Trait Mindfulness and its Dimensions as Personal Resources in the Job Demands-Resources Theory of Work-Related Stress and Motivation

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Abstract

This thesis presents three empirical studies designed to examine trait mindfulness and its five facets as personal resources in the job demands-resources (JD-R) theory which highlights importance of workplace characteristics in relation to employee health and well-being. Study 1 hypothesised that mindfulness would buffer negative effects of high-strain jobs on job burnout and boost positive effects of active jobs on employee engagement at both within- and between-person level. A sample of 144 employees completed online diaries twice daily recording 1083 diary entries over five working days. Results of multilevel moderation analyses to disentangle the episodic and more enduring effects at the within- and between-person level supported the buffering role of trait mindfulness in the energy erosion process at the between-person level but not at the within-person level. A more complex pattern of results emerged with respect to the motivation process suggesting that mindfulness boosted work engagement but only in jobs with high control and manageable demands at the between-person level.

Study 2 conducted a follow-up examination of awareness and acceptance dimensions of trait mindfulness with respect to the moderating effect of mindfulness in the energy erosion and motivation processes of the JD-R using the same sample as study 1. First, a set of confirmatory factor analyses revealed that the five-factor correlated model of mindfulness yielded better fit than alternative higher-order factor structures of trait mindfulness proposed in the literature and the subsequent study analyses therefore proceeded at the facet level. Next, results of multilevel analyses revealed that the observe facet enhanced the within-person reactivity to high-strain episodes which was associated with an episodic drop in work engagement (but not higher burnout). While the acceptance dimension

(nonjudgment and non-reactivity facets) together with acting with awareness carried the buffering effects at the between-person level. Moreover, trait non-reactivity facet was found to directly predict both burnout and work engagement at the between-person level over and above the influence of workload demands, job control and trait negative affectivity.

The third empirical study then examined trait mindfulness and its dimensions of mindful awareness and acceptance with respect to work-related worry/rumination as an active mechanism in the energy erosion and motivation processes of the JD-R theory. The main aim was to examine whether more mindful employees worried less when faced with high job demands or whether they were less vulnerable to the detrimental effects of worry with respect to emotional exhaustion and work engagement. A sample of 173 employees completed weekly diary surveys over three weeks recording a total of 479 weekly diary entries. Results of multilevel path analyses supported the mediating role of work-related worry / rumination in the energy erosion (but not motivation) process of the JD-R at the between-person level. Multilevel moderation analyses supported the buffering role of trait mindfulness in the relationship between job demands and work-related worry / rumination at the between-person level. Again, a more complex pattern of results emerged at the facet level.

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"The present moment is filled with joy and happiness.
If you are attentive, you will see it."

- Thich Nhat Hahn

The present moment can be filled with sadness, fear, anxiety or anger.
If you are attentive, you will see that too.

- L.Z.

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Table of Contents

List of Tables

List of Figures

List of Acronyms

Acceptance and Commitment Therapy	ACT
Allostatic Load model	AL
Blood Pressure	BP
Chartered Institute of Personnel and Development	CIPD
Cognitive and Affective Mindfulness Scale – Revised	CAMS-R
Cognitive Behavioural Therapy	CBT
Common Method Variance	CMV
Comprehensive Inventory of Mindfulness Experiences - Beta	CHIME-β
Conservation of Resources Theory	COR
Conditional Process Model	CPM
Demand-Induced Strain Compensation	DISC
Dialectical Behaviour Therapy	DBT
Ecological Momentary Assessment	EMA
Five Facet Mindfulness Questionnaire	FFMQ
Freiburg Mindfulness Inventory	FMI
High Reliability Organisations	HRO
Interleukin-6	IL-6
International Classification of Diseases 11th Revision	ICD-11
Job Demands - Control Model	JDC
Job Demands-Resources Model/Theory	JD-R
Kentucky Inventory of Mindfulness Scale	KIMS
Maslach's Burnout Inventory	MBI
Mindful Attention Awareness Scale	MAAS
mindfulness-based interventions	MBIs

Mindfulness-Based Stress-Reduction	MBSR
Monitor and Acceptance Theory	MAT
Multidimensional State Mindfulness Questionnaire	MSMQ
Philadelphia Mindfulness Scale	PHLMS
Self-awareness, Self-regulation, and Self-transcendence	S-ART
Shirom-Melamed Burnout Measure	SMBM
Southampton Mindfulness Questionnaire	SMQ

Thesis Introduction: Overview & Aims

This thesis presents three empirical studies examining trait mindfulness in context of a well-established, contemporary model of work-related stress and motivation. Mindfulness, originating in Eastern contemplative traditions and defined as a non-judgmental awareness and attention to the present moment (Bishop et al., 2004), has gained popularity with general public, organisations and scientific community worldwide. In a move dubbed "the mindful revolution", mindfulness training courses have been rapidly adopted by a wide range of organisations from high technology giants of Silicon Valley and US military to the British Parliament, National Health Service, education and criminal justice systems in the UK and other European countries (Mindfulness All-Party Parliamentary Group, 2015; Van Dam et al., 2018). Mindfulness meditation and mindfulness-based training have become a booming industry which was valued at $1.21 billion in 2017 but estimated to reach $2.08 billion by 2022 in the U.S. alone (LaRosa, 2017).

Writing for the Academy of Management (AOM) Insights, Kudesia recently noted that the main driver of this trend was a growing need to focus on employee well-being and highlighted stress-reduction as the primary selling point for mindfulness training in organisations (AOM Insights, 2019). According to Health and Safety Executive's (2019) annual statistics, work-related stress, anxiety or depression accounted for 44% of all work-related ill health cases and 54% of all working days lost due to ill health in the UK. The Chartered Institute of Personnel and Development (CIPD; 2015; 2016; 2018; 2019) reported that stress and employee mental ill health were among the top three causes of the long-term absence (accounting for 43%) recorded in the UK organisations in 2019 and unmanageable workload demands were (repeatedly) identified by a wide margin as

the main cause of continuously rising levels of the stress-related sickness absence between 2015 and 2019.

The impact of common mental health problems (such as stress, anxiety and depression) on the individual and those around them can be huge and life changing. And the costs to the UK economy have been estimated at a staggering value. The Stevenson / Farmer 'Thriving at work' review of mental health and employers estimated the overall cost of poor mental health (including common mental health problems as well as more severe mental illness) to the UK economy at £74 to £99 billion per year (Farmer & Stevenson, 2017). Their calculation included the direct costs to employers due to absenteeism (£8bn), presenteeism (£17 to £26bn) and staff turnover (£8bn) as well as costs to the UK Government due to benefits payments (£10bn), lost tax and National Insurance revenue (£11 to £14bn) and NHS costs (£3bn).

Mindfulness training to reduce employee stress and enhance well-being therefore seems to be a timely answer to a pressing problem. However, the mindful revolution has been also recently facing some significant challenges and criticism among the scientific community. For example, Van Dam et al., (2018) warned that the current media hype with tens of thousands news articles published on mindfulness and meditation each year ignored some fundamental issues raised by mindfulness researchers ranging from lack of agreement on what mindfulness is and how it can be measured in the first place to a substantial variability across mindfulness-based interventions (MBIs) and their evaluation studies. They called for more rigorous research designs as well as greater clarity in reporting of the empirical studies.

Similarly, Michalak and Heidenreich (2018) highlighter other factors (historical, social, psychological) than the sole weight of scientific evidence-base which contributed to the rapid adoption of MBIs by individuals and organisations in recent years. Specifically, they pointed to the current zeitgeist of economization and acceleration of culture, to a pressing salience of psychological stress and mental health issues, to a role of modern information technologies, and to specific aspects of the health-care systems which favoured exploration of a novel and promising treatment approach alongside other well-established, traditional approaches such as CBT.

Moreover, Purser and his colleagues criticised the "McMindfulness" industry (a trend turning mindfulness into a commodity marketed as a fashionable spiritual technique for personal self-fulfilment and corporate gains) for something even more fundamental than potentially unsubstantiated claims about the benefits of mindfulness (Purser & Loy, 2013; Purser, 2019). Purser and Milillo (2015, p. 16) pointed to a 'convenient' shift in perspective adopted by many organisations offering mindfulness training to their employees where "stress is framed as a personal problem, and mindfulness-based interventions are offered as means of helping employees cope and work more effectively and calmly within … toxic environments". Perhaps as a possible sign of such trend, the CIPD's (2019) Health and well-being at work report noted that in 2019 fewer organisations used staff surveys and/or focus groups to identify the causes of stress (49% in 2019 compared to 62% in 2018), and similarly fewer used risk assessments / stress audits (48% in 2019, down from 58% in 2018). Whereas individual-focused approaches such as flexible working options / improved work–life balance (68%) and employee assistance programmes (61%) remained the most common methods used to identify

and reduce stress at work (recording little change from 69% and 63% respectively in 2018).

Leaving aside an ethical paradox implied by Purser's criticism (i.e. providing individual-focused mindfulness training rather than addressing the organisational causes of employee stress), there is an important research question implied here. With increasing academic interest in mindfulness and its role in stress reduction, there is a growing body of robust empirical evidence supporting the beneficial effects of mindfulness on psychological as well as physical health and wellbeing (emerging across multiple fields, e.g., clinical, health and cognitive psychology and neuroscience). Yet only few studies have so far examined mindfulness in context of well-established and empirically supported theoretical models of work-related stress developed in the field of occupational health literature over the past 40 years.

The present thesis therefore aims to investigate how does trait mindfulness as a naturally occurring individual characteristic – which can be also enhanced by a variety of training interventions – exert its beneficial influence in context of the job demands-resources model (JD-R; Bakker & Demerouti, 2017). The JD-R is currently considered one of the most popular theoretical frameworks of work-related stress and motivation which highlights importance of the workplace characteristics for employee health and wellbeing. This thesis can be outlined in three broad parts. The first part introduces the main theoretical concepts and empirical evidence which provide basis for the research questions and hypotheses in the following empirical studies. Chapter 1 provides an overview of what mindfulness is, how it can be measured and briefly presents several recent theories of mindfulness mechanisms implied in coping with (work-related) stress. Chapter 2

briefly summarizes some of the most influential theoretical models of stress and motivation, with a particular focus on the JD-R framework and on the role of individual characteristics within this framework. Chapter 3 then provides a brief introduction to a quantitative diary methodology used in the empirical studies and its theoretical implications for the (multilevel) models of employee well-being.

The next part of this thesis includes three empirical studies. Chapter 4 presents a five-day daily diary study investigating the role of trait mindfulness as a personal resource in an energy erosion and motivation process of the JD-R model at both within- and between-person level of analysis. Chapter 5 presents a follow-up study exploring the structure of mindfulness with respect to two higher-order dimensions of mindfulness (mindful awareness and mindful acceptance) and investigating the role of trait mindfulness in the JD-R model at the facet level. And finally, chapter 6 presents a three-week study which examined a concept of work-related worry / rumination as a mediator between work characteristics and work-related outcomes (burnout and work engagement) and the moderating role of trait mindfulness in these relationships at both within- and between-person level.

The third part of this thesis, chapter 7, then presents a general discussion of the empirical findings from all three empirical studies and the theoretical, practical, and methodological implications which can be drawn from their results. The limitations of this research and suggestions for future research are also discussed.

Chapter 1 - Mindfulness – Definitions, Measurement and Mechanisms

1.1 What is mindfulness?

As it stands, the current mindfulness literature does not present us with a single, universally accepted definition of mindfulness and ongoing, lively academic discussions about the origin, nature, and measurement of the concept can be observed across a number of scientific disciplines (Chiesa, 2013; Davidson & Kaszniak, 2015; Grossman & Van Dam, 2011; Kudesia, 2019; Purser & Milillo, 2015; Van Dam et al., 2018; Williams & Kabat-Zinn, 2011). Some of the difficulty in defining mindfulness may stem from the fact that two leading strands of thought and research on mindfulness (often called the Western – or socio-cognitive - and Eastern approach) have been running in parallel for nearly 40 years without directly addressing each other's work or clarifying the differences or similarities between them (Hart, Ivtzan, & Hart, 2013; Ie, Ngnoumen, & Langer, 2014). Both approaches will be briefly outlined here in order to clarify the theoretical context of this thesis and for their clear relevance and application in the field of organisational behaviour and occupational health psychology. However, the theory and empirical studies in this thesis are firmly based on the Eastern approach to mindfulness as initiated by Jon Kabat-Zinn (2003).

The Western approach to mindfulness is based on pioneering work of Ellen Langer in the early 1970s and her socio-cognitive perspective on mindfulness and mindlessness as information processing modes (Langer, 1992; 2005). Langer defined mindfulness as "an active state of mind characterized by novel distinction-drawing that results in being (1) situated in the present; (2) sensitive to context and perspective; and (3) guided (but not governed) by rules and routines" (Langer, 2014, p. 11). She contrasted this active and cognitively flexible mode of conscious

awareness to a more automatic, habitual, and superficial cognitive processing mode characterised by cognitive rigidity and overreliance on distinctions and categories drawn in the past - mindlessness. According to Sternberg (2000), in the socio-cognitive perspective, mindfulness is viewed as a cognitive style – rather than a cognitive ability or a stable personality trait - and involves the following five components: present orientation, openness to novelty, attentiveness to difference, recognition of diverse contexts, and ability to adopt multiple perspectives (Sternberg, 2000). Empirical research of the socio-cognitive mindfulness conducted by Langer and her colleagues typically involved experimental studies using simple educational and cognitive reframing exercises to prompt participants' shift from the mindless to more mindful information processing modes resulting in improved cognitive performance as well as psychological well-being and health outcomes (for reviews see Carson & Langer, 2006; Fox Lee, 2019; Hart, Ivtzan, & Hart, 2013; Langer, 1992; 2014).

Langer's concept of socio-cognitive mindfulness was also adopted by organisational scholars and forms the conceptual basis of collective mindfulness (or mindful organising) (Sutcliffe, Vogus, & Dane, 2016; Vogus & Sutcliffe, 2012; Weick, Sutcliffe, & Obsted, 1999). Weick and colleagues (1999) used the term of collective mindfulness to describe cognitive processes underlying adaptive learning, effective detection of errors and reliable organisational performance of high reliability organisations (HRO) in increasingly complex environments. They suggested that collective mindfulness comprises of five cognitive processes which interrelate at multiple organisational levels: preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise in decision-making. In line with Langer's concept of socio-

cognitive mindfulness at individual level, these five processes at the organisational level are thought to induce rich awareness of discriminatory detail and enable capacity for effective action. Both organisational and individual mindfulness in the socio-cognitive perspective rely on (self-) regulation of attention to create rich, conscious awareness of the present moment and the processes that unfold. This concept is also central to the Eastern approach to mindfulness. However, there are also some fundamental differences between the two approaches with respect to their underlying philosophies, the components of their constructs and their main focus (Hart et al., 2013).

The introduction of the Eastern approach to mindfulness in contemporary Western psychology is often credited to the pioneering work of Jon Kabat-Zinn and his colleagues at the University of Massachusetts Medical School who developed a meditation-based clinical intervention for patients experiencing chronic pain in the late 1970s (Kabat-Zinn, 2003; 2011). The intervention, known as the Mindfulness-Based Stress Reduction (MBSR) Programme today, trained medical patients in relatively intensive mindfulness meditation and yoga. It was firmly rooted in the 2,500-year-old tradition of Buddhist psychology, yet aimed to introduce these ancient and potentially transformative meditative practices to the Western medical patients free of the cultural, religious, and ideological factors associated with their Buddhist origins.

A number of other mindfulness-based psychotherapeutic approaches – such as dialectic behaviour therapy (DBT, Linehan, 1993, 2015) or acceptance and commitment therapy (ACT, Hayes, Strosahl, & Wilson, 1999; Hayes, 2019) – were developed during this time. Invariably, their proponents also drew on their own personal experience with various types of Buddhist meditation, Zen, yoga, or other

contemplative practices and the "fruit-nut-seed mix of ideas that were floating around in the 1960s and 1970s" (Hayes, 2019, p. 59).

The Eastern approach to mindfulness can be traced back to the Buddhist concept of *sati*. The word *sati* comes from a Buddhist canonical language Pali. It has been translated to English in a number of ways but most often as mindfulness, attention, awareness, retention (memory), or discernment. In the Buddhist tradition, mindfulness is cultivated through *vipassana* (or insight) meditation (Davidson & Kaszniak, 2015; Grossman & Van Dam, 2011; Siegel, Germer, & Olendzki, 2009).

For the secular context of the MBSR programme, Kabat-Zinn (2003, p. 145) defined mindfulness as "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment." Bishop and colleagues (2004) later used this definition as a basis to propose a two-component model of mindfulness characterised by (a) self-regulation of attention and (b) a particular orientation to experience which is adopted and cultivated in mindfulness meditation practices.

Self-regulation of attention was suggested to involve cognitive abilities to sustain and switch attention and ability to refrain from secondary elaborative processing of thoughts, feelings and sensations so that the focus of attention is maintained on the direct experiencing of these internal and external events. Orientation to experience was then characterised by a curious, open and accepting attitude. Shapiro, Schwartz and Santerre (2005) suggested that additional dimensions were needed to explicitly incorporate the affective ("heart") nature of mindfulness and proposed 12 qualities of mindful attention: nonjudging, nonstriving, acceptance, patience, trust, openness, letting go, gentleness, generosity,

empathy, gratitude and lovingkindness. Yet, the two-component model is the most widely accepted and used in the scientific research today.

As was already noted above, lively discussions have been unfolding in the academic literature about the accuracy and suitability of Kabat-Zinn's and other definitions of mindfulness and many scholars turn back to the original Buddhist concepts in their own critique of the contemporary, 'clinical' mindfulness (Dreyfus, 2011; Grossman & Van Dam, 2011; Husgafvel, 2018; Maex, 2011; Purser & Milillo, 2015). This lack of conceptual clarity and consensus about the term mindfulness – even within this Eastern, Buddhism-based, approach to mindfulness - can be illustrated by Nilsson and Kazemi's (2016) review, which identified 33 unique definitions of mindfulness in a pool of 308 peer-reviewed theoretical and empirical articles published between 1993 and 2016. Their thematic analysis yielded four main themes or core elements of mindfulness across these studies: (1) attention and awareness; (2) present-centeredness; (3) external events (as an umbrella term for stimuli in the external environment which impact mind-body functioning); and (4) cultivation of one's character though mindfulness. In addition, they referred to the Buddhist origins of mindfulness (*sati*) to argue that another core element – ethical-mindedness (a social dimension of mindfulness) – has emerged from their thematic analysis as being absent in the contemporary scientific definitions.

Similarly to Nilsson and Kazemi's (2016) review, Sutcliffe et al. (2016) reviewed a narrow sample of 14 recent papers in the organisational and occupational health psychology literature identifying a variety of one-, two-, and three-dimensional definitions of mindfulness across these papers. They noted that a dimension of present-moment awareness of external and internal experience was

shared universally among these definitions and that differences arose with respect to additional features or qualities that may also characterise mindfulness (e.g., non-judging stance). Yet, despite these ongoing difficulties to reach agreement on the specific dimensions of mindfulness in the psychological scientific literature, Bear (2019) recently noted that many contemporary researchers seemed to agree on the attention itself (*what*) and certain qualities of this attention (*how*) as two essential elements in defining mindfulness.

Another potential source of difficulty in reaching agreement on defining mindfulness in the academic literature can also stem from the fact that mindfulness can take on various forms and can be cultivated through a variety of practice formats. Brown and Ryan (2003, 2004) noted that whilst mindfulness was first introduced to the Western world primarily through a meditative practice actively cultivating conscious attention and awareness (mindfulness practice), it can be also seen as a naturally occurring characteristic with individuals naturally differing in their capacity to be mindful over time. These differences may be observed as (1) mindful *states*, a stream of consciousness fluctuating in its degree of conscious awareness of the present moment from one moment to another within a person, or (2) differences between individuals in their tendency to experience these mindful states over time (mindfulness as a *trait*).

As with any naturally occurring personal characteristic, people can go about their days with varying degrees of state mindfulness as momentary conscious attention and awareness of their experience in the present moment. Indeed, experience sampling studies assessing individuals' state mindfulness repeatedly over a number of measurement occasions and days reported that approximately 41% (Hülsheger, Walkowiak and Thommes, 2018) to 71% (Brown & Ryan, 2003) of

variation in mindfulness was attributable to these within-person, momentary fluctuations. However, individual differences also exist in the tendency to experience these mindful states across time and various situations and mindfulness can be therefore also viewed as a trait reflecting the density distribution of these mindful states (a view which is consistent with a recent conceptualisation of personality traits in general psychology, Fleeson, 2004; Fleeson & Law, 2015).

In addition, the term mindfulness has been used in the literature to denote mindfulness *practice* and thus also refers to a method through which we can intentionally develop and sharpen these mindful states of consciousness (Shapiro, Wang, & Peltason, 2015). Mindfulness practices typically involve formal mindfulness meditations, although their nature, length and intensity can vary considerably – ranging from guided or non-guided meditations to brief mindfulness exercises delivered online or via an app. Moreover, even informal mindfulness practices – such as mindfully attending to household chores and simple everyday activities (such as walking, washing-up or brushing teeth) - were suggested to increase individuals' propensity to experience mindful states without meditation.

Mindfulness-based programmes or *interventions* (MBIs) then provide a structured framework of mindfulness practices informed by contemplative practices, science, and research in medicine, psychology and education (Crane, Brewer, Feldman, Kabat-Zinn, Santorelli, Williams, & Kuyken, 2017). Various types of mindfulness practices and programmes then share a common goal of intentionally introducing the momentary mindful states in order to develop a greater tendency to experience these mindful states of awareness in everyday life (as a trait). This assumption has been supported by empirical evidence with respect to short mindfulness exercises or low dose mindfulness interventions (Hulsheger, Feinholt,

& Nubolt, 2015) as well as the eight-week mindfulness-based programmes (e.g., Kiken, Garland, Bluth, Palsson, & Gaylord, 2015; for meta-analysis see Quaglia, Braun, Freeman, McDaniel, & Brown, 2016).

To briefly summarize what is mindfulness we need to consider the content, form and format of this "deceptively simple concept that is difficult to characterize accurately." (Brown & Ryan, 2004, p. 242). There are two different schools of thought which, despite their different roots, both defined mindfulness as a particular state of consciousness characterised by an open awareness and attention to the present moment. Langerian, socio-cognitive approach emphasized the external focus and receptiveness to new information in actively drawing new distinctions to enhance one's creativity, cognitive performance, and psychological well-being. While Kabat-Zinn's Buddhism-based therapeutic approach to mindfulness emphasized both internal and external focus of mindful awareness and a wider scope of attitudinal attributes contributing to metacognitive processes proposed to underlie physical and psychological symptom reduction in patients in clinical settings.

Mindfulness can be also described with respect to its form as a state or a trait characteristic and its cultivation may take on several formats involving both meditative and non-meditative practices. A need for such explicit conceptual distinctions between intentional mindfulness practice, mindfulness as a state and mindfulness as a trait has been also echoed in recent reviews of mindfulness in organisational literature (Jamieson & Tuckey, 2017; Wheeler, Arnkoff & Glass, 2017). For the purpose of this thesis, mindfulness is understood and examined as a multidimensional trait characteristic in line with Kabat-Zinn's Eastern approach to mindfulness.

1.2 Measurement of Mindfulness

A number of psychometric reviews observed that this conceptual variety was also reflected in some fundamental differences among unidimensional and multidimensional operationalisations and measures of mindfulness in the current academic literature (e.g., Grossman, 2008; Bergomi, Tschacher, & Kupper, 2013a, 2013b; Chiesa, 2013; Sauer, Walach, Schmidt, Hinterberger, Lynch, Büssing, & Kohls, 2013). Unidimensional scales focused primarily on the present-moment attention and awareness component while multidimensional measures assessed present moment awareness together with other components of mindfulness such as its accepting and non-judgmental nature. Bergomi et al. (2013b) noted that such a considerable diversity of phenomena in conceptualisation and measurement of mindfulness may be problematic for comparing and replicating research findings. This observation is also pertinent to mindfulness research in the organisational and occupational health literature as researchers in this field invariably draw on existing, well validated measures of general mindfulness in their work-related studies.

On one hand, Brown and Ryan (2003) defined individual mindfulness simply as the present moment awareness: "a quality of consciousness that is characterised by clarity and vividness of current experience and functioning and thus stands in contrast to the mindless, less "awake" states of habitual or automatic functioning" (Brown & Ryan, 2003, p. 823). Aiming to capture this subjective experience of present-centred attention and awareness, Brown and Ryan (2003) developed a 15-item, unidimensional measure of dispositional mindfulness, the Mindful Attention Awareness Scale (MAAS) together with a short, 5-item derivative scale capturing the transient mindfulness states. Results of their

experience sampling study using both - trait and state - MAAS scales demonstrated that individuals with higher trait mindfulness scores were indeed more likely to experience higher levels of momentary mindfulness over time and both trait and state mindfulness predicted more autonomous activity (autonomous self-regulation) and lower levels of unpleasant affect (Brown & Ryan, 2003). This finding was corroborated in other studies conducted in work-related contexts. For example, trait mindfulness was associated with higher state mindfulness scores over time and both displayed significant relationships with emotional exhaustion and job satisfaction in a 5-day diary study of 219 employee in interactive service jobs (Hülsheger, Alberts, Feinholdt & Lang, 2013).

However, the unidimensional MAAS measure has faced some strong criticism over the years. It has been frequently criticised on grounds of its face validity and for its complete reliance on reverse-scored items and therefore assessing mindfulness under an assumption that absence of mindlessness indicates presence of mindfulness (Rosch, 2007; Grossman, 2011; Chiesa, 2013; Blanke & Brose, 2017). Moreover, it was suggested to assess "lapses of conscious awareness and everyday cognitive failures" rather than mindfulness (Carriere, Cheyne, & Smilek, 2008; Cheyne, Carriere, & Smilek, 2006).

Nevertheless, Sauer et al.'s (2013) psychometric review of 11 existing mindfulness scales argued that despite this criticism, there was sufficient empirical evidence to support the validity of the MAAS scale and concluded that it was well suited for studies interested in general mindfulness score assessed in a relatively short questionnaire. The MAAS has become the most widely used mindfulness measure in research generally (Sauer et al., 2013) and with specific populations such as non-clinical populations in non-intervention studies (Tomlinson, Yousaf,

Vittersø, & Jones, 2017). Jamieson and Tuckey (2017) reported a similar observation in their systematic review of 40 published articles of mindfulness interventions in the workplace.

In terms of dimensionality of the MAAS measure, Brown & Ryan (2003, 2004) assessed mindfulness simply as pure, non-conceptual attention and awareness of present events and experience and argued that a dimension of acceptance or openness to experience was already subsumed by the present focus. They reported that a distinct acceptance factor failed to provide any additional explanatory advantage over the presence factor in the initial stages of the mindfulness scale development and therefore considered it psychometrically redundant (Brown & Ryan, 2004). As a unidimensional measure, the MAAS does not allow for a more fine-grained investigation of mindfulness dimensions (Sauer et al., 2013). Consequently, more recent studies in mindfulness literature tend to opt for multidimensional measures in their quest to investigate the underlying active mechanisms by which both individual differences in dispositional mindfulness and mindfulness training impact psychological adjustment.

In contrast to Brown & Ryan's (2003) unidimensional conceptualisation of mindfulness, multidimensional self-report scales assess mindful awareness along additional qualities that also characterise mindfulness. For example, one of the first measures of mindfulness, the Freiburg Mindfulness Inventory (FMI; Buchheld et al., 2001; Walach et al., 2006) assessed mindfulness as a four-factor construct: (1) mindful presence, (2) non-judgmental acceptance, (3) openness to experiences, and (4) insight. The Kentucky Inventory of Mindfulness Scale (KIMS; Baer, Smith, & Allen, 2004) was designed to measure four aspects of mindfulness in daily life (observing, describing, acting with awareness, and accepting without judgment)

specifically drawing on Linehan's conceptualisation of mindfulness skills in DBT (Linehan, 1993, 2015). The Southampton Mindfulness Questionnaire (SMQ; Chadwick, Hember, Symes, Peters, Kuipers & Dagnan, 2008) was originally designed as a four bipolar aspect measure assessing: (1) decentered awareness vs. being lost in reacting to cognitions, (2) allowing attention to difficult cognitions vs. experiential avoidance, (3) acceptance of difficult thoughts and images vs. being judgmental, and (4) non-reactivity to difficult cognitions vs. rumination and worry. Feldman, Hayes, Kumar and Greeson (2007) developed the Cognitive and Affective Mindfulness Scale and its revised version (CAMS-R) assessing respondents' willingness and ability to be mindful using the following four dimensions: attention, awareness of internal experiences, acceptance of internal experiences, and present-focus. While Cardaciotto, Herbert, Forman, Moitra and Farrow (2008) developed a two-dimensional scale of present-moment awareness and acceptance, the Philadelphia Mindfulness Scale (PMS).

Drawing on the diversity of the existing measures, Baer and colleagues adopted a factor-analytic approach to develop a comprehensive measure of mindfulness dimensions based on five of the above self-report questionnaires (Baer, Smith, Hopkins, et al., 2006; Baer, Smith, Lykins, et al., 2008). The resulting Five Facet Mindfulness Questionnaire (FFMQ) measures mindfulness along five dimensions: (1) observing (i.e. noticing or attending to internal and external experiences), (2) describing (i.e. labelling internal experiences with words), (3) acting with awareness (i.e. attending to one's activities in the present moment), (4) nonjudging (i.e. nonevaluative attitude towards one's thoughts and feelings), and (5) nonreactivity (i.e. ability to allow thoughts and feelings to come and go without getting caught up or carried away by them).

Other mindfulness dimensions identified in research, which are not captured by the FFMQ, include aspects such as decentering (non-identification with or meta-cognitive awareness of own experiences), non-avoidance (willingness and readiness to expose oneself to experiences), self-acceptance (Chadwick et al., 2008; Bergomi et al., 2013) or non-attachment (Sahdra, Ciarrochi & Parker, 2016). However, Fresco and colleagues argued that decentering was a related but distinct construct from mindfulness (Fresco, Moore, van Dulmen, Segal, Ma, Teasdale & Williams, 2007). Such conceptual variety can thus further illustrate the above-mentioned difficulties in reaching agreement on the definition and specific dimensions of mindfulness.

The FFMQ has also found its critics predominantly questioning the nature and the number of its dimensions. For example, Brown, Ryan and Cresswell (2007) criticised the multidimensional FFMQ for tapping into wider "mindfulness skills" rather than into the facets of mindfulness per se. Such view was empirically supported by Coffey, Hartman and Fredrickson (2010) who found a large overlap among FFMQ subscales and subscales of an emotion regulation measure in their factor-analytic study. They suggested that FFMQ facets such as describe or nonreactivity to inner experience should be considered sequelae of mindfulness and therefore skills reflecting clarity about one's emotions or emotion regulation ability enabled by mindfulness rather than true facets of mindfulness. In terms of mindfulness dimensions, Coffey et al. (2010) concluded that two dimensions of mindfulness - present-centered attention and acceptance of experience - jointly facilitated clarity about one's own internal experience which in turn contributed to improved regulation of negative emotions, decreased rumination, lower levels of psychological distress and greater flourishing. A more general criticism of the

FFMQ, which is pertinent to any self-report mindfulness measure, focused on possibility of differential understanding of the self-report items by novices and experienced meditators (Grossman, 2008).

Moreover, a growing stream of research has brought a series of unexpected, contradictory findings with respect to one of the FFMQ facets. Baer and colleagues (2006, 2008) were the first to report a differential function of the observing facet in meditating and non-meditating samples. Noticing or attending to internal and external experiences (such as bodily sensations, cognitions, emotions, sounds or smells) was associated with higher psychological well-being and lower severity of psychological symptoms in experienced meditators with five factors significantly loading onto one overarching mindfulness construct in their factor analytic study (Baer et al., 2008). But studies with non-meditating samples reported inconsistent or positive associations of the observing facet with symptoms of psychological maladjustment, non-positive or inconsistent relationships with other FFMQ facets and invariably found that a four-factor hierarchical model (excluding the observing facet) provided a superior fit to the data (Baer et al., 2008; Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011; Curtiss & Klemanski, 2014; Gu, Strauss, Crane, Barnhofer, Karl, Cavanagh, & Kuyken, 2016; Malinowski & Lim, 2015; Siegling & Petrides, 2016; Williams, Dalgleish, Karl, & Kuyken, 2014).

These contradictory findings led many to question the validity of the observing facet as an indicator of mindfulness in non-meditating samples (Gu et al., 2016; Siegling & Petrides, 2016) and encouraged renewed efforts to develop a second generation of mindfulness scales (e.g., Comprehensive Inventory of Mindfulness Experiences beta (CHIME-β), Bergomi et al., 2013a; Short Inventory of Mindfulness Capability, Duan & Li, 2016; Multidimensional State Mindfulness

Questionnaire (MSMQ), Blanke & Brose, 2017; or a unidimensional measure of work-related mindfulness behaviours, Zivnuska, Kacmar, Ferguson, & Carlson, 2016).

It is beyond the scope of this thesis to offer a more comprehensive critique of the diverse conceptualisations and measures of mindfulness (for more detailed reviews and critiques see e.g., Grosmann, 2008; Chiesa, 2013; Bergomi et al., 2013a, 2013b; Sauer, Walach, Schmidt, Hinterberger, Lynch, Büssing, & Kohls, 2013; Quaglia, Brown, Lindsay, Creswell & Goodman, 2014). For the purpose of this thesis and the empirical studies aiming to investigate mindfulness in a role of a personal resource in coping with workplace demands and utilisation of resources available to employees at work, mindfulness is considered to be a multidimensional construct involving both attentional and attitudinal element and the FFMQ will be used to allow for a closer investigation of the individual dimensions of this phenomenon.

1.3 Theories of Mindfulness Mechanisms

Despite the fundamental questions about dimensionality of mindfulness and the function of the observing facet of the FFMQ in non-meditating samples discussed in the previous section of this thesis, some of the greatest theoretical and empirical advances in mindfulness research made in recent years were associated with the multidimensional FFMQ. One stream of research spurred on by the contradictory findings with respect to the observing facet focused on exploration of the *what* and *how* dimensions of mindful attention and their conditional effects and inspired development of several new theories to explain these effects. The distinction between the *what* and *how* of mindfulness as two fundamental skills was

first introduced by Marsha Linehan in her DBT training manual (Linehan, 1993, 2015). The *what* skills were suggested to reflect the present moment awareness and attention while the *how* skills reflected the attitudinal aspect of mindfulness, and especially its nonjudgmental nature as a specific quality of this attention. Such theoretical distinction opened up new research avenues with a possibility to investigate interactive (conditional) effects between the FFMQ dimensions representing these skills.

For example, a study with a nonmeditating student sample reported that awareness of and attention to internal and external experiences (observing facet) predicted higher rates of alcohol and tobacco use in students with low scores on the nonjudging and non-reactivity subscales of the FFMQ (respectively) but that these relationships reversed to negative as the nonjudgmental and nonreactive quality of the mindful attention increased (Eisenlohr-Moul, Walsh, Charnigo, Lynam, & Baer, 2012). Peters, Eisenlohr-Moul, Upton & Baer (2013) documented a similar interactive pattern between awareness-based and nonjudging-based mindfulness facets with respect to problems with relationships, emotion-related impulsivity, and anger rumination. And Tomfohr and colleagues observed similar interactions in a study linking mindfulness to well established predictors of physiological health in a sample of 130 healthy adults (Tomfohr et al., 2015). While the composite score of trait mindfulness was positively associated with resting blood pressure (BP) and an inflammatory marker, interleukin-6 (IL-6), a closer examination of the FFMQ facets revealed that higher acting with awareness was only associated with lower BP when nonjudging stance was also high and observing was only associated with lower IL-6 when nonreactivity was high. These studies - taking advantage of the multidimensional mindfulness measure - provided initial evidence that the

beneficial effects of present-moment awareness might depend on the extent to which it is also nonjudgmental or non-reactive at the same time.

More recently, a number of new theories has been proposed to explain and accommodate for the differential function of the observing facet under a coherent theoretical framework such as the conditional process model of mindfulness and emotional regulation (CPM; Desrosiers, Vine, Curtiss, & Klemanski, 2014; Curtis, Klemanski, Andrews, Ito, & Hofmann, 2017) or the monitor and acceptance theory (MAT; Lindsay & Creswell, 2017; 2019). Both theories proposed that observation or monitoring of the present moment experience was a core mindfulness skill, however its effect was proposed to depend on the nonreactive or accepting quality of this observation or awareness. CPM posited that an individual's ability to observe one's own emotions non-reactively fostered greater use of more adaptive cognitive emotion regulation strategies (e.g., reappraisal) and resulted in fewer symptoms while reactive observation was associated with greater use of maladaptive emotion regulation strategies (e.g., suppression) and resulted in elevated symptoms of emotional disorders such as depression and anxiety (Desrosiers et al., 2014; Curtiss et al., 2017). Empirical studies lending initial support to the CPM propositions have invariably used the observing and nonreactivity subscales of the FFMQ to examine the direct and interactive effects of these dimensions of mindfulness.

In contrast to CPM, Lindsay and Creswell (2017) considered acceptance as a broader concept measurable by both nonreactivity and nonjudgment subscale of the FFMQ and noted that certain subscales of other multidimensional mindfulness measures such as the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004) or the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) also mapped onto the acceptance skills

proposed by the MAT theory. The core tenets of MAT posit that (1) attention monitoring skills enhanced awareness of present-moment experience and improved cognitive functioning outcomes in emotionally neutral contexts but alone were insufficient for improving performance on cognitive tasks where emotion regulation was also needed as attention monitoring in itself enhanced (both positive and negative) affective experience and reactivity. And furthermore that (2) acceptance skills modified how individuals related to the present-moment experience which in turn allowed for improved regulation of the enhanced reactivity to affective experience. According to MAT, both skills are therefore needed to improve performance on cognitive tasks involving emotion regulation in order to reduce negative reactivity and to improve stress-related health outcomes (Lindsay & Creswell, 2017, p. 51).

Lindsay and Creswell (2017) reviewed a range of published studies with preliminary supporting evidence emerging from previous research in neuroscience, cognitive, clinical and health psychology. In a direct test of the MAT theory, Lau, Leung, Wing and Lee (2017) found that trait nonreactivity moderated the positive association between observing facet of FFMQ and poor sleep quality and that this was partially mediated through psychological distress. Moreover, a number of experimental studies compared effectiveness of the monitoring and acceptance component of mindfulness training on a range of outcomes. For example, Rahl et al. (2017) concluded that the acceptance component was essential in reducing mind wandering on a boring and frustrating attention skills task. Participants who received attention monitoring and acceptance training performed significantly better than participants who only received attention monitoring training or another active training control group. Similarly, Lindsay et al. (2018) reported that a brief

smartphone training intervention involving a combination of monitoring and acceptance component reduced participants' cortisol and systolic blood pressure reactivity to a laboratory stress task in comparison to control groups receiving monitor only or active coping training in their randomized control trial study. It should be noted that no study has yet tested MAT tenets in the work-related contexts and even studies investigating mindfulness at the facet level are still rather scarce in the occupational literature.

