likely to shift their appraisals from stressful situations to positive challenges, as indicated by Study I and previous research (Good et al., 2016; Peifer & Tan, 2021). This effect can be explained by considering intra-individual mechanisms as well as interactions within the given social context. Firstly, mindfulness enhances the awareness of situations aspects as well as internal goals and values. Based on Study II and in alignment with previous research (Ludwig et al., 2020), mindfulness can facilitate the recognition of alignments between the demands and internal goals or values, fostering autonomous regulation and reducing effortful regulation. Autonomous regulation subsequently enables flow experiences as indicator of eudaimonic well-being. Secondly, mindfulness enhances the perception of social cues and acceptance of others' viewpoints, fostering a greater understanding of others (Glomb et al., 2011). Based on Study III and previous research (Good et al., 2016; Ku et al., 2015; van Doesum et al.,

2013), I propose that such understanding, less colored by own emotions and experiences, can enable a more meaningful appraisal fostering eudaimonic well-being. Therefore, both pathways enable individuals to generate new meanings, creating more positive and functional appraisals that allow for savoring positive moments and improving coping with negative ones (Garland, Farb, et al., 2015b). This reduces stress and fosters momentary eudaimonic well-being, as indicated by flow and work engagement. Through this integrated framework, mindfulness interventions are conceptualized as catalysts for cognitive, emotional, and social processes that collectively promote eudaimonic well-being in the workplace, enhancing individual well-being and performance. Further research is necessary to confirm this theoretical framework and assess each aspect separately, possibly focusing directly on the appraisal of certain situations and aspects.

6.2 Comparison of included studies

Whereas all studies provided important evidence for the potential of mindfulness interventions to foster momentary eudaimonic well-being, they entail important differences in the choice of indicators of eudaimonic well-being, the length and timing of the interventions, control conditions, and randomization, as well as assessed underlying mechanisms.

6.2.1 Indicators of eudaimonic well-being

The first two studies provided evidence for the effectiveness of mindfulness in fostering flow experience as indicator of eudaimonic well-being, while the last study extended these results to work engagement. Both flow experience and work engagement reflect momentary eudaimonic well-being (see section 2.3), showing considerable intraindividual fluctuation within individuals over different days (e.g., Hülsheger et al., 2014; Rivkin et al., 2016). The prior focus on flow experience when investigating the

effects of mindfulness intervention on eudaimonic well-being was chosen because it reflects the quality of individuals' experiences in the present moment just like mindfulness (Digutsch & Diestel, 2021; Nakamura & Csikszentmihalyi, 2009). The corresponding time frame of flow is typically limited to specific activities or tasks (Nakamura & Csikszentmihalyi, 2009). In contrast, work engagement encompasses a slightly broader and more sustained level of involvement, reflecting individuals' attitudes and behaviors over multiple tasks or several hours (Digutsch & Diestel, 2021; Schaufeli et al., 2002). Further, the choice of indicator corresponded with the assessed underlying mechanism. Since the regulation of behaviors and thoughts is often directly associated with work demands and specific tasks, flow experience was chosen as indicator of eudaimonic well-being in Study II. In comparison, social interactions that require perspective taking are not necessarily tied to a specific task, so work engagement as a broader indicator of eudaimonic well-being was chosen in Study III.

It becomes clear that both, flow experience and work engagement, are important indicators of eudaimonic well-being, yet providing different reflections of eudaimonic well-being in the work context. Importantly, previous research streams have largely treated these constructs separately, with only a few studies exploring their interrelations. For instance, studies by Digutsch and Diestel (2021) and Medhurst and Albrecht (2016) have begun to compare and contrast both constructs, shedding light on their similarities and differences in terms of time span and scope. Extending this research, I conducted additional analyses for the last study in which I considered work engagement as the main indicator of eudaimonic well-being, confirming that flow experience can be improved in a similar way as outcome of an evening meditation (see footnotes 2 and 3). Therefore, while it is crucial to investigate the effects of mindfulness interventions on flow experience and work engagement individually, our study contributes to the

growing body of evidence suggesting that such interventions may influence both constructs as indicators of eudaimonic well-being in a similar way. This underscores the importance of integrating both constructs into future research to gain a comprehensive understanding of how mindfulness relates to flow experience and work engagement as indicators of eudaimonic well-being.