In contrast to Lindsay & Creswell's (2017; 2019) MAT theory and the CPM (Desrosiers et al., 2014) focusing on the specific function of the two main dimensions of mindfulness, other theoretical models and accounts of mindfulness mechanisms focused more specifically on wider psychological and neurobiological processes underlying its effects. For example, Gu, Strauss, Bond, & Cavanagh (2015) summarised six prominent theoretical models of mindfulness and of the specific mechanisms proposed to underlie the salutary effects of mindfulness-based interventions (Baer, 2003; Brown, Ryan, & Cresswell, 2007; Grabovac, Lau, & Willett, 2011; Hölzel, Carmody, Vangel, Congleton, Yerramsetti, Gard, & Lazar, 2011; Shapiro, Carlson, Astin, & Freedman, 2006; and Vago & Silbersweig, 2012). Their theoretical review identified a wide variety of psychological processes proposed across these six models such as greater awareness of and disengagement from repetitive negative thinking, greater autobiographical memory specificity, reperceiving (decentering), reduced negative reactivity, nonattachment, non-aversion, self-awareness, self-regulation, self-transcendence, greater emotional, cognitive and behavioural flexibility, clarification of inner values, exposure, improved attentional control and regulation, greater body awareness, enhanced mind-body and integrated functioning, emotion regulation, self-compassion,

compassion, insight, acceptance, relaxation and ethical practices. And their subsequent meta-analysis then provided supportive evidence for mindfulness, rumination and worry as significant mediators of the effects of MBIs on mental health outcomes (Gu et al, 2015).

Furthermore, a team of organisational researchers, proposed a comprehensive model of mental and neurobiological processes underlying the effects of mindfulness and mindfulness-based interventions specifically with respect to work performance and employee well-being in the workplace (Glomb, Duffy, Bono and Yang, 2011). They highlighted three core processes of (1) decoupling of self from experiences and emotions (a process also descried as decentering, or a metacognitive capacity of meta-awareness in which thoughts are viewed as passing mental events rather than facts or true reflections of reality); (2) decreased use of automatic mental processes (through which past experiences, schemas and cognitive habits constrain the present experience); and (3) greater awareness and regulation of the body's physiological response systems (e.g., approach-avoidance, fight-flight, or inhibition-activation systems). In addition to these three core processes, they also identified seven secondary processes which were argued to contribute to enhanced self-regulation of thoughts, emotions, behaviours and physiological reactions associated with mindfulness. These involved greater behavioural response flexibility following work events and interactions, decreased rumination, greater empathy, improved affective regulation, increased self-determination and persistence, enhanced working memory and improved accuracy in affective forecasting.

For comparison, Vago and Silbersweig's (2012) neurobiological model of mindfulness mechanisms suggested three key processes: self-awareness, self-

regulation, and self-transcendence (S-ART); and further six components of neurocognitive supportive mechanisms: (1) intention and motivation, (2) attention regulation (executive, volitional control), (3) emotion regulation and improved self-regulation skills, (4) extinction and reconsolidation of biases of attention and memory related to habitual distortions, (5) prosociality, and (6) non-attachment and decentering. They highlighted that many of these processes have been conceptually and functionally mapped onto specific neurobiological systems and preliminary supportive evidence has started to emerge from neuroimaging studies (Holzel et al., 2011; Vago & Silbersweig, 2012; Tang et al., 2015).

Despite a seeming simplicity of the mindfulness concept involving present-moment, non-judgmental awareness and attention to both internal and external experience, the definitions, measurement and theories of its active mechanisms are incredibly complex. There is a broad consensus among scholars that mindfulness involves multiple mechanisms which synergistically influence a number of different functional domains at the same time (i.e. cognition, emotion, behaviour and physiology; Good et al., 2016). And furthermore, with such a variety of mindfulness mechanisms and processes in play, it is likely that different mechanisms may be more prominent with respect to specific outcomes, conditions, or timeframes.

For example, Lindsay and Creswell (2017) suggested that attention monitoring skills enhanced awareness of present-moment experience and improve cognitive functioning outcomes in emotionally neutral contexts. But on cognitive tasks in contexts where emotional regulation was needed, attention monitoring skills alone would not be sufficient for improving performance. They highlighted the key role of emotion regulation skills (e.g., acceptance, nonreactivity and nonjudgment)

in mitigating initial stress appraisal and lowering stress reactivity responses in high-stress situations (Lindsay & Creswell, 2014; 2017).

In a more detailed account of these mechanisms at the neurobiological level, Vago and Silbersweig (2012) suggested that mindfulness might enhance emotion regulation in response to stressors at both conscious level of controlled cognitive strategies (such as decentering and cognitive reappraisal) as well as at a non-conscious level of automatic, viscerosomatic responses. They argued that mindfulness and MBIs "can improve automatic forms of regulation like homeostasis in the face of emotional or physical stress by protecting the internal milieu from the harmful effects of a stressor, which can be referred to as the 'raincoat effect,' and by facilitating recovery, which we refer to as the 'towel effect.' The raincoat acts as a metaphor for protection, as it protects one from getting wet; the towel acts as a metaphor for recovery, as it facilitates drying off when one already has gotten wet." (Vago & Silbersweig, 2012; p. 19). Moreover, such raincoat and towel effects could also correspond to Bolger and Zukerman's (1995) account of the role of personality in the stress process suggesting that personality characteristics may influence individual's reactivity to stressful situations as well as the effectiveness of their coping efforts and therefore affect the individual's recovery from the stressful event. This framework will be introduced in greater detail in the next chapter.

To expand on Lindsay and Creswell's (2014; 2017) and Vago and Silbersweig's (2012) line of thinking, it may be useful to summarise the vast variety of mindfulness mechanisms suggested in the literature with respect to coping with work-related stress under three broad processes involving: (1) a greater awareness of the present-moment experience, (2) a lower emotional and stress reactivity (due to the raincoat effect of mindfulness), and (3) a faster recovery to the homeostatic

and emotional baseline (the towel effect) enabled by adopting a mindful, decentred stance and more effective coping strategies. These three broad processes will guide the theorizing about the role of mindfulness in the energy erosion and motivation processes depicted by the JD-R theory of work-related stress and motivation in the following sections of this thesis.

Chapter 2: Work-Related Models of Stress and Motivation

The empirical studies in this thesis aim to examine the effect of trait mindfulness as an individual, dispositional characteristic on how employees cope with stressful situations at work to reduce their negative impact and enhance well-being. Stress has been described as "an emergent process that involves interactions between individual and environmental factors, historical and current events, allostatic states, and psychological and physiological reactivity" (Epel, Crosswell, Mayer, Prather, Slavich, Puterman et al., 2018; p. 146). Cox and Griffiths (1995) adopted such process perspective to specifically describe work-related stress in terms of five basic components: (1) antecedent factors, i.e. exposure to classical hazards as well as those inherent in the design and management of work (psychosocial hazards); (2) cognitive processes that give rise to the emotional experience of stress at work (appraisal of one's situation and their ability to cope); (3) the psychological, behavioural, and physiological correlates of the emotional experience of stress; (4) the secondary effects of stress which may involve ill-health, and poor social or organisational behaviour with implications for employee's organisation, family or wider context; and (5) feedback from the wider environment reflecting effectiveness of the coping efforts.

A number of theories of stress has been proposed across various domains of scientific literature which tend to focus on specific elements of this emergent process. However, there is no one overarching theory of work-related stress or more general which would encompass all of the five parts of the stress process. The work-related theories of stress predominantly focus on the antecedents of employees' experiences of stress which are associated with the work environments in order to provide a conceptual basis for work-related stress risk assessment and management

approach. This chapter will briefly review some of the most influential stress models before it narrows its focus on closer investigation of trait mindfulness as a personal characteristic within the JD-R framework. The aim here is not to create (or re-create) a taxonomy of all work-related stress models described in the occupational health literature or wider, this has been done by others (e.g., Cox, Griffiths, & Rial-González, 2000; Cox & Griffiths, 2010; Dewe, 2017; Le Blanc, de Jonge, & Schaufeli, 2008). The aim of this brief review is to purposefully outline the main tenets of a few selected work-related models and highlight the theoretical linkages between these particular models which are directly relevant to the theoretical argument about the influence of mindfulness as a malleable individual characteristic on employee well-being.

2.1 The Job Demands – Control Model (JDC)

The JD-R model (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), which was used as the main theoretical framework of work-related stress in this thesis, in its inception brought together and expanded on several earlier influential job stress models such as Karasek's job demands - control model (JDC; Karasek, 1979; Karasek et al., 1998), Siegrist's (1996; 2017) effort-reward imbalance model, and Hackman and Oldham's (1980; 2010) job characteristics model of work motivation. Only the JDC model will be reviewed here in greater detail because its tenets are directly reflected in the hypotheses proposed under the JD-R model. Karasek's JDC model identified two key dimensions of work environments, (1) job demands placed on employees, and (2) decision latitude in terms of discretion permitted to employees in deciding how to meet these demands (Karasek, 1979; Karasek et al., 1998). The psychological job

demands were typically operationalised as workload demands, time pressure and conflicting demands; whereas decision latitude involved two basic components: authority over decisions and skill/intellectual discretion (i.e. a possibility for employees to decide on how their knowledge at work is used and developed) (Karasek et al., 1998; Theorell, 2003).

The JDC model posited that a combination of low decision latitude and high level of psychological demands (i.e. "high strain" jobs) leads to job strain and increases risk of illness (e.g., cardiovascular disease, functional gastrointestinal disorders or musculoskeletal disorders; see Figure 1). Conversely, jobs combining high demands with high decision latitude (i.e. "active" jobs) were posited to encourage learning and personal growth (Karasek, 1979; Karasek, Baker, Marxer, Ahlbom & Theorell, 1981; Kompier, 2003; Terry & Jimmieson, 1999). These two main tenets of the JDC model are also known as the strain hypothesis and buffering or learning hypothesis and both inspired a large body of empirical work in the field of occupational health psychology.

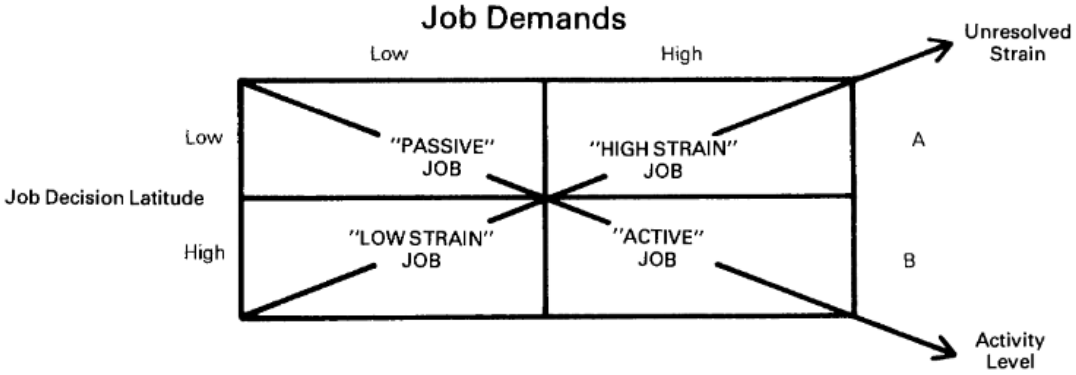

Figure 1. The job demands-control model of psychological strain (Karasek, 1979, p. 288).

Several revisions have been proposed to the original JDC model over the years. For example, Johnson and Hall (1988) suggested that lack of social support

was a third dimension that caused the highest levels of strain in combination with high demands and low control. The Demand-Induced Strain Compensation (DISC) model introduced a concept of match between the demands and different sources of support available to employees in coping with these demands (i.e. emotional, cognitive, physical; de Jonge & Dorman,2003, 2006). And more recently, Rubino and colleagues put forward the Demand-Control-Person model which explicitly integrated Karasek's JDC model with Hobfoll's (1989) conservation of resources theory suggesting that individual characteristics also determined the effect of stressors on strain (Rubino, Perry, Milam, Spitzmueller, & Zapf, 2012)

Despite the JDC model's large popularity with occupational health researchers over the years and its substantial influence on more recent theoretical developments in the field, the research evidence generated by the original strain and learning hypothesis of the JDC model is rather mixed. While good support was generally found for the main / additive effects of job demands and control on self-reported health and psychological wellbeing, the interactive (buffering) hypothesis was rarely supported in the early studies and lack of consistent evidence from longitudinal research fuelled discussions on methodological shortcomings of these studies (De Lange, Taris, Kompier, Houtman & Bongers, 2003; Häusser, Mojzisch, Niesel & Schulz-Hardt, 2010; Terry & Jimmieson, 1999; Van Der Doef & Maes, 1999). Taris (2006) even classified the buffering hypothesis of the JDC model as one of the urban myths in occupational health psychology and called for an end to research of the two-way interactive effects between job demands and control while acknowledging that there was plentiful evidence for the demands and control as major (unconditional) predictors of work stress and ill-health.

Nevertheless, the buffering hypothesis of the JDC still continues to attract considerable scientific attention. Some of the more recent directions of research involve for example: (1) closely matching operationalisations of job demands, resources and outcomes via a triple-matching principle (e.g., type of demands – resources – and strains; Daniels & de Jonge, 2010; de Jonge & Dormann, 2006; de Jonge, Dormann & Van den Tooren, 2008; van den Tooren & de Jonge, 2011); (2) investigation of a wider scope of job resources such as co-worker and supervisory support, team atmosphere, role clarity, performance feedback, etc. and multiple resources in one model (Bakker & Demerouti, 2017; Bakker, Demerouti & Euwema, 2005; Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007); (3) investigation of the role of individual differences in the buffering effects of job control such as self-efficacy (Schaubroeck & Merrit, 1997; Peng, Schaubroeck, & Xie, 2015), locus of control (Meier, Semmer, Elfering & Jacobshagen, 2008; Stiglbauer, 2017) or emotional stability (Li, Burch, & Lee, 2017); and (4) utilisation of person-centred (rather than variable-centred) methodologies such as latent profile analyses to identify the demand-control constellations and their hypothesised covariates (Igic et al., 2017; Mauno et al., 2016; Mäkikangas et al., 2018).

In terms of the specific role of individual or personal characteristics in the stress process, Karasek et al. (1998) suggested that the JDC model reflected a stimulus approach among the stress theories and that it stood in contrast to the transactional stress models. For example, Lazarus & Folkman's (1984) transactional stress model assumed that employees' cognitive appraisals or interpretations of the situation and therefore the dynamic, relational nature of the transactions between an individual and their environment, gave rise to the stress experience. In contrast to this proposition, Karasek's JDC model posited that employee's experience and

behaviour are to a large extent “generated by social environments and their constraints outside the individual” (Karasek et al., 1998; p. 327). Hence, the role of personality and individual differences was not at the forefront of the subsequent theoretical development based on the original JDC model. Karasek’s assumption about the role of personal characteristics was to some extent contradicted by the above-mentioned, more recent empirical studies reporting on the conditional (moderating) effects of personal characteristics in the JDC hypotheses.

As for the mechanisms of action proposed by the JDC model, Karasek and his colleagues assumed that the impact of demands and decision latitude as major determinants of employee health and well-being was mediated by two main pathways: (1) lifestyle factors such as smoking, dietary habits, alcohol and drug use etc.; and (2) via the direct effect of the psychosocial factors on endocrine systems and metabolism (Karasek et al., 1998; Theorell, 2003). A large body of supportive evidence for these proposed mechanisms comes mainly from large-scale population-based longitudinal and prospective studies such as Whitehall II or Framingham studies (e.g., Backé et al., 2012; Bosma et al., 1997; Bosma, Stansfeld, & Marmot, 1998; Kivimäki et al., 2006; Kivimäki et al., 2012; Kivimäki & Steptoe, 2018; Mahmood, Levy, Vasan, & Wang, 2013; Nyberg et al., 2013; Steptoe & Kivimäki, 2013).

2.2 Conservation of Resources Theory (COR)

In contrast to a narrow focus on job decision latitude in the JDC model, other theories included a broader conceptualisation of resources with Hobfoll’s conservation of resources (COR) theory fuelling some of the greatest advancements in research of stress and burnout as well as of positive work experiences such as

work engagement and employee well-being (Gorgievski, Halbesleben, & Bakker, 2011). Similarly to the JDC model, Hobfoll also contrasted his theory with Lazarus and Folkman's (1984) transactional model of stress suggesting that the COR theory was essentially the opposite of the stress-appraisal model and emphasized the objective nature of stress experience over the individual's appraisal process (Hobfoll, 1989; Hobfoll, Halbesleben, Neveu, & Westman, 2018; Holmgreen, Tirone, Gerhart, & Hobfoll, 2017).

The main tenet of the COR theory is that people naturally strive to accumulate and protect things which they value (resources) and that stress is generally experienced in the following situations: when resources are threatened, actually lost or when one fails to gain resources following a significant resource investment (Hobfoll, 1989; Hobfoll et al., 2018). According to COR theory, resources were defined as four broad classes of entities - material, personal characteristics, conditions, or energies - of intrinsic or instrumental value (Hobfoll, 1989). Resources were not considered to be individually determined but generally relevant to any given person, community or culture and Hobfoll (2001) identified 74 of such transcultural resources such as suitable housing, personal health, money, medical insurance, self-discipline and other resources.

When applied to the workplace settings, resources could be therefore viewed as inherent to the work environment or job design such as tools for work but also psychosocial characteristics of the workplace such as autonomy, social support, feedback or job security. However, resources could be also viewed as internal to the individual. For example, such individual resources may involve key skills and knowledge, or personal characteristics such as vigour, hope or self-efficacy which can energize and motivate employees' actions and therefore be instrumental in

seeking and maintaining further external resources in form of stable employment or supportive working relationships (Hobfoll et al., 2018; Holmgreen et al., 2017).

The main propositions of the COR theory also involve a number of principles and corollaries. The first principle was that resource loss was disproportionately more salient than resource gain. Hobfoll argued that this was due to a powerful evolution-based, built-in bias "to overweight resource loss and underweight resource gain" (Hobfoll et al., 2018, p. 105). The second principle stated that people must invest resources in order to prevent resource loss, recover from losses or gain resources. And finally, a "gain paradox" principle stated that in the context of resource loss (actual or possible), resource gain became even more important (increased in salience).

Furthermore, the COR's corollaries are particularly relevant to the theoretical arguments made in this thesis and their implications. These corollaries state that individuals with greater resources were less vulnerable to resource loss and more capable of resource gain, whereas those who lacked resources were more vulnerable to resource loss and less capable of resource gain. The COR theory also viewed stress as a dynamic process arguing that "stressful conditions are seldom events; rather, they are complicated sequences that occur over time" (Hobfoll et al., 2018, p. 105). Resource loss was therefore viewed as a sequence of events rather than a single occurrence and to describe such process perspective, Hobfoll introduced a concept of resource loss cycles or spirals which tend to gain in momentum as well as magnitude as resources were lost and fewer resources were left to be used in the individual's coping efforts. This corollary has been particularly influential in understanding and conceptualisation of burnout in the occupational health literature (Gorgievski & Hobfoll, 2008).

As a mirroring process, Hobfoll also proposed that as resources were gained, people became more capable of making further resource gains and therefore experienced increased health and wellbeing in a similar (but upward) cycle of resource gain spiral. Moreover, resources were argued to co-exist with other resources rather than individually (in so-called "resource caravans") and were thought to be likely to emerge from broader environments ("ecological conditions") which were resource-rich and fostered and nurtured further resource creation and sustenance. For example, self-efficacy as an internal personal resource was thought to be more likely to emerge in socially supportive environments (external resource) and therefore resources tend to be highly correlated within individuals, organisations and communities (Holmgreen et al., 2017). The COR theory has thus also influenced the theoretical understanding and conceptualisation of work engagement and of motivational processes in organisational literature (Gorgievski & Hobfoll, 2008; Gorgievski et al., 2011).

Moreover, the principles and corollaries put forward by the COR theory are frequently cited as a theoretical explanation of how job demands and job resources lead to employee burnout or work engagement in context of the empirical studies of the JD-R model. The COR theory therefore also provided an explanatory basis for the JD-R as a more work-specific theory of work-related stress and motivation. The main tenets and theoretical developments of the JD-R theory will be briefly reviewed next.

2.3 The Job Demands – Resources Theory (JD-R)

The first version of the JD-R model was initially proposed by Demerouti, Bakker, Nachreiner and Schaufeli in 2001 in an attempt to understand the

workplace antecedents of burnout. Burnout was conceptualised as high level of exhaustion, negative attitudes towards work (cynicism or depersonalisation) and reduced personal accomplishment (i.e. doubts about one's contribution and competence at work) in line with Maslach's conceptual and measurement approach to burnout (Maslach & Jackson, 1981; Maslach & Leiter, 2017; Maslach, Schaufeli, & Leiter, 2001). In a series of cluster and discriminant analyses, Demerouti and her colleagues (2001) identified a cluster of work characteristics corresponding to job demands which was the most important correlate of the exhaustion dimension of burnout, whereas a different cluster of work characteristics corresponding to job resources was correlated with cynicism (a disengagement dimension in the Oldenburg Burnout Inventory; Bakker & Demerouti, 2017; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001).

This early version of the JD-R model therefore classified a wide range of specific job characteristics under two general categories of job demands and job resources (see Figure 2; Bakker & Demerouti, 2007; Demerouti et al., 2001; Demerouti & Bakker, 2011). The JD-R model assumed that every occupation could be described in terms of a unique combination of specific demands and resources and the broad conceptualisation of demands and resources in a single, overarching framework allowed for meaningful predictions to be made regardless of the specific work characteristics involved in a particular occupation or job role. Job demands were defined as "physical, psychological, social, or organisational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore associated with certain physiological and/or psychological cost" (Bakker & Demerouti, 2007, p. 312). Job demands were not necessarily viewed as negative per se; they were only suggested to turn into job stressors in

high cost situations whereby high demands required high efforts from which employees did not sufficiently recover. Lack of recovery was therefore seen as an implicit mechanism operating in the stressor-strain relationship (Geurts & Sonnentag, 2006; Sonnentag, 2018).

On the other hand, job resources were defined as "physical, psychological, social or organisational aspects of the job that either/or (1) are functional in achieving work goals; (2) reduce job demands and the associated physiological and psychological costs; (3) stimulate personal growth, learning, and development" (Bakker & Demerouti, 2007, p. 312). Job resources were therefore proposed to reduce the impact of high job demands and employees' strain (as predicted by Karasek's job Demands-Control model), but they were also seen as valuable in their own right; and thus reflected the main principles of Hobfoll's (1989, 2002) COR theory.

The JD-R model also expanded on Hackman and Oldham's (1975, 1980) job characteristics model which identified five core job characteristics: autonomy, feedback, task significance, identity and skills variety as promoting work motivation, satisfaction and performance. While the job design characteristics in Hackman and Oldham's model were originally specified at the task level only, the COR theory suggested that job resources could be also located at organisational level (e.g., pay, job security), interpersonal level (e.g., team climate, supervisor or colleague support), work role level (e.g., role clarity or participation in decision-making processes) or intra-personal level (e.g., skills or personal characteristics). The JD-R model did not limit its scope of resources to any particular level and their definition was mainly based on their function in relation to work achievement and personal growth.

In empirical studies testing the main propositions of the JD-R model, job demands were often operationalised as high workload, time pressure or emotionally demanding social interactions. Schaufeli and Taris's (2014) critical review of the JD-R model identified 30 different job demands examined across 16 empirical studies. Whereas job resources studied within the framework of the JD-R model were often operationalised as autonomy, performance feedback, social support from colleagues and supervisors and opportunities to learn and develop. Schaufeli and Taris's (2014) review listed 33 different job resources investigated within the JD-R framework to date. The wide definitions of job demands and resources allowed for a substantial flexibility of the model, which could accommodate many different demands and resources in various occupational contexts. However, Schaufeli and Taris (2014) also argued that this came at a cost of limited generalizability of the empirical findings from the JD-R research citing an example of a study which identified an interactive effect between time pressure and control on work engagement nevertheless such finding could not be generalised across the full range of demands and resources investigated in the model.

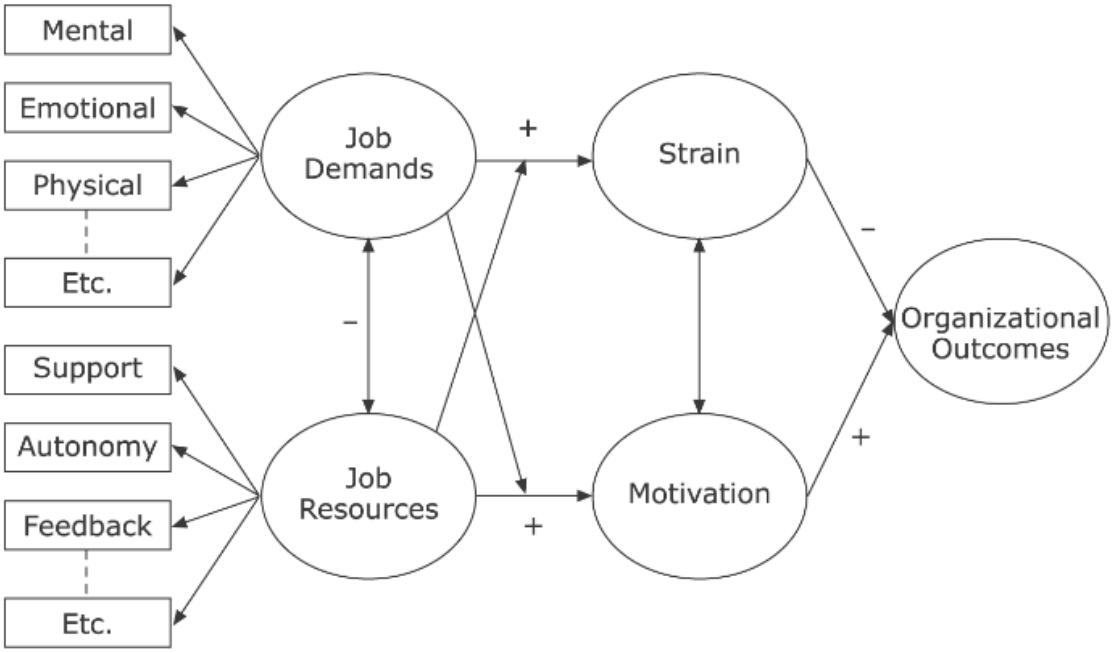

Figure 2. The job demands-resources model (Bakker & Demerouti, 2007, p. 313).

The core of the JD-R theory lies in two distinct processes linking the job design and situational characteristics – i.e. job demands and resources - with specific types of outcomes (see Figure 2; Bakker & Demerouti, 2007; 2017; Bakker, Demerouti, & Sanz-Vergel, 2014; Demerouti et al., 2001; Schaufeli & Taris, 2014). The first process represents a stress process which has been also called an energy-erosion or health-impairment process. This process is initiated when employees expend sustained physical and/or psychological effort to cope with high job demands such as time pressure or emotionally demanding work. Over time, such sustained activation and long-term overtaxing may gradually erode employees' mental and physical resources leading to a state of exhaustion (reflecting the energetic component of burnout) and ultimately result in depression, psychosomatic health complaints and cardiovascular disease as well as negative organisational outcomes such as sickness absence and poor performance. Burnout was therefore

seen as a mediator between job demands and individual and organisational outcomes.

The second psychological process proposed by the JD-R model can be linked to motivation theories. Initially, Demerouti et al. (2001) argued that lack of resources further complicated coping with the high job demands and this was thought to lead to withdrawal behaviour and disengagement from work (suggesting a negative association between job resources and burnout). However, in a revision of this initial model, Schaufeli and Bakker (2004) recognised that there was also a positive, motivational side to this process whereby availability of job resources such as autonomy, social support or performance feedback increased employee motivation and resulted in high work engagement, low levels of cynicism and high performance. This was explained by the instrumental nature of job resources in achieving work goals but also by their intrinsic motivational nature as they were argued to satisfy the basic human needs for autonomy, relatedness and competence (Ryan & Deci, 2000). The broad framework of the JD-R model therefore integrated two, fairly independent theoretical and research traditions: one of work-related stress and another focusing on work characteristics promoting motivation (Demerouti & Bakker, 2011).

Burnout and work engagement are considered two key or central concepts in the JD-R model and thus a brief definition of both concepts will be provided here before this chapter continues to outline some of the more recent developments of the JD-R model. Burnout and work engagement often feature as outcome variables in many empirical studies of the JD-R model, however their main conceptual and practical importance is due to their association with individual health and well-

being and organisational performance outcomes (Bakker et al., 2014; Maslach & Leiter, 2017).

Maslach initially used the term “burnout” to describe psychological difficulties of workers in healthcare and social service jobs, but later conceptualisations acknowledged that the psychological experience of burnout could be experienced in any occupation (Maslach & Leiter, 2017). According to Maslach’s conceptualisation, burnout can be characterised by its three dimensions: feelings of energy depletion or exhaustion; feelings of cynicism related to one’s job; and reduced professional efficacy. In recognition of the pervasive nature of the phenomenon, the World Health Organisation’s diagnostic handbook, the International Classification of Diseases (ICD-11), officially classified burnout as “a syndrome resulting from chronic workplace stress that has not been successfully managed.” (World Health Organisation, 2018).

A number of conceptualisations and measures of burnout have been proposed in the literature with Maslach’s Burnout Inventory (MBI; Maslach & Jackson, 1981) and the Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) among the most frequently used in the JD-R research. Maslach and Jackson (1981) defined burnout as a three-dimensional construct involving emotional exhaustion (loss of energy, depletion, and fatigue), cynicism and reduced personal effectiveness. While Shirom defined burnout as “physical fatigue (feelings of tiredness and low energy), emotional exhaustion (lack of energy to display empathy to others), and cognitive weariness (feelings of reduced mental agility)” (Shirom, 2010, p. 63). Shirom’s conceptualisation of burnout is based on Hobfoll’s COR theory and places burnout at the centre of a rapidly increasing loss cycle where ineffective coping efforts lead to progressive deterioration of individual

resources (i.e., physical, emotional and cognitive energy). As has been already noted above burnout can ultimately result in ill mental and physical health and the research evidence for the link between the energy erosion process (or burnout) and ill health is substantial (for reviews see Ahola & Hakanen, 2014; Mäkikangas & Kinnunen, 2015; Maslach & Leiter, 2017; Melamed, Shirom, Toker, Berliner & Shapira, 2006; Shirom, 2010).

In contrast to burnout, work engagement was first conceptualised by Kahn (1990) as manifestation of one's physical, cognitive and emotional presence at work. Maslach and Leiter (2008; 2017) viewed engagement as a positive anti-thesis of burnout, as a state of well-being characterised by high energy, involvement and efficacy (and therefore an opposite end of a burnout – engagement continuum). On the other hand, Schaufeli and colleagues conceptualised work engagement as a positive, fulfilling, work-related state characterised by vigour, dedication and absorption which was seen as related to but different from burnout (Bakker & Leiter, 2010; Schaufeli, Salanova, González-Romá & Bakker, 2002; Schaufeli & Bakker, 2010). Hence the energy erosion and motivation paths of the JD-R model were considered as independent of each other. This view has been also supported by studies using latent profile analyses and other person-centred methodologies reporting co-occurrence of high engagement and high burnout within individuals (e.g., Moeller et al. (2018) reported such co-occurrence for 18.8% of a representative sample of U.S. employees).

Employee work engagement has been linked to a variety of individual and organisational outcomes such as employees' job performance (Christian, Garza, & Slaughter, 2011; Halbesleben & Wheeler, 2008); team performance (Costa, Passos, & Bakker, 2015), better financial results (Xanthopoulou et al., 2009) or individual

health and turnover intentions (Halbesleben, 2010). In terms of organisational outcomes, employee work engagement has been associated for example with customer loyalty and satisfaction (Salanova, Agut, Peiró, 2005; for meta-analyses and reviews see Bakker et al., 2014; Demerouti & Cropanzano, 2010; Halbesleben, 2010; Harter, Schmidt, & Hayes, 2002; Stairs & Galpin, 2010).

There is also a large body of more specific evidence for the two main paths of the JD-R model i.e. the energy erosion / health impairment process and motivation process, generated by studies testing the JD-R propositions. For example, Alarcon (2011) reported supportive meta-analytic evidence based on 231 study samples with respect to the health impairment process while Halbesleben (2010) and Christian, Garza and Slaughter (2011) reported on meta-analyses with respect to the motivation process. Crawford, Le Pine and Rich (2010) conducted meta-analytic path analysis providing support for both processes simultaneously; and Nahrgang, Morgeson and Hofmann (2011) reported meta-analytic evidence with respect to both processes and a variety of safety outcomes. Most recently, Lesener, Gusy and Wolter (2018) conducted meta-analytic structural equation modelling based on 74 longitudinal studies finding evidence for both processes as well as reciprocal relationships between job characteristics and employee well-being over time.

In addition to the main effects of job demands and resources on the respective outcomes in the energy erosion and motivation processes of the JD-R model, Bakker and Demerouti (2007) also outlined interactive effects between job demands and job resources such that the job resources were proposed to buffer the impact of high job demands on strain (and thus echoing the buffering hypothesis of Karasek's JDC model). Furthermore, job resources were argued to gain a particular

importance for work engagement when the job demands were also high (and thus reflecting the active jobs hypothesis of the JDC model as well as the propositions of the COR theory; Bakker & Demerouti, 2006; 2017; Schaufeli & Bakker, 2004). See Figure 2 for an illustration of the main and interactive effects proposed in the early stages of the JD-R development. As has been already mentioned above, the interaction hypotheses including a wider range of job resources under the JD-R model managed to find better empirical support in comparison to the JDC's original buffering hypothesis which only involved workload demands and decision latitude (Bakker, Demerouti & Euwema, 2005; Bakker, Hakanen, Demerouti & Xanthopoulou, 2007; Bakker, van Veldhoven, Xanthopoulou, 2010).

In addition, a consistent line of research evidence has emerged for a conditional effect of individual differences with respect to the buffering role of control in the work-related stress research which is also relevant to the JD-R propositions. In the first studies to report such conditional effects, Schaubroeck and colleagues found that high self-efficacy acted as a condition of the buffering effect of job control on the relationship between perceptions of job demands and systolic blood pressure (Schaubroeck & Merritt, 1997) and upper respiratory illnesses (Schaubroeck, Jones, & Xie, 2001). More specific computer self-efficacy was found to moderate the buffering effect of control on the relationship between work overload and burnout dimensions of exhaustion and cynicism among IT workers (Salanova, Peiro, & Schaufeli, 2002). And similar conditional effects were found for other personal characteristics such as proactive personality (Parker & Sprigg, 1999), optimism (Totterdell, Wood, & Wall, 2006), locus of control (Meier, Semmer, Elfering, & Jacobshagen, 2008; Stiglbauer, 2017), hardiness (Hystad, Eid,

& Brevik, 2011), or emotional stability (Rubino, Perry, Milam, Spitzmueller, & Zapf, 2012; Li, Burch, & Lee, 2017).

To accommodate for this interplay between personal and environmental (job) characteristics, the most recent version of the JD-R framework, the 'expanded JD-R theory', included the concept of personal resources (see Figure 3; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007; Bakker & Demerouti, 2017). Personal resources were initially defined as "aspects of the self that are generally linked to resiliency" in context of Hobfoll's COR theory (Hobfoll, Johnson, Ennis, & Jackson, 2003, p. 632). Building on this early outline, van den Heuvel, Demerouti, Bakker and Schaufeli (2010, p. 129) proposed a more specific working definition of personal resources within the JD-R model as "lower-order, cognitive-affective aspects of personality; developable systems of positive beliefs about one's "self" (e.g., self-esteem, self-efficacy, mastery) and the world (e.g., optimism, faith) which motivate and facilitate goal-achievement, even in the face of adversity and challenge."

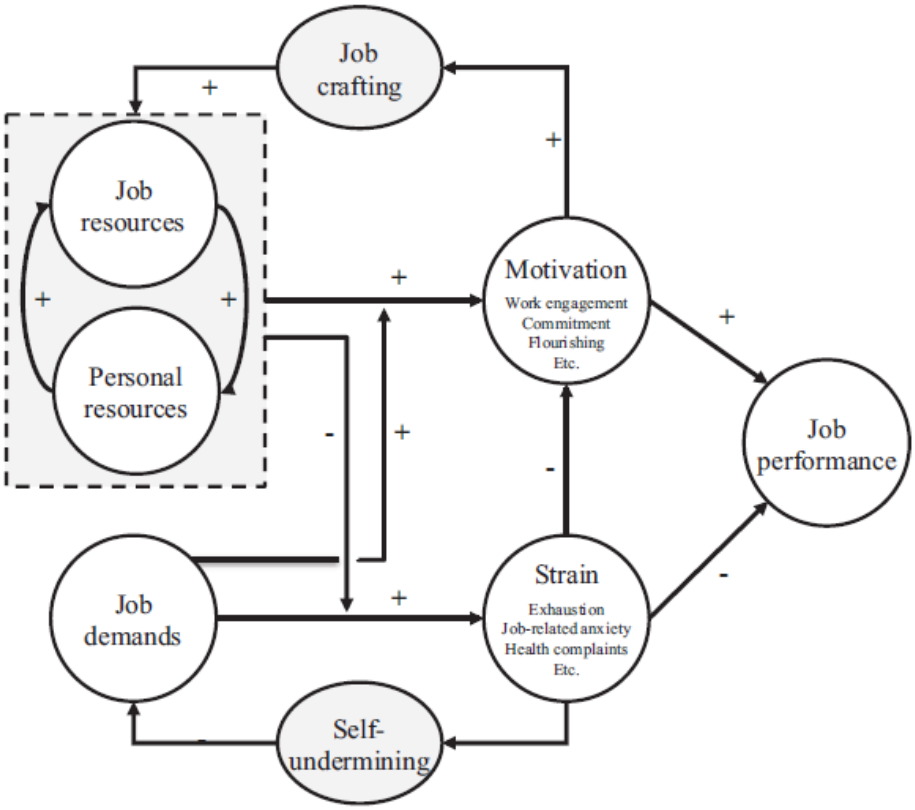

Figure 3. The expanded job demands-resources model (Bakker & Demerouti, 2017; p. 275).

Van den Heuvel and colleagues (2010) listed a number of individual characteristics which have already been studied with respect to work-related outcomes such performance, job satisfaction, commitment and work engagement and could be therefore considered as personal resources in the JD-R model. These included individual components of the Psychological Capital construct (PsyCap; i.e. self-efficacy, hope, optimism and resilience; Luthans, Youssef, & Avolio, 2007) as well as meaning-making (Baumeister & Vohs, 2003) or self-regulatory focus (Brockner & Higgins, 2001). Schafeli and Taris's (2014) noted that the PsyCap components were indeed the most frequently examined personal resources in the JD-R model among other personal characteristics such as extraversion, intrinsic motivation or value orientation. Moreover, with rising popularity of mindfulness,

Kroon, Menting and van Woerkom (2015) provided an initial theoretical outline for conceptualisation of mindfulness as a personal resource in the expanded JD-R framework using the COR theory before the first empirical study of mindfulness as a personal resource in the JD-R model was published (Grover, Teo, Pick, & Roche, 2016).

Yet, according to Schaufeli and Taris's (2014) review, the specific role of personal resources in the JD-R model remains unclear. So far, personal resources have been hypothesised to have a direct, positive effect on work engagement (e.g., PsyCap; Alessandri, Consiglio, Luthans, & Borgogni, 2018), to act as moderators of the relationships between job characteristics and well-being (buffering the negative impact of job demands on strain and boosting the positive impact of job resources on motivation and performance (e.g., self-efficacy and optimism; Xanthopoulou, Bakker, & Fishbach, 2013)), to act as mediators between job characteristics and well-being (e.g., self-efficacy, organisational-based self-esteem, and optimism; Xanthopoulou et al., 2007), and act as third variables (influencing both perceptions of job characteristics and employee well-being (for reviews see Schaufeli and Taris, 2014; Schaufeli, 2017).

Notably, Schaufeli and Taris (2014) highlighted an open, heuristic and descriptive (rather than explanatory) nature of the JD-R theory. As an advantage, this allows for a wide variety of demands and resources (both job and personal) to be meaningfully anchored and examined within one overarching framework of employee well-being and motivation without a-priori prescribing which role should a particular personal resource in question take (i.e. direct predictor, mediator, moderator or a 3rd variable). Moreover, due to this flexibility of the JD-R framework, there are no constraints or limitations placed on the scope of the

underlying psychological processes that may be involved to explain the specific effect of each personal resource investigated in the model. Nevertheless, this also means that each personal resource investigated within the JD-R model must bring its own explanatory theoretical framework to justify its specific role and to clarify the psychological mechanisms involved in its effects.

To summarise, the JD-R model is firmly rooted in previous theories of work-related stress and motivation outlined above which view stress as an objectively identifiable experience in theoretical opposition to subjective appraisal models. The main advantage of the JD-R theory over its theoretical roots is in its integration of both positive and negative processes at work (motivation and stress process) and in the wide scope of potential job demands, resources and personal characteristics which can be meaningfully placed and examined within one overarching framework. From a practical perspective, the objective nature and wide scope of demands and resources provided a useful basis for a stress risk assessment approach adopted by Health and Safety regulators and governmental agencies in the UK, Europe and other countries (Bakker & Demerouti, 2017). However, when it comes to the role of personality and individual characteristics in the energy erosion and motivation processes of the JD-R model, the specific role and psychological mechanisms remain to be defined and justified with each personal characteristic examined.

2.4 Alternative Models of Personality in the Stress and Motivation Processes

The latest revision of the JD-R framework included the concept of personal resources in acknowledgement of the role that stable individual differences as well as more transient emotional/cognitive aspects of individual nature may play in the

motivation and energy erosion processes in the workplace (Bakker & Demerouti, 2017; see Figure 3). More specifically, Bakker and Demerouti (2017) argued that personal resources can play a similar role to job resources. Personal resources were proposed to directly influence work engagement, buffer the undesirable effect of job demands on strain and boost the positive effect of challenge demands on motivation. Yet, the JD-R theory only acknowledged the role of personality for as long as it could be conceptualised as a resource and fell short of acknowledging that negative emotional traits (such as neuroticism) or concepts which would not fit the initial definition of personal resources as positive control beliefs could also affect the energy erosion and motivation processes. Concepts such as mindfulness, self-compassion or psychological flexibility which have recently gained scientific attention thanks to the rising popularity of mindfulness-based interventions would not fit the positive control belief criterium.

In contrast to this rather narrow definition of personal resources in the JD-R theory based in positive psychology, Bolger and Zuckerman (1995) proposed a more comprehensive framework for studying personality in the stress process which was later modified to include both positive emotions and motivational processes as well as the negative ones (Mäkikangas, Feldt, Kinnunen, & Mauno, 2013; Zautra, Affleck, Tennen, Reich, & Davis, 2005). Bolger and Zuckerman's (1995) framework was originally proposed as a general, rather than work-specific, model and suggested two basic mechanisms of exposure and reactivity to explain how a personality trait of neuroticism affected health and psychological outcomes in the stressor-strain relationship.

Bolger and Zuckerman (1995, p. 890) hypothesised that personality would affect a person's *exposure* to stressful events, i.e. "the extent to which a person is

likely to experience a stressful event," influence their *reactivity* (i.e. their emotional and physical reactions) to the stressful event or a combination of both (i.e. one's personality could influence the likelihood of their exposure to a stressful event as well as their reactivity). These three options were called a differential exposure model, differential reactivity model, and a differential exposure-reactivity model respectively. A series of statistical tests on a 14-day diary dataset revealed that participants with high trait neuroticism reported greater exposure to daily interpersonal conflicts as well as being more reactive to these conflicts than participants low in neuroticism. A further test comparing the effect sizes of these effects revealed that participants' reactivity to these conflicts was more detrimental to the negative affect than exposure. In addition, participants' neuroticism also influenced the choice of their coping strategies and their effectiveness.

Drawing on Bolger and Zuckerman's original framework, Mäkikangas and colleagues (2013) adapted the models to fit with the work characteristics paradigm including both job demands (as negative characteristics) and job resources (as motivational work characteristics). They specifically extended the term exposure to reflect the extent to which a person is likely to experience a given work characteristic either negatively (demands) or positively (resources) and reactivity was also extended to include emotional or physical reactions to both types of work characteristics. Based on these fundamental mechanisms of exposure and reactivity, Mäkikangas et al. (2013) proposed eight different models to describe the role of personality in the relationship between work characteristics and well-being (work engagement in their review); see Figure 4.

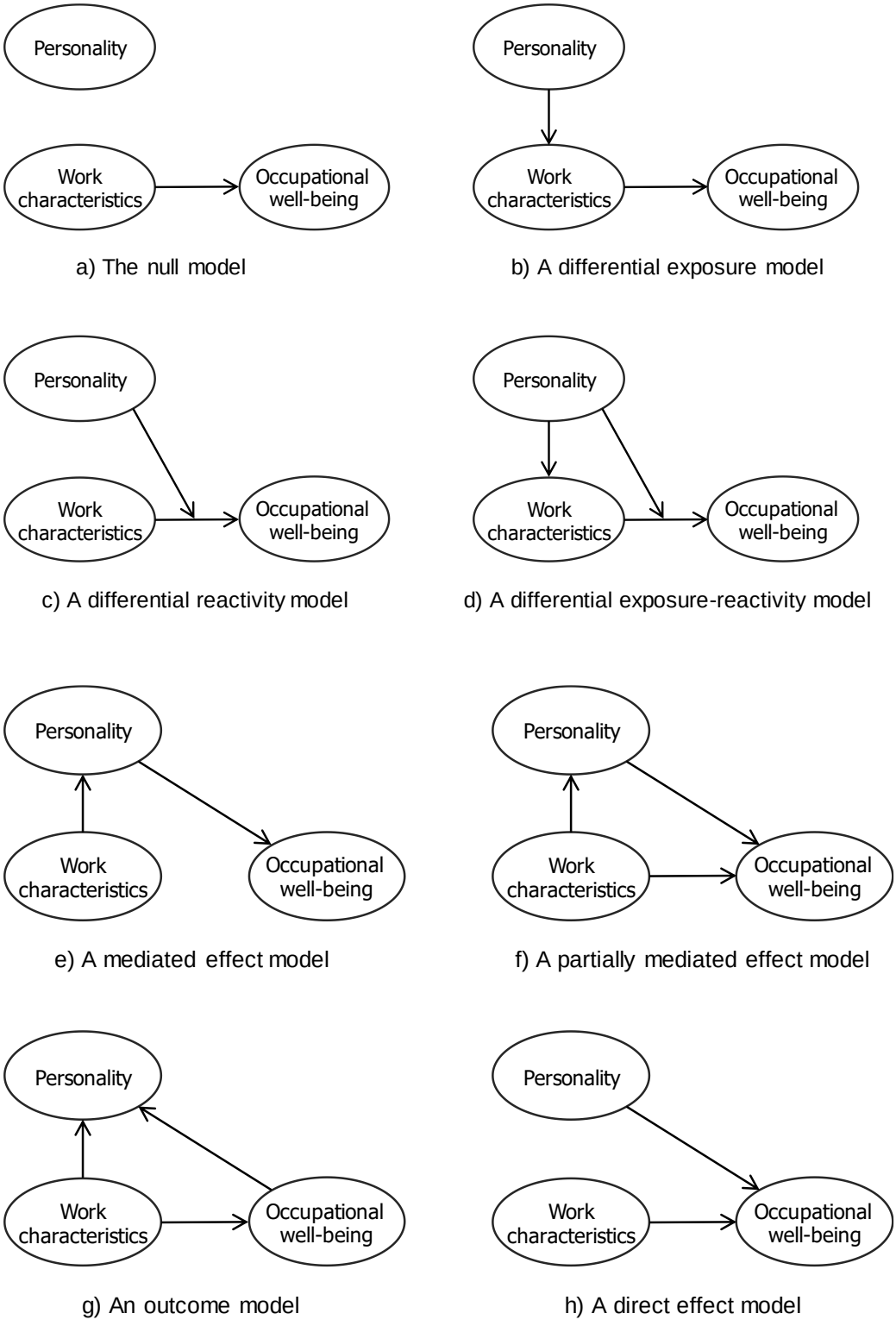

Figure 4. The theoretical links between personality, work characteristics and occupational well-being (Mäkikangas, Feldt, Kinnunen, & Mauno, 2013).

Models a) to d) reflect the original Bolger & Zuckerman's (1995) propositions. The null model assumes no influence of the personality characteristics on the relationship between work characteristics and work-related well-being. The differential exposure model (model b) assumes that work characteristics mediate between personality and well-being, whereas the differential reactivity model (model c) assumes that personality influences employee well-being by moderating the effects of work characteristics on well-being. The JD-R propositions about the buffering and boosting effect of personal resources on the work-related outcomes (Bakker & Demerouti, 2017) would be in line with the differential reactivity model (c). Model d) then reflects the differential exposure-reactivity hypothesis combining both moderating and mediating effects.

In addition, Mäkikangas et al. (2013) proposed further four models reflecting the influence of work characteristics on employee personality (models e to g). Models e and f assume that personality mediates the relationship between work characteristics and work-related well-being, i.e. work characteristics influence employee personality which in turn affects employee well-being. And finally, model h suggested that personality would be a direct predictor of work-related well-being without exerting any influence on the work characteristics or on the relationship between work-characteristics and their outcomes.

Mäkikangas et al. (2013) subsequently conducted a systematic review of studies that examined the association between personality and work engagement published between 1967 and 2011. Their systematic literature search included conceptual keywords such as personality, individual differences and personal resources as well as specific personality characteristics such as self-efficacy, locus of control, neuroticism/ emotional stability, optimism, hope, resiliency etc. Self-

efficacy was the most popular dispositional trait investigated with respect to work engagement. In the 28 studies identified in their review, 64% of the results supported the direct effect model (h), 15% of the findings supported the mediated effect models (e and f), 9% supported the differential reactivity model (c), and 7.5% supported the outcome model (g). Mäkikangas et al.'s (2013) concluded that mechanisms proposed to explain the role of personality in the stress process can be therefore also used for modelling of the work motivation processes. Empirical studies in this thesis will draw on these templates to examine the role of mindfulness in the energy erosion and motivation process of the JD-R framework.

To briefly summarize the workplace mindfulness research from the perspective of the above models for the role of personality in the relationship between work characteristics and work-related outcomes, a number of relatively recent studies can be mentioned here. However, this area of research is still relatively new in the field of occupational health psychology and so far only a handful of studies explored mindfulness in relation to both work characteristics and employee well-being or work-related outcomes. For example, day to day fluctuations in state mindfulness as a personal characteristic have been reported to partially mediate the relationship between daily work demands and job control and daily workplace learning (Lawrie, Tuckey, & Dollard, 2017). While Hülsheger, Walkowiak and Thommes (2018) reported that daily sleep quality and daily workload were associated with daily fluctuations in mindfulness which was in turn associated with subsequent psychological detachment and sleep quality. Although these studies did not directly examine occupational well-being as an outcome of the workplace characteristics, their findings could be considered as lending an

indicative support for a mediating effect of mindfulness in the mediated effect models (e and f) proposed by Mäkikangas et al. (2013).

Furthermore, two cross-sectional studies investigated a moderating role of trait mindfulness (MAAS) as a personal resource in the health impairment process of the JD-R model with mindfulness buffering the relationship between emotional demands and psychological stress in a sample of Australian nurses (Grover, Teo, Pick, & Roche, 2016) and between workload demands and mental and physical symptoms of strain in US police officers (Fisher, Kerr, & Cunningham, 2019). These two studies therefore provided initial empirical support for the buffering effect of mindfulness (in line with the differential reactivity model) outlined by both Bolger & Zuckerman (1995) and Mäkikangas et al.'s (2013). The boosting effect of mindfulness on the relationship between job resources or active jobs and positive work-related outcomes is still to be examined. And finally, several studies have reported on direct effect of daily variations in state mindfulness on state outcomes such as work engagement (Tuckey, Sonnentag, & Bryan, 2018), daily emotional exhaustion and daily job satisfaction (Hülsheger, Alberts, Feinholdt, & Lang, 2013), and negative affect before bedtime (Haun, Nübold, & Bauer, 2018) while controlling for the effects of workplace characteristics (this corresponds to the direct effects model h).

To summarise, this chapter provided a selective overview of work-related models of stress and motivation which serve as a basis for the research questions and hypotheses explored in the empirical chapters of this thesis. Three closely related models have been reviewed here – Karasek's JDC model, Hobfoll's COR theory and the JD-R model – with an aim to provide a brief summary of the main propositions of these models and with a particular attention paid to the role of

personality or personal characteristics within these models. An additional theoretical framework was introduced here to provide basis for a more systematic approach to modelling of the more specific role of personal characteristics in the stress and motivation processes. Before moving on to present the three empirical studies in this thesis, the next chapter will introduce an increasingly popular methodology used in the studies exploring the JD-R propositions with respect to within-person fluctuations in job burnout and work engagement, the daily/weekly diary methodology.

Chapter 3: Daily Diary Methodology – Disentangling Acute and Chronic Effects

The empirical studies in this thesis adopt a dynamic, multilevel perspective on mindfulness and the energy erosion and motivation processes of the JD-R model and in doing so build on two relatively recent methodological and theoretical developments in work and occupational health psychology. The first development pertains to an increasingly popular daily / weekly diary methodology in stress and motivation research and application of multilevel modelling techniques to accommodate for the specific nature of the daily diary data. Diary methodology yields quantitative, repeated measurement data within a pre-specified timeframe which allows for capturing of the within-person processes as they unfold over time, i.e. everyday lived experiences rather than summative judgements of employees' experience over time which is traditionally captured in cross-sectional designs.

The second, relatively recent development in the field of occupational health psychology is associated with calls for a greater theoretical extrapolation of knowledge gained through the diary methods. The theoretical models of work-related stress and motivation reviewed in the previous chapter were developed mainly with respect to between-person processes and individual differences rather than intra-personal processes. With greater analytical sophistication enabled by the multilevel modelling, researchers can now apply and examine these traditional models of stress and motivation at both levels of analysis, yet a multilevel theory of employee well-being and motivation was largely missing until Ilies, Aw and Pluut (2015) outlined a more comprehensive, multilevel theoretical framework. Both developments will be briefly introduced here.

3.1 Daily Diary Methods

When first introduced in the 1990s, the daily/weekly diary methodology and multilevel analyses provided an alternative perspective to cross-sectional and longitudinal study designs. They opened up a new perspective on employee well-being allowing researchers to investigate employee experience as a series of dynamic states which fluctuate within person over time in response to specific work events (Sonnentag, Dormann, & Demerouti, 2010; Ohly, Sonnentag, Niessen, & Zapf, 2010). Bolger, Davis and Rafaeli (2003) suggested that diary methods could be used to answer three different types of research questions.

The first type of question is similar to research questions typically asked in cross-sectional studies: (1) What is the typical person like, and how much do people differ from each other? Such questions reflect the person-level information (a so-called between-person variance component of daily diary data). In work-related stress research using the daily diary methodology, such person-level questions could be phrased as does a typical person experience burnout when presented with high-demand, low-control working conditions over five days? And do individual differences such as employees' level of neuroticism predict how individuals differ from each other with respect to their burnout levels over the five days?

The second type of questions then focuses on modelling of the within-person processes: (2) What is the within-person process for the typical person, and how do people differ in these processes? In the work-related stress research scenario, this question could be phrased with respect to the within-person fluctuations and experience: On days when people face higher-demands and lower-control (in relation to their average five-day levels) do they also experience higher burnout than usual? And, again, do individual differences affect this within-person reactivity? For

example, do employees higher in neuroticism experience higher burnout (i.e. states or episodes of higher emotional exhaustion, cognitive weariness and physical tiredness) than employees lower in neuroticism on days or in situations when they are faced with higher demands?

And finally, the third type of research questions could also focus on modelling of the time-course: (3) How does a typical person change over time? And do people differ in the rate of change over time? The data analysis in response to these questions typically involves modelling of the growth curves in the investigated phenomena and their person-based or environmental covariates. The empirical studies in this thesis specifically focused on exploration of the first two types of research questions and used multilevel modelling analyses for this purpose.

The daily diary studies thus adopt a micro-perspective based on collecting repeated daily measurements. The 'first generation' of daily diary studies conducted in research of the energy erosion and motivation processes of the JD-R model revealed that a substantial proportion of variance in what were traditionally considered relatively stable and enduring individual characteristics developing over longer time-frames (such as job burnout and work engagement) could be attributed to within-person, day-specific fluctuations. For example, Xanthopoulou and Bakker (2013) noted that on average 42% of variance in work engagement could be attributed to within-person (intra-individual) fluctuations (ranging between 28% and 72% across 7 published studies). A similar proportion of within-person variance was reported for symptoms of burnout such as work-related exhaustion or fatigue (ranging between 38% and 79% across five studies; Xanhopoulou & Meier, 2014). While intra-individual (acute) and inter-individual (more enduring or chronic) effects are typically confounded in cross-sectional studies, the daily diary studies of

the ‘first generation’ typically focused only on the intra-individual or within-person processes, exploring the within-person associations of more proximal, situational and personal characteristics with the proximal, state outcomes.

However, such within-person focus allowed for a large proportion of variance in the outcomes associated with the inter-individual differences (at the between-person level) to go unexplained in these studies. In terms of Bolger et al.’s (2003) question types mentioned above, the first generation of daily diary studies focused on researching mainly type 2 questions. This was noted by numerous scholars and many have pointed to the value of a more integrated approach combining both intra- and inter-individual perspective (i.e., looking at both type 1 and 2 questions; Chen, Bliese, & Mathieu, 2005; Binnewies & Sonnentag, 2013; Xanthopoulou & Meier, 2014; Sonnentag, 2015; Ilies, Aw, & Pluut, 2015; Pindek, Arvan, & Spector, 2019).

For example, one of the pioneering studies of the ‘second generation’ daily diary studies conducted by Hülsheger and her colleagues investigated the role of both trait and state mindfulness for psychological detachment from work during non-work time and sleep quality over five days (Hülsheger, Lang, Depenbrock, Ferhmann, Zijlstra, & Alberts, 2014). They reported a large bivariate correlation (.61) between a trait measure of mindfulness (MAAS) taken at the beginning of the study and the mean of state mindfulness (aggregated for each participant over the five days), illustrating that indeed employees scoring high on a trait mindfulness measure experienced more mindful states with greater frequency on average over the five days. Moreover, they also found that employees’ mean level of mindfulness during work (as an individual difference, a more stable between-person variable) over the five days was more strongly associated with the outcomes and therefore

explained whether they were able to detach from work and sleep well on each day as opposed to their daily deviations from the five-day mean (as a within-person variable). In other words, it was more important whether an individual was more mindful in general in comparison to others over the five days (rather than whether they were more mindful than usual on the specific day) to be able to detach from work and get a good nights' sleep.

Similarly, Syrek, Weigelt, Peifer and Antoni (2017) investigated both within- and between-person effects of how unfinished tasks at the end of the week impaired employee sleep at the weekend in a 12-week study. They reported that employees indeed experienced sleep problems on weeks with higher levels of unfinished tasks and this was mediated by higher levels of affective rumination. However, beyond these acute effects, they also found that a higher level of unfinished tasks over the 3-months study period predicted sleep problems even after controlling for the acute stressors. From the methodological perspective, had the researchers removed the between-person variance (by disregarding the person means generated by the person-mean centring of the study variables), as was typically done by the first generation of the daily diary and experience- or event-sampling studies, many theoretically and statistically significant relationships would have been missed.

3.2 A Multilevel Model of Employee Well-Being

Apart from the statistical argument to combine both intra- and inter-individual perspective in the quantitative diary research, there are also important theoretical implications in applying the multilevel perspective to explore both within- and between-person effects in the daily diary studies. In a recent meta-

analysis of stressor-strain relationships in daily diary studies, Pindek, Arvan and Spector (2019) argued that the within- and between-person components of variables (assessed through the repeated measurements in daily diary and experience sampling studies) have different theoretical meanings. The within-person variance component reflects purely episodic effects such as acute strain responses on days when people experience more stressful events than usual. To control for the effects of individual differences, these need to be re-introduced as group-mean centred between-person variables. As such, the episodic events may occur occasionally but do not necessarily represent enduring aspects of one's job.

In contrast to these acute or episodic effects, the between-person variance component reflects more stable conditions that are endemic to the work environments or individual differences between people. These between-person variables are fundamentally different from the summary judgements of one's (more stable) job characteristics in cross-sectional studies. These between-person diary variables are calculated as latent variables by aggregating the episodic ratings of participants' daily or momentary experiences. These latent variables may be therefore more accurate reflections of the more long-term, more stable characteristics than the individual's summary judgements.

More importantly, Pindek et al. (2019) argued that many influential occupational stress theories (such as JDC or JD-R) have been applied and empirically examined at both levels of analysis (within- or between-person level) interchangeably without being able to meaningfully anchor their hypotheses within a multilevel conceptual framework because an overarching theory has been lacking. It can be argued that in this instance, theory development in work and occupational health psychology is closely linked to – or one could even say 'driven' by – the

methodological advancements in the daily diary methodology and multilevel modelling analyses discussed above.

Specifically, Ilies, Aw, and Pluut (2015) were among the first to call for development of a more comprehensive theoretical framework which could meaningfully integrate and explain the two complementary perspectives of between- and within-person studies in employee well-being research and pushed the theoretical boundaries by questioning the practical value of findings from within-person studies. Specifically, they pointed to the fact that the intra-individual variation happened around the same characteristic average levels. Although such theory-building is still needed, a number of scholars have argued that the Allostatic Load (AL) model (McEwen, 1998; Juster, McEwen, & Lupien, 2010), which adopts a dynamic perspective to understand the physiology and neurobiology of stress and adaptation processes, has already proven a useful organising framework in literature reviews aiming to bridge the gap between physiological and psychosocial stress models (Ganster & Rosen, 2013; Ilies, Aw, & Pluut, 2015; Ilies, Aw, & Lim, 2016). And hence the AL model could serve as a useful starting point for such theory-building work.

The concept of allostasis refers to a dynamic process of adaptive adjustment of multiple physiological systems (involving the autonomic nervous system, the hypothalamo-pituitary-adrenal axis, cardiovascular, metabolic and immune systems) in response to environmental challenges (McEwen, 1998, 2007, 2018; Juster et al., 2010). Allostatic load then represents the psychological and physiological strain, the "wear and tear" on the body and brain, due to chronic activation or dysregulation of these systems which - while adaptive in the short term - can cause damage and promote pathology in the long-term. Notably, the AL model proposes a temporal

cascade of multisystemic physiological adjustments which unfolds in a non-linear fashion (Juster et al., 2010).

In an initial phase, an acute stressor (real or anticipated) triggers a physiological stress response involving primary mediators (such as release of stress hormones – adrenalin and cortisol - and cardiovascular activation). These acute, short-term effects are transient and highly variable in response to daily stressors. Ilies et al. (2016) argued that such within-person associations among daily stressors, mood states and physiological stress response indicators (such as salivary cortisol, heart rate, or blood pressure) can be examined as the within-person effects in studies using daily diary and ecological momentary assessment (EMA) methodologies and reviewed such evidence from 31 work-related stress studies. They argued that these within-person studies can shed light on the *micro-level causal mechanisms* by which work stressors (or work characteristics) influence well-being.

Moreover, parallels can be drawn between this micro-level perspective on causal mechanisms of work-related well-being and an innovative approach to advance complex explanatory conceptualisations of coping action patterns that trigger and maintain daily negative and (low) positive affect in individuals with high levels of self-critical perfectionism (Dunkley, Ma, Lee, Preacher, & Zuroff, 2014; Dunkley, Lewkowski, Lee, Preacher, Zuroff, Berg, & Foley, 2016). In a series of daily diary studies, Dunkley and colleagues demonstrated that different patterns of distinct appraisal and coping strategies may operate at the within- and between-person level to trigger the individual's affective experience and to maintain it over 14 days. In terms of multilevel theory building, it may be useful to borrow from the multilevel terminology used by Dunkley et al.'s (2014; 2016) in their daily diary

studies and we could therefore talk about a *within-person trigger pattern* of work-related stress response or well-being outcomes.

The AL model perceives these acute, within-person transient processes as adaptive mechanisms of adjustment to changing environments. However, a chronic over-activation of these processes can be harmful in the long-term. For example, release of cortisol when people perceive a challenge represents an efficient allostatic response, yet failing to turn the cortisol response on and off as needed or its chronic activation over multiple days, weeks or months represents an allostatic load for the brain and body (McEwen, 2018). And thus the next stage of the temporal cascade involves more fundamental changes in the secondary mediators such as flattening of cortisol diurnal rhythm, metabolic changes (e.g., in blood sugar, cholesterol levels, belly fat), cardiovascular changes (e.g., hypertension) or poorer immune system functioning. A chronic dysregulation of these secondary mediators is therefore considered a key risk for subsequent mental and physical disease.

Ilies et al. (2016) suggested that in contrast to the transient and state-like nature of the primary mediators, these secondary mediators of the allostatic load could be observed as relatively stable, between-individual differences. Although there are still many questions to be answered especially with respect to a more specific timeframe of stress exposure and subsequent dysregulation of the secondary AL mediators (Ganster & Rosen, 2013; Ilies et al., 2016), such processes may provide a theoretical explanation for the theoretical significance of the between-person variables assessed in EMA or daily diary studies over a number of days or weeks. Again, borrowing from Dunkley et al.'s (2014, 2016) multilevel terminology, these between-person processes could be viewed as *maintenance patterns* and may signify how a more enduring, repeated or chronic pattern of daily

experiences helps to establish and maintain the subsequent health and well-being outcomes over days, weeks or months.

Finally, the AL model also specifies a tertiary phase of allostatic overload resulting from a long-term dysregulation of the secondary mediators. These tertiary outcomes are mainly described and researched as mortality and disease end points (such as cardiovascular disease and diabetes) or as mental ill health such as clinical depression. Ganster and Rosen's (2013) multidisciplinary review noted that empirical evidence for these long-term outcomes comes predominantly from epidemiological literature involving large-scale cohort studies such as the Whitehall II studies (e.g., Backé et al., 2012; Bosma et al., 1997; Bosma, Stansfeld, & Marmot, 1998; Steptoe & Kivimäki, 2013).

In summary, the AL model views stress as a dynamic process unfolding over extended periods of time whereby the allostatic overload reflects a cumulative burden of what is initially an adaptive response in the aftermath of an acute stress event (McEwen, 2005). Furthermore, according to Ilies et al.'s (2016) proposition for an outline of a multilevel framework of employee well-being, the within- and between-person processes (variance components) examined in daily diary studies may tap into different stages of the allostatic systems (dys-)regulation. And thus research findings with respect to each level of analysis, i.e. to the within- and between-person processes, may therefore carry a different theoretical meaning and associated practical implications.

An important question then arises with respect to the specific role of personal resource characteristics such as mindfulness in the dynamic processes captured in the EMA or daily diary studies given this theoretical significance of the within- and between-person effects / processes. From the theoretical perspective, we

can formulate various research questions with respect to both levels of the multilevel hierarchy. For example, at the level of episodic, within-person processes, do (trait or state) personal resources influence the within-person reactivity in response to the daily fluctuations in environmental demands and resources? Or, in other words, do (trait or state) personal resources affect the within-person trigger patterns of daily stress reactivity, i.e., daily burnout experience. And hence more specifically, do more mindful employees experience lower stress reactivity (e.g., in terms of the episodic pattern of their emotional, cognitive and behavioural responses) on days when their work demands are higher, and job control lower than usual in comparison to less mindful employees?

Furthermore, and perhaps more importantly, such questions could be also specified at the more stable level of between-person variation: do personal resources influence the between-person associations between environmental demands and resources and strain in general across a number of days? And thus do personal resources play any part in the more enduring maintenance patterns? Or, in other words, regardless of the daily fluctuations, can personal resources prevent development of the resource loss spirals of burnout and can they also enhance the gain cycles of work engagement over a number of days or weeks when the demands are consistently high? Or even more specifically, do more mindful employees experience lower burnout levels in general – irrespective of their daily stress reactivity – in comparison to less mindful employees?

The present thesis therefore aims to investigate trait mindfulness and its two main dimensions of mindful awareness and acceptance as personal resources which could potentially exert their influence at both levels of the multilevel hierarchy. And although the empirical studies in this thesis do not specifically examine any of the

physiological AL mediators, the allostatic load model can provide us with a useful anchor with respect to the practical implications for the within- and between-person effects examined. According to the AL model, the within-person processes may be potentially a sign of more adaptive adjustment and instrumental to effective coping with work-related stressors which also enables learning. The within-person processes could be described as the daily *trigger patterns* of work-related health and well-being outcomes. Whereas the processes at the between-person level may signal more long-term or chronic effects and may potentially represent changes in the secondary mediators of the stress response. In line with Dunkley's terminology, the between-person processes could be described as work-related health and well-being *maintenance patterns*.

The empirical studies in this thesis therefore aim to use the daily and weekly diary design and multilevel modelling methodology to bring together several diverse strands of theory and research: the mindfulness literature with its focus on mindfulness as a multi-dimensional construct and on the active mechanisms through which mindfulness is hypothesised to influence its outcomes; the JD-R literature linking work characteristics with specific work-related outcomes via the dual pathway model of energy erosion and motivation; and the AL model providing us with a temporal lens though which we can interpret the within- and between-person effects with respect to their theoretical and practical implications.

Chapter 4: A Daily Diary Study of Within- and Between-Person Effects of Trait Mindfulness as a Personal Resource in the Job Demands-Resources Model: Revealing "Hidden" Interactions.

Abstract

While research on mindfulness at work is currently flourishing, empirical evidence for the beneficial effects of mindfulness in the context of well-established models of work-related stress and motivation is still scarce. This daily diary study investigated trait mindfulness as a personal resource in the job demands-resources (JD-R) model which highlights importance of the workplace characteristics in relation to employee health and well-being outcomes. Drawing on active mechanisms of mindfulness identified in the mindfulness literature and on a multilevel framework of employee well-being, we hypothesised that mindfulness would buffer the negative effect of high-strain jobs on job burnout and boost the positive effect of active jobs on employee engagement at both within- and between-person level. A sample of 144 employees completed online diaries twice daily recording 1083 diary entries over five working days. The results of multilevel moderation analyses to disentangle the episodic and more enduring effects at the within- and between-person level supported the buffering role of trait mindfulness in the energy erosion process of the JD-R at the between-person level but not at the within-person level. A more complex pattern of results emerged with respect to the motivation process suggesting that mindfulness indeed boosts work engagement but only in jobs with high control and manageable demands at the between-person level. Theoretical and practical implications of these findings are discussed.

Introduction

Mindfulness as non-judgmental awareness and attention to the present moment (Bishop et al., 2004) has gained huge popularity with wide public, private and public organisations and the scientific community worldwide. A body of empirical research documenting beneficial effects of mindfulness in work settings has been growing rapidly with reviews and meta-analyses linking both mindfulness as a naturally occurring personal characteristic as well as mindfulness training to many important work-related outcomes such as greater well-being, job satisfaction, work engagement, job performance, better interpersonal relations at work, or reduced levels of stress and burnout and lower work withdrawal (for reviews see Dane, 2011; Glomb, Duffy, Bono, & Yang, 2011; Good et al, 2016; Hyland, Andrew, Lee, & Mills, 2015; Janssen, Heerkens, Kuijer, van der Heijden, & Engels, 2018; Lomas, Medina, Ivtzan, Rupprecht, Hart, & Eiroa-Orosa, 2017; Luken & Sammons, 2016; Sutcliffe, Vogus, & Dane, 2016; Tomlinson, Yousaf, Vittersø, & Jones, 2018; for meta-analyses see Bartlett et al., 2019; Eberth & Sedlmeyer, 2012; Mesmer-Magnus, Manapragada, Viswesvaran, & Allen, 2017; Virgili, 2015).

Yet, despite the vast popularity of mindfulness training to reduce employee stress and enhance well-being, very little is still known about the effects of mindfulness in context of well-established models of work-related stress and motivation which highlight importance of workplace characteristics in relation to these work-related well-being outcomes (Bartlett et al, 2019). For example, Karasek's (1979) job demand-control (JDC) model identified high workload demands and low decision latitude as key job characteristics resulting in employee mental strain. Such propositions are also upheld by the job demands–resources theory (JD-R), one of the most popular work-related stress and motivation theories today (Bakker & Demerouti,

2017). Unmanageable workload demands were (repeatedly) identified by a wide margin as the main cause of continuously rising levels of stress-related sickness absence in organisations by the UK's Charted Institute of Personnel and Development (2015; 2016; 2018; 2019). Yet, there is very little research on whether mindfulness could actually help employees cope better (more effectively) with their workload demands to prevent burnout. Moreover, a number of scholars recently called for more research on positive outcomes of mindfulness in organisational contexts such as work engagement and performance (Bartlett et al., 2019; Reb & Atkins, 2015).

This study therefore aims to address the above questions while utilising some of the most recent theoretical and methodological advances in the field of work and occupational health psychology such as multilevel modelling to examine chronic and momentary determinants of employees' well-being (Ilies, Aw & Lim, 2016; Pindek, Arvan, & Spector, 2019; Sonnentag, 2015). Put simply, this study does not aim to ask whether mindfulness is good for you. The primary aim of this study is to investigate how does trait mindfulness as a personal resource operate within dynamic patterns of job burnout and work engagement unfolding over a number of days. In doing so this study adopts a dual process perspective afforded by the expanded JD-R model (Bakker & Demerouti, 2014; 2017) and employs daily diary methodology and multilevel modelling to disentangle acute and chronic (or more enduring) effects over five working days. In addition, taking into account the most recent recommendations with respect to measurement of mindfulness (Baer, 2019), this study adopts a multi-dimensional perspective on mindfulness which has been rarely done in organisational research so far.

Conceptualisation and Measurement of Mindfulness

Mindfulness is primarily defined as a state of consciousness, a state of present-moment awareness characterised by open and non-judgemental attitude towards current experience as an ongoing stream of thoughts, feelings and sensations involving both internal and external focus (Kabat-Zinn, 2003; Bishop et al., 2004). As with any state characteristic, people can go about their days with varying degree of mindful awareness from one moment to another. Experience sampling studies, assessing individuals' state mindfulness repeatedly over a number of measurement occasions and days, reported that approximately 41% (Hülsheger, Walkowiak, & Thommes, 2018) to 71% (Brown & Ryan, 2003) of variation in mindfulness was attributable to within-person fluctuations. Moreover, individuals can also differ in their general tendency to experience these mindful states across time and various situations and mindfulness can be therefore also viewed as a *trait* reflecting the density distribution of these mindful states. In addition, the term mindfulness has been used to denote a mindfulness *practice* (Shapiro, Wang, & Peltason, 2015), mindfulness-based training programmes or *interventions* (MBIs; Crane et al., 2017) and a further distinction has been made in the organisational literature between individual and collective mindfulness (Sutcliffe et al., 2016). However, this study will limit its focus on the role individuals' trait mindfulness in the stress and motivational processes.

Discussions with respect to the definitions and measurement of mindfulness have been ongoing in the mindfulness literature for some time (Van Dam et al., 2018). Sutcliffe et al. (2016) highlighted a question of dimensionality of mindfulness definitions and measures. For example, the unidimensional Mindful Attention Awareness Scale (MAAS, Brown & Ryan, 2003), assesses mindfulness as a single

dimension of present moment awareness. While multidimensional scales (such as the Five Factor Mindfulness Questionnaire, FFMQ, Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer et al., 2008) assess mindful awareness along additional qualities such as nonjudgmental and nonreactive attitude towards the present experience.

Bergomi, Tschacher & Kupper (2013a, 2013b) reviewed eight existing, validated mindfulness scales (including the MAAS and FFMQ) and identified nine distinguishable aspects of mindfulness across these scales with each scale assessing a different subset of these aspects but none measuring all nine. They noted that such heterogeneity in conceptualisations and measurement of mindfulness should be taken into account when comparing and replicating research findings. It is beyond the scope of this chapter to offer a more comprehensive summary or critique of the diverse conceptualisations and measurement of mindfulness here (for more detail, see Grosmann, 2008; Chiesa, 2013; Bergomi et al., 2013a, 2013b; Sauer et al., 2013; Quaglia, Brown, Lindsay, Creswell & Goodman, 2015). In line with Baer's (2019) recent recommendations, the present study considers and measures mindfulness as a multidimensional construct involving both attentional and attitudinal element.

Theoretical Accounts of Mindfulness Mechanisms

Numerous theoretical explanations for the beneficial effects of dispositional mindfulness and MBIs have been proposed in the mindfulness literature (for a brief systematic review see Gu, Strauss, Bond, & Cavanagh, 2015). While these theoretical accounts vary somewhat in terms of the number and specific processes involved in the salutary effects exerted by mindfulness, there is a consensus among researchers that mindfulness involves multiple mechanisms which synergistically influence a number of different functional domains at the same time (e.g., cognition, emotion, behaviour

and physiology; Good et al., 2016). For example, work and organisational scholars, Glomb et al. (2011), proposed a comprehensive theoretical framework of how mindfulness impacts employee performance and well-being identifying three core processes of (1) decoupling of self from experiences and emotions (a process also descried as decentering, or a metacognitive capacity of meta-awareness in which thoughts are viewed as passing mental events rather than facts or true representations of reality); (2) decreased use of automatic mental processes (through which past experiences, schemas and cognitive habits constrain the present experience); and (3) greater awareness and regulation of the body's physiological response systems (e.g., approach-avoidance, fight-flight, or inhibition-activation systems). In addition to these three core processes, they also identified seven secondary processes contributing to enhanced self-regulation of thoughts, emotions, behaviours and physiological reactions associated with mindfulness. These involve greater behavioural response flexibility following challenging or stressful work events and interactions, decreased rumination, greater empathy, improved affective regulation, increased self-determination and persistence, enhanced working memory and improved accuracy in affective forecasting.

With such a wide variety of mindfulness mechanisms and processes in play, it is likely that different mechanisms may be more prominent with respect to specific domains, outcomes, conditions and timeframes. In particular, Lindsay and Creswell (2017) suggested that attention monitoring skills enhance awareness of present-moment experience and therefore improve cognitive functioning outcomes in emotionally neutral contexts but are alone insufficient for improving performance on cognitive tasks where emotion regulation is also needed. They highlighted a key role of emotion regulation skills (e.g., acceptance, nonreactivity and nonjudgment) in

mitigating initial stress appraisal and lowering stress reactivity responses especially in high-stress situations (Creswell & Lindsay, 2014; Lindsay & Creswell, 2017).