Furthermore, it is important to note that many different terms emerged around the concept of eudaimonic well-being with similar but slightly different conceptualizations, focusing on different forms of self-realization. These include among others, positive functioning (Lee & Carey, 2013), integrative self (Kuhl et al., 2015), or autonomous functioning (Weinstein et al., 2012). Further, several researchers aimed at a direct measure of eudaimonic well-being with the scale proposed by Ryff (1989) and Waterman et al. (2010) being among the most popular. The traditional measure by Ryff (1989) entailed six dimensions including autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance, of which the first three factors are all present in flow experience and closely related to work engagement. The newer scale by Waterman et al. (2010) encompasses the facets self-discovery, development of one's potential, sense of purpose, intense involvement in activities, investment of significant effort, and enjoyment of activities; with the latter three directly referring to flow experience along with the facets absorption and dedication of work engagement. Accordingly, flow experience and work engagement represent important momentary indicators of eudaimonic well-being, while there are still certain facets of eudaimonic well-being that need to be addressed beyond these indicators, such as a sense of purpose or self-discovery. Further research has to provide more insights into how different constructs are related to eudaimonic well-being and how they can easily be fostered as momentary experience as well as in the long term.

6.2.2 Types of intervention and time span

The varying durations of interventions (i.e., ranging from brief daily intervention to MBSR program over eight weeks) and investigation of different periods (i.e., within one day to multiple weeks) offer valuable insights into how mindfulness affects momentary eudaimonic well-being across different temporal scales. In the first study, participants underwent an eight-week MBSR program, allowing us to examine mindfulness's weekly impact over an extended period. Weekly assessments revealed a gradual increase in mindfulness alongside corresponding changes in flow and stress. These findings suggest that each weekly session of the MBSR program, coupled with subsequent practice, contributed to increased mindfulness and flow. Moreover, the decrease in stress levels indicates that mindfulness may help individuals to shift their experience from stress to flow, which aligns with the preposition of the TSF that relevant tasks can be appraised as stressors or as manageable challenges conducive to flow experiences (Peifer & Tan, 2021). This further underscores the notion that increased mindfulness might directly facilitate flow by changing the perception of tasks and situations, as also outlined in the MMT (Garland, Farb, et al., 2015a). The linear change trajectories of mindfulness, flow, and stress along with their relations imply that even shorter mindfulness interventions may directly enhance flow, albeit with somewhat smaller effects.

Following up on these results, the second study aimed to assess whether brief mindfulness interventions are powerful enough to provoke more immediate effects and foster flow experience during the same day. In doing so, the second study zooms in on daily mechanisms and provides a more detailed perspective on how quickly the benefits of mindfulness for flow experience manifest. Further, utilizing a brief ten-minute morning meditation intervention can be a condensed yet potentially impactful approach

to integrating mindfulness into daily routines. Accordingly, by comparing days with and without an intervention of the same participants (i.e., intraindividual manipulation), we showed that meditating in the morning could provide direct results for facilitated flow experience during the same day via improved regulatory processes. The manipulation on the within-person level allows to concentrate on intraindividual changes and their relations, freeing residual variance from between-person effects (Schmiedek & Neubauer, 2020). In comparison to the first study, these results show the effectiveness of brief mindfulness interventions and the possibility that mindfulness can impact eudaimonic well-being directly during the same day. Even though both concepts cannot be experienced simultaneously (Sheldon et al., 2015), the research provided evidence that it is not necessary to build up mindfulness-related skills, such as attentional control, over longer periods, but that state mindfulness can foster state flow experience during the same day.

To enhance the validity of our previous findings, we implemented a randomized design with experimental and active control condition in our last study. One group engaged in the mindfulness intervention during the first week and the active control condition (i.e., audio play with a similar setup) during the second week, while the order was reversed for the second group. Although this design involved between-person randomization, it still enabled the comparison of intraindividual fluctuations, limiting the measurement of habituation effects due to the randomization of the order of interventions. Moreover, this approach helps mitigate the potential influence of the intention-to-treatment (Rosenthal effect; Rosenthal & Rubin, 1978), thus providing a more robust evaluation of the intervention's effects. Further, despite eliminating methodological concerns, we aimed to improve the practicality of the intervention for employees and shed further light on the time spans in which such an intervention could