Providing a more detailed account of these mechanisms, Vago and Silbersweig (2012) suggested that mindfulness enhances emotion regulation in response to stressors at both conscious level of controlled cognitive strategies (such as decentering and cognitive reappraisal) as well as at a non-conscious level of automatic, viscerosomatic responses (such as activation of hypothalamic-pituitary-adrenal (HPA) axis). They argued that mindfulness and MBIs "can improve automatic forms of regulation like homeostasis in the face of emotional or physical stress by protecting the internal milieu from the harmful effects of a stressor, which can be referred to as the 'raincoat effect', and by facilitating recovery, … the 'towel effect'." (p. 19). Moreover, they proposed that these effects should be evident across a range of physiological stress response mediators and a recent meta-analytic study of RCTs in a range of populations has provided initial empirical evidence in support of their assertion (Pascoe, Thompson, Jenkins, & Ski, 2017).

Perhaps as a useful way to summarize this wide scope of mindfulness mechanisms suggested in the mindfulness literature with respect to coping with work-related stress, we identified three broad processes involving (a) greater awareness of present-moment experience, (b) lower emotional and stress reactivity and (c) faster recovery to the emotional and homeostatic baseline enabled by adopting a mindful, decentered perspective (Good et al., 2016; Shapiro et al., 2015). These three broad mechanisms can therefore guide our understanding of how mindfulness influences work-related stress and coping processes depicted by the current work-stress models examined in this study.

In addition, Garland, Farb, Goldin, and Fredrickson (2015) argued that while the above theoretical accounts of mindfulness mechanisms were especially relevant with respect to the protective role of mindfulness in the stress processes, they did not suffice to explain how mindfulness operated with respect to cultivation of adaptive behaviours and positive affective and attitudinal states of mind, such as motivation and work engagement. To this effect, they proposed that additional emotion regulation strategies such as positive reappraisal and savouring of pleasant life experiences enabled by the mindful, decentered perspective can explain how mindfulness results in positive emotions and work attitudes. Moreover, Garland et al. (2015) emphasised the temporal nature of these effects arguing that multiple iterations of mindful decentering and reappraisal within and across emotion regulation episodes may be needed before a positive trajectory of well-being – known as an upward spiral – can be established. The present empirical study therefore aims to extend such theorizing and conceptualise trait mindfulness as a personal resource with respect to both stress and motivation processes at work.

JD-R theory and the Concept of Personal Resources

Hobfoll, Johnson, Ennis and Jackson (2003, p. 632) broadly defined personal resources as "aspects of self that are generally linked to resiliency." Concepts such as optimism and self-efficacy have been frequently examined as personal resources in the context of the JD-R theory (Bakker & Demerouti, 2017). Personal resources have been proposed to have a direct, positive effect on work engagement, act as moderators of the relationships between job characteristics and well-being (buffering the negative impact of job demands on strain, and boosting the positive impact of job resources on motivation and performance), act as mediators between job characteristics and well-

being or act as third variables (influencing both perceptions of job characteristics and employee well-being (for review see Schaufeli and Taris, 2014; Schaufeli, 2017). Schaufeli and Taris (2014) noted that, the JD-R theory was of an open, heuristic and descriptive nature, which allowed for a wide variety of demands and resources (both job and personal) to be meaningfully examined within one overarching framework, without a-priori prescribing or limiting the scope of underlying psychological processes that might be involved to explain the specific effects. Hence each personal resource investigated within the JD-R model needs to bring their own explanatory theoretical framework to clarify its specific role and psychological mechanisms involved in its effects.

The core of the JD-R theory lies in its two distinct processes linking work and situational characteristics with their outcomes (Bakker & Demerouti, 2007; 2017). On one hand, in a health-impairment (or energy erosion) process, long-term, excessive job demands (such as time pressure, workload, emotional or conflicting demands) are posited to lead to exhaustion and burnout, which in turn result in poor employee psychological and physiological health and negative organisational outcomes. On the other hand, a distinct, motivation-driven process is triggered by availability of job resources (such as autonomy, social support, skill variety or performance feedback) which foster employee work engagement and result in improved well-being and positive organisational outcomes. The two main paths of the JD-R model have been supported by a substantial body of evidence (for meta-analytical summaries see Alarcon, 2011; Christian, Garza, & Slaughter, 2011; Crawford, Le Pine, & Rich, 2010; Halbesleben, 2010; Lesener, Gusy, & Wolter, 2019 and Nahrgang, Morgeson, & Hofmann, 2011).

Echoing the main propositions of Karasek's (1979) DC model, the JD-R theory also identified a combination of high job demands and low job resources (so-called high-strain jobs) as resulting in the highest levels of job burnout and posited that job resources would buffer the impact of high job demands on strain (Bakker & Demerouti, 2017; Bakker & Derks, 2010). Moreover, in line with Karasek's (1979) 'active jobs hypothesis', the JD-R theory maintained that job resources would influence (boost) motivation particularly when the job demands were high and thus in turn foster learning and promote work engagement. Although, the buffering hypothesis of the original DC model received only weak empirical support (Häusser, Mojzisch, Niesel, & Schultz-Hardt, 2010; Van Vegchel, de Jonge, & Landsbergis, 2005; cf. Taris, 2006), more promising evidence emerged from studies testing these interactions (buffering and boosting effects) with multiple job resources within the JD-R model with respect to both health-impairment and motivational process (e.g., Bakker, Demerouti, & Euwema, 2005; Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, van Veldhoven, & Xanthopoulou, 2010).

In addition, a growing stream of research points to a possible qualifying role of employees' personal characteristics which may act as conditions of these buffering and boosting effects of control and demands in predicting various health and well-being outcomes (e.g., Daniels & Guppy, 1994; Hystad et al., 2011; Li et al., 2017; Meier et al., 2008; Parker & Sprigg, 1999; Salanova et al., 2002; Schaubroeck & Merritt, 1997; Schaubroeck et al., 2001; Stiglbauer, 2017; Totterdell et al., 2006; and Xanthopoulou et al., 2013). To accommodate for this interplay between personal and environmental (job) characteristics, a more recent, expanded version of the JD-R model included the concept of individual differences operationalised as personal resources (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007; Bakker &

Demerouti, 2017). However, as noted above, the specific role and underlying psychological mechanisms explaining the nature of their effects depend on the specific personal resource in question.

Mindfulness as a Personal Resource

Mindfulness has already been suggested to act as a personal resource in the JD-R model by Kroon, Menting and van Woerkom (2015) who briefly outlined an initial theoretical groundwork for incorporating mindfulness as a personal resource in the motivation path of the JD-R model using the conservation of resources (COR) theory (Hobfoll, 1989). They argued that mindfulness contributed to work performance as it could help employees become more aware of resources they might not have noticed otherwise, be more open to the full potential of each resource they encountered and become less vulnerable to any negative feelings associated with resource loss and therefore more resilient to the loss of job resources. Kroon et al.'s (2015) theoretical argument could be therefore extended to allow for the three broad mechanisms of mindfulness (i.e., greater awareness of the present-moment experience, lower emotional and stress reactivity and faster recovery) to be contextualised with respect to the specific job demands and job resources constellations proposed by the JD-R. Hence, mindfulness could be hypothesised to buffer the negative effects of high-strain jobs due to the reduced emotional and stress reactivity in the high-demands and low-resource situations and aid faster recovery following the high-strain episodes. Moreover, mindfulness could be hypothesised to enhance the motivational effect of active jobs due to employees' greater awareness of important job resources and more effective utilisation of these job resources in dealing with work demands.

Yet, empirical evidence with respect to the above propositions is still scarce. So far, two cross-sectional studies investigated the moderating role of trait mindfulness (MAAS) as a personal resource in the health impairment process of the JD-R model with mindfulness acting as a buffer in the relationship between emotional demands and psychological stress in Australian nurses (Grover, Teo, Pick, & Roche, 2016) and between workload demands and mental and physical symptoms of strain in US police officers (Fisher, Kerr, & Cunningham, 2019). To our best knowledge, the boosting effect of mindfulness in the relationship between job resources or active jobs and positive work-related outcomes is still to be examined.

Further promising evidence emerged from daily diary studies linking daily variations in state mindfulness to state outcomes such as work engagement (Tuckey, Sonnentag, & Bryan, 2018), daily emotional exhaustion and daily job satisfaction (Hülsheger, Alberts, Feinholdt, & Lang, 2013), daily workplace learning (Lawrie, Tuckey, & Dollard, 2017) and lower negative affect before bedtime (Haun, Nübold, & Bauer, 2018). Two recent studies investigated how daily fluctuations in work characteristics influenced employees' mindful states during the day, reporting evidence for mindful states (measured by MAAS) mediating between daily job conditions and daily learning (Lawrie et al., 2017) and daily recovery experiences (psychological detachment and sleep quality; Hülsheger et al., 2018). Moreover, Haun et al. (2018) reported that daily fluctuations in state mindfulness (state MAAS) at work and at home buffered the within-person effects of daily quantitative and emotional demands on daily psychological detachment after work. Initial supportive evidence is therefore emerging for the beneficial role of mindfulness in context of work stress and recovery models from both cross-sectional and daily diary studies. However, in order to further develop the buffering and boosting hypotheses outlined

above with respect to the within- and between-person processes in context of the JD-R theory, we first need to consider the theoretical meaning of these effects in line with recent calls for a multilevel framework of employee well-being (Chen, Bliese, & Mathieu, 2005; Illies et al., 2016; Pindek et al., 2019).

Within- and Between-Person Effects in Daily Diary Studies

With rising popularity of daily diary studies in work and occupational health research, scholars increasingly point to different theoretical meanings of the within- and between-person effects (Beal & Weiss, 2013; Binnewies & Sonnentag, 2013; Chen et al., 2005; Daniels, 2006). In a recent meta-analysis of stressor-strain relationships in daily diary studies, Pindek et al. (2019) argued that within-person effects reflected purely episodic, acute strain responses on days (or measurement occasions) when employees experienced more stressful events than usual while controlling for individual differences (by group-mean centring of within-person variables). In contrast to these episodic, acute effects, the between-person effects were suggested to reflect more stable conditions endemic to the work environment or individual differences between people.

Moreover, Illies et al. (2016) adopted a dynamic perspective of the Allostatic Load (AL) model (McEwen, 1998, 2006, 2007) to explain the theoretical significance of these effects in line with this prominent physiological model of stress and argued that the within- and between-person effects could tap into different stages of the allostatic systems (dys-)regulation. Drawing on the AL model, episodic, transient and highly-variable within-person effects could be linked to an acute stress response involving primary mediators of the stress response (such as release of stress hormones – adrenalin and cortisol – and episodic activation of the cardiovascular system)

(Ganster & Rosen, 2013; Illies et al., 2016). And thus these within-person effects could shed light on the *micro-level causal mechanisms* by which proximal work stressors (or proximal work characteristics) influenced well-being states at work (Sonnentag, Dormann, & Demerouti, 2010; Ohly, Sonnentag, Niessen, & Zapf, 2010; Xanthopoulou & Meier, 2014; Sonnentag, 2015). Drawing on terminology used in a series of multilevel, daily diary studies (Dunkley, Ma, Lee, Preacher, & Zuroff, 2014; Dunkley, Lewkowski, Lee, Preacher, Zuroff, Berg, & Foley, 2017), we could conceptualise these processes as *within-person trigger patterns* of acute stress and well-being outcomes. Furthermore, according to the AL model, these episodic, highly transient within-person processes may represent an adaptive allostatic response, which can be understood as an efficient way of dealing with a perceived challenge at the physiological level (McEwen, 2006).

In contrast to this episodic reactivity, enduring or chronic activation (or dys-regulation) of the same allostatic processes over long periods of time represents an allostatic load, the "wear and tear" on the body and brain, involving more long-term changes in the secondary mediators (e.g., cortisol diurnal rhythm, blood sugar, cholesterol levels, belly fat, hypertension etc.) which are considered key risk factors for subsequent mental and physical disease (McEwen, 1998, 2006, 2018). The AL model thus may provide an important foundation for the theoretical significance of the between-person effects observed in the diary studies over a number of days or weeks. These between-person effects could imply more enduring or chronic processes leading to potentially more serious consequences. Again, drawing on Dunkley et al.'s (2014, 2017) multilevel terminology, these between-person effects could be viewed as *maintenance patterns* and may help us explain how a more enduring, repeated or chronic pattern of daily experience becomes established and maintained with respect

to health and well-being outcomes over time. Furthermore, not only does such theorising build a case for investigation of both within- and between- effects in the daily diary studies simultaneously, it also implies that the moderating role of the (trait) personal resource characteristics in the dynamic processes could be observed at both levels.

Trait Mindfulness in the Energy Erosion Process: A Buffer

Trait mindfulness can be therefore hypothesised to exert its influence both at the within-person level of episodic reactivity and transient trigger patterns as well as at the between-person level of more enduring recovery processes and maintenance patterns of burnout and work engagement over time. At the within-person level of episodic trigger patterns, more mindful employees can be hypothesised to report reduced immediate emotional and stress reactivity to high-demand work episodes and situations (Creswell & Lindsay, 2014; Good et al., 2016). Specifically, more mindful employees may be able to adopt a more decentered and nonjudgmental attitude towards difficult thoughts and emotions that arise during high-demand / low-resource work episodes and thus these inner states may be less likely to function as inner stressors compounding the effect of the episodic job conditions. Hence, valuable energy resources can be made available for their coping efforts.

Previous research has shown that trait mindfulness (FFMQ) was associated with lower levels of emotional reactivity (assessed as lower emotional lability for both positive and negative emotions) in a one-week experience sampling study (with non-reactivity and nonjudging subscales accounting for these effects; Hill & Updegraff, 2012). Similarly, trait mindfulness (MAAS, Brown, Weinstein, & Creswell, 2012) as

well as mindfulness training (Lindsay, Young, Smyth, Brown, & Creswell, 2018) were associated with lower cortisol response to a laboratory stress task.

When it comes to complex work environments, high job and workload demands may be complemented by availability of job resources such as autonomy and social support so that employees can deal with their work tasks more effectively. According to the JD-R and other resource theories, what is perceived as stressful in the high-demand jobs and situations is the lack or loss of resources (rather than presence of the demands per se) and thus can in turn trigger the downward spiral of further resource loss (Hobfoll, 1989; Hobfoll, Halbesleben, Neveu, & Westman, 2018; Bakker & Demerouti, 2018). It is therefore in these episodic situations of high demands and lack or loss of resources that mindfulness' salutary effects due to lower emotional and stress reactivity would be needed most to prevent the initiation (and establishment) of the downward loss spiral of exhaustion and burnout.

In addition to these episodic, within-person effects, mindfulness can be also hypothesised to affect the more enduring maintenance patterns at the between-person level. Indeed, previous cross-sectional studies – aiming to tap into the level of more stable perceived job characteristics and individual differences rather than within-person variation – reported that mindfulness (measured as the present-moment awareness by MAAS) buffered the negative effect of high job demands on burnout (Grover et al., 2016; Fisher et al., 2019). Mindfulness theories and previous research suggest a number of processes through which mindfulness buffers the more enduring or chronic negative effect of the high-strain jobs on employee burnout. Mindfulness has been hypothesized to aid faster recovery to the emotional and homeostatic baseline following stressful episodes (Good et al., 2016; Vago & Silbersweig, 2012), reduce levels of worry and rumination and in turn prevent establishment and

maintenance of the stress response over time (Brosschot, Gerin, & Thayer, 2006; Gu et al, 2015; Crain, Schonert-Reichl, & Roeser, 2017; Querstret, Cropley, & Fife-Schaw, 2017) and improve psychological detachment from work and sleep quality (Hülsheger, Lang, Depenbrock, Fehrmann, Zijlstra, & Alberts, 2014). While Miksch, Lindeman and Varghese (2015) argued that mindfulness could help prevent development of the allostatic load associated with perseverative and chronic stress response over time.

Taken together, trait mindfulness can be therefore hypothesised to buffer the detrimental effect of recurrent high-strain work episodes over time and thus influence the dynamic energy erosion and health impairment process of the JD-R both at the within- and between-person level (see Figure 5), hence:

Hypothesis 1: Trait mindfulness will moderate (buffer) the negative effect of (a) high-strain work episodes (characterised by higher demands and lower control than usual at the within-person level) and (b) more enduring high-strain job conditions (characterised by high demands and low control at the between-person level) on job burnout so that these will be more positively associated with burnout in less mindful employees as opposed to employees high in trait mindfulness.

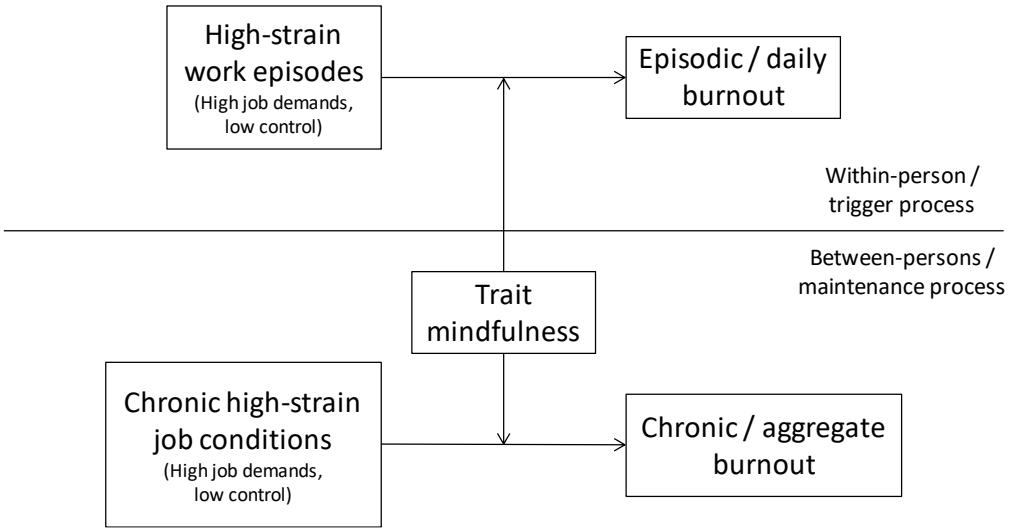

Figure 5. Conceptual model of the energy erosion process

Mindfulness in the Motivation Process: A Booster

Trait mindfulness has been previously linked to positive work-related outcomes such as work engagement in cross-sectional studies (Avey, Wernsing, & Luthans, 2008; Dane & Brummel, 2014; Leroy, Anseel, Dimitrova, & Sels, 2013; Malinowski & Lim, 2015; Kotzé, 2018; Silver, Caleshu, Casson-Parkin, & Ormond, 2018; Gunasekara & Zheng, 2019) and preliminary, albeit somewhat weak evidence has also emerged for the link between mindful states at work and state work engagement from a daily diary study (Tuckey et al., 2018). Considering the effect of mindfulness within the motivational path of the JD-R model, Kroon et al. (2015) argued that mindful awareness could help employees notice important job resources more readily and use them more effectively in completing their tasks. The JD-R theory implies that mindfulness as a personal resource would be especially useful in high demand situations where resources gain central importance in dealing with these demands (Bakker & Demerouti, 2018). Mindfulness could therefore act as a booster

in promoting employee engagement in high demand, high resource work episodes and situations at the within-person level.

Moreover, Garland et al. (2015) suggested that mindfulness facilitated adaptive emotion regulation strategies such as positive reappraisal and savouring of pleasant life experiences both within and across multiple work episodes. These processes could manifest as individual differences in tendency to notice useful job resources available to an employee at work as well as employees' meta-awareness (ability to adopt a mindful, decentred perspective) and perhaps even savouring of their own ability to use these resources in dealing with the challenging (high-demand) work tasks. Furthermore, these processes could be again hypothesised at both levels of the multilevel hierarchy – at the within-person level of episodic trigger patterns as well as at the between-person level of more enduring maintenance patterns (see Figure 6). We therefore hypothesise that:

Hypothesis 2: Trait mindfulness will moderate (boost) the positive effect of (a) active job episodes (characterised by higher demands and higher control than usual) and (b) more enduring active job conditions on work engagement so that more mindful employees will report higher work engagement than less mindful employees.

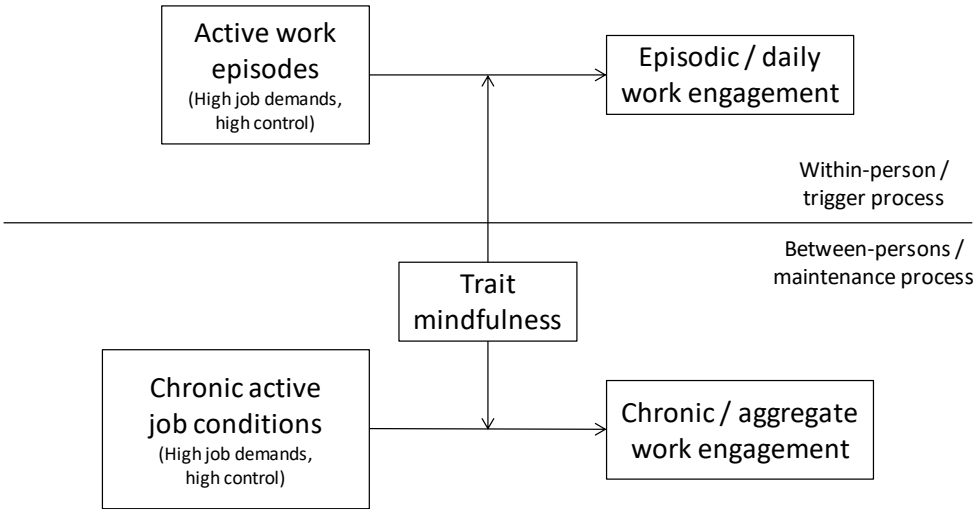

Figure 6. Conceptual model of the motivation process

In addition, trait mindfulness has been suggested to convey greater present-moment awareness of both internal and external experience whereby more mindful employees would be expected to notice more readily when important job resources become available. Employees higher in trait mindfulness could be therefore expected to notice and act upon opportunities to influence the content, method, or timings of the work tasks, i.e., job control. And thus, we also hypothesise that:

Hypothesis 3: Trait mindfulness will be positively associated with mean level of job control (aggregate) over five days.

Furthermore, Pindek et al. (2019) argued that between-person level of analysis represented more stable conditions that were endemic to the work environment as well as to individual differences in perceiving the stressfulness of one's overall experiences on the job. Indeed, trait NA and neuroticism have been long recognised as personal characteristics which could influence both reports and experiences of job stressors and strains and this would be particularly relevant at the between-person level (e.g., Bolger & Zuckerman, 1995; Chen & Spector, 1991; Daniels, 2006;

Spector, Zapf, Chen, & Frese, 2000). Nevertheless, a routine use of NA or neuroticism as control variables in occupational health and organisational research has been disputed as this may partial out substantive variance of interest (Bernerth & Aguinis, 2016; Spector et al., 2000). Yet, previous mindfulness research reported medium to high negative associations between measures of mindfulness and trait NA (e.g., r = -.37 to -.43 across a number of samples, Brown and Ryan, 2003; or r = -.39 in a meta-analysis by Giluk, 2009) and neuroticism (r = -.56, Brown and Ryan, 2003; r = -.45, Giluk, 2009; or r = -.56, Iani, Lauriola, Cafaro, & Didonna, 2017). While Baer (2019) recently observed that incremental validity of mindfulness measures over NA and neuroticism was a neglected topic in the mindfulness literature. Therefore, trait negative affectivity (NA) as a general tendency to experience negative emotions will be used in the present study as a control variable at the between-person level.

In sum, the present study aims to investigate trait mindfulness as a personal resource which can exert its influence at both levels of the multilevel hierarchy: at the within-person level of episodic reactivity and transient trigger patterns as well as at the between-person level of more enduring recovery processes and maintenance patterns. To account for the role of individual differences such as NA and neuroticism in the stressor-strain relationships and to examine the incremental validity of the FFMQ over trait NA in the energy erosion process of the JD-R model, the present study will use trait NA as a control variable at the between-person level.

Method

Participants and Procedure

Participants were recruited as a voluntary convenience sample among employees of a range of UK-based organisations. Participants were initially contacted

by direct email with a brief description of the study sent via researchers' professional and personal contacts working in these organisations. Once participants expressed interest in the study, they were emailed an invitation to complete a series of online hosted questionnaires on Qualtrics platform over five working days. Participants were offered an executive summary of the study results; no monetary compensation or other incentives were offered. First, participants completed an initial questionnaire including measures of trait mindfulness, trait negative affectivity and demographics. Following this, participants were instructed to complete a series of short daily surveys at mid-day and just before the end of their working day over five working days. The short daily surveys included measures of state burnout, state engagement, state job demands and state job resources.

A total of 183 participants expressed interest in the study and completed the initial questionnaire. Daily diaries from 144 participants were retained in the final sample following matching of the initial and daily diary surveys, data checking and cleaning (McCabe, Mack, & Fleeson, 2011). On average, participants completed 7.5 daily surveys out of a maximum of ten (M_{survey} = 7.52; *SD* = 3.12). This represents 1083 daily diary entries over the five working days. Participants' average age was 37.05 years (*SD* = 9.6) and 56.6% were female. The participants' average tenure with their current organisation was 5.77 years (*SD* = 6.64; range = 1 to 41 years). In terms of the current job role, 24.8% reported working in a managerial position, 55.9% worked in a professional, non-managerial position and 19.3% held an administrative role. All participants were based in the UK and worked across a range of sectors: 35% of participants worked for a large engineering consultancy organisation in the construction sector, while the remaining participants worked in a range of

organisations from the following sectors: communication and media (27%), architecture (15%), financial services (14%) and other (9%).

Initial Survey Measures

Trait mindfulness. Mindfulness was measured in its dispositional, trait form using the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). FFMQ assesses general tendency to be mindful in daily life across five facets: non-reactivity to inner experience (e.g., "I perceive my feelings and emotions without having to react to them"), observing or noticing internal and external stimuli (e.g., "I pay attention to how my emotions affect my thoughts and behaviour"), acting with awareness (e.g., a reverse scored item "I find it difficult to stay focused on what's happening in the present"), describing (e.g., "I'm good at finding the words to describe my feelings"), and non-judging of experience (e.g., a reverse scored item "I criticise myself for having irrational or inappropriate emotions"). All items were rated on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). The scale demonstrated excellent reliability overall (Cronbach's α = .87) as well as in its subscales (non-reactivity α = .71; observing α = .74; acting with awareness α = .82, describing α = .82, and non-judging α = 88).

Trait negative affectivity. The negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988) was used to assess trait or dispositional tendency to experience negative affect. The total of 10 mood items under 'general / on average' instruction was rated on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Cronbach's α was .87.

Demographic variables. One-item measures assessed gender, age, tenure, and job role.

Daily Survey Measures

The short daily surveys comprised of state measures of job demands, job resources, burnout and work engagement. Where general, trait measures rely on participants' recall and generalisation of their experience over certain pre-specified period of time, the day-level versions of these measures aim to assess the states or episodic fluctuations in these variables as they are experienced. Participants were therefore required to complete identical daily survey measures twice per day, at mid-day and again just before the end of their working day, with instructions emphasising responding purely with respect to their most recent work experience of the past couple of hours in the morning and in the afternoon on the day. To avoid excessive length of the daily surveys and reduce participants' burden of completing the daily surveys, a reduced number of items per factor were used instead of the full versions of the questionnaires (Ohly et al., 2010). Some of the items were slightly rephrased or adapted to reflect responding at the day-level with an aim to keep any changes to a minimum.

State (proximal) job demands and control. The specific, proximal job demands were operationalised as time pressure and conflicting demands using items drawn from a measure of perceived work characteristics developed by Haynes, Wall, Bolden, Stride and Rick (1999). The job demands were measured by three items thought to reflect the nature and complexity of jobs in today's knowledge organisations where employees work under tight deadlines and deal with multiple stakeholders ("To what extent did you find yourself meeting the following problems in carrying out your work this morning / afternoon …. I didn't have enough time to carry out my work," "I could not meet all the conflicting demands made on my time at work," and "Professionals made conflicting demands of me."). The items were

rated on a 5-point Likert scale ranging from 1 (*to a very little extent*) to 5 (*to a very large extent*). The specific, proximal job resources were operationalised as job control and were also measured by three items (e.g., “To what extent did you choose what work you carried out?”).

As both within- and between-person effects of the job demands and control were examined in this study, a multilevel reliability (2-level alpha reliability) coefficient was estimated for all daily variables using a multilevel confirmatory framework analysis (mCFA approach) in Mplus. Geldhof, Preacher and Zyphur (2014) demonstrated that using single-level reliability estimates in a multilevel context conflated the within- and between-cluster reliability estimates and hence the conflated reliability estimate did not reflect true scale reliability at any of the two levels of analysis. They provided methodological guidance on assessing and reporting reliability at multiple levels of analysis which was used to calculate the multilevel reliability estimates in this study. Results of the multilevel reliability analyses are detailed as follows: the job demands scale was found to be more reliable at the between-person level (α = .896, 95% CI [.864, .929]) and still acceptable at the within-person level (α = .707, 95% CI [.667, .747]). Similarly, the job control scale also demonstrated higher reliability at the between-person level (α = .872, 95% CI [.826, .919]) than within persons (α = .660, 95% CI [.611, .709]). The above estimates of reliability for both scales and levels are considered good or acceptable at both levels in line with Nezlek's (2017) recommendations for calculating reliability in studies of within-person variability.

State burnout. Six items drawn from the Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) were used to assess state burnout along its three dimensions: physical fatigue (e.g., “I feel tired”), emotional exhaustion (e.g., “I feel I

am unable to be sensitive to the needs of colleagues and customers"), and cognitive weariness (e.g., "My thinking process is slow"). Items were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). Again, 2-level alpha was calculated to establish the scale reliability at each level separately. The state burnout scale displayed very good reliability at both between- (α = .934, 95% CI [.916, .952]) and within-person level (α = .864, 95% CI [.852, .875]).

State work engagement. Six items from the UWES-9 (Schaufeli, Bakker & Salanova, 2006) were used to measure episodic work engagement along its three dimensions: vigour, dedication and absorption. Items were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). The state work engagement scale displayed very good reliability at both between-person (α = .932, 95% CI [.915, .949]) and within-person level (α = .877, 95% CI [.867, .888]).

Given an ongoing discussion about distinctiveness of burnout and work engagement (Cole, Walter, Bedeian, & O'Boyle, 2012; Taris, Ybema, & van Beek, 2017; Goering, Shimazu, Zhou, Wada, & Sakai, 2017), a multilevel confirmatory factor analysis was conducted to establish the distinctiveness of the two concepts at both levels of the analysis.

Analytic Strategy

The data analysis proceeded in three main phases. In the first phase, a series of confirmatory factor analyses (CFA) was conducted on the full FFMQ measure and alternative shorter versions proposed in the literature to evaluate the structure and identify the best fitting measure of mindfulness in the present study. The alternative measures to be compared included the full 39-item FFMQ (Baer et al., 2006), a 24-item version FFMQ-SF (Bohlmeijer et al., 2011) and a 15-item FFMQ-15 (Bear et al., 2012; Gu et al., 2016). For each measure, the following five models were tested: (a) a

one-factor model in which all items were indicators of an overall, latent mindfulness factor, (b) a five-factor model featuring five correlated mindfulness factors, (c) a five-factor hierarchical model in which the five factors were indicators of one higher-order mindfulness factor, (d) a four-factor hierarchical model in which four factors (excluding the observing facet) were indicators of the higher-order mindfulness factor, and (e) a four-factor model in which items were indicators of their respective four correlated mindfulness factors (excluding the observing facet). This testing strategy closely follows procedure used by Baer et al. (2006; Baer et al., 2008), Bohlmeijer et al., 2011, and Gu et al., 2016. The CFAs of the full, 39-item FFMQ were conducted using item parcels (groups of items) rather than individual items (as described by Baer et al., 2008).

Model fit was evaluated using the following benchmarks proposed in the literature: comparative fit index (CFI) and the Tucker-Lewis index (TLI) with values ≥.95 indicating a good fit and values ≥.90 indicating an acceptable fit, the root mean square error of approximation (RMSEA; good fit: <.06, and acceptable fit <.08), the standardized root mean square residual (SRMR; good fit: <.06, and acceptable fit <.08),the chi-square model test, and the Akaike information criterion (AIC) as a measure of model parsimony with the lower the value, the better the model fit (Akaike, 1974; Hu & Bentler, 1999).

In the second phase, a series of multilevel models was created to accommodate for the hierarchical nature of data with episodic observations nested within persons and to test the moderating hypotheses in Mplus version 7.3 (Muthén & Muthén, 1998-2015). First, the intraclass correlation coefficients (ICC1) for the daily variables were calculated to examine the degree of nonindependence in the state variables and the proportion of variance attributable to the between- and within-

person component of the daily variables. Next, an unconflated multilevel model (UMM) was used to test the hypothesised moderated effects at both levels of the hierarchy using full information maximum likelihood (FIML) estimation (Heck & Thomas, 2015; González-Romá & Hernández, 2017; Preacher, Zhang & Zyphur, 2016). The UMM requires that person-mean centered state variables (reflecting only the within-person variance) are entered at the within-person level (L1) and that the grand-mean centered person means (reflecting the between-person variance) are introduced at the between-person level (L2) of the model to allow for testing of associations between predictors and outcomes at both levels of the multilevel hierarchy separately. Specific unconflated interaction terms were identified between trait (L2) and state variables decomposed into their within- (L1) and between-person (L2) components: trait characteristic moderating the within-person associations (as a true cross-level interaction) and the trait characteristic moderating the between-person effects operating at the person level. Finally, the nature of any significant interaction terms was examined and graphically displayed using simple slopes analysis tools provided by Preacher, Curran, and Bauer (2006) and Dawson (2014). The hypotheses would be accepted upon inspection of whether the form of the significant three-way interaction effects reflected what had been specified by the hypotheses rather than on basis of the significance of the interaction term itself.

Finally, a multilevel path model was created to test the direct and indirect relationships at the within-person and between-person level with respect to both work engagement and burnout as proposed by the Hypothesis 3.

Results

Confirmatory factor analyses of the full 39-item FFMQ and its short forms

The results of the confirmatory factor analyses are presented in Table 1 detailing the fit indices for the five CFA models tested for the alternative versions of the mindfulness measure, i.e., FFMQ-39, FFMQ-24 and FFMQ-15. For each model, indices in bold indicate that they meet the cut off criteria for an acceptable model fit. As detailed in Table 1, for each version of the FFMQ, a one-factor model yielded the poorest fit to the data, which indicates that items (or item parcels for the FFMQ-39) should not be directly subsumed under a unidimensional model. These results thus provide psychometric evidence for dimensionality of mindfulness as measured by the FFMQ. In comparison of the alternative versions of the FFMQ tested here, the correlated five-factor model utilising the full 39-item measure yielded the best fit to the data and the fit of the five-factor hierarchical model was still acceptable. Figure 7 then shows the standardized factor loadings of the five-factor hierarchical model of mindfulness used in the subsequent analyses.

Table 1.

CFA Fit Indices for the FFMQ-39, FFMQ-24, and FFMQ-15

Model	CFI	TLI	RMSEA	SRMR	X^2	*df*	AIC
FFMQ-39							
One-factor	.374	.270	**.066**	.182	706.342	90	4368.002
Five-factor	**.957**	**.944**	**.058**	**.054**	125.153	80	3806.800
Five-factor hierarchical	**.935**	**.920**	**.022**	.094	150.659	85	3822.309
Four-factor	**.947**	**.928**	**.023**	**.060**	94.246	48	3037.403
Four-factor hierarchical	**.942**	**.923**	**.024**	**.078**	100.393	50	3039.547
FFMQ-24							
One-factor	.380	.321	**.040**	.130	846.292	252	8876.181
Five-factor	**.909**	**.896**	**.016**	.083	335.803	242	8385.697
Five-factor hierarchical	**.906**	**.895**	**.016**	.089	343.952	247	8383.830
Four-factor	**.915**	**.901**	**.017**	.088	240.341	164	6970.610
Four-factor hierarchical	**.916**	**.904**	**.016**	.089	241.273	166	6967.558
FFMQ-15							
One-factor	.358	.251	**.049**	.153	429.039	90	5689.303
Five-factor	.887	.852	**.022**	.084	138.141	80	5418.422
Five-factor hierarchical	.887	.860	**.021**	.090	144.271	85	5414.553
Four-factor	**.909**	.874	**.023**	.086	90.492	48	4224.923
Four-factor hierarchical	**.913**	.885	**.022**	.086	90.607	50	4221.037

Note. Indices in boldface indicate a good fit when rounded up or down to two decimal places. AIC = Akaike information criterion; CFI = comparative fit index; RMSEA = root mean square error of approximation; SMRM = standardized root mean square residual; TLI = Tucker Lewis Index.
One-factor model refers to the model in which all items (or item parcels) were loaded onto an overall mindfulness factor. Five-factor model hierarchical model refers to the model in which the five factors were indicators of one higher-order mindfulness factor. Four-factor hierarchical model refers to the model in which only four facets (without the observing facet) were loaded onto an overall mindfulness factor.

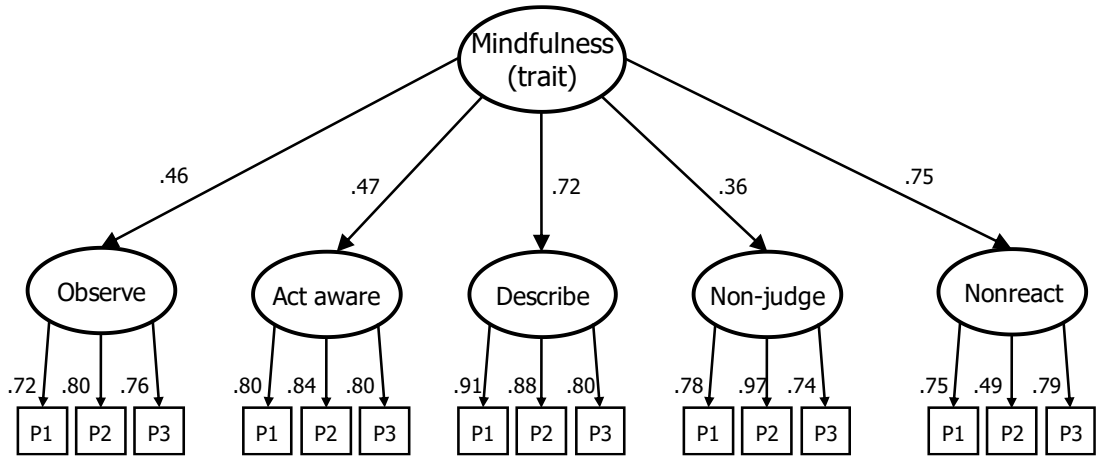

Figure 7. Five-factor hierarchical structure of trait mindfulness.

Note. Standardized parameters are listed. All parameters are significant ($p < .01$)

Hypothesis Testing – Moderating Effects

Table 2 displays means, standard deviations, intraclass correlation coefficients (ICC1) and intercorrelations of the study variables. Correlations at the person level are shown in the top part of the table. Intercorrelations of the within-person variables are shown in the lower part. Results showed that 50.3% of variance in burnout and 40.9% of variance in work engagement was attributable to the within-person level; with 49.7% and 59.1% of variance to be explained at between-person level respectively. It is of interest to note that trait mindfulness was significantly negatively correlated with trait negative affectivity ($r = -.470$, $p < .001$) and burnout at the between-person level ($r = -.320$, $p < .001$) but not work engagement ($r = .144$, $p = .085$) and neither with the mean levels of job demands ($r = -.058$, $p = .490$) nor with control ($r = .135$, $p = .104$) at the between-person level.

Table 2.
Means, standard deviations, intraclass correlation coefficients (ICC1) and zero-order correlations between the study variables

Person-level (trait)	M	SD	1	2	3	4	5	6	7	8
1. Gender	1.57	0.50	-							
2. Age	35.05	9.60	-.24**	-						
3. Tenure	5.77	6.64	-.22**	.68**	-					
4. Negative affect	1.84	0.63	.16	-.17*	-.00	-				
5. Trait mindfulness	3.38	0.39	.10	.06	-.03	-.47**	-			
6. Control	3.46	0.78	-.01	.19*	.06	-.16	.14	-		
7. Demands	2.27	0.83	-.05	.03	.06	.10	-.06	.07	-	
8. Burnout	2.46	0.87	.03	-.24**	-.19**	.28**	-.32**	-.29**	.35**	-
9. Work engagement	3.63	1.01	-.10	.22**	.19*	-.12	.14	.43**	.05	-.45**

Day-level (state)	M	SD	ICC1	1	2	3
1. Control	0.00	0.58	.572	-		
2. Demands	0.00	0.61	.579	-.13**	-	
3. Burnout	0.00	0.74	.497	-.23**	.20**	-
4. Work engagement	0.00	0.74	.591	.26**	-.13**	-.52**

Note: Person-level N = 144. Day-level N = 1083 observations nested in 144 participants. *p<.05; **p<.01

Hypotheses 1a and 1b stated that trait mindfulness buffers the positive relationship between high-strain work episodes (at the within-person level) and high-strain job conditions (at the between-person level) and burnout whereby more mindful employees would report lower burnout than less mindful employees at both levels. Hypotheses 2a and 2b stated that trait mindfulness boosts the positive relationship between active work episodes (at the within-person level) and active work conditions (at the between-person level) and work engagement whereby more mindful employees were expected to report higher levels of work engagement than less mindful employees at both levels. Due to complexity of the moderation terms proposed by hypotheses 1 and 2, a separate unconflated multilevel model was calculated for each of the two dependent variables, i.e., one for burnout and another one for work engagement.

The moderation results with respect to burnout are presented in Table 3. Both unstandardized and standardized coefficients are reported (in Table 3 and 4) using STDYX standardization method in Mplus; standardized parameter estimates provide an indication of the strenght of the effect in standard deviation units. Model 1 examined the direct relationships between trait negative affectivity (control variable), trait mindfulness, individual differences in the job demands and job control at the person-level of the analysis (calculated as person-means capturing the overall level of the variables over the five days) as well as the episodic (within-person) fluctuations in job demands and control at the episodic (within-person) level. The model 1 provided a significantly better fit to the data than the null model ($\Delta\chi^2(6) = 130.20$, $p < .001$). Pseudo-R^2 change values were computed as proportional reduction of residual variance in comparison to the previous model at each level separately (Kreft & De Leeuw, 1998). Episodic and person-level variables in Model 1 explained 8.6% and

30.4% of variance at the within- and between-person level respectively. It should be noted that trait mindfulness was a marginally signigicant negative predictor of burnout in this model (unstd. estimate γ = -.42, p = .051) after controlling for the effect of trait negative affectivity. In Model 2, two-way interaction terms at the episodic-level were added and Model 3 examined the incremental effect of the three-way interaction term between trait mindfulness and episodic demands and control at the within-person level. Model 3 did not provide better fit over the previous model and the three-way interaction term was not statistically significant (γ = .12, p = .472). This finding suggests that trait mindfulness did not buffer the within-person, episodic reactivity to high-strain work episodes. Hence, hypothesis 1a was not supported.

To examine the between-person effects in Model 4, two-way interactions at the person-level were added. Significant two-way interaction terms between trait mindfulness and job demands (γ = -.36, p = .044) and job control (γ = .45, p = .039) explained additional 6.1% of the residual variance at the between-level. Finally, Model 5 examined the incremental effect of the three way interaction between trait mindfulness and individual differences in the job demands and job control at the person-level. The three-way interaction term was significant (γ = .51, p = .022) and explained an additional 1.9% of residual variance at the between level over the previous model.

The pattern of this interactive effect was further probed using the simple slopes analysis. In high-strain jobs, described as a combination of high job demands (1 *SD* above the mean) and low control (1 *SD* below the mean), trait mindfulness was significantly negatively associated with burnout, the simple intercept was 2.97, t = 26.68, p < .001 and the simple slope was -1.14, t = -4.21, p < .001. The graphical representation of the three-way interactive effect is shown in Figure 4. Trait

mindfulness was therefore found to buffer the effect of high-strain job conditions on burnout at the between-person level and the Hypothesis 1b was supported.

Table 3.
Multilevel Regression Analyses Predicting Job Burnout

	Null model		Model 1		Model 2	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)			-.27*** (.04)	-.20*** (.03)	-.26*** (.04)	-.19*** (.03)
Job demands within (JD_w)			.21***(.04)	.17*** (.03)	.22*** (.04)	.17*** (.03)
$JR_w \times M$					-.16 (.01)	-.05 (.03)
$JD_w \times M$					-.14 (.01)	-.04 (.03)
$JR_w \times JD_w$					.08 (.06)	.04 (.03)
$JR_w \times JD_w \times M$						
Person-level model terms (Level 2						
Intercept	2.44*** (.07)	3.01*** (.23)	2.45*** (.06)	3.05*** (.22)	2.45*** (.06)	3.06*** (.22)
Negative affectivity			.14 (.11)	.11 (.09)	.14 (.11)	.11 (.09)
Trait mindfulness (M)			-.42* (.18)	-.20* (.09)	-.41* (.18)	-.20* (.09)
Job resources between (JR_b)			-.32*** (.08)	-.30*** (.08)	-.32*** (.08)	-.30*** (.08)
Job demands between (JD_b)			.35*** (.08)	.36*** (.07)	.35*** (.08)	.35*** (.07)
$JR_b \times M$						
$JD_b \times M$						
$JR_b \times JD_b$						
$JR_b \times JD_b \times M$						
Level 1 residual variance (*SE*)	.629 (.03)		.575 (.03)		.571 (.03)	
Level 2 residual variance (*SE*)	.621 (.09)		.432 (.06)		.432 (.06)	
Pseudo ΔR^2 (Level 1)			.086		.006	
Pseudo ΔR^2 (Level 2)			.304		.000	
-2 × log likelihood (LL)	2863.36		2733.15		2727.64	
Diff -2 ×LL			130.20***		5.52†	
df diff	3		6 (9)		3 (12)	

Continued

Table 3. (*Continued*)

Variable	Model 3		Model 4		Model 5	
	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	-.26*** (.04)	-.19*** (.03)	-.26*** (.04)	-.19*** (.03)	-.26*** (.04)	-.19*** (.03)
Job demands within (JD_w)	.21*** (.04)	.17*** (.03)	.21*** (.04)	.17*** (.03)	.21*** (.04)	.17*** (.03)
$JR_w \times M$	-.16† (.10)	-.05† (.03)	-.16† (.10)	-.05† (.03)	-.16† (.10)	-.05† (.03)
$JD_w \times M$	-.14 (.10)	-.04 (.03)	-.14 (.10)	-.04 (.03)	-.14 (.10)	-.04 (.03)
$JR_w \times JD_w$	.07 (.06)	.03 (.03)	.07 (.06)	.03 (.03)	.06 (.06)	.03 (.03)
$JR_w \times JD_w \times M$	.12 (.16)	.03 (.03)	.11 (.16)	.02 (.03)	.11 (.16)	.02 (.03)
Person-level model terms (Level 2						
Intercept	2.45*** (.06)	3.06*** (.22)	2.43*** (.06)	3.01*** (.22)	2.45*** (.06)	3.04*** (.22)
Negative affectivity	.14 (.11)	.11 (.09)	.19† (.11)	.15† (.09)	.22† (.11)	.17† (.09)
Trait mindfulness (M)	-.41* (.18)	-.20* (.09)	-.32† (.18)	-.15† (.09)	-.25 (.18)	-.12 (.09)
Job resources between (JR_b)	-.32*** (.08)	-.30*** (.08)	-.33*** (.08)	-.31*** (.08)	-.34*** (.08)	-.32*** (.08)
Job demands between (JD_b)	.35*** (.08)	.36*** (.07)	.39*** (.07)	.40*** (.07)	.39*** (.07)	.40*** (.07)
$JR_b \times M$			.45* (.20)	.17* (.08)	.36† (.20)	.14† (.08)
$JD_b \times M$			-.36* (.18)	-.16* (.08)	-.43* (.18)	-.19* (.08)
$JR_b \times JD_b$			.07 (.10)	.06 (.08)	.07 (.10)	.06 (.08)
$JR_b \times JD_b \times M$					.51* (.26)	.15* (.08)
Level 1 residual variance (*SE*)	.571 (.03)		.571 (.03)		.571 (.03)	
Level 2 residual variance (*SE*)	.433 (.06)		.395 (.06)		.383 (.06)	
Pseudo ΔR^2 (Level 1)	.000		.000		.000	
Pseudo ΔR^2 (Level 2)	-.002		.061		.019	
-2 × log likelihood (LL)	2727.08		2716.99		2713.08	
Diff -2 ×LL	0.56		10.09*		3.91*	
df diff	1 (13)		3 (16)		1 (17)	

Note.
$^{\dagger}p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

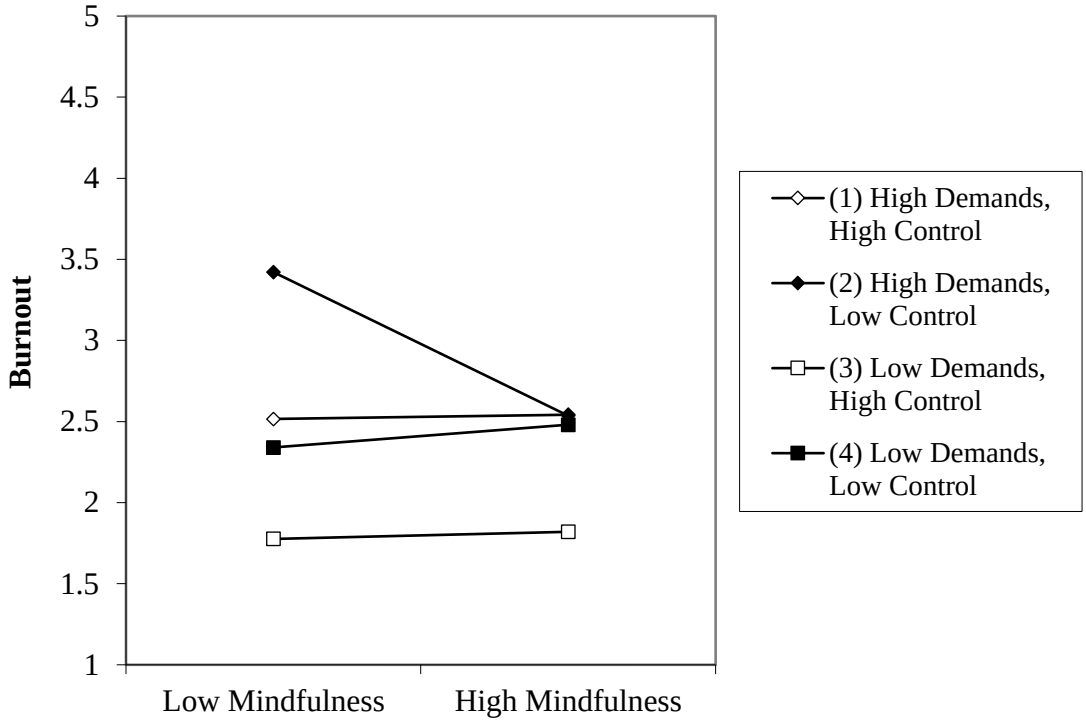

Figure 8. Burnout as a function of trait mindfulness, job demands and control at the between-person level

The moderation results with respect to work engagement are reported in Table 4. Again, Model 1 examined the direct relationships between trait negative affectivity, trait mindfulness, job demands, job control and work engagement at the person-level together with the episodic fluctuations in job demands, control and work engagement at the episodic (within-person) level. Episodic and person-level variables in Model 1 explained 7.8% and 21.8% of variance at the within- and between-person level respectively. In Model 2, true cross-level two-way interactions at the episodic-level were added and Model 3 examined the incremental effect of the three-way interaction between trait mindfulness and episodic demands and control at the within-person level. Model 3 did not provide better fit over the previous model and the three-way interaction term was not statistically significant (γ = .19, p = .159). Hence, hypothesis 2a was not supported. This finding suggests that trait mindfulness did not boost work

engagement in response to the active work episodes at the within-person, episodic level.

In Model 4, two-way interaction terms at the person-level were added. And finally, Model 5 examined the incremental effect of the three way interaction between trait mindfulness and individual differences in the job demands and job control at the person-level. The three-way interaction term was significant (γ = -.74, p = .036) and explained an additional 2.6% of residual variance at the between-person level over the Model 4. Yet in contrast to Hypothesis 2b, the simple slopes analysis revealed that mindfulness did not boost work engagement in active jobs which were defined as a combination of high demands (1 *SD* above the mean) and high control (1 *SD* above the mean), the simple intercept was 3.99, t = 24.63, p < .001 and the simple slope was 0.003, t = 0.01, p = 0.994 (see Figure 9, simple slope 1). Hence Hypothesis 2b was not supported.

Table 4.
Multilevel Regression Analyses Predicting Work Engagement

	Null model		Model 1		Model 2	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)			.32*** (.04)	.24*** (.03)	.32*** (.04)	.23*** (.03)
Job demands within (JD_w)			-.12** (.04)	-.09** (.03)	-.12** (.04)	-.09** (.03)
$JR_w \times M$					.11 (.10)	-.03 (.03)
$JD_w \times M$					-.00 (.10)	-.00 (.03)
$JR_w \times JD_w$					.06 (.06)	.03 (.03)
$JR_w \times JD_w \times M$						
Person-level model terms (Level 2						
Intercept	3.63*** (.09)	3.80*** (.27)	3.62*** (.08)	3.77*** (.26)	3.62*** (.08)	3.77*** (.26)
Negative affectivity			-.02 (.14)	-.01 (.09)	-.02 (.14)	-.01 (.09)
Trait mindfulness (M)			.25 (.22)	.10 (.09)	.26 (.22)	-.10 (.09)
Job resources between (JR_b)			.56*** (.10)	.44*** (.07)	.56*** (.10)	.44*** (.07)
Job demands between (JD_b)			.06 (.09)	.05 (.08)	.06 (.09)	.05 (.08)
$JR_b \times M$						
$JD_b \times M$						
$JR_b \times JD_b$						
$JR_b \times JD_b \times M$						
Level 1 residual variance (*SE*)	.632 (.03)		.583 (.03)		.581 (.03)	
Level 2 residual variance (*SE*)	.912 (.12)		.713 (.10)		.715 (.10)	
Pseudo ΔR^2 (Level 1)			.078		.003	
Pseudo ΔR^2 (Level 2)			.218		-.002	
-2 × log likelihood (LL)	2916.08		2806.99		2804.92	
Diff -2 ×LL			109.09***		2.07	
df diff (total)	3		6 (9)		3 (12)	

Continued

Table 4. (*Continued*)

Variable	Model 3		Model 4		Model 5	
	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	.32*** (.04)	.23*** (.03)	.32*** (.04)	.23*** (.03)	.32*** (.04)	.23*** (.03)
Job demands within (JD_w)	-.12** (.04)	-.09** (.03)	-.12** (.04)	-.09** (.03)	-.12** (.04)	-.09** (.03)
$JR_w \times M$	.10 (.10)	.03 (.03)	.10 (.10)	.03 (.03)	.10 (.10)	.03 (.03)
$JD_w \times M$	-.00 (.10)	-.00 (.03)	-.01 (.10)	-.00 (.03)	-.01 (.10)	-.00 (.03)
$JR_w \times JD_w$	.04 (.07)	.02 (.03)	.04 (.07)	.02 (.03)	.04 (.07)	.02 (.03)
$JR_w \times JD_w \times M$	.19 (.16)	.04 (.03)	.19 (.16)	.04 (.03)	.19 (.16)	.04 (.03)
Person-level model terms (Level 2						
Intercept	3.62*** (.08)	3.76*** (.26)	3.62*** (.08)	3.75*** (.26)	3.62*** (.08)	3.70*** (.26)
Negative affectivity	-.02 (.14)	-.01 (.09)	.01 (.14)	.01 (.09)	-.02 (.14)	-.02 (.09)
Trait mindfulness (M)	.27 (.22)	.11 (.09)	.24 (.23)	.10 (.09)	.14 (.23)	.06 (.09)
Job resources between (JR_b)	.55*** (.10)	.44*** (.07)	.52*** (.11)	.42*** (.08)	.54*** (.10)	.43*** (.08)
Job demands between (JD_b)	.06 (.09)	.05 (.08)	.08 (.09)	.07 (.08)	.08 (.09)	.07 (.08)
$JR_b \times M$			.25 (.26)	.08 (.08)	.36 (.26)	.11 (.08)
$JD_b \times M$			-.04 (.23)	-.02 (.08)	.05 (.23)	.02 (.08)
$JR_b \times JD_b$			-.15 (.13)	-.10 (.08)	-.14 (.12)	-.09 (.08)
$JR_b \times JD_b \times M$					-.74* (.33)	-.19* (.08)
Level 1 residual variance (*SE*)	.580 (.03)		.580 (.03)		.579 (.03)	
Level 2 residual variance (*SE*)	.719 (.10)		.709 (.10)		.685 (.09)	
Pseudo ΔR^2 (Level 1)	.002		.000		.001	
Pseudo ΔR^2 (Level 2)	-.004		.011		.026	
-2 × log likelihood (LL)	2803.51		2801.12		2796.04	
Diff -2 ×LL	1.41		2.39		5.09*	
df diff	1 (13)		3 (16)		1 (17)	

Note.
$^{\dagger}p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

The pattern of simple slopes representing this three-way interaction is shown in Figure 9. It appears that trait mindfulness was positively associated with work engagement in high control (+1 *SD*), low demands (-1*SD*) job conditions, however this slope was only approaching significance (the simple intercept was 4.05, t = 25.61, $p < .001$, and the simple slope was .90, $t = 1.77$, $p = .079$). This pattern (Figure 9) also seems to suggest a negative association between trait mindfulness and work engagment in low control (-1 *SD*), low demands (-1 *SD*) job conditions, however the simple slope was not statistically significant (the simple intercept was 3.03, $t = 20.56$, $p < .001$, and the simple slope was -.63, $t = -1.08$, $p = .28$).

The significance of the three-way interaction effect trait mindfulness, job demands and job control seems to be carried by the significant effect of control in employees high in trait mindfulness (+1 *SD*) in low demands (-1*SD*) job conditions (the simple intercept was 3.55, $t = 17.87$, $p < .001$, and the simple slope was 1.04, $t = 5.12$, $p < .001$) which fades into non-significance in employees low in trait mindfulness (-1*SD*) (the simple intercept was 3.47, $t = 16.63$, $p < .001$, and the simple slope was .27, $t = 1.18$, $p = .241$; compare simple slope 3 vs simple slope 4 in Figure 10). This pattern of results (see Fig. 10) suggests that high control was associated with higher work engagement in more mindful employees when their job demands were manageable (i.e. they were typically able to achieve what they set out to do in a given work episode and reported fewer conflicting demands from their stakeholders). However, this pattern of results also suggests that more mindful employees may be more aware of a repeated (ongoing) lack of control opportunities during their work episodes which may be associated with lower work engagement as a more stable attitude at the between-person level.

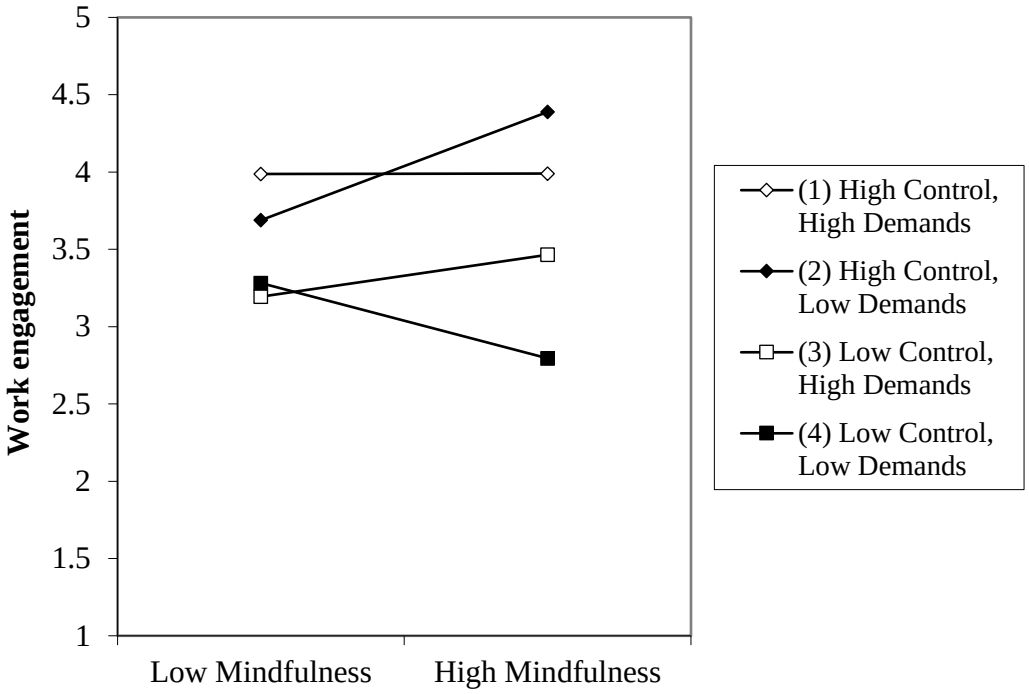

Figure 9. Mindfulness as a moderator of the relationship between active job conditions and work engagement at the between-person level.

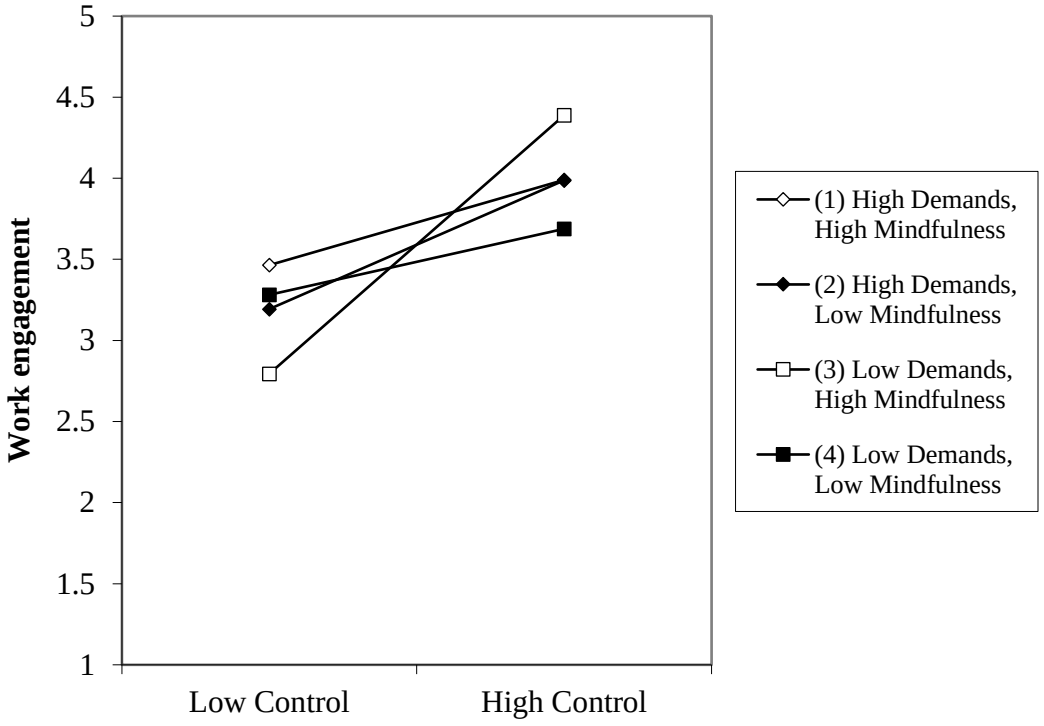

Figure 10. Mindfulness as a moderator of the relationship between active job conditions and work engagement at the between-person level.

Finally, to test for the hypothesised direct relationship between trait mindfulness and mean level of job control over the five days (Hypothesis 3), an overall multilevel path model was created including both outcomes simultaneously (see Figure 11), yielding an acceptable model fit (X^2 = 19.281; *df* = 5; p = .006; CFI = .972; TLI = .884; RMSEA = .040; SRMR within = .044; SRMR between = .037). The results of the multilevel path analysis indicated, that trait mindfulness was not a significant predictor of job resources (control) at the between-person level (standardized estimate = .145, *p* = .118) and hypothesis 3 was therefore not supported. It can be also noted that trait mindfulness was a significant direct predictor of mean level of burnout over the five days over and above the trait negative affectivity when also controlling for the mean level of proximal work characteristics (job demands and control) at the between-person level.

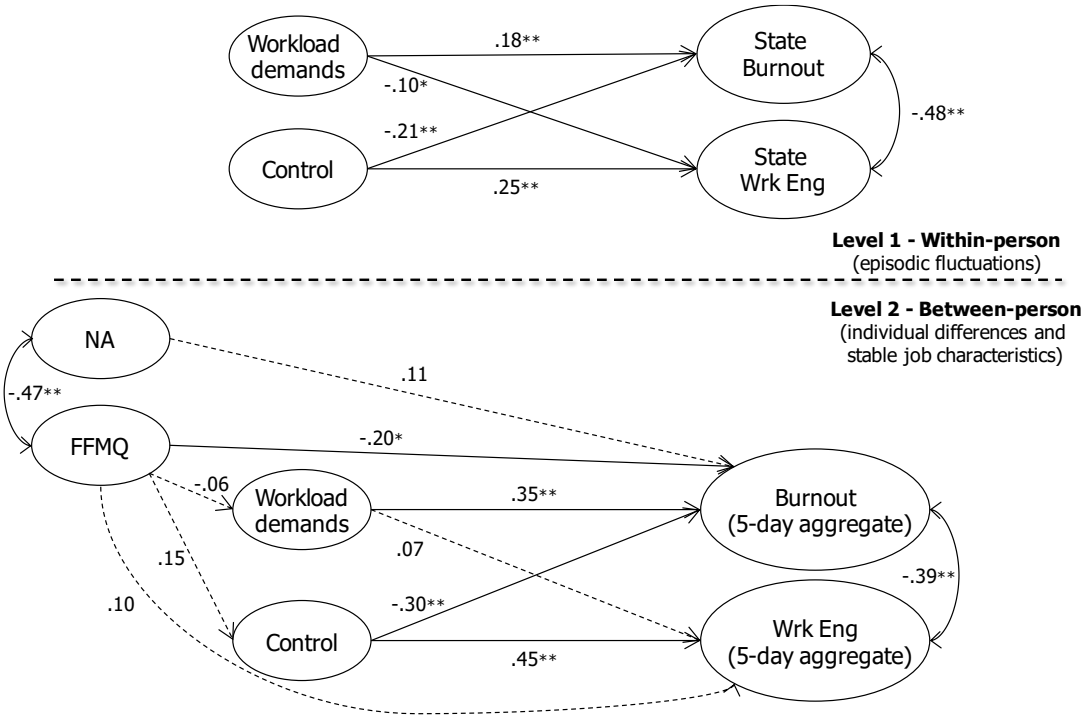

Figure 11. Multilevel path model of the direct relationships at the within-person and between-person level. Standardized estimates are shown.

Discussion

The central aim of the present daily diary study was to examine trait mindfulness in context of the JD-R model of work-related stress and motivation. This study adopted the expanded JD-R theory (Bakker, Demerouti, & Sanz-Vergel, 2014; Bakker & Demerouti, 2017) to examine trait mindfulness as a personal resource in context of the dynamic health-impairment and motivation processes over 5 working days. Drawing on the mindfulness literature, we identified three broad processes whereby trait mindfulness influences the work-related health and well-being outcomes: (1) greater awareness of present-moment experience; (2) lower emotional and stress reactivity; and (3) faster recovery to the emotional and homeostatic baseline. Furthermore, in line with recent calls for development of a multilevel model of employee well-being (Ilies et al., 2016), we hypothesised that trait mindfulness would exert its influence at both levels of the multilevel hierarchy - at the within-person level of episodic reactivity and *transient trigger patterns* as well as at the between-person level of more enduring processes, individual differences and more stable job characteristics which can be also viewed as *maintenance patterns* of burnout and work engagement over time.

Contrary to the study hypotheses, trait mindfulness was not found to buffer the within-person effects of high-strain work episodes on state burnout nor boost the within-person effects of active job episodes on state work engagement. In other words, trait mindfulness was not found to be associated with any corresponding differences in the within-person reactivity in response to episodic variations in the proximal job conditions. However, as hypothesised, trait mindfulness was found to buffer the between-person effect of more stable high-strain job conditions on burnout over the five days after controlling for trait negative affectivity.

Furthermore, a more complex pattern of results emerged for the moderating role of trait mindfulness on the between-person relationships with respect to the motivation path of the JD-R. Contrary to our hypothesises, trait mindfulness was not found to enhance the positive effect of more stable active job conditions (high demands, high control) on work engagement. Instead, mindfulness was found to augment the positive effect of job control on work engagement in more stable low (or manageable) workload demands condition over the five days. And finally, contrary to our expectation that more mindful employees would more readily notice availability of important job resources – such as job control in terms of opportunities to influence and decide on what work they carry out, when and what methods they use - trait mindfulness was not found to be related to job control as a more stable job characteristic at the between-person level over the five days.

Theoretical Implications

This study contributes to the occupational health and mindfulness literature in several ways. The first theoretical contribution is that we build upon and extend previous knowledge about trait mindfulness as a moderating personal resource in context of the energy erosion process of the JD-R. Previous cross-sectional studies reported supportive evidence for the buffering effect of trait mindfulness on the relationship between job demands and burnout in the energy-erosion process of the JD-R (Fisher et al., 2019; Grover et al., 2016). The present daily diary study replicated and extended these findings in context of a multilevel framework of employee well-being. Trait mindfulness was indeed found to buffer the relationship between workload demands and burnout at the between-person level which taps into the more stable job characteristics and individual differences that are also targeted

in the cross-sectional studies. However, the present study was also able to clarify that this buffering effect was specific to high-strain job conditions characterised by a combination of high workload demands and low control and was no longer evident in high control conditions. It could be therefore argued that mindfulness as a personal resource mitigated the effect of low control in high demands job conditions.

The empirical findings from the present study thus also seem to lend empirical support to resource theories such as JD-R and COR suggesting that lack or loss of resources in high demand jobs is more salient and detrimental to employee well-being than the presence of job demands per se (Bakker & Demerouti, 2018; Hobfoll et al., 2018). And the pattern of results with respect to the energy-erosion path of the JD-R also seems to provide initial supportive empirical evidence for Kroon et al.'s (2015) theoretical argument that trait mindfulness could acts as a fundamental personal resource which would make more mindful employees less vulnerable to the negative feelings associated with (actual or potential) resource loss and thus more resilient in high demand, low resource situations.

The second theoretical contribution of this study was enabled by adopting the increasingly popular daily diary methodology and multilevel perspective to examine a personal resource characteristic in both episodic and highly transient fluctuations in job burnout and work engagement (trigger patterns) as well as in the more enduring or stable patterns which build up over a number of days (maintenance patterns). We were able to disentangle the variance in burnout and work engagement into their two main components reflecting (1) the within-person, episodic reactivity, and (2) the between-person component representing individual

differences, more stable job characteristics and more long-term recovery processes. The results of the present study indicated that 50.3% of variance in state burnout was attributable to within-person, episodic variation whereas 49.7% was attributable to the between-person level. Such proportion of within- and between-person variance is consistent with previous daily diary studies adopting the JD-R framework (Demerouti, Bakker, & Halbesleben, 2015; Haar, Roche, & ten Brummelhuis, 2018; Xanthopoulou & Meier, 2014).

While the daily diary research so far has mainly focused on the within-person level of episodic micro-processes and trigger patterns, more recently both occupational health researchers (Pindek et al., 2019) and statisticians (Preacher et al., 2016) pointed to a large proportion of systematic variance to be explained at the between-person level. Moreover, Pindek et al. (2019) argued that the within- and between-person effects represented entirely different information pertinent to the stressor-strain relationships: episodic reactivity and more stable processes (respectively). The present study therefore examined the trait personal resource characteristic at the within- and between-person level simultaneously and is one of the first studies to report a different pattern of results at the within- and between-person level, i.e., non-homological findings at the within- and between-person level. Such findings can provide further empirical backing for the above mentioned calls for development of the multilevel theory and for the need to adopt a more comprehensive approach that would integrate for within- and between-person perspective (Chen et al., 2005; Sonnentag, 2015).

The null finding with respect to the moderating role of trait mindfulness at the within-person level may seem puzzling in context of the previous daily diary (Hill & Updegraff, 2012) and laboratory studies (Brown et al., 2012; Lindsay et al.,

2018) reporting lower episodic emotional and physiological stress reactivity associated with trait mindfulness. This may be due to the methodological differences between the studies (e.g., daily diary vs experimental laboratory studies) but it may also indicate that a trait personal characteristic exerts stronger influence at the between-person level (Pindek et al., 2019). Thus, a measurement of its state counterpart (i.e., state mindfulness) may have been needed to pin down its moderating role in the within-person, episodic effects. In other words, it may be more important whether an employee is mindfully aware and non-judgemental of their immediate situation and of their own reactions (state mindfulness) during the high-strain work episodes to experience the lower episodic emotional and physiological stress reactivity rather than whether they tend to experience mindful states more generally (as a trait).

An alternative theoretical explanation for such finding can be drawn on basis of the AL theory which suggest that within-person, episodic reactivity to an environmental challenge represents an adaptive allostatic response (McEwen, 2006). On the other hand, not turning on an adequate stress response when one is needed (i.e., when an employee is faced with higher workload demands and lower control than usual during a high-strain work episode) may be problematic in itself. For example, Creswell, Pacilio, Lindsay and Brown (2014) found that while a brief 3-day mindfulness meditation training reduced self-reported psychological reactivity to a laboratory stress task, it increased salivary cortisol reactivity in their study participants. Moreover, participants with low pre-existing levels of dispositional mindfulness (MAAS) reported the greatest increase in the salivary cortisol reactivity when performing the stress task following the mindfulness training. From the AL theory perspective, episodic stress reactivity in response to a

novel stress task in laboratory conditions or to a pressing deadline at work wouls not be problematic per se, it would only become problematic when turned on repeatedly day after day or when employees become unable to switch it off after work and therefore become unable to engage in a much needed recovery (a phenomenon recently described as the "recovery paradox", Sonnentag, 2018).

To summarize the second theoretical contribution of this study, we need to draw on the multilevel perspective adopted by the AL theory. Trait mindfulness was not found to reduce the within-person episodic reactivity in response to episodic variations in the proximal job conditions (i.e., the within-person trigger pattern of state burnout). However, trait mindfulness was indeed found to buffer the between-person effect of more stable high-strain job conditions on employee burnout over the five days (i.e., maintenance patterns). This may represent an important moderating (interactive) effect of a trait personal resource characteristic which would have remained "hidden" had this study focused on the within-person, episodic processes only. In light of the AL theory, these between-person effects gain an important theoretical and practical significance. In contrast to the episodic, within-person variation, the more enduring and stable maintenance patterns of job burnout may translate into a chronic pattern of allostatic load with potentially more important health-related consequences over time.

The third theoretical contribution of this study pertains to the motivation process of the JD-R theory. Previous cross-sectional and daily diary research provides plentiful empirical evidence for an important role of stable job resources endemic to the work environments as well as their daily fluctuations in fostering positive employee attitudes and states such as work engagement (Bakker, 2014; Bakker & Albrecht, 2018; Crawford, LePine, & Rich, 2010; Halbesleben, 2010). A

growing body of evidence suggest that personal resources such as mindfulness can also both directly and indirectly contribute to increased employee work engagement (Avey et al., 2008; Dane & Brummel, 2013; Leroy et al., 2013; Malinowski & Lim, 2015).

This study therefore examined trait mindfulness in the JD-R model in line with Kroon et al.'s (2015) theoretical argument suggesting that more mindful employees could notice important job resources more readily and use them more effectively in completing their work tasks. While this study did not find any empirical evidence for the first proposition, the results of the multilevel moderation analyses seem to suggest that trait mindfulness indeed enhanced the positive relationship between perceived job control (as a more stable job characteristics variable over five days rather than its episodic fluctuations) and work engagement in low (or manageable) demands job conditions at the between-person level. It should be noted that low demands job conditions in the present study imply manageable workloads (in contrast to an excessive time pressure and a multitude of conflicting tasks) rather than a complete lack of any job demands.

To summarize, the episodic fluctuations in employee state engagement were associated with episodic fluctuations in perceived job control and job demands regardless of employee trait mindfulness levels. However, at the between-person level, only more stable perceived job control significantly predicted employee work engagement as a more stable characteristic over the five days and this relationship was amplified in more mindful employees with manageable workloads. And thus this pattern of findings seems to lend empirical support to theoretical arguments highlighting more enduring processes in play such as savouring of pleasant life experiences across multiple work episodes (Garland et al., 2015), regular

opportunities for job crafting (Demerouti & Bakker, 2014; Tims, Bakker, & Derks, 2013) and more long-term development of gain spirals at work (Tuckey et al., 2018).

Finally, the fourth theoretical contribution of this study is to expand on the current knowledge and provide empirical evidence with respect to the mechanisms of mindfulness such as lower episodic emotional and physiological reactivity to and faster recovery from stressful workplace events due to decentered, non-reactive and non-judgmental stance of more mindful employees (Good et al., 2016; Lindsay & Creswell, 2014; 2017; Vago & Silbersweig, 2012). The multilevel perspective adopted by the present study allowed for a closer investigation of the within-person episodic reactivity and trigger patterns as well as of the more enduring between-person processes and maintenance patterns in context of complex work environments. In the present field study, trait mindfulness was not associated with any significant reduction of the within-person, episodic (self-reported) emotional, cognitive and physiological reactivity to changing environmental conditions. And thus, the results seem to suggest that trait mindfulness did not 'blunt' or 'flatten' the episodic emotional landscape of more mindful individuals. However, the present results did reveal a buffering effect of trait mindfulness with respect to the more stable high-strain job conditions over time – possibly due to more mindful employees' ability to recover faster from the episodic stressful workplace events and due to more long-term, iterative processes involving for example reduction in the perseverative cognitive patterns over time (Garland et al., 2015; Gu et al., 2015).