evoke effects. Considering the varying schedules and preferences of employees, meditating in the morning may not be feasible for everyone, whereas the evening may offer greater flexibility. Accordingly, we tested the effects of an evening meditation and provided evidence that it can evoke not just day-specific effects but also increase eudaimonic well-being (i.e., work engagement) during the subsequent day via enhanced perspective taking. Notably, these effects could not be attributed to improved sleep quality during the night, suggesting the sustainability of the intervention's effects. These results underscore the potential efficacy of brief mindfulness interventions at different times of the day in provoking positive day-specific or next-day effects on eudaimonic well-being. Overall, the varied intervention lengths across our studies offer a nuanced understanding of how mindfulness interventions can promote eudaimonic well-being across different time frames, from weeks-long programs to brief daily practices.

6.2.3 Underlying mechanisms

After research has extensively demonstrated the benefits of mindfulness, less is known about the underlying mechanisms of mindfulness and related interventions (Britton, Desbordes, et al., 2021; Chiesa et al., 2014; Shapiro et al., 2006). Whereas the first study aimed to provide general evidence for the positive effects of mindfulness interventions on eudaimonic well-being, the second and third studies aimed to shed light on different underlying mechanisms, drawing from previous research about mindfulness. The MMT (see section 2.2) highlights a broadened field of attention along with the acceptance of all aspects as main mechanisms that help to create a more functional and positively connotated meaning of situations (Garland, Farb, et al., 2015a). However, the MMT leaves room for how exactly meaning is created and how thoughts and emotions during this metacognitive state are regulated. Based on the PSI theory and in particular the distinction between self-regulation and self-control (Koole

et al., 2018), the second study provided evidence that mindfulness can foster autonomous regulation and reduce effortful self-control. These results align well with previous research that has emphasized improved regulation of thoughts, emotions, and behaviors as core mechanisms of mindfulness (Bowlin & Baer, 2012; Glomb et al., 2011; Masicampo & Baumeister, 2007). It further broadens this research by distinguishing between these two distinct mechanisms of regulation. It has been hypothesized, mostly based on the self-determination theory, that mindfulness can help to identify alignment between actions as well as internal interests and values, facilitating self-regulation (Ludwig et al., 2020; Schultz & Ryan, 2015). Our results provide important empirical evidence for this relation, showcasing as the first study that enhanced self-regulation is a direct benefit of a brief mindfulness intervention without requiring long-term training. It further shows that autonomous self-regulation represents an important process in fostering eudaimonic well-being, as indicated by flow experience.

However, whereas mindfulness encompasses broad attention not only towards the self but also all external stimuli, research has mostly focused on the individual actor to explain the benefits of mindfulness (e.g., Britton, Desbordes, et al., 2021; Shapiro et al., 2006). Since many tasks and situations at work involve interactions with customers, colleagues, or leaders (Lehmann-Willenbrock, 2024), the last study explored perspective taking as an additional explanatory mechanism for the effects of mindfulness interventions on work engagement. While previous research has investigated the effects of mindfulness on compassion or empathy, as well as group outcomes (Birnie et al., 2010; Cheang et al., 2019; Condon, 2017; Fasbender et al., 2020), the consideration of perspective taking as an explanatory mechanism for mindfulness' benefits on individual well-being and performance is novel. Firstly, the

results extend the evidence that mindfulness interventions positively affect perspective taking on a state level. Despite considerable intraindividual variation, previous research has mostly focused on the trait level or longer interventions (Birnie et al., 2010; Cheang et al., 2019; Nguyen et al., 2019). Our findings suggest that even short-term mindfulness practices can enhance an individual's ability to adopt others' perspectives, which is crucial for effective communication and collaboration in a workplace setting. Secondly, perspective taking was positively related to the actor's work engagement as an indicator of eudaimonic well-being. Prior evidence has primarily highlighted the benefits of perspective taking for interpersonal outcomes, such as improved relationships and teamwork (Ku et al., 2015). This study extends that understanding by showing that perspective taking also directly enhances individual work engagement, suggesting that employees who can better understand and empathize with others are more likely to find their work meaningful and engaging.