Practical Implications

The present study ultimately aims to contribute to a broader discussion of mindfulness in organisational context (Hülsheger, 2015; Rupprecht, Koole, Chaskalson, Tamdjidi, & West, 2019). In particular, the present study examined mindfulness as a trait personal characteristic in context of work-related stress and motivation processes without a-priori limiting its focus on the effects of mindfulness developed through any particular form of mindfulness training. However, it is widely assumed and empirical evidence suggests that mindfulness training conveys its benefits through improving the participants' more stable, dispositional levels of mindfulness (i.e. as a greater propensity to experience mindful states in and outside of the training environment) (Quaglia, Braun, Freeman, McDaniel, & Brown, 2016). The practical implications of the findings reported in this study may be therefore not only relevant to mindfulness as a naturally occurring personal characteristics but also to the effects of mindfulness training aiming to increase participants' trait mindfulness.

First and most importantly, the results of the present study suggest that trait mindfulness indeed buffered the negative effects of high-strain jobs on employee burnout over time and therefore add to the existing empirical evidence supporting use of mindfulness-based interventions as an effective strategy to reduce stress in working populations (Lomas et al., 2017; Chiesa & Serretti, 2009). However, the beneficial effects of mindfulness in preventing burnout did not seem to go beyond mitigating the negative effects of low control and it has to be noted here that employees who reported high control and manageable workloads experienced the lowest level of burnout regardless of their trait mindfulness. Such finding implies that for the most effective reduction of employee burnout addressing the work

characteristics endemic to the job design or combining features of individual- and job re-design interventions (e.g., Bond, Flaxman, & Bunce, 2008) may be needed.

Moreover, organisations providing their employees with access to mindfulness training in order to boost their work motivation and engagement levels may need to consider their employees' work characteristics (i.e., manageability of their workloads and degree of control) at the same time. The empirical findings reported by the present study suggested that trait mindfulness was indeed associated with highest levels of work engagement as a more stable characteristic in employees with manageable workloads and high control over the five days, however low levels of control were associated with the lowest levels of work engagement in more mindful employees. These findings may therefore provide an initial empirical evidence to expand on anecdotal reports about employees changing jobs or reducing their overtime hours following participation in a mindfulness training course (Hülsheger, 2015).

To summarize the practical implications, the findings reported by the present study may provide empirical backing for suggestions that mindfulness (and mindfulness training) should not be considered a panacea for the malady of modern workplaces involving e.g., excessive workloads, bullying, harassment or punitive supervision (Rupprecht et al., 2019). Drawing on the complex interactive patterns revealed in this study, although higher trait mindfulness or mindfulness training may help employees survive, it would not help them thrive in toxic work environments. Conversely though, trait mindfulness was indeed associated with higher levels of employee work engagement in job conditions with manageable workloads and a high degree of control.

Strengths, Limitations and Future Directions

The major strength of the present study lies in its synthesis of several theories and perspectives from different theoretical domains in one multilevel model. Stress has been described as "an emergent process that involves interactions between individual and environmental factors, historical and current events, allostatic states, and psychological and physiological reactivity" (Epel et al., 2018; p. 146). This study therefore aimed to explore some of this complexity by bringing together (a) mindfulness literature with its focus on the nature of mindfulness and active mechanisms through which mindfulness influences the work-related outcomes; (b) occupational health literature and in particular the JD-R theory as one of the most popular, contemporary theories of work-related stress and motivation with its focus on the work characteristics and their relationships with specific work-related outcomes via the dual pathway model; and (c) the AL model explaining stress and associated physiological processes through the lens of psychoneuroendocrinology which can provide us with greater understanding of the temporal patterns and biological bases of these processes and their long-term consequences.

The present study also has a number of limitations. First, the study did not directly test any of the AL mechanisms through which mindfulness was suggested to influence the work-related outcomes such as any of the primary AL mediators (e.g., salivary cortisol or heart rate variability) over time. And neither did it directly examine any of the specific emotional and stress reactivity or recovery processes suggested to underlie the moderating effect of mindfulness in the context of the energy-erosion path of the JD-R theory. For example, previous research suggested that mindfulness training was associated with reduction in perseverative cognition

and ruminative patterns (e.g., Gaynor, 2014; Hawley et al., 2014; Querstret et al., 2017). This may be particularly relevant in context of the work characteristics research suggesting that job demands are associated with diverse patterns of work-related ruminative thoughts which in turn contribute to both negative and positive outcomes over time (Kinnunen et al., 2017). The present study argued that mindfulness would buffer the more enduring, between-person effect of high-strain jobs on employee burnout due to more long-term processes such as reduced rumination over time, however such proposition too still remains to be empirically examined in future research.

Second, all study variables were assessed by self-report measures at the same points in time and thus increasing probability of the common method variance (CMV). CMV represents systematic error variance resulting from a variety of sources but is most often associated with use of a single reporting method (such as self-report surveys) at the same point in time and is viewed as problematic as it may artificially inflate relationships between variables and bias the research results (Podsakoff, MacKenzie, Lee & Podsakoff, 2003; Podsakoff, MacKenzie & Podsakoff, 2012; Spector, 2006). For example, Daniels (2006) argued that transient moods, trait affect, or temperament could systematically bias both reports of the job characteristics as well as of the outcome measures in job strain research and suggested that failure to control for trait affect would seriously undermine the strength of conclusions drawn from such a study. Hence, this study used trait negative affectivity as a control variable in the study analyses.

Moreover, Siemsen, Roth, and Oliveira's (2010) simulation study demonstrated that interaction effects could not be artefacts of CMV as CMV severely deflated any quadratic and interaction terms in their regression models

making it more difficult to detect these effects through statistical means. It is therefore unlikely that the interactions observed in the present study would be an artefact of CMV. Nevertheless, it could still be beneficial to further validate and extend the present findings by future studies utilising different time frames and measurement occasions to separate the predictor, moderator and outcome measurements and employ other than self-report measures where practically possible.

Third, the daily diary design of a 5-day period of employee everyday work life and the multilevel modelling methodology were used to investigate micro-level processes at the daily level, i.e., "… the content of and patterns surrounding experiences, behaviours, or physiology as they unfold in real time, or close to real time, in daily life" (Conner & Lehman, 2012). As such the daily diary data are still cross-sectional in their nature and thus these methods are best suited to answering correlational questions regarding covariation of the observed phenomena over the study period of five days rather than causal questions assuming causal relationships. An alternative approach would be to use lagged analyses to investigate precedence of the phenomena in a day (e.g., mindfulness and work engagement measured at mid-day were both found to predict mindfulness at the end of the day at the within-person level, Tuckey et al., 2018). Yet neither such lagged analyses would be sufficient to indicate causality. Hence, any causal interpretation of findings from these daily diary or micro-longitudinal studies with no experimental control or manipulation of the proximal work characteristics or psychological states as is done in experimental designs should be regarded with caution.

And finally, five working days of employees' lived experience is a relatively short-term interval and the results could have been influenced by an unusual work

situation occurring in a single week. Yet, 5-day daily diary designs are not uncommon in occupational health research (e.g., Debus, Sonnentag, Deutsch, & Nussbeck, 2014; Orth & Volmer, 2017; van Hooff & Geurts, 2015; Xanthopoulou et al., 2009). And while it would be an exaggeration to talk about chronic effects in such a short span of time, the between-persons effects over five-day period meaningfully supplement the examination of intraindividual links and thus allow for a more pertinent illustration of how more enduring trends may begin to develop over a number of days.

Conclusion

The present study examined trait mindfulness as a personal resource in context of the JD-R theory which highlights the importance of workplace characteristics in relation to employee health and well-being outcomes. Drawing on the theories of active mechanisms through which mindfulness conveys its beneficial effects proposed in the mindfulness literature, it was hypothesised that mindfulness would buffer the negative effect of high-strain job conditions on job burnout and boost the positive effect of active job conditions on employee engagement at both within- and between-person level. This study only found evidence for the buffering effect of trait mindfulness at the between-person level and interpreted these findings through the lens of a multilevel framework of employee well-being (Ilies et al., 2016). Future research could focus on closer exploration of the specific mechanisms through which mindfulness influences these within- and between-person processes of work-related stress and motivation over time.

Chapter 5: Dimensions of Trait Mindfulness as Personal Resources in the Job Demands-Resources Model: A Daily Diary Study

Abstract

Mindfulness has been broadly defined in terms of its awareness and acceptance dimension. This five-day diary study set out to explore the differential effects of these two dimensions in context of the JD-R theory. A sample of 144 employees completed online diaries twice daily recording a total of 1083 daily diary entries over five working days. First, a set of confirmatory factor analyses was used to examine alternative configurations of the FFMQ facets under two higher-order factors of awareness and acceptance. A five-factor correlated model of mindfulness provided the best fit to the data and the subsequent study analyses therefore proceeded with the five individual facets. Next, multilevel moderation analyses to disentangle the within- and between-person effects revealed that the observing facet was associated with higher within-person reactivity to high-strain episodes resulting in episodic drop in work engagement (but not in higher burnout). While the describing facet buffered the between-person effect of high-strain working conditions on burnout. Moreover, non-judgment and acting with awareness facets buffered the detrimental effect of high workload demands on burnout (regardless of employee control levels) at the between-person level. The non-reactivity facet buffered the detrimental effect of low control on burnout and was a significant direct predictor of both burnout and work engagement at the between-person level over and above the influence of workload demands, job control and trait negative affectivity. Theoretical and practical implications of these findings are discussed.

Introduction

Study 1 of this thesis examined trait mindfulness as a personal resource in context of the job demands-resources (JD-R) model (Bakker & Demerouti, 2017) over five working days. This study conceptualised mindfulness as a naturally occurring trait characteristic and used the total score of the Five Factor Mindfulness Questionnaire (FFMQ, Baer, Smith, Hopkins, et al., 2006; Baer, Smith, Lykins, et al., 2008) assessed in an initial questionnaire (completed prior to a series of daily diary surveys) as an indicator of employees' trait mindfulness in general. The daily diary data had a multilevel structure with daily (episodic) observations nested within persons and multilevel modelling was used to disentangle the within- and between-person effects of trait mindfulness on two parallel processes of the JD-R framework: energy erosion process resulting in employee burnout and motivation processes resulting in work engagement. Trait mindfulness was found to predict employees' levels of burnout (but not work engagement) over and above the influence of job demands, control and trait negative affectivity. Moreover, trait mindfulness was found to moderate the between-person relationships of high-strain jobs (i.e., high-demand, low-resource) and burnout (mindfulness acted as a buffer) and a more complex pattern of results emerged with respect to employee engagement.

However, mindfulness is not a monolithic concept. Recent theoretical developments and empirical studies suggest that various dimensions of mindfulness may take on different functions (e.g., adaptive vs. maladaptive; Baer, 2019; Bodenlos, Wells, Noonan, & Mayrsohn, 2015; Descrosiers, Klemanski, & Nolen-Hoeksema, 2013; Hanley, 2016; Lindsay & Creswell, 2019). The present, second study in this thesis therefore aims to take a closer look and provide a more comprehensive understanding of these effects in context of the JD-R model, with respect to the

dimensions of mindfulness or the *what* and *how* aspects of mindfulness. Hence, Study 2 of this thesis will investigate trait mindfulness as a personal resource in the JD-R model with respect to its awareness and acceptance dimension. Moreover, while several alternative suggestions for a higher-order factor structure of mindfulness (representing the *what* and *how* dimension of the construct) have been proposed in the mindfulness literature, no psychometric comparison of these alternative higher-order structures has yet been published. This study will therefore start off with a preliminary, exploratory investigation into the possible groupings of the five FFMQ facets under the two higher-order (*what* and *how*) dimensions or under the attentional and attitudinal aspect of mindfulness.

The Structure of Mindfulness

According to Kabat-Zinn (2003, p. 145), mindfulness is "the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment." Bishop and colleagues (2004) later extended this definition to highlight its two-component nature characterised by (a) a self-regulation of attention, and (b) a particular orientation to experience which is adopted and cultivated in mindfulness meditation practices. Self-regulation of attention was proposed to involve cognitive abilities to sustain and switch attention and ability to refrain from secondary elaborative processing of thoughts, feelings and sensations. Orientation to experience was then characterised by a curious, open and accepting attitude. Others expanded on the attitudinal (affective or heart) qualities of mindfulness to add other attributes such as gratitude, gentleness, generosity, empathy and lovingkindness (Shapiro, Schwartz, & Santerre, 2005).

This conceptual diversity with respect to mindfulness attributes is also reflected in the diversity of the multidimensional measures of mindfulness. For

example, Bergomi, Tschacher and Kupper's (2013a) psychometric review identified nine distinguishable aspects of mindfulness across eight validated self-report mindfulness scales with no single scale measuring all nine aspects. One of the most popular multidimensional scales, the FFMQ (Baer, Smith, Hopkins, et al., 2006; Baer, Smith, Lykins, et al., 2008), assesses mindfulness along the following five dimensions: observing (noticing or attending to internal and external experiences), describing (labelling internal experiences with words), acting with awareness (attending to one's activities in the present moment), nonjudging (nonevaluative attitude towards one's thoughts and feelings), and nonreactivity (ability to allow thoughts and feelings to come and go without getting caught up or carried away by them). Despite ongoing discussions about the specific dimensions and measurement of mindfulness in psychological science, Bear (2019) recently noted that many contemporary researchers seemed to agree on the attention itself (*what*) and the qualities of this attention (*how*) as two essential dimensions in defining mindfulness.

Several higher-order structure conceptualisations of mindfulness reflecting these two dimensions have been proposed in the mindfulness literature with a varying degree of specificity regarding measurement of the higher-order factors. Four of these will be described in greater detail below. The theoretical distinction between the *what* and *how* dimension of mindfulness was first introduced by Marsha Linehan in the 1990s as part of her dialectical behaviour therapy (DBT) approach for treatment of suicidal behaviours, borderline personality disorder and other mental disorders that involve serious emotion dysregulation (Linehan, 1993; 2015).

Linehan drew on her own practice of Zen and emerging scientific knowledge about allowing (as opposed to avoiding or suppressing) experiences to formulate the two broad sets of mindfulness skills which clients learned together with a range of

other skills related to interpersonal effectiveness, emotion regulation, and distress tolerance in the DBT sessions. She defined the *what* skills of mindfulness as what one does when being mindful: observing (attending to events, emotions and behavioural responses as they are without trying to change them), describing (applying accurate and distinctive verbal labels to emotions, behaviours and environmental events), and participating (engaging in the activities of the present moment with attention on the task rather than self-consciously). The *how* skills of mindfulness were defined as the qualitative nature of the observing, describing and participating: nonjudgmentally (taking a nonevaluative stance, refraining from using "good" and "bad" labels), one-mindfully (focusing one's full attention on the current activity rather than splitting attention among several activities or thinking about something else), and effectively (letting go of "being right" in favour of being effective, i.e. seeing and doing what is actually needed or called for in a particular situation).

In her own empirical research, Linehan then focused on evaluation of the DBT's effectiveness with respect to various populations and symptomatology rather than a psychometrical exploration of the *what* and *how* skills. And while the Kentucky Inventory of Mindfulness Scale (KIMS; Baer et al., 2004) was specifically designed as a DBT-inspired measure to assess four aspects of mindfulness in daily life (observing, describing, acting with awareness, and nonjudgment), it did not specifically categorise these aspects under the two higher-order dimensions. And to date, there is no specific guidance on assessing the two higher-order *what* and *how* skills using the existing mindfulness measures.

In contrast to Linehan's therapeutic approach, Lindsay and Creswell (2017, 2019) recently developed a new theoretical model of mindfulness mechanisms, the monitor and acceptance theory (MAT), to explain the differential effects of the two

broad mindfulness dimensions: attention monitoring skills and acceptance skills, and to encourage a more specific empirical focus on research of the correlates of these two skills. MAT proposed that present-focused awareness (monitoring skills) enhanced vividness of the present experience, whether this experience was positive, negative, or neutral, and thus would in turn intensify one's affective reactivity to this experience. However, it also posits, that acceptance – an attitude of nonjudgment, openness and equanimity towards internal and external experience – was a critical emotion regulation mechanism acting to reduce this affective and physiological reactivity. Lindsay and Creswell (2017) argued that the synergistic effect of both mindfulness dimensions (or skills developed through mindfulness interventions) was needed to foster mental and physical health.

Moreover, Lindsay and Creswell (2017) also briefly reviewed three of the most popular multidimensional measures of mindfulness and identified specific subscales of these self-report measures which would directly, discretely correspond to the monitoring and acceptance dimensions. Specifically, they identified the observing facet of the FFMQ as directly mapping onto the monitoring dimension of mindfulness, while the non-reactivity and nonjudgment facets of the FFMQ would map onto the acceptance dimension. They also argued that that the describing and acting with awareness facets of the FFMQ could not be discretely mapped onto only one of these two higher-order dimensions and thus could not be considered as clear indicators of these dimensions in empirical research. So far, Lindsay and colleagues conducted mainly experimental studies manipulating the monitor and acceptance dimension via brief mindfulness interventions and reported on supportive empirical evidence for the differential function of these mindfulness skills (e.g., Lindsay, Chin, Greco et al., 2019, Lindsay, Young, Brown, Smyth, & Creswell, 2019). However,

more research would be still needed to explore the MAT propositions with respect to these mindfulness dimensions as naturally occurring characteristics in working populations.

The other two conceptualisations of mindfulness structure featuring two higher-order factors are based purely on the FFMQ scale and took a psychometric approach. One was conducted by Tran and his colleagues and another version was published by Burzler and his team. Tran and colleagues conducted a series of confirmatory analyses and exploratory structural equation modelling to investigate the psychometric and structural properties of the full 39-item and an abbreviated 20-item version of the FFMQ (Tran, Glück, & Nader, 2013; Tran, Cebolla, Glück, Soler, Garcia-Campayo, & von Moy, 2014). Tran et al.'s (2013) exploratory structural equation models identified two second-order factors of mindfulness corresponding to (a) self-regulated attention (SRA), and (b) orientation to experience (OTE) with the five FFMQ facets loading onto these two factors in two different samples (an Austrian community and a student sample). In both samples, the observing facet loaded strongly onto the SRA factor while acting with awareness, nonjudgment and non-reactivity facets loaded onto the OTE factor corresponding to the awareness and acceptance dimension respectively. The describing facet cross-loaded onto both factors in both samples. Furthermore, both higher-order factors were negatively associated with emotion suppression and alexithymia subscales (i.e., with difficulties in identification and describing of feelings and externally oriented thinking), but only the OTE (and not SRA) factor was negatively associated with ratings of psychological distress, depression and anxiety. Tran et al.'s (2013) study therefore provided psychometric evidence for the two higher-order factors of mindfulness as measured by the FFMQ and for their differential associations with psychological symptoms.

In a follow-up study with a large German-speaking general population sample, Burzler, Voracek, Hos and Tran (2019) managed to replicate the two factor higher-order structure of the FFMQ. Although, slightly different item selections were used for the abbreviated version of the FFMQ in comparison to Tran et al.'s (2013) study. The two-factor exploratory structural equation model yielded a good fit with the observing facet loading onto the higher-order factor of SRA, whereas the acting with awareness, nonjudgement and non-reactivity facets loaded onto the higher-order OTE factor. Again, the describing facet loaded significantly onto both higher-order factors, though the loading was higher onto the OTE factor. Burzler et al. (2019) also conducted an exploratory path analysis of the two higher-order factors, mindfulness mechanisms (such as body awareness, acceptance of emotions, impulse control etc.) and a range of psychological outcomes (such as depression, anxiety and somatization) which identified different paths of action associated with these two higher-order factors.

To summarize, a number of alternative proposals with respect to the factorial higher-order structure of mindfulness have been described in the mindfulness literature but a psychometric comparison of these alternative suggestions is yet to be published. In the most recent review of the current trends in assessment of mindfulness by self-report measures, Baer (2019) noted that despite the overwhelming agreement on the *what* and *how* dimension as two essential aspects of mindfulness, how to best conceptualise and measure these two dimensions remained an unresolved question. The first research question to be addressed by this study will therefore focus on a psychometric exploration of the alternative groupings of the FFMQ facets under the two higher-order factors. Once the measurement of the two

higher-order dimensions is established, this study will focus on the role of these mindfulness dimensions in the JD-R model.

Awareness and Acceptance Dimensions of Trait Mindfulness as Personal Resources in the JD-R Theory

The JD-R theory (Bakker & Demerouti, 2007; 2017) and the role of personal resources in this dual pathway model were introduced and described in more detail in the introduction chapters and in the Study 1 of this thesis. In brief, personal resources (such as optimism or self-efficacy) have been examined as direct predictors of employee well-being, moderators and mediators of the relationships between job characteristics and well-being, and in the role of a "third variable" influencing both perceptions of the job characteristics and employee well-being (Schaufeli & Taris, 2014). However, which specific role would a particular personal resource in question take within the JD-R model depends on the specific mechanisms of action and the theoretical explanatory framework associated with this personal characteristic.

Study 1 (chapter 4) identified three broad mechanisms of trait mindfulness involving (a) a greater awareness of the present-moment experience, (b) lower emotional and stress reactivity, and (c) faster recovery to the emotional and homeostatic baseline and examined trait mindfulness in the role of a direct predictor of work-related outcomes (job burnout and work engagement) as well as a moderator in the relationships between the job characteristics and these outcomes. Expanding on the MAT theory and other theoretical accounts of mindfulness' mechanisms, the study 2 will focus specifically on the awareness (*what*) and acceptance (*how*) dimensions of mindfulness which have been hypothesised to take on different roles in different contexts.

This section will therefore provide a brief review of the FFMQ facets and of the higher-order factors (the *what* as attentional or awareness dimension and the *how* as attitudinal or acceptance dimension of mindfulness proposed in the literature), their mechanisms of action and possible implications for employees' workplace functioning. The theoretical relevance of possible grouping of the mindfulness facets under the two higher-order factors with respect to the role of mindfulness in the JD-R model becomes evident when we consider previous contradictory empirical findings in relation to the observing facet of mindfulness (Bodenlos et al., 2015; Bowlin & Baer, 2012; Consedine & Butler, 2014; Desrosiers et al., 2013; Eisenlohr-Moul et al., 2012) and more recent theoretical accounts of the active mechanisms underlying the salutary effects of mindfulness (Desrosiers et al., 2014; Lindsay & Cresswell, 2019; Teper, Segal, & Inzlicht, 2013).

A number of empirical studies have linked the awareness (*what*) dimensions of mindfulness – i.e., acting with awareness but especially the observing facet – with maladaptive symptoms and behaviours. For example, the observing facet was negatively associated with physical health among college students (Bodenlos et al., 2015), and positively related to subjective health symptoms such as backaches, pain and bowel trouble as well as greater healthcare utilization in a general sample of adults (Consedine & Butler, 2014). The observing facet was also a positive predictor of anxious arousal in a sample of treatment-seeking adults (Curtiss & Klemanski, 2014; Desrosiers et al., 2013). These findings were also reflected in psychometric studies reporting that the four-factor structure of mindfulness (excluding the observing facet) yielded a better fit to the data than the full five-factor model in non-meditating samples (Bohlmeijer et al., 2011; Curtiss & Klemanski, 2014; Gu et al., 2016).

Theoretical explanations of these contradictory findings and discussions of their clinical implications often drew on neuroscience of attention and emotion regulation (Creswell & Lindsay, 2014; Guendelman, Medeiros, & Rampes, 2017; Vago, 2014). For example, Strosahl, Robinson, and Gustavsson (2015) suggested that attentional capacity for noticing or attending to internal and external experiences (as measured by the observing facet) was a finite, functional resource involving multiple structures in the brain which was requested by competing neural networks resulting in bottom-up or top-down attention. Bottom-up attention is primarily generated in the oldest, primitive reptilian, activating functional structures of the brain (i.e. subcortical regions like amygdala, periaqueductal gray, ventral striatum, anterior insula and dorsal-anterior cingulate cortex) which developed to detect (real or imagined) threats to survival. Bottom-up attention is therefore fundamentally unstable, shifting from one potential threat to another and is often associated with primitive affective states such as anxiety, fearfulness or depression. On the other hand, top-down attention originates in the "new brain" networks (i.e., cortical regions such as the dorso-lateral and ventro-lateral prefrotal cortex, parietal cortex etc.) and involves ability to both voluntarily manage and shift attention via the central executive network. Top-down attention is thus more stable and provides foundation for higher levels of emotional processing and more complex problem solving.

Higher awareness of internal and external experiences as measured by the observing facet of the FFMQ could be therefore associated with bottom-up, stimulus-driven attention servicing the sympathetic nervous system (SNS) activation to generate emotional arousal and the fight-or-flight response (Guendelman et al, 2017; Strosahl et al., 2015). However, higher awareness of internal and external experiences could be also associated with the top-down processes which are cognitively based,

involve voluntary cognitive control and conscious access to one's habitual world view and self-narrative as it is activated and enacted in the present-moment experience (meta-awareness). Such attention then enables employment of more sophisticated emotion regulation strategies involving development of an insight into one's experience and thought processes and reduction of the negative bias at both implicit and explicit levels of processing (Guendelman et al., 2017). Given the contradictory findings with respect to the observing facet of FFMQ, it seems likely that both modes of attention can be captured by this measure.

In line with this argument, the MAT theory (Lindsay & Creswell, 2017; 2019) suggested that attention monitoring skills (either as a natural characteristic or a skill developed in mindfulness training) enhanced awareness of the present-moment experience and were in turn associated with improvements in cognitive outcomes (e.g., selective attention, sustained attention, task switching, working memory, and insight) and enhanced attention to affective information (which could potentially intensify both negative and positive reactivity). In context of the JD-R framework, it may be therefore expected that the awareness (attentional / *what*) dimension of mindfulness would be associated with a greater sensitivity to internal processes as well as to contextual information i.e., as a greater awareness of important work characteristics.

Organisational researchers, Kroon, Menting and van Woerkom (2015), argued that mindfulness could help employees notice availability of job resources which they would not have noticed otherwise. However, this could also involve enhanced sensitivity to less optimal working conditions. Specifically, employees could use the bottom-up driven attention to scan their work environments for threats to work-related goal pursuit and their wellbeing which may result in greater emotional reactivity to

excessive demands or lack of job resources in the workplace. Whereas, the same facility driven by the top-down processing could be instrumental in identifying available job resources, provide basis for more adaptive emotion regulation (free of negative attentional biases and maladaptive elaborative habits) and result in greater positive affective reactivity and higher work engagement in resource-rich work environments.

In contrast to the awareness dimension of mindfulness, the MAT theory (Lindsay & Creswell, 2017; 2019) considers the acceptance dimension an umbrella term for a range of attitudes including an open, nonjudgemental, non-evaluative, non-elaborative, non-reactive and equanimous stance towards the internal and external experiences. Creswell and Lindsay (2014) argued that acceptance acted as a critical mindfulness mechanism to mitigate the initial stress appraisals and to reduce stress-reactivity responses and that these effects would be most pronounced especially in environments where individuals carried high stress burden. Strosahl et al. (2015) explained these salutary effects of the nonjudgmental and non-reactive attitudes by higher levels of involvement of the executive control network, top-down attention, and self-reflective awareness in downregulating the SNS activation and over-riding of the negative information bias of the bottom-up attention.

Moreover, Williams (2010) and Teper et al. (2013) suggested that the effect of mindful awareness and acceptance due to improved executive control and emotion regulation did not act to eliminate all emotional responding and highlighted the key role of time in these processes. In their view, the basic emotional reactions can have an important adaptive, signalling function. And thus, mindful awareness could actually increase an individual's sensitivity to primary visceral cues and provide an insight about their body's affective responses to external or internal events. While an

accepting attitude towards these primary sensations and affective signals could subsequently enable more efficient responding to these signals in contrast to needless elaboration on these signals in habitual ruminative thought chains or attempts to suppress them. According to Williams (2010), mindfulness did not act to reduce the initial affective reactions but helped to prevent the negative consequences of their long-term activation. This view is also consistent with the allostatic load model (McEwen, 2004), a prominent physiological model of stress described in the study 1, which posited that transient, acute stress reactivity represented an adaptive allostatic response to a perceived challenge whereas an enduring or chronic activation of these processes could be more problematic.

From the perspective of the JD-R framework, work environments representing a high-stress burden could be described by high demands, lack of job resources or a combination of the two, i.e., the high-strain jobs. Study 1 of this thesis argued that more mindful employees would be able to adopt a more decentered, nonjudgmental attitude towards difficult thoughts and emotions which tend to arise in such high-strain situations due to the SNS activation and the negative information bias. It was hypothesised that employees' ability to downregulate their emotional and stress reactivity in the high-strain episodes over time would act as a buffer in the relationship between high-strain episodes and more enduring work conditions and burnout. The findings of the study 1 supported this buffering hypothesis at the between-person level of individual differences and more stable job conditions but not at the within-person level of episodic reactivity. These results therefore seem to provide support to Teper, Segal and Inzlicht's (2013) account that mindfulness enhanced emotion regulation across situations to prevent development of more stable affective patterns rather than to eliminate all within-person reactivity.

The present study will therefore try to extend these findings and explore whether the buffering effect of trait mindfulness overall was carried in particular by the acceptance dimensions of mindfulness at the between-person level and whether a different pattern of enhanced within-person reactivity could be observed with respect to the awareness dimension of mindfulness. Drawing on the above theories which highlighted the differential function of the awareness and acceptance dimension of mindfulness, it is therefore expected that the acceptance facets would act as a buffer in the energy erosion process of the JD-R at the between-person level and that the awareness facets would be associated with enhanced episodic reactivity at the within-person level. Moreover, it is also expected that the awareness facets would be associated with higher reactivity with respect to the motivation process at both within- and between-person level. With respect to the energy erosion process, tt is therefore hypothesised that:

Hypothesis 1: Attention / awareness dimension (i.e., observe facet) will enhance the within-person reactivity to high-strain work episodes at the within-person level with more mindful employees reporting higher state burnout levels.

Hypothesis 2: Attitudinal/ acceptance dimension (i.e. (a) nonjudgement, and (b) non-reactivity) will act as buffers in the relationship between high-strain job conditions and burnout at the between-person level with more mindful employees reporting lower levels of burnout over the five days.

With respect to the motivation process of JD-R, it is hypothesised that:

Hypothesis 3: Attention / awareness dimension (i.e., observe facet) will enhance the within-person reactivity to active work episodes at the within-person level of the motivation process with more mindful employees reporting higher levels of state work engagement.

Hypothesis 4: Both attention / awareness dimension (i.e. (a) observe facet) and acceptance dimension (i.e. (b) nonjudgement, and (c) non-reactivity) will enhance the more stable effect of active work episodes on work engagement at the between-person level.

Furthermore, not only may employees with higher level of mindful awareness notice availability of important job resources during various work episodes, the JD-R theory also views employees as proactive agents engaged in actively shaping their own work environments by changing their job demands and resources (Bakker & Demerouti, 2017; Bakker & Oerlemans, 2019; Le Blanc, Demerouti, & Bakker, 2017; Tims, Bakker, & Derks, 2013; Zhang & Parker, 2019). Wrzesniewski and Dutton (2001) described this largely informal process as "job crafting" suggesting that employees themselves changed the design and social environment of their jobs in personally meaningful ways. Tims et al., (2013) later elaborated on this concept arguing that employees' job crafting may involve several forms such as increasing social and structural job resources (e.g., social support and autonomy), increasing challenge job demands and reducing hindrance job demands.

This view also closely aligns with Parker, Bindl, & Strauss' (2010) model of proactive work motivation which posited that employees actively changed their work environments to achieve a better fit between their own characteristics and their environments. Parker et al. (2010) identified more distal antecedents of individual-level proactive behaviours at work which included individual differences (e.g., personality, values, knowledge and ability) as well as contextual factors including leadership, work design, and interpersonal climate. Similarly, Le Blanc, Demerouti and Bakker (2017) argued that employees' proactive personality, personal resources

and approach or avoidance regulatory focus in interaction with situational, job characteristics motivated employees' job crafting behaviours.

Both dimensions of mindfulness could be therefore seen as beneficial in helping employees actively influence their job demands and resources levels. More specifically, the awareness dimensions could be associated with greater work engagement due to greater awareness of resources available as well as greater sensitivity to job crafting opportunities. However, the acceptance facets could be also associated with lower burnout and higher work engagement due to more adaptive emotion regulation strategies that free up employees' energy resources which could be in turn used to seek further resources or to reduce hindering demands. The conservation of resources theory describes such process of personal and job resources accumulation as a gain spiral of resources resulting in resource caravans (Hobfoll, 2002; Hobfoll, Halbesleben, Neveu, & Westman, 2018). On the other hand, a low level of nonjudgmental acceptance of one's thoughts and emotions in response to a perceived lack of resources or hindering demands at work may be associated with maladaptive emotion regulation strategies and self-undermining behaviours resulting in higher burnout and job demands levels over time, i.e., a resource loss spiral (Hobfoll et al., 2018).

Hypothesis 5: Both awareness dimension (i.e. (a) observe facet) and acceptance dimension (i.e. (b) nonjudgement, and (c) non-reactivity) will be negatively associated with job demands at the between-person level.

Hypothesis 6: Both awareness dimension (i.e. (a) observe facet) and acceptance dimension (i.e. (b) nonjudgement, and (c) non-reactivity) will be positively associated with job control at the between-person level.

Hypothesis 7: Both awareness dimension (i.e. (a) observe facet) and acceptance dimension (i.e. (b) nonjudgement, and (c) non-reactivity) will be negatively associated with burnout at the between-person level.

Hypothesis 8: Both awareness dimension (i.e. (a) observe facet) and acceptance dimension (i.e. (b) nonjudgement, and (c) non-reactivity) will be positively associated with work engagement at the between-person level.

There seems to be relatively clear agreement about the observing facet of the FFMQ as representing the attentional or awareness dimension of mindfulness, whereas the nonjudgment and non-reactivity facets are thought to represent the attitudinal or acceptance dimension. However, how to categorise the describing and acting with awareness facets of the FFMQ seems less clear. Lindsay and Creswell (2017) suggested that these two facets did not clearly and discretely measure neither monitoring nor acceptance, hence the MAT theory did not make any specific predictions with respect to these two skills. Considering that the MAAS scale is the source questionnaire of majority of items in the FFMQ subscale of acting with awareness (5 out of the 8 items; Baer et al., 2006), we may look to the research associated with MAAS development. Brown and Ryan's (2004) validation study concluded that an additional acceptance factor did not add any explanatory advantage over the presence factor of the MAAS (acting with awareness facet). And Bergomi et al.'s (2013) review concluded that despite the criticisms of this measure, the MAAS scale (and therefore the acting with awareness facet of the FFMQ) could be considered a concise measure of mindfulness addressing both the attention and the acceptance aspects of mindfulness, yet it did not differentiate one aspect from the other.

With respect to the describing facet of the FFMQ, Strosahl et al. (2015) suggested that an ability to find and apply clear and nonevaluative verbal labels to discriminate between and among internal experiences was a core skill of emotional processing which was closely associated with activation of the frontal cortex areas responsible for downregulating the amygdala and the bottom-up attention. Such reasoning would place the describing facet on a middle point of a continuum spanning between the noticing skills which can serve both bottom-up and top-down attention on one end and the acceptance skills which are clearly in the domain of the adaptive emotion regulation on the other end. No specific hypotheses will be therefore proposed with respect to the direct or moderating effects of the acting with awareness and the describing facet, however, an exploratory analysis will be conducted to shed light on the specific effects associated with these facets.

Method

This study is based on the same sample as Study 1 (chapter 4), however as described above, the main focus of the analyses has now shifted onto the individual facets and onto the *what* and *how* qualities of attention as two-higher order factors of trait mindfulness. Only a brief description of the sample and measures is provided below, for a full description, please refer to the Method section of the Study 1.

Participants and Procedure

Participants were recruited as a voluntary convenience sample among employees of a range of UK-based organisations. They completed an initial questionnaire first, which included measures of trait mindfulness, trait negative affectivity and demographics, before moving on to complete a series of short daily surveys at mid-day and just before the end of each working day for five working days. The short daily surveys included measures of state burnout, state engagement, state job demands and state job resources.

A total of 183 participants expressed interest in the study and completed the initial questionnaire and 144 participants were retained in the final sample following data checking and cleaning (McCabe et al., 2011). On average, participants completed 7.5 daily surveys out of a maximum of ten (M_{survey} = 7.52; *SD* = 3.12). This represents a total of 1083 daily diary entries over the five working days. Participants' average age was 37.05 years (*SD* = 9.6) and 56.6% were female. The average tenure with their current organisation was 5.77 years (*SD* = 6.64; range = 1 to 41 years). In terms of their current job role, 24.8% reported working in a managerial position, 55.9% worked in a professional, non-managerial position and 19.3% held an administrative role.

Initial Survey Measures

Trait mindfulness facets. Mindfulness facets were measured in their dispositional, trait form using the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The five trait facets reflect a general tendency to be mindful in daily life: observing or noticing internal and external stimuli (e.g., "I pay attention to how my emotions affect my thoughts and behaviour"), describing (e.g., "I'm good at finding the words to describe my feelings"), acting with awareness (e.g., a reverse scored item "I find it difficult to stay focused on what's happening in the present"), nonjudging of experience (e.g., a reverse scored item "I criticise myself for having irrational or inappropriate emotions"), and non-reactivity to inner experience (e.g., "I perceive my feelings and emotions without having to react to them"). All items were rated on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). The facet scales demonstrated very good reliability: non-reactivity α = .71; observing α = .74; acting with awareness α = .82, describing α = .82, and non-judging α = 88.

Trait negative affectivity. The negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988) was used to assess trait or dispositional tendency to experience negative affect. The total of 10 mood items under 'general / on average' instruction was rated on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Cronbach's α was .87.

Demographic variables. One-item measures assessed gender, age, tenure, and role.

Daily Survey Measures

The short daily surveys comprised of state measures of job demands, job resources, burnout and work engagement.

State (proximal) job demands and control. Specific, proximal job demands were operationalised as time pressure and conflicting demands using items drawn from a measure of perceived work characteristics developed by Haynes, Wall, Bolden, Stride and Rick (1999). The job demands were measured by three items thought to reflect the nature and complexity of jobs in today's knowledge organisations where employees work under tight deadlines and deal with multiple stakeholders ("To what extent did you find yourself meeting the following problems in carrying out your work this morning / afternoon …. I didn't have enough time to carry out my work," "I could not meet all the conflicting demands made on my time at work," and "Professionals made conflicting demands of me."). The items were rated on a 5-point Likert scale ranging from 1 (*to a very little extent*) to 5 (*to a very large extent*). The specific, proximal job resources were operationalised as control and were also measured by three items (e.g., "To what extent did you choose what work you carried out?"). A multilevel reliability (2-level alpha reliability) coefficient was estimated using multilevel confirmatory framework analysis (mCFA approach) in Mplus: the job demands scale was found to be more reliable at the between-person level (α = .896, 95% CI [.864, .929]) than within persons (α = .707, 95% CI [.667, .747]). Similarly, the job control scale also demonstrated higher reliability at the between-person level (α = .872, 95% CI [.826, .919]) than within persons (α = .660, 95% CI [.611, .709]). In line with Nezlek's (2017) recommendations for calculating

reliability in studies of within-person variability, the above estimates of reliability for both scales are considered good or acceptable at both levels.

State burnout. Six items drawn from the Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) were used to assess state burnout along its three dimensions: physical fatigue (e.g., "I feel tired"), emotional exhaustion (e.g., "I feel I am unable to be sensitive to the needs of colleagues and customers"), and cognitive weariness (e.g., "My thinking process is slow"). Items were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). Again, 2-level alpha was calculated to establish the scale reliability at each level separately. The state burnout scale displayed very good reliability at both between- (α = .934, 95% CI [.916, .952]) and within-person level (α = .864, 95% CI [.852, .875]).