When testing perspective taking as an underlying mechanism, self-regulation as well as sleep quality were used as control variables. However, in contrast to the previous study, the effects of an evening meditation on self-regulation did not reach significance. This discrepancy could be attributed to several factors. Firstly, the timing of the meditation sessions may play a crucial role. Morning meditations might offer a fresh start to the day, enhancing self-regulation by setting a mindful tone for the day's activities. In particular, morning meditation can broaden the attention span and facilitate acceptance during the day, which could facilitate the recognized alignment of actions and values or interests. In contrast, evening meditations may serve more as a tool for winding down and reflecting on the day's events. Potentially this plays a greater role in detaching from one's own perspective and fostering perspective taking, but the effects on self-regulation are not durable enough to persist until the following day. Secondly,

the last study utilized a different design, in which participants were introduced to the meditation or the active control condition from the beginning onward. This approach might allow intervention effects to carry over to non-intervention days, potentially diminishing the impact of mindfulness compared to the control group. Additionally, the active control group, which involved listening to an engaging audio play, may have provided similar relaxation and cognitive engagement benefits, thereby reducing observable differences between groups. Thirdly, variations in conceptualizations and measurements of self-regulation across studies could contribute to the differing findings. The first study differentiated between self-regulation and self-control, identifying self-regulation as a key mechanism for mindfulness effects on flow experience. In contrast, the second study measured self-regulation alongside self-relaxation and self-motivation as distinct strategies. While self-relaxation aligns with previous research indicating that mindfulness can improve emotional regulation, as in particular stress and anxiety (Chambers et al., 2009; Eberth & Sedlmeier, 2012; Khoury et al., 2015), the evening meditation did not yield significant results for any of these measures. Further research should explore the specific components of self-regulation that are most impacted by mindfulness practices. Summarizing, more research with a stronger consideration of other-oriented processes such as perspective taking seems to be imperative based on the importance of social interaction in the workplace (Lehmann-Willenbrock, 2024). A direct comparison between intra-individual and other-oriented processes can support designing more effective mindfulness interventions tailored to individual needs and work contexts, ultimately enhancing momentary eudaimonic well-being.

6.3 Practical contributions

This thesis offers several practical contributions for enhancing well-being and eudaimonic well-being in the workplace. Different interventions, such as the eight-week MBSR training and brief meditations in the morning or evening can be tailored to suit the diverse needs and schedules of employees. These interventions provide employees with various options to integrate mindfulness into their daily routines, promoting eudaimonic well-being. For example, comprehensive programs like the eight-week MBSR can provide in-depth training and significant long-term benefits, while shorter, more flexible practices can be easily incorporated into busy schedules, offering immediate day-specific and next-day benefits for well-being and performance. Especially time-effective mindfulness practices can enable individuals to benefit from enhanced self-regulation, perspective taking, and eudaimonic well-being without requiring many resources. Enhanced knowledge about the effects of these interventions, which can not only improve well-being and performance at work but also after work, can enable employees to make informed decisions about whether they want to engage with these interventions. Furthermore, companies can support employees with the implementation of these interventions by providing flexible working hours, offering corporate training, as well as financial support (e.g., for the MBSR program). Especially for smaller companies with limited budgets providing brief mindfulness interventions for employees might be of interest since they do not require many resources. Further, companies can provide information about different mindfulness exercises that could also be integrated during working times (e.g., mindful eating, body scan, Hülsheger et al., 2015).

Additionally, companies can enhance self-regulation and perspective taking directly through structured interventions and modifications. Implementing job crafting

and providing flexibility within working roles can support employees in aligning their work roles with their personal goals and strengths (Demerouti et al., 2015; Kuijpers et al., 2020), which fosters well-being and performance. Job crafting allows employees to modify their tasks, interactions, and cognitive perceptions of their jobs to better fit their skills and interests, enhancing job satisfaction and engagement (Kuijpers et al., 2020). By offering flexible work arrangements and opportunities for job crafting, organizations can empower employees to take an active role in shaping their work experience, leading to higher well-being and performance (Kuijpers et al., 2020). Further, specific training can be implemented to directly foster perspective taking (Herrera et al., 2018; Weisz & Zaki, 2016). Building a greater understanding within the workforce cannot only improve cooperation and group outcomes but also individual well-being and performance of employees. Mindfulness training and other positive psychology practices can be integrated into organizational development programs, helping employees develop better self-regulation, increased awareness, and improved interpersonal skills. Additionally, various interventions are available to directly foster flow or work engagement (e.g., positive feedback to increase self-efficacy, task variety at work, regular feedback and setting clear goals during appraisals, using character strength at work; Bakker & van Wingerden, 2021; Peifer & Wolters, 2021). These practices enable employees to manage stress more effectively, view challenges as opportunities for growth, and foster a more collaborative and supportive work environment. The benefits of these interventions extend beyond individual well-being to the overall organizational culture. Organizations that invest in the mental health and well-being of their workforce can expect lower turnover rates, reduced absenteeism, and improved motivation (Wright & Huang, 2012). In summary, the practical contributions of this thesis highlight the importance of tailored mindfulness interventions and direct

enhancement of self-regulation and perspective-taking. These strategies offer valuable tools for employees and companies to improve their well-being and performance simultaneously, supporting employees to thrive.