State work engagement. Six items from the UWES-9 (Schaufeli, Bakker & Salanova, 2006) were used to measure episodic work engagement along its three dimensions: vigour, dedication and absorption. Items were rated on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*extremely*). The state work engagement scale displayed very good reliability at both between-person (α = .932, 95% CI [.915, .949]) and within-person level (α = .877, 95% CI [.867, .888]).

Analytic Strategy

The data analysis proceeded in three main phases. The first phase of the analysis extended the confirmatory factor analyses (CFA) conducted on the full 39-item FFMQ in Study 1 in order to compare a limited number of models suggesting existence of two higher-order factors of mindfulness in line with the alternative conceptualisations of the *what* and *how* skills proposed in the literature. The following six models were tested: (a) a correlated five-factor model as a baseline against which the alternative models featuring higher-order factors could be compared, (b) a

hierarchical five-factor model with the five facets loading onto a single latent higher-order mindfulness factor, (c) the MAT model specifying nonjudgment and non-reactivity as a higher-order acceptance factor and observe, describe and acting with awareness as separate, individual factors, (d) the DBT model specifying observing, describing and acting with awareness as loading onto the higher-order *what* factor and nonjudgment and non-reactivity as loading onto the higher-order *how* factor, (e) Tran et al.'s (2013) exploratory model specifying observing and describe facets as loading onto the higher-order factor of self-regulated attention (SRA) and acting with awareness, nonjudgment and non-reactivity as loading onto the higher-order factor of orientation to experience (OTE), and finally (f) Burzler et al.'s (2019) exploratory model suggesting a self-regulation of experience factor as indicated by the observing facet of FFMQ and orientation to experience factor as indicated by acting with awareness, nonjudgment, non-reactivity and describe.

Model fit was evaluated using the following benchmarks proposed in the literature: comparative fit index (CFI), the Tucker-Lewis index (TLI) with values ≥.95 indicating a good fit and values ≥.90 indicating an acceptable fit, the root mean square error of approximation (RMSEA; good fit: <.06), the standardized root mean square residual (SRMR; good fit: <.08),the chi-square model test, and the Akaike information criterion (AIC) as a measure of model parsimony with the lower the value, the better the fit (Akaike, 1974; Hu & Bentler, 1999). Based on the results of the first phase of analysis, the next phase would then proceed to test the individual factors from the best fitting model with respect to the moderating hypotheses proposed at the within- and between-person level.

The second phase of the analysis tested the moderating hypotheses with respect to the best fitting factors. A series of unconflated multilevel models (UMM)

was used to test the hypothesised moderated effects at both levels of the hierarchy using full information maximum likelihood (FIML) estimation (Heck & Thomas, 2015; González-Romá & Hernández, 2017; Preacher, Zhang & Zyphur, 2016). The UMM requires that person-mean centered state variables (reflecting only the within-person variance) are entered at the within-person level (L1) and that the grand-mean centered person means (reflecting the between-person variance) are introduced at the between-person level (L2) of the model to allow for testing of associations between predictors and outcomes at both levels of the hierarchy separately. Specific unconflated interaction terms were identified between trait (L2) and state variables decomposed into their within (L1) and between (L2) components: i.e., the trait characteristic moderating the within-person associations (a true cross-level interaction) and the trait characteristic moderating the between-person effects operating at the person level.

Due to a high complexity of the moderation terms at the within- and between-person level, a series of unconflated multilevel models was calculated for each trait mindfulness facet with respect to the two dependent variables separately. For each facet and dependent variable, Model 1 examined the direct effects of trait negative affectivity (control variable), the respective trait mindfulness facet, and individual differences in the job demands and job control (person-means capturing the overall level of the variables over the five days as between-person variables) at the person-level of the analysis as well as the episodic (within-person) fluctuations in job demands and control at the episodic (within-person) level. In Model 2, two-way interaction terms at the episodic-level were added and Model 3 examined the incremental effect of the three-way interaction term between the respective trait mindfulness facet and episodic demands and control at the within-person level. Next,

two-way interactions at the person-level were added in Model 4 and finally, Model 5 examined the incremental effect of the three way interactions between the respective trait mindfulness facets and individual differences in the job demands and job control at the person-level.

The significant interaction terms were examined and graphically displayed using the simple slopes analysis tools provided by Preacher, Curran, and Bauer (2006) and Dawson (2014). The study hypotheses could be accepted upon inspection of whether the pattern of the significant three-way interaction effect corresponded to what had been specified by the hypotheses rather than on basis of the significance of the interaction term itself.

And finally, the third phase of the analysis tested the hypothesised direct relationships among the study variables with respect to the best fitting solution of mindfulness factors. The daily diary data had a hierarchical structure with episodic observations nested within persons and multilevel modelling techniques were used to test the hypotheses in Mplus version 7.3 (Muthén & Muthén, 1998-2015). First, the intraclass correlation coefficients (ICC1) for the daily variables were calculated to examine the degree of nonindependence in the state variables and the proportion of variance attributable to the between- and within-person components. Next, a series of multilevel path models was created to model the direct relationships at both level of the hierarchy.

Results

Confirmatory Factor Analyses of the Higher-Order Factor Structure of Mindfulness (Phase 1)

Results of the confirmatory factor analyses are presented in Table 5 detailing the fit indices for the six CFA models tested to compare (a) the correlated five-factor model of mindfulness, (b) the hierarchical five-factor model with all facets loading onto the single higher-order mindfulness factor and (c – f) the alternative models featuring the proposed combinations of facets under the two higher-order factors. The correlated five-factor model yielded the best fit with the fit indices falling into the good fit range while the five-factor hierarchical model yielded the worst model fit (although still falling into the acceptable range). In comparison, none of the alternative higher-order factor models yielded better model fit than the five-factor correlated model. Of the two-higher order factor models, Tran et al.'s (2013) model yielded the next best fit. Tran et al's (2013) model specified two higher-order factors: self-regulated attention (SRA) factor indicated by observing and describe facet of the FFMQ; and orientation to experience (OTE) factor indicated by nonjudgment, non-reactivity and acting with awareness facet of the FFMQ. Based on these model comparisons, the subsequent analyses will therefore proceed with the five mindfulness factors as measured by the five separate facets of the FFMQ.

Table 5.
CFA Fit Indices for the Six Models

Model	CFI	TLI	RMSEA	SRMR	X^2	*df*	AIC
a) Five-factor model - correlated	**.957**	.944	**.058**	**.054**	125.153	80	3806.800
b) Five-factor model - hierarchical	.935	.920	.070	.094	150.661	85	3822.309
c) MAT model	.940	.924	.068	.082	141.234	82	3818.881
d) DBT model	.936	.919	.070	.095	148.860	84	3822.505
e) Tran et al.'s (2013) model	.942	.927	.066	.085	143.191	84	3816.826
f) Burzler et al.'s (2019) model	.935	.920	.070	.094	150.661	85	3822.309

Note. Indices in boldface indicate a good fit when rounded up or down to two decimal places. AIC = Akaike information criterion; CFI = comparative fit index; DBT = Dialectical behaviour therapy; MAT = Monitor and acceptance theory; RMSEA = root mean square error of approximation; SMRM = standardized root mean square residual; TLI = Tucker Lewis Index.

(a) Five-factor model – correlated refers to the model in which all five facets were allowed to correlate with each other. (b) Five-factor – hierarchical refers to the model in which all five facets were loaded into an overall mindfulness factor. (c) MAT model refers to the model in which nonjudgment and non-reactivity were loaded onto a higher-order acceptance factor and observe, describe and acting with awareness were separate, individual factors. (d) DBT model refers to the model in which observing, describing and acting with awareness were loaded onto the higher-order *what* factor and nonjudgment and non-reactivity were loaded onto the higher-order *how* factor. (e) Tran et al.'s (2013) model refers to the model in which observing and describe facets were loaded onto the higher-order factor of self-regulated attention (SRA) and acting with awareness, nonjudgment and non-reactivity were loaded onto the higher-order factor of orientation to experience (OTE). (f) Burzler et al.'s (2019) model refers to the model in which self-regulation of attention (SRA) factor was indicated by the observing facet and orientation to experience (OTE) factor was indicated by acting with awareness, nonjudgment, non-reactivity and describe facet.

Hypotheses Testing (Phase 2 and 3)

Table 6 displays means, standard deviations, intraclass correlation coefficients (ICC1) and intercorrelations of the study variables. Correlations at the person level are shown in the top part of the table. Intercorrelations of the within-person variables are shown in the lower part. The intraclass correlation coefficient is the ratio of variance between persons to variance within person (Tabachnick & Fidell, 2014). High values imply that the assumption of independence of errors (and measurement) is violated and that the grouping of the observations matters and therefore use of multilevel modelling methods is required to analyse the data. Results showed that 50.3% of variance in burnout and 40.9% of variance in work engagement was

attributable to the within-person level; with 49.7% and 59.1% of variance to be explained at between-person level respectively.

Table 6.
Means, standard deviations, intraclass correlation coefficients (ICC1) and zero-order correlations between study variables

Person-level (trait)	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	1.57	0.50	-												
2. Age	35.05	9.60	-.24**	-											
3. Tenure	5.77	6.64	-.22**	.68**	-										
4. Negative affect	1.84	0.63	.16	-.17*	-.00	-									
5. Observe	3.40	0.59	.14	.03	.01	-.12	-								
6. Describe	3.53	0.64	.16	-.01	-.09	-.21*	.39**	-							
7. ActAware	3.33	0.59	-.03	.06	-.01	-.31**	.16	.27**	-						
8. Nonjudge	3.38	0.75	.06	.07	-.08	-.53**	-.13	.19*	.37**	-					
9. Non-react	3.25	0.55	-.02	.04	.11	-.24**	.23**	.44**	.28**	.24**	-				
10. Mindfulness (total)	3.38	0.39	.10	.06	-.03	-.47**	.49**	.73**	.66**	.59**	.67**	-			
11. Control	3.46	0.78	-.01	.19*	.06	-.16	-.03	.12	.10	.15	.07	.14	-		
12. Demands	2.27	0.83	-.05	.03	.06	.10	-.12	.02	-.01	-.05	-.01	-.06	.07	-	
13. Burnout	2.46	0.87	.03	-.24**	-.19**	.28**	-.09	-.19*	-.24**	-.23**	-.25**	-.32**	-.29**	.35**	-
14. Work engagement	3.63	1.01	-.10	.22**	.19*	-.12	.03	.11	.11	-.01	.26**	.14	.43**	.05	-.45**

Day-level (state)	M	SD	ICC1	1	2	3
1. Control	0.00	0.58	.572	-		
2. Demands	0.00	0.61	.579	-.13**	-	
3. Burnout	0.00	0.74	.497	-.23**	.20**	-
4. Work engagement	0.00	0.74	.591	.26**	-.13**	-.52**

Note: Person-level N = 144. Day-level N = 1083 observations nested in 144 participants. *p<.05; **p<.01

It is of interest to note that - at the between-person level - observe facet was the only mindfulness facet which was not significantly correlated with burnout (r = -.092, *p* = .273) and neither with work engagement (r = .028, *p* = .743) while all of the other four facets were significantly negatively correlated with burnout (describe, r = -.188, *p* = .024; acting with awareness, r = -.243, *p* = .003; nonjudgment, r = -.226, *p* = .007; and non-reactivity, r = -.250, *p* = .002). The non-reactivity facet was the only mindfulness facet which significantly correlated with work engagement (r = .261, *p* = .002). None of the five facets were significantly correlated with neither the mean level of job demands (observe, r = -.122, *p* = .142; describe, r = .017, *p* = .838; acting with awareness, r = -.011, *p* = .897; nonjudgment, r = -.053, *p* = .526; and non-reactivity, r = -.010, *p* = .905) nor with the mean level of job control (observe, r = -.034, *p* = .683; describe, r = .124, *p* = .137; acting with awareness, r = .096, *p* = .249; nonjudgment, r = .146, *p* = .080; and non-reactivity, r = -.071, *p* = .396) at the between-person level.

Hypotheses 1 to 4 stated that awareness and acceptance dimension of mindfulness would act as moderators of the relationships between high-strain and active jobs and their respective outcomes, burnout and work engagement. The moderation results (phase 2 of the analysis) for each trait mindfulness facet with respect to burnout are presented in Table 3 and the moderation results with respect to work engagement are presented in Table 4. Both unstandardized and standardized coefficients are reported (in Table 3 and 4) using STDYX standardization method in Mplus; standardized parameter estimates provide an indication of the strenght of the effect in standard deviation units. For sake of consise presentation of the results, only the final multilevel models are reported in the summary tables below and the nature of the interactions and the simple effects tests to follow-up these interactive effects are described in the text under a high-level heading for each facet.

Finally, a series of multilevel path models was created to model the hypothesised direct relationships between each mindfulness facet and job demands, job control and burnout and work engagement whilst controlling for the influence of trait negative affectivity (Hypotheses 5 to 8; phase 3 of the analysis). The details of the respective model fit and figures including the standardized path coefficients (using STDYX standardization method in MPlus) for each mindfulness facet separately are provided below, under the high-level headings for each facet.

Table 7.

Multilevel Regression Analyses of Trait Mindfulness Facets Predicting Job Burnout

	FFMQ		Observe		Describe	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	-.26*** (.04)	-.19*** (.03)	-.27*** (.05)	-.19*** (.03)	-.26*** (.04)	-.19*** (.03)
Job demands within (JD_w)	.21*** (.04)	.17*** (.03)	.22*** (.05)	.17*** (.04)	.21*** (.05)	.16*** (.04)
$JR_w \times M$	-.16† (.10)	-.05† (.03)	-.14† (.08)	-.06† (.04)	-.11† (.06)	-.05† (.03)
$JD_w \times M$	-.14 (.10)	-.04 (.03)	-.06 (.08)	-.03 (.04)	-.03 (.07)	-.01 (.04)
$JR_w \times JD_w$	.06 (.06)	.03 (.03)	.05 (.08)	.03 (.04)	.06 (.07)	.03 (.04)
$JR_w \times JD_w \times M$	.11 (.16)	.02 (.03)	-.13 (.13)	-.04 (.04)	.03 (.08)	.01 (.03)
Person-level model terms (Level 2)						
Intercept	2.45*** (.06)	3.04*** (.22)	2.44*** (.06)	3.04*** (.22)	2.46*** (.06)	3.04*** (.22)
Negative affectivity	.22† (.11)	.17† (.09)	.25* (.12)	.20* (.09)	.25* (.11)	.20* (.09)
Trait mindfulness facet (M)	-.25 (.18)	-.12 (.09)	-.07 (.12)	-.05 (.09)	-.10 (.10)	-.08 (.08)
Job resources between (JR_b)	-.34*** (.08)	-.32*** (.08)	-.27*** (.08)	-.25*** (.08)	-.32*** (.08)	-.30*** (.07)
Job demands between (JD_b)	.39*** (.07)	.40*** (.07)	.36*** (.08)	.37*** (.08)	.42*** (.09)	.44*** (.09)
$JR_b \times M$	.36† (.20)	.14† (.08)	.18 (.15)	.11 (.08)	.19 (.12)	.11 (.07)
$JD_b \times M$	-.43* (.18)	-.19* (.08)	-.15 (.14)	-.09 (.08)	-.21 (.13)	-.14† (.08)
$JR_b \times JD_b$	.07 (.10)	.06 (.08)	.14 (.09)	.11 (.07)	.02 (.10)	.02 (.08)
$JR_b \times JD_b \times M$	.51* (.26)	.15* (.08)	.26† (.15)	.11† (.06)	.39* (.15)	.18** (.08)
Level 1 residual variance (*SE*)	.571 (.03)		.570 (.06)		.572 (.06)	
Level 2 residual variance (*SE*)	.383 (.06)		.430 (.08)		.401 (.06)	
R^2 (Level 1)	.080		.083		.079	
R^2 (Level 2)	.411		.332		.379	
AIC	2747.080		2757.990		2753.477	

Continued

Table 7. (*Continued*)

Variable	Aware		Nonjudge		Nonreact	
	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	-.27*** (.05)	-.20*** (.03)	-.28*** (.05)	-.20*** (.03)	-.27*** (.05)	-.20*** (.03)
Job demands within (JD_w)	.21*** (.05)	.17*** (.04)	.21*** (.05)	.16*** (.04)	.23*** (.05)	.18*** (.04)
$JR_w \times M$	-.01 (.08)	-.00 (.03)	-.04 (.06)	-.02 (.03)	-.01 (.06)	-.00 (.03)
$JD_w \times M$	-.07 (.08)	-.03 (.04)	-.11 (.05)	-.06 (.03)	-.17† (.09)	-.08† (.04)
$JR_w \times JD_w$	.05 (.08)	.03 (.04)	.05 (.07)	.03 (.04)	.08 (.07)	.04 (.04)
$JR_w \times JD_w \times M$	.14 (.10)	.04 (.03)	.16† (.09)	.06† (.03)	.02 (.12)	.01 (.04)
Person-level model terms (Level 2)						
Intercept	2.47*** (.06)	3.04*** (.22)	2.42*** (.06)	3.02*** (.22)	2.46*** (.06)	3.04*** (.22)
Negative affectivity	.24* (.11)	.19* (.09)	.24* (.11)	.18* (.09)	.24* (.11)	.19* (.09)
Trait mindfulness facet (M)	-.13 (.13)	-.09 (.09)	-.05 (.09)	-.05 (.08)	-.25* (.11)	-.17* (.07)
Job resources between (JR_b)	-.38*** (.09)	-.37*** (.08)	-.31*** (.08)	-.30*** (.08)	-.32*** (.08)	-.30*** (.07)
Job demands between (JD_b)	.36*** (.08)	.37*** (.08)	.32*** (.08)	.33*** (.08)	.39*** (.08)	.40*** (.08)
$JR_b \times M$	.17 (.15)	.10 (.09)	.23† (.12)	.17* (.08)	.25* (.13)	.13* (.06)
$JD_b \times M$	-.29* (.14)	-.18* (.08)	-.27** (.10)	-.21** (.07)	-.02 (.13)	-.02 (.08)
$JR_b \times JD_b$	.08 (.10)	.06 (.08)	.15 (.09)	.11 (.07)	.04 (.09)	.03 (.07)
$JR_b \times JD_b \times M$	.26† (.16)	.12† (.07)	.11 (.12)	.07 (.07)	.29† (.17)	.12† (.07)
Level 1 residual variance (*SE*)	.573 (.06)		.569 (.06)		.570 (.06)	
Level 2 residual variance (*SE*)	.396 (.07)		.402 (.07)		.405 (.07)	
R^2 (Level 1)	.078		.084		.082	
R^2 (Level 2)	.382		.376		.367	
AIC	2754.311		2749.851		2752.148	

Note.
†*p <.10, *p < .05, **p < .01, ***p < .001.*

Table 8.

Multilevel Regression Analyses of Trait Mindfulness Facets Predicting Work Engagement

	FFMQ		Observe		Describe	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	.32*** (.04)	.23*** (.03)	.33*** (.05)	.24*** (.03)	.32*** (.05)	.23*** (.03)
Job demands within (JD_w)	-.12** (.04)	-.09** (.03)	-.12* (.05)	-.10* (.04)	-.11* (.05)	-.09* (.04)
$JR_w \times M$	.10 (.10)	.03 (.03)	-.01 (.11)	-.01 (.05)	.12** (.05)	.07** (.02)
$JD_w \times M$	-.01 (.10)	-.00 (.03)	-.03 (.10)	-.01 (.05)	-.11† (.07)	-.06† (.03)
$JR_w \times JD_w$	.04 (.07)	.02 (.03)	.08 (.06)	.04 (.03)	.08 (.06)	.04 (.03)
$JR_w \times JD_w \times M$	.19 (.16)	.04 (.03)	.23* (.09)	.08* (.03)	.08 (.08)	.03 (.03)
Person-level model terms (Level 2)						
Intercept	3.62*** (.08)	3.70*** (.26)	3.62*** (.08)	3.76*** (.25)	3.62*** (.08)	3.78*** (.26)
Negative affectivity	-.02 (.14)	-.02 (.09)	-.01 (.14)	-.06 (.09)	-.07 (.15)	-.05 (.10)
Trait mindfulness facet (M)	.14 (.23)	.06 (.09)	.14 (.14)	.09 (.09)	.08 (.13)	.06 (.08)
Job resources between (JR_b)	.54*** (.10)	.43*** (.08)	.49*** (.11)	.39*** (.09)	.53*** (.10)	.42*** (.08)
Job demands between (JD_b)	.08 (.09)	.07 (.08)	.07 (.10)	.06 (.09)	.03 (.11)	.02 (.10)
$JR_b \times M$	.36 (.26)	.11 (.08)	-.32† (.18)	-.15† (.08)	-.03 (.15)	-.02 (.08)
$JD_b \times M$	.05 (.23)	.02 (.08)	.01 (.18)	.01 (.09)	.06 (.19)	.03 (.11)
$JR_b \times JD_b$	-.14 (.12)	-.09 (.08)	-.21 (.13)	-.14 (.09)	-.10 (.14)	-.07 (.09)
$JR_b \times JD_b \times M$	-.74* (.33)	-.19* (.08)	-.09 (.21)	-.03 (.07)	-.31 (.22)	-.12 (.09)
Level 1 residual variance (*SE*)	.579 (.03)		.578 (.06)		.575 (.06)	
Level 2 residual variance (*SE*)	.685 (.09)		.696 (.10)		.702 (.11)	
R^2 (Level 1)	.073		.076		.080	
R^2 (Level 2)	.270		.250		.242	
AIC	2830.037		2830.558		2825.751	

Continued

Table 8. (*Continued*)

Variable	Aware		Nonjudge		Nonreact	
	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Day-level model terms (Level 1)						
Job resources within (JR_w)	.33*** (.05)	.24*** (.03)	.33*** (.05)	.24*** (.03)	.03*** (.05)	.23*** (.03)
Job demands within (JD_w)	-.12* (.05)	-.09* (.04)	-.11* (.05)	-.09* (.04)	-.12* (.05)	-.09* (.04)
$JR_w \times M$	-.05 (.12)	-.02 (.05)	.03 (.05)	.02 (.03)	.04 (.05)	.02 (.02)
$JD_w \times M$	-.01 (.08)	-.00 (.04)	.09 (.06)	.06 (.04)	.00 (.07)	.00 (.03)
$JR_w \times JD_w$	.04 (.06)	.02 (.03)	.05 (.06)	.03 (.03)	.06 (.07)	.03 (.04)
$JR_w \times JD_w \times M$	.07 (.10)	.02 (.03)	.01 (.09)	.01 (.03)	-.00 (.10)	-.00 (.03)
Person-level model terms (Level 2)						
Intercept	3.59*** (.08)	3.72*** (.26)	3.60*** (.08)	3.72*** (.25)	3.60*** (.08)	3.74*** (.26)
Negative affectivity	-.07 (.13)	-.05 (.08)	-.16 (.15)	-.10 (.09)	.01 (.14)	-.00 (.09)
Trait mindfulness facet (M)	.00 (.15)	.00 (.09)	-.11 (.11)	-.09 (.09)	.40* (.16)	.23* (.09)
Job resources between (JR_b)	.51*** (.10)	.40*** (.08)	.53*** (.10)	.42*** (.08)	.56*** (.10)	.44*** (.08)
Job demands between (JD_b)	.08 (.11)	.07 (.09)	.08 (.11)	.07 (.09)	.04 (.10)	.04 (.09)
$JR_b \times M$	.14 (.17)	.07 (.09)	.30* (.13)	.18* (.08)	.03 (.18)	.01 (.08)
$JD_b \times M$	-.25 (.17)	-.12 (.09)	.03 (.14)	.02 (.09)	.01 (.20)	.01 (.10)
$JR_b \times JD_b$	-.19 (.13)	-.13 (.08)	-.19 (.12)	-.13 (.08)	-.08 (.13)	-.05 (.08)
$JR_b \times JD_b \times M$	-.36† (.19)	-.14† (.07)	-.15 (.14)	-.08 (.07)	-.44† (.24)	-.15† (.08)
Level 1 residual variance (*SE*)	.581 (.06)		.579 (.06)		.581 (.06)	
Level 2 residual variance (*SE*)	.680 (.11)		.665 (.10)		.648 (.09)	
R^2 (Level 1)	.071		.074		.071	
R^2 (Level 2)	.268		.298		.298	
AIC	2832.241		2826.319		2826.988	

Note.
†*p <.10, *p < .05, **p < .01, ***p < .001.*

Observing facet

Observing facet as a moderator (Phase 2). The moderation results for the observing facet with respect to burnout are presented in Table 7. The three-way interaction term of the trait observing facet of mindfulness and job demands and control was not a significant predictor of intra-individual, episodic fluctuations in burnout (β_w = -0.04, 95% CI [-.11, .03], p = .320) at the within-person level and neither of the mean level of burnout over the five days (β_b = 0.11, 95% CI [.01, .22], p = .081), although the 3-way interaction term at the between-person level was approaching statistical significance. These results therefore fail to provide support for the Hypothesis 1 suggesting that the observing facet would enhance the within-person reactivity to high-strain working episodes with more mindful employees reporting higher state burnout levels. None of the two-way interaction terms were significant at the within- or between-person level, although the two-way interaction term between the observing facet of trait mindfulness and episodic fluctuations in control at the within-person level was approaching significance (β_w = -0.06, 95% CI [-.12, -.00], p = .094). Overall, the final multilevel model explained 8.3% of variance in burnout at the within-person level and 33.2% of variance in burnout at the between-person level.

The moderation results for the observing facet with respect to work engagement are presented in Table 8. The three-way interaction term of the trait observing facet of mindfulness and job demands and control was a significant predictor of intra-individual, episodic fluctuations in work engagement (β_w = 0.08, 95% CI [.03, .13], p = .014) but not of the mean level of work engagement over the five days (β_b = -0.03, 95% CI [-.15, .09], p = .659). Figure 12 illustrates the pattern of the 3-way interaction term at the within-person level. The gradients of all four

simple slopes were statistically significant (simple slope 1 (unst.) = .45, t = 6.73, p < .001; simple slope 2 (unst.) = .30, t = 3.07, p = .002; simple slope 3 (unst.) = .19, t = 2.73, p = .006; simple slope 4 (unst.) = .37, t = 2.89, p = .004). There was a statistically significant difference between simple slope 1 and 3 (slope difference = .26, t = 2.65, p = .008) and this was due to the effect of high/low job demands at high level of trait observe facet.

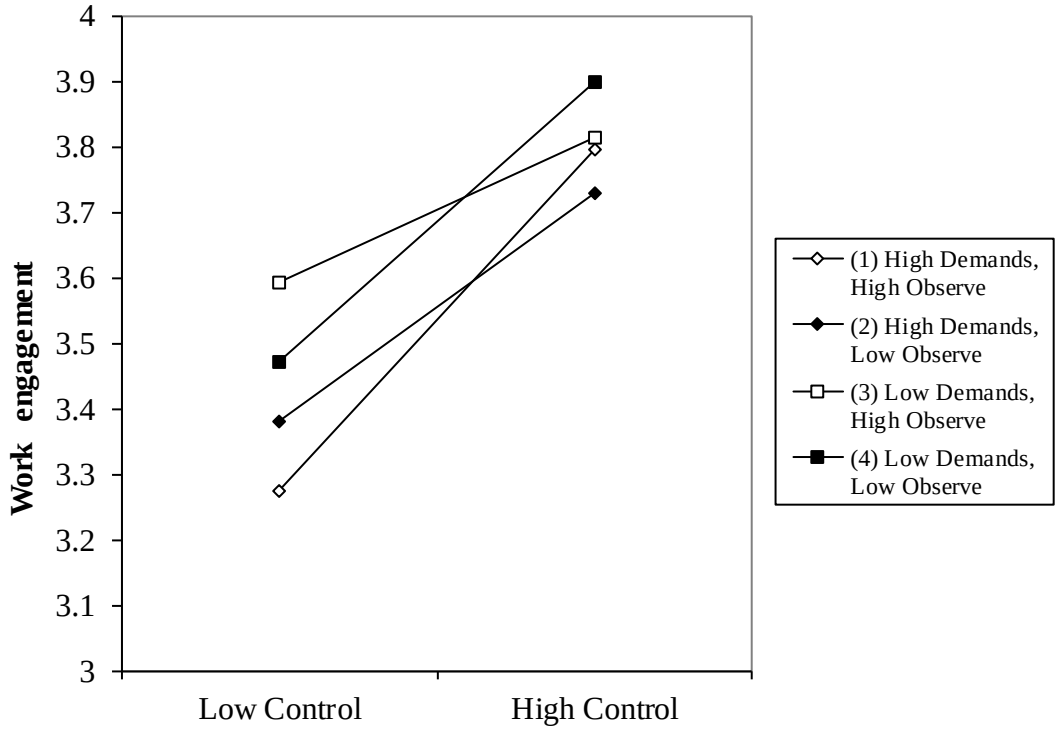

Figure 12. Trait observe facet of mindfulness and job demands as moderators of the positive relationship between job control and work engagement at the within-person level. High/low values correspond to 1 *SD* above/below mean.

An alternative way to illustrate this significant 3-way moderating effect is provided in Figure 13. Only two of the four simple slopes were statistically significant (simple slope 1 (unst.) = -.02, t = -0.23, p = .820; simple slope 2 (unst.) = -.14, t = -2.18, p = .030; simple slope 3 (unst.) = -.26, t = -2.44, p = .015; simple

slope 4 (unst.) = -.07, t = -0.96, p = .339). Figure 13 clearly illustrates that control levels differentiate employees with higher vs lower levels of work engagement overall. However this figure also highlights that in employees high on trait observing facet, control buffers the negative within-person effect of job demands on episodic work engagement (slope 1 vs. slope 3, slope diff. = .24, t = 2.10, p = .036) and this effect is no longer evident in employees low on the trait observing facet (slope 2 vs. slope 4, slope diff. = -.07, t = -.89, p = .372). Contrary to Hypothesis 3, this pattern of simple slopes does not suggest that observing facet would act as a booster of work engagement in active job episodes but rather that the observing facet enables the buffering effect of control in high-demand situations (i.e. slope 1 in Fig. 13 is non-significant and not significant positive which points to buffering rather than boosting effect). Moreover, in employees who scored high (+1 SD) on the observing facet, high-demand work situations were associated with the lowest level of their episodic work engagement in low control conditions (simple slope 3 in Fig. 13).

Despite the significant 3-way interaction effect at the within-person level, these results therefore failed to provide support for the Hypothesis 3 suggesting that the observing facet would boost the positive effect of active working episodes on work engagement. None of the two-way interaction terms were significant at the within- or between-person level, although the two-way interaction term between the observing facet of trait mindfulness and episodic fluctuations in control at the between-person level was approaching significance (β_b = -0.15, 95% CI [-.29, -.02], p = .063). Overall, the final multilevel model explained 7.6% of variance in work engagement at the within-person level and 25.0% of variance in work engagement at the between-person level.

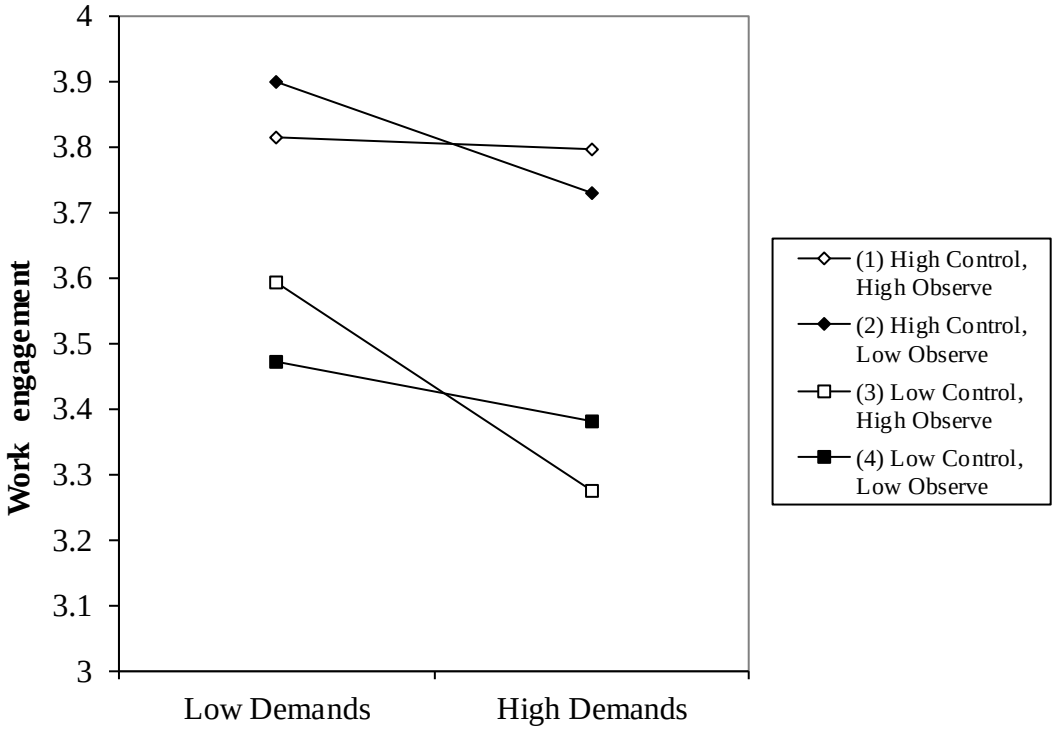

Figure 13. Trait observe facet of mindfulness and job control as moderators of the negative relationship between job demands and work engagement at the within-person level. High/low values correspond to 1 *SD* above/below mean.

Observing facet as a direct predictor of job characteristics and work-related outcomes (Phase 3). The multilevel path model including the hypothesised direct relationships between the attentional, observing facet and job demands, job control and the work-related outcomes whilst controlling for the effect of negative affectivity yielded an excellent model fit (see Figure 3; χ^2 (1) = .282, p = .641, CFI = 1.000, RMSEA = .000, SRMR Within = .000, SRMR Between = .010, AIC = 10714.441). Contrary to Hypotheses 5a and 6a, observing facet was not a significant predictor of job demands (β_b = -0.13, 95% CI [-0.26, 0.01], p = .129) nor job control (β_b = -0.06, 95% CI [-0.21, 0.09], p = .495) at the between-person level. And neither

was the observing facet a significant predictor of burnout (β_b = -0.02, 95% CI [-0.16, 0.11], p = .774) nor work engagement (β_b = 0.06, 95% CI [-0.07, 0.20], p = .437) at the between-person level when controlling for the effect of trait negative affectivity. The hypotheses 7a and 8a were therefore not supported with respect to the observing facet of mindfulness.

Moreover, trait negative affectivity was a significant negative predictor of burnout (β_b = 0.18, 95% CI [0.03, 0.33], p = .044) and in addition to this direct effect, the path model also revealed an indirect relationship between trait negative affectivity and burnout through the individuals' inability to accumulate job control and therefore higher exposure to low control episodes or low subjective perceptions of job control across the work episodes over the five days (NA → job control, β_b = -0.19, 95% CI [-0.34, -0.04], p = .035) at the between-person level (indirect effect NA → burnout, β_b = 0.08, 95%CI [0.01, 0.14]).

Overall, the multilevel path model explained 8.4% of variance in burnout and 7.8% of variance in work engagement at the within-person level and 28.7% of variance in burnout and 22.3% of variance in work engagement at the between-person level.

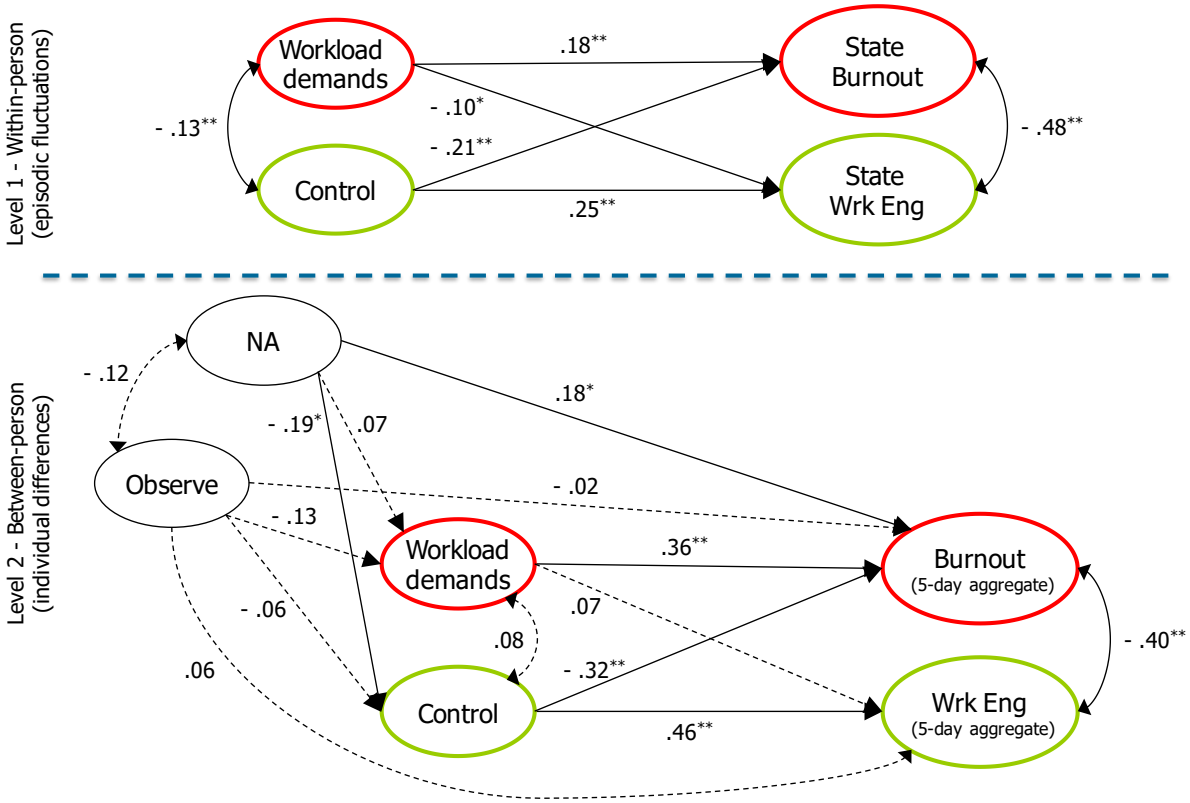

Figure 14. Multilevel path model of the direct relationships between observing facet and job demands, control, burnout and work engagement at the person level.

Describing facet

Describing facet as a moderator (Phase 2). No specific hypotheses were proposed with respect to the describing facet of mindfulness, however an exploratory analysis was run with the describing facet as a personal resource in the role of a moderator in the JD-R. The moderation results for the describing facet with respect to burnout are presented in Table 7. At the within-person level of episodic fluctuations, the three-way interaction term of the describing facet and job demands and control was not a significant predictor of episodic burnout (β_w = 0.01, 95% CI [-.04, .06], p = .662). However, there was a significant 3-way interaction between the describing facet, job demands and control at the between-person level (β_b = 0.18, 95% CI [.07, .29], p = .008).