6.4 Limitations

The studies presented provide important evidence for the potential of mindfulness interventions to foster eudaimonic well-being, particularly in enhancing flow experience and work engagement. However, several important limitations must be acknowledged. Firstly, all three studies used self-report measures to assess the central constructs flow experience and work engagement as well as underlying mechanisms of self-regulation and perspective taking. While self-reports are common in psychological research to assess constructs that cannot easily be inferred by the outside or via physiological markers (e.g., work engagement, mindfulness), self-report measures are susceptible to response bias, social desirability, and common method bias when used for multiple constructs (Donaldson & Grant-Vallone, 2002). We mitigated these concerns by directly evaluating the effects of a mindfulness intervention instead of incorporating the effects of self-reported mindfulness. Further, we separated the measures of the underlying mechanisms and outcomes during the day, reducing bias based on common assessment. However, future research could additionally include alternative assessments, such as external assessments for performance or physiological proxies for flow and stress to address these concerns.

Secondly, the quasi-experimental designs used in Studies I and II, as well as the inactive control groups, limit assumptions about causality. In Study I, we could not randomized participants towards the experimental and control groups, which we attempted to address by comparing baseline measures and controlling for them. A randomized controlled trial with an active control group should be conducted to

replicate the results. In Study II, we used a within-subjects manipulation that automatically accounts for between-person variance. In order to avoid spill-over effects between days with and without interventions, we did not randomize intervention days. However, future studies should involve an active control group and randomize the intervention to test the robustness of the findings. Study III improved on these designs by implementing an active control group and randomizing the order of conditions.

Thirdly, despite the evaluation of interventions, causality cannot always be ensured for the whole model. Although the evaluation of the interventions suggests that changes are likely due to the interventions, the reliance on self-reported measures for the underlying mechanisms and outcomes means that reverse causality cannot be ruled out. Despite the separated measurements and profound theoretical foundation, it might be the case that for instance self-regulation and flow experience increased simultaneously or that flow experience increased before self-regulation, reversing the causal order. The temporal sequence of changes in the mediating mechanisms and outcomes may not be perfectly captured, complicating the establishment of a clear causal relationship.

Fourthly, several potentially relevant factors, such as organizational context and personality traits, could not be accounted for in these studies. Organizational context, including culture, leadership styles, and structural changes, can significantly influence the effectiveness of interventions. For instance, supportive leadership and a positive work environment may enhance the impact of an intervention. Similarly, personality traits such as resilience, openness to experience, and conscientiousness can affect how individuals respond to interventions. These unmeasured variables could introduce confounding effects, making it difficult to isolate the specific impact of the interventions. In conclusion, these limitations highlight the need for future research to

use more rigorous experimental designs, incorporate physiological measures, and consider a broader range of influencing factors to better understand the effects of mindfulness interventions on eudaimonic well-being.

6.5 Conclusion

In conclusion, the series of studies presented provides compelling evidence that mindfulness interventions can significantly enhance eudaimonic well-being. Utilizing the MMT as a meta-framework, I argue that mindfulness fosters accepting awareness of all stimuli in the present moment, enabling a new appraisal (i.e., meaning) of demands and situations. By acknowledging and accepting all aspects of tasks and personal resources, individuals can reframe previously stressful events as positive challenges, leading to flow experiences (Study I). They can also align tasks with internal values and interests, fostering autonomous self-regulation and flow (Study II). Furthermore, mindfulness helps in detaching from one's own perspective and emotions, fostering perspective-taking and improving flow and work engagement (Study III).

Specifically, Study I showed that MBSR training reduces stress and enhances flow experience, particularly benefiting those with high levels of emotional exhaustion, demonstrating the potential of an eight-week mindfulness program. Study II focused on brief mindfulness practices, revealing that a short morning meditation boosts autonomous self-regulation and reduces effortful self-control, leading to increased flow and vitality throughout the day. Study III examined evening meditation's impact on next-day work engagement, showing that it enhances perspective-taking, which improves work engagement and performance. This highlights the importance of social processes in mediating mindfulness benefits on well-being and performance.

Overall, these studies illustrate that mindfulness interventions, from comprehensive programs to brief daily practices, effectively enhance various aspects of

eudaimonic well-being as indicated by flow and work engagement. They emphasize the critical roles of individual regulatory mechanisms and outward-focused processes in the social context. However, limitations such as reliance on self-reported measures, quasi-experimental design, and the inability to account for all relevant factors like organizational context and personality traits must be considered. These promising outcomes suggest that mindfulness interventions can be a valuable tool for fostering eudaimonic well-being, as evidenced by increased flow experience and work engagement.

7. References

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Appendix A (Study I)

Bayesian estimation

When analyzing the individual change trajectories and their relation, we used Bayesian estimation because empirical Bayes estimates calculated for each participant are additionally weighted by overall sample information providing a more accurate representation than estimates based on separate regression models for each participant (Chen et al., 2011). Additionally, Bayesian estimation can successfully handle non-normal and skewed posterior distributions, for instance in the case of indirect effects (Zyphur & Oswald, 2015). We relied on the Markov chain Monte Carlo method (MCMC) with non-informative priors because no studies have been conducted that can provide reliable baseline information on the relationships assessed in this study. In doing so, we allow the estimation of the posterior distribution of the parameters to be dominated by the collected data (Zyphur & Oswald, 2015).

We followed suggestions by Depaoli and van de Schoot (2017) and assessed several indicators of Bayesian diagnostics to ensure the correct specification of our Bayesian models. Results support the correct convergence of our models, a limited influence of the non-informative prior, the credibility of posterior distributions, and acceptable autocorrelation. For further information, please review the supplementary materials or contact the first author.

Appendix B (Study II)

Confirmatory Factor Analyses

Second-order confirmatory factor analyses were conducted to ensure the distinctiveness of our measures (see Table B1). Model 1 with four distinct factors for self-regulation, self-control, flow experience (consisting of its two facets absorption and enhanced subjective experience), and subjective vitality fitted our data the best. Other models, combining different factors provided a slightly worse fit. Table B1 summarizes the fit indices of all models. Due to conventions in the field, we report χ^2 difference tests for our models as well. However, because the models have been structurally revised on the latent level (e.g., two factors have been integrated into a single latent variable) and cannot be considered nested, a focus on different fit indices such as AIC and BIC is recommended (T. A. Brown & Moore, 2012).

Table B1.

Second-order confirmatory factor analyses

	χ^2 Test of Model Fit		Fit Indices						Satorra-Bentler Scaled χ^2 Difference Test (in comparison to Model 1)		
	χ^2	*df*	RMSEA	SRMR (within)	CFI	TLI	AIC	BIC	χ^2	*df*	*p*
Model 1	566.58	181	.069	.059	.926	.915	25760.72	26052.63			
Model 2	1248.21	184	.113	.091	.797	.768	26629.54	26909.12	824.59	3	.000
Model 3	571.14	183	.069	.061	.926	.915	25764.19	26047.89	4.79	2	.091
Model 4	579.58	183	.069	.066	.924	.913	25780.46	26064.15	10.24	2	.006
Model 5	581.41	183	.069	.067	.924	.913	25784.42	26068.11	10.85	2	.004
Model 6	1272.97	183	.115	.101	.792	.761	26706.64	26990.34	1177.71	2	.000
Model 7	1010.40	183	.100	.078	.842	.819	26357.62	26641.31	465.28	2	.000

Note. Model 1 refers to a model with separate factors for self-regulation, self-control, flow (modeled as a second-order factor consisting of its two subfacets), and vitality. In Model 2, self-regulation and self-control are combined in one factor. In Model 3, both sub-facets of flow and subjective vitality are combined in one second-order factor. In Model 4, self-regulation and both facets of flow are combined in one second-order factor. In Model 5, self-control and both facets of flow are combined in one second-order factor. Model 6 combines the subfactes of flow optimal experience together with self-control into one factor, while Model 7 combines this subfacet with self-regulation. In both models, the subfacet absorption was modeled separately.