A closer inspection of this 3-way interaction term revealed that the pattern of the simple slopes closely resembled the simple slopes pattern of the full FFMQ interaction term from the Study 1 (see Figure 4). The gradient of the simple slope number 3 (depicting the high-strain job conditions at the between-person level) was statistically significant (simple slope (unst.) = -.63, t = -2.42, p = 0.017) and the slope differences between slope 3 and the other three slopes were also statistically significant (slope 3 vs. slope 1, slope diff. = .76, 95% CI [.24, .44], p = .005; slope 3 vs. slope 2, slope diff. = .59, 95% CI [.00, 1.18], p = .052; slope 3 vs. slope 4, slope diff. = -.81, 95% CI [-1.47, -.14], p = .019). An employee‘s ability to accurately label and express one’s own feelings in words therefore seems to buffer the negative effects of high demand and low control work conditions on burnout at the between-person level. Overall, the final multilevel model explained 7.9% of variance in burnout at the within-person level and 37.9% of variance in burnout at the between-person level.

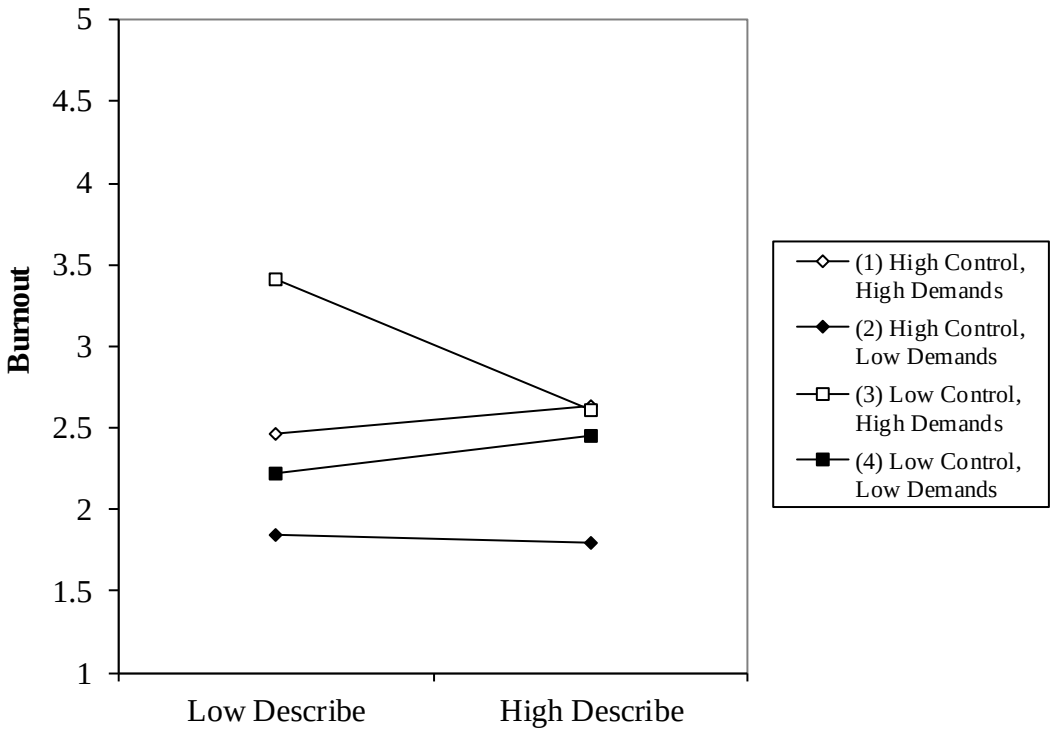

Figure 15. Trait describe facet of mindfulness as a buffer between more enduring high-strain work conditions and burnout at the between-person level. High/low values correspond to 1 *SD* above/below mean.

The moderation results for the describing facet with respect to work engagement are presented in Table 8. None of the three-way interaction terms of the describing facet and job demands and control was a significant predictor of work engagement at the within- or between-person level (β_w = 0.03, 95% CI [-.02, .07], p = .324; β_b = -0.12, 95% CI [-.27, .02], p = .156). There was a significant 2-way interaction term between the describing facet and episodic fluctuations in control at the within-person level (β_w = 0.07, 95% CI [.03, .10], p = .007). The nature of the significant 2-way interaction term between describing facet and job control is illustrated by Figure 16. For employees high in describing facet of trait mindfulness (+1 *SD*), there was a significant positive relationship between job control and work

engagement (simple slope (unst.) = .40, t = 6.85, p < .001) which is weaker but still significant for employees who are low on this trait (-1 *SD*, simple slope (unst.) = .24, t = 4.18, p < .001). And thus employees‘ ability to accurately label and express one’s own feelings in words seems to enhance the positive effect of job control on episodic work engagement at the within-person level regardless of the episodic fluctuations in job demands. Overall, the final multilevel model explained 8.0% of variance in work engagement at the within-person level and 24.2% of variance at the between-person level.

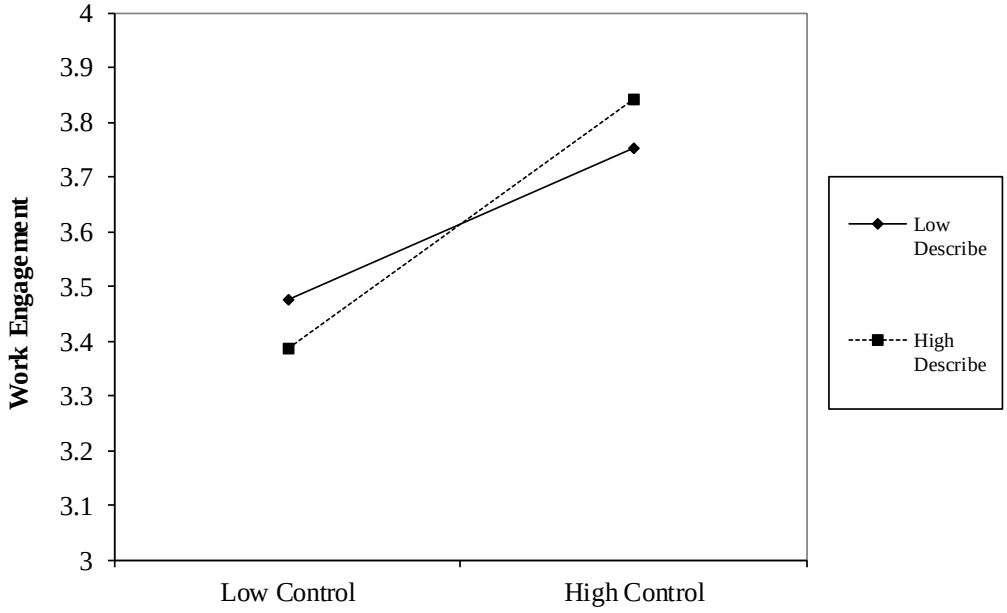

Figure 16. Trait describe facet of mindfulness as a booster of the within-person effect of job control on episodic work engagement. High/low values correspond to 1 *SD* above/below mean.

Describing facet as a direct predictor of job characteristics and work-related outcomes (Phase 3). The multilevel path model including the direct relationships between the attentional describing facet and excessive and conflicting workload demands and job control and the work-related outcomes whilst controlling

for the effect of negative affectivity yielded an excellent model fit (χ^2 (1) = .234, p = .655, CFI = 1.000, RMSEA = .000, SRMR Within = .000, SRMR Between = .009, AIC = 10734.074; see Figure 17). Describing facet was not a significant predictor of job demands (β_b = 0.03, 95% CI [-0.12, 0.19], p = .710) nor job control (β_b = 0.09, 95% CI [-0.06, 0.25], p = .332) at the between-person level. And neither was the describing facet predictor of burnout (β_b = -0.11, 95% CI [-0.25, 0.04], p = .229) nor work engagement (β_b = 0.06, 95% CI [-0.09, 0.21], p = .517) at the between-person level when controlling for the effect of trait negative affectivity. Overall, the multilevel path model including the describing facet explained 8.4% of variance in burnout and 7.8% of variance in work engagement at the within-person level and 29.7% of variance in burnout and 22.3% of variance in work engagement at the between-person level.

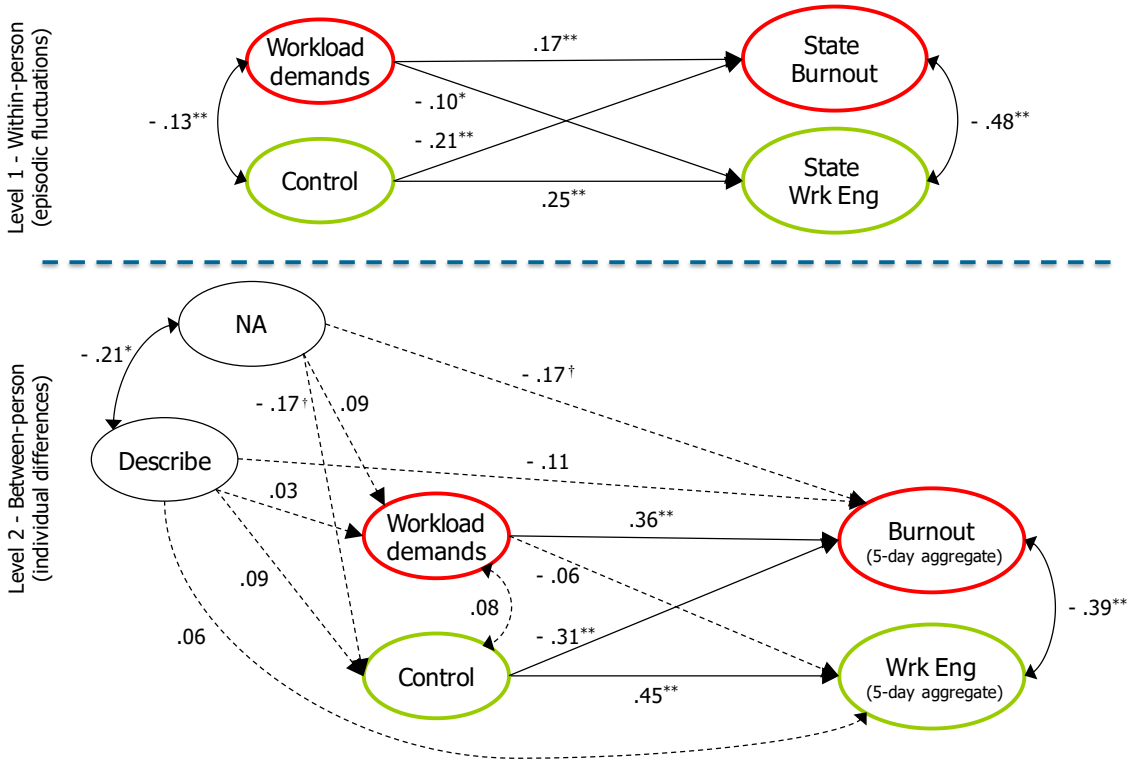

Figure 17. Multilevel path model of the direct relationships between describing facet and job demands, control, burnout and work engagement at the person level.

Acting with awareness facet.

Acting with awareness facet as a moderator (Phase 2). The moderation results for the acting with awareness / aware facet with respect to burnout are presented in Table 7. The three-way interaction term of the aware facet and job demands and control was not a significant predictor of episodic burnout (β_w = 0.04, 95% CI [-.01, .09], p = .163) at the within-person level and neither at the between-person level (β_b = 0.12, 95% CI [.01, .12], p = .087). There was a significant the 2-way interaction term between the aware facet and job demands at the between-person level (β_b = -0.18, 95% CI [-.30, -.05], p = .025). For employees low in trait acting with awareness facet of mindfulness (-1 *SD*), there was a significat positive relationship between job demands and burnout (simple slope (unst.) = .53, t = 4.28, p < 0.001) which appeared weaker and fell just outside the region of statistical significance for employees who were high on this trait (+1 *SD*, simple slope (unst.) = .19, t = 1.92, p = 0.057; also see Figure 7). To summarize, the aware facet buffered the relationship between high job demands and burnout at the between-person level regardless of the job control levels reported by the employees. Overall, the final multilevel model explained 7.8% of variance in burnout at the within-person level and 38.2% of variance in burnout at the between-person level.

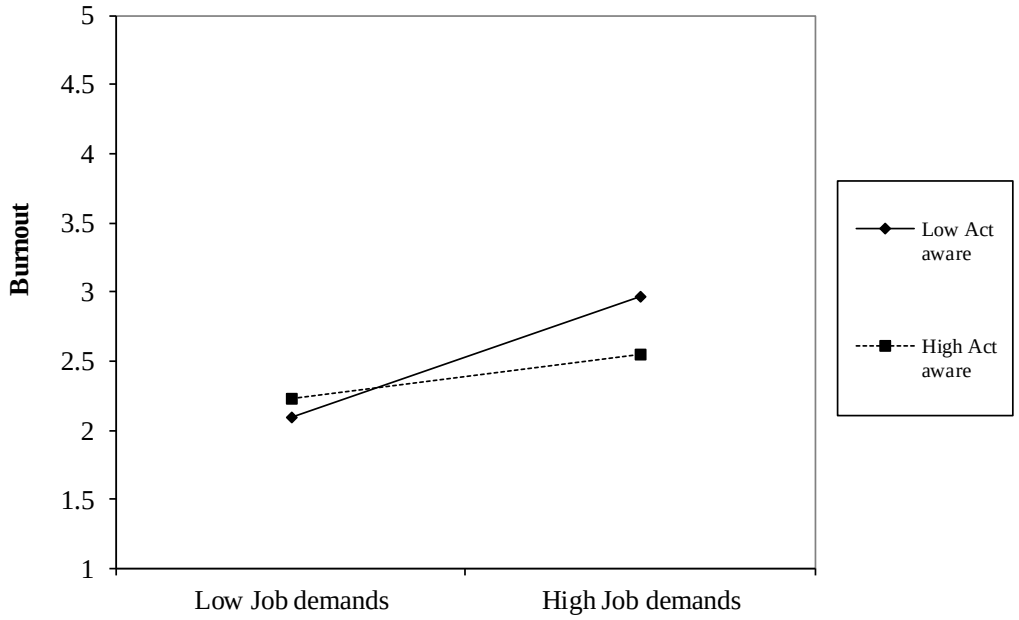

Figure 18. Trait acting with awareness facet of mindfulness as a buffer of the positive relationship between more enduring job demands and burnout at the between-person level. High/low values correspond to 1 *SD* above/below mean.

The moderation results for the acting with awareness / aware facet with respect to work engagement are presented in Table 8. The three-way interaction term of the aware facet and job demands and control was not a significant predictor of episodic fluctuations in work engagement (β_w = 0.02, 95% CI [-.03, .07], p = .485) at the within-person level and it was only approaching significance at the between-person level (β_b = -0.14, 95% CI [-.25, -.02], p = .056). None of the 2-way interaction terms between aware facet and job demands and control were statistically significant at the within- or between-person level. The final multilevel model explained 7.1% of variance in work engagement at the within-person level and 26.8% of variance in work engagement at the between-person level.

Acting with awareness facet as a direct predictor of job characteristics and work-related outcomes (Phase 3). The multilevel path model including the direct relationships between acting with awareness facet of mindfulness and workload demands and job control and the work-related outcomes whilst controlling for the effect of negative affectivity yielded an excellent model fit (χ^2 (1) = .165, p = .682, CFI = 1.000, RMSEA = .000, SRMR Within = .000, SRMR Between = .007, AIC = 10698.252; see Figure 19). Acting with awareness facet was not a significant predictor of job demands (β_b = 0.03, 95% CI [-0.12, 0.18], p = .729) nor job control (β_b = 0.05, 95% CI [-0.12, 0.21], p = .660) at the between-person level. The direct effect of acting with awareness facet on burnout was negative but only approaching the significance threshold (β_b = -0.17, 95% CI [-0.32, -0.02], p = .060) and there was no significant direct effect of acting with awareness on work engagement (β_b = 0.06, 95% CI [-0.10, 0.21], p = .550) at the between-person level when controlling for the effect of job demands, control and trait negative affectivity. Overall, the multilevel path model including the acting with awareness facet explained 8.4% of variance in burnout and 7.8% of variance in work engagement at the within-person level and 31.3% of variance in burnout and 22.1% of variance in work engagement at the between-person level.

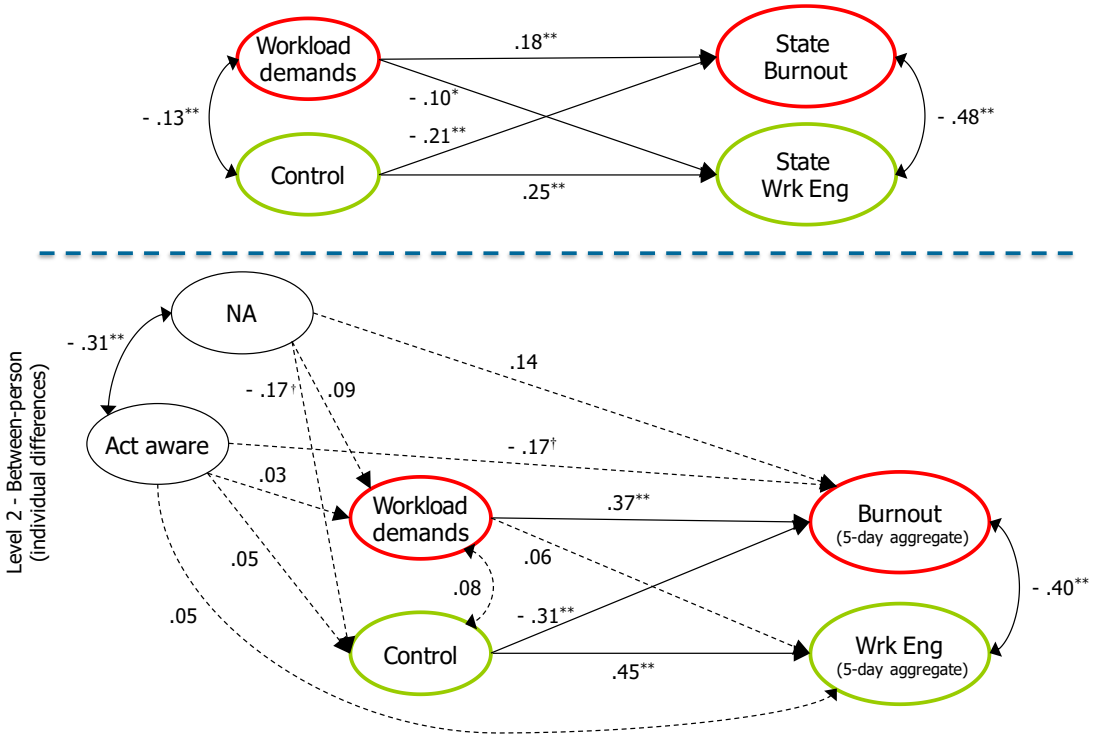

Figure 19. Multilevel path model of the direct relationships between acting with awareness facet and job demands, control, burnout and work engagement at the person level.

Nonjudgement facet.

Nonjudgement facet as a moderator (Phase 2). The moderation results for the nonjudgment facet with respect to burnout are presented in Table 7. The three-way interaction term of the nonjudgment facet and job demands and control fell short of statistical signficance in predicting episodic burnout (β_w = 0.06, 95% CI [.01, .11], p = .059) at the within-person level and it was not significant at the between-person level (β_b = 0.07, 95% CI [-.05, .19], p = .310). However, there was a statistically significant 2-way interaction term between the nonjudgement facet and job demands (β_b = -0.21, 95% CI [-.32, -.09], p = .003) and nonjudgment facet and job control (β_b = 0.17, 95% CI [.03, .31], p = .047) at the between-person level. These 2-way interaction terms are illustrated by Figures 20 and 21.

For employees low in trait nonjudgment facet of mindfulness (-1 *SD*), there was a significat positive relationship between job demands and burnout (simple slope (unst.) = .53, t = 4.98, p < 0.001) which was no longer significant for employees who were high on this trait (+1 *SD*, simple slope (unst.) = .12, t = 1.13, p = 0.263; see Fig. 20). Moreover, nonjudgment facet also acted as a moderator of the negative relationship between job control and burnout at the between-person level. For employees low in trait nonjudgment (-1 *SD*), there was a significat negative relationship between job control and burnout (simple slope (unst.) = -.49, t = -3.60, p < 0.001) which was no longer significant for employees who were high on this trait (+1 *SD*, simple slope (unst.) = -.14, t = -1.24, p = 0.219; see Fig. 21).

To summarize, while the Hypothesis 2a was not supported with respect to the buffering effect of the nonjudgment facet in the high-strain job conditions at the between-person level, the nonjudgment facet buffered the relationship between high job demands and burnout at the between-person level regardless of the job control

levels reported by the employees. Independently of this buffering effect (as suggested by the non-significant 3-way interaction term), the nonjudgment facet also moderated the relationship between job control and burnout. In more judgmental employees job control was negatively associated with burnout regardless of their job demands levels. Whereas in less judgmental employees more enduring control levels over the five days were not associated with burnout. Overall, the final multilevel model explained 7.8% of variance in burnout at the within-person level and 38.2% of variance in burnout at the between-person level.

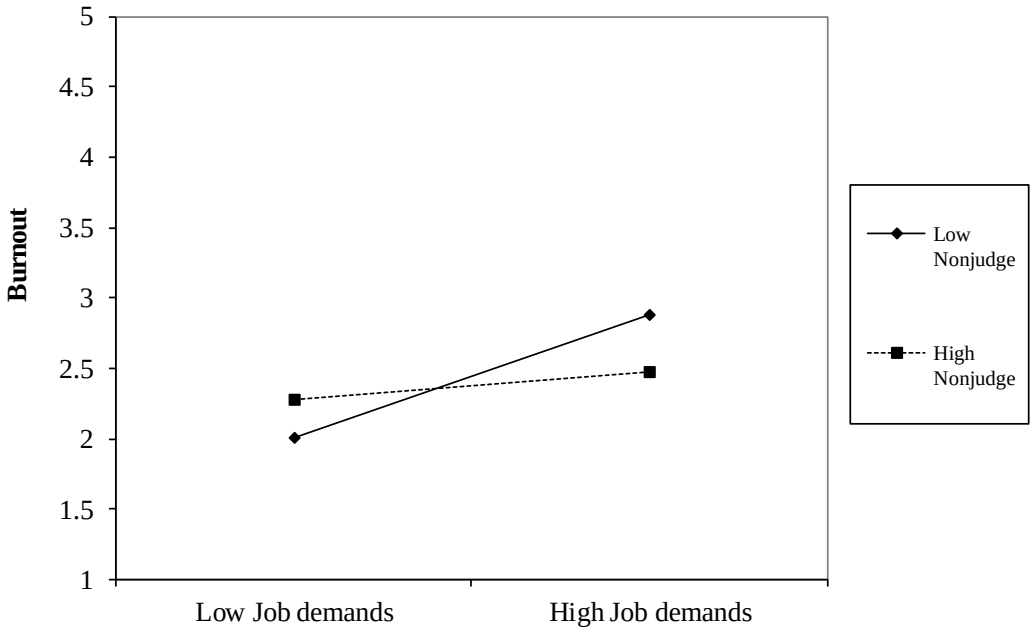

Figure 20. Trait nonjudgment facet of mindfulness as a buffer of the positive relationship between more enduring job demands and burnout at the between-person level. High/low values correspond to 1 *SD* above/below mean.

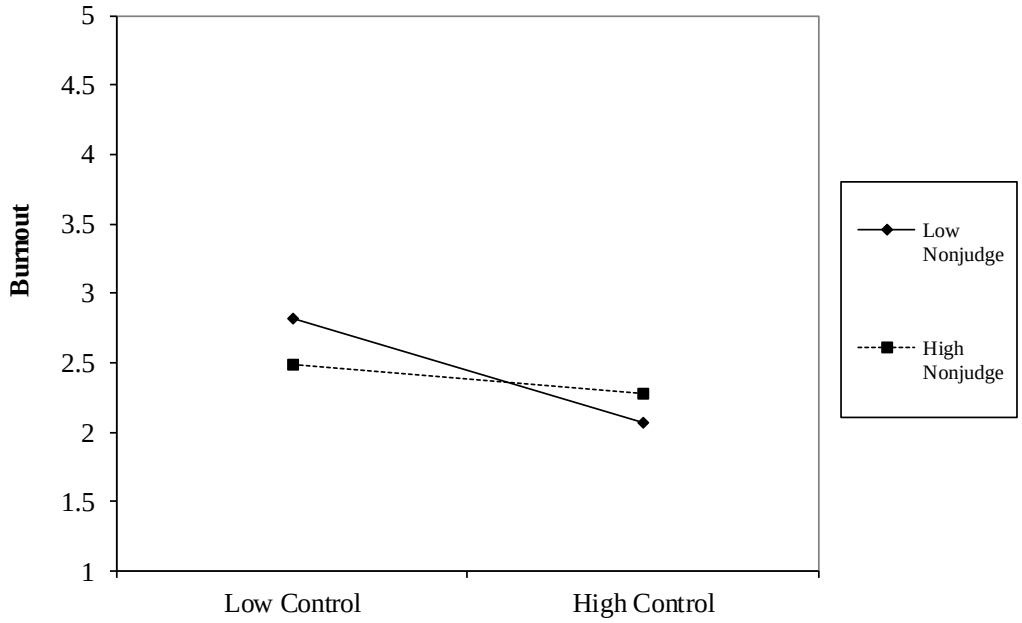

Figure 21. Trait nonjudgment facet of mindfulness as a moderator of the negative relationship between more enduring job control and burnout at the between-person level. High/low values correspond to 1 *SD* above/below mean.

The moderation results for the nonjudgment facet with respect to work engagement are presented in Table 8. The three-way interaction term of the nonjudgment facet and job demands and control was not a significant predictor of episodic work engagement (β_w = 0.01, 95% CI [-.05, .06], p = .889) at the within-person level and neither at the between-person level (β_b = -0.08, 95% CI [-.20, .05], p = .301). However, there was a statistically significant 2-way interaction term between the nonjudgement facet and control at the between-person level (β_b = 0.18, 95% CI [.05, .30], p = .019). The 2-way interaction term is illustrated by Figure 22. For employees high in trait nonjudgment facet of mindfulness (+1 *SD*), there was a significat positive relationship between control and work engagement (simple slope (unst.) = .76, t = 5.90, p < 0.001) which became weaker but still remained

significant for employees who were low on this trait (-1 *SD*, simple slope (unst.) = .31, $t = 2.16$, $p = 0.032$). To summarize, while the Hypothesis 4b was not supported with respect to the boosting effect of the nonjudgment facet on work engagement at the between-person level, the nonjudgment facet enhanced the positive relationship between control and work engagement at the between-person level regardless of the job demands levels reported by the employees. Overall, the final multilevel model explained 7.4% of variance in work engagement at the within-person level and 28.9% of variance in work engagement at the between-person level.

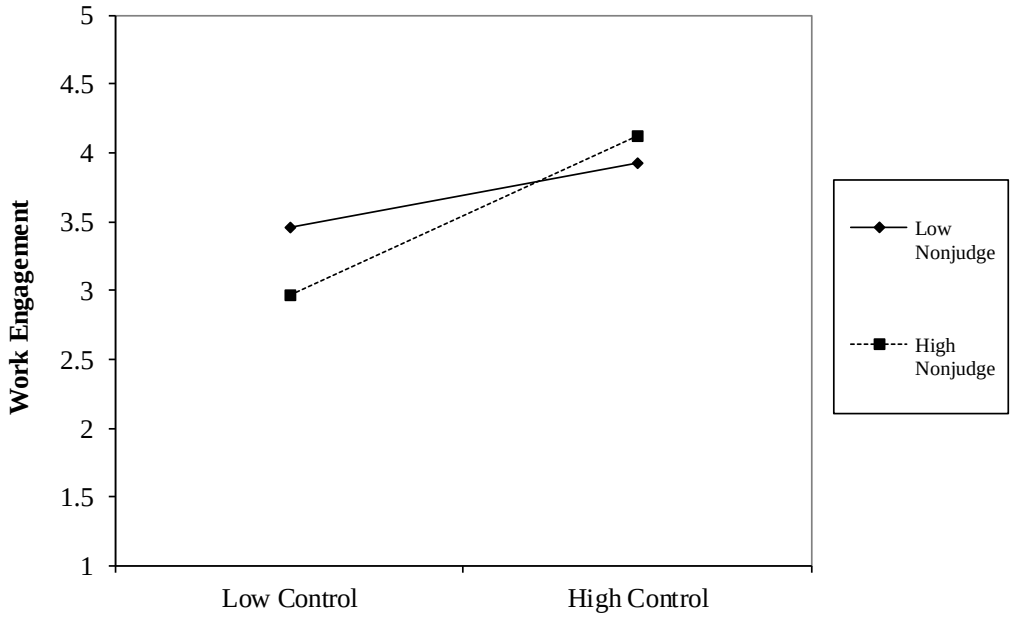

Figure 22. Trait nonjudgment facet of mindfulness as a moderator of the positive relationship between more enduring job control and work engagement at the between-person level. High/low values correspond to 1 *SD* above/below mean.

Nonjudgement facet as a direct predictor of job characteristics and work-related outcomes (Phase 3). The multilevel path model including the hypothesised direct relationships between the attitudinal nonjudgment facet of mindfulness and

excessive and conflicting workload demands and job control and the work-related outcomes whilst controlling for the effect of negative affectivity yielded an excellent model fit (χ^2 (1) = 1.594, p = .207, CFI = .999, RMSEA = .020, SRMR Within = .000, SRMR Between = .020, AIC = 10737.865; see Figure 12). Contrary to Hypothesis 5b and 6b, nonjudgment facet was not a significant predictor of job demands (β_b = -0.02, 95% CI [-0.19, 0.14], p = .820) nor job control (β_b = 0.09, 95% CI [-0.08, 0.26], p = .361) at the between-person level. And neither was the nonjudgement facet a significant predictor of burnout (β_b = -0.11, 95% CI [-0.25, 0.04], p = .223) nor work engagement (β_b = -0.07, 95% CI [-0.22, 0.07], p = .412) at the between-person level when controlling for the effect of job demands, control and trait negative affectivity. The hypotheses 7b and 8b were therefore not supported with respect to the nonjudgment facet of mindfulness. Overall, the multilevel path model including the nonjudgment facet explained 8.4% of variance in burnout and 7.8% of variance in work engagement at the within-person level and 28.7% of variance in burnout and 22.3% of variance in work engagement at the between-person level.

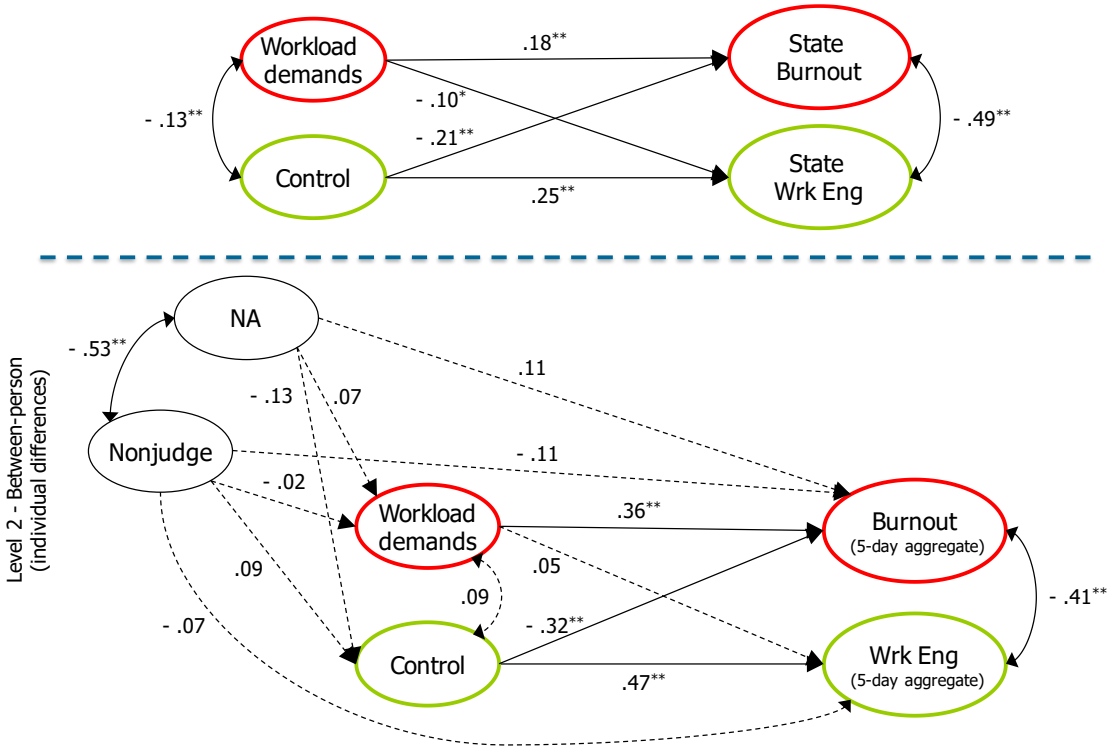

Figure 23. Multilevel path model of the direct relationships between nonjudgment facet and job demands, control, burnout and work engagement at the person level.

Non-reactivity facet

Non-reactivity facet as a moderator (Phase 2). The multilevel moderation results for the non-reactivity facet of trait mindfulness with respect to burnout are presented in Table 7. The non-reactivity facet was a significant negative predictor of burnout (β_b = -0.17, 95% CI [-.29, .05], p = .017) at the between-person level over and above the influcence of trait negative affectivity (which was also a significant predictor of burnout, β_b = 0.19, 95% CI [.04, .33], p = .036) and the job characteristics. The three-way interaction term of the non-reactivity facet and job demands and control was not a significant predictor of episodic burnout (β_w = 0.01, 95% CI [-.06, .07], p = .885) at the within-person level and it was outside the region of statistical significance at the between-person level (β_b = 0.12, 95% CI [.01, .23], p = .077).

There was a statistically significant 2-way interaction term between the non-reactivity facet and control (β_b = 0.13, 95% CI [.03, .23], p = .037) at the between-person level and the 2-way interaction term between non-reactivity facet and job demands at the within-person level was approaching significance (β_w = -0.08, 95% CI [-.15, -.01], p = .063). The significant 2-way interaction term at the between-person level is illustrated by Figure 24. For employees low in trait non-reactivity facet of mindfulness (-1 *SD*), there was a significat negative relationship between control and burnout (simple slope (unst.) = -.46, t = -3.71, p < 0.001) which appeared weaker but was still significant for employees who were high on this trait (+1 *SD*, simple slope (unst.) = -.18, t = -2.08, p = 0.040).

To summarize, while the Hypothesis 2b was not supported with respect to the buffering effect of the non-reactivity facet in high-strain work conditions at the between-person level, the non-reactivity facet moderated the relationship between

job control and burnout at the between-person level regardless of the job demands levels reported by the employees. Overall, the final multilevel model explained 8.2% of variance in burnout at the within-person level and 36.7% of variance in burnout at the between-person level.

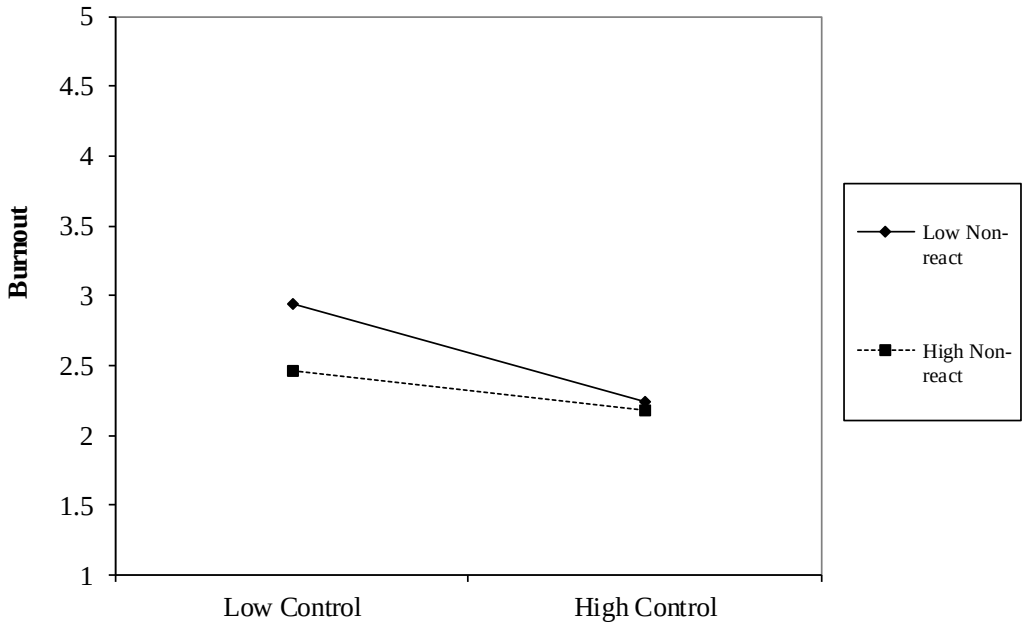

Figure 24. Trait non-reactivity facet of mindfulness as a moderator of the negative relationship between more enduring job control and burnout at the between-person level. High/low values correspond to 1 *SD* above/below mean.

The multilevel moderation results for the non-reactivity facet of trait mindfulness with respect to work engagement are presented in Table 8. The non-reactivity facet was a significant positive predictor of work engagement (β_b = 0.23, 95% CI [.08, .37], p = .010) at the between-person level. However, the three-way interaction term of the non-reactivity facet and job demands and control was not a significant predictor of episodic fluctuations in work engagement (β_w = -0.00, 95% CI [-.06, .05], p = .986) at the within-person level and it was just outside the

statistical significance threshold at the between-person level (β_b = -0.15, 95% CI [-.28, -.01], p = .069). There were no statistically significant 2-way interaction terms at the within- or between-person level. Hypothesis 4c was therefore not supported with respect to the moderating effect of the non-reactivity facet on the relationship between active work conditions and work engagement at the between-person level. Overall, the final multilevel model explained 7.1% of variance in work engagement at the within-person level and 29.8% of variance at the between-person level.

Non-reactivity facet as a direct predictor of job characteristics and work-related outcomes (Phase 3). The multilevel path model including the hypothesised direct relationships between the non-reactivity facet of mindfulness and excessive and conflicting workload demands and job control and the work-related outcomes whilst controlling for the effect of negative affectivity yielded an excellent model fit (χ^2 (1) = .016, p = .914, CFI = 1.000, RMSEA = .000, SRMR Within = .000, SRMR Between = .002, AIC = 10680.569; see Figure 14). Contrary to Hypotheses 5c and 6c, non-reactivity facet was not a significant predictor of job demands (β_b = 0.02, 95% CI [-0.15, 0.18], p = .883) nor job control (β_b = 0.04, 95% CI [-0.11, 0.19], p = .671) at the between-person level. However, the non-reactivity facet was a significant direct predictor of both burnout (β_b = -0.19, 95% CI [-0.30, -0.07], p = .009) and work engagement (β_b = 0.25, 95% CI [0.11, 0.39], p = .004) at the between-person level when controlling for the effects of job demands, control and trait negative affectivity. Therefore, these results provide support for the hypotheses 7c and 8c with respect to the non-reactivity facet of mindfulness. Overall, the multilevel path model including the non-reactivity facet explained 8.4% of variance in burnout and 7.9% of variance in work engagement at the within-person level and

32.3% of variance in burnout and 27.9% of variance in work engagement at the between-person level.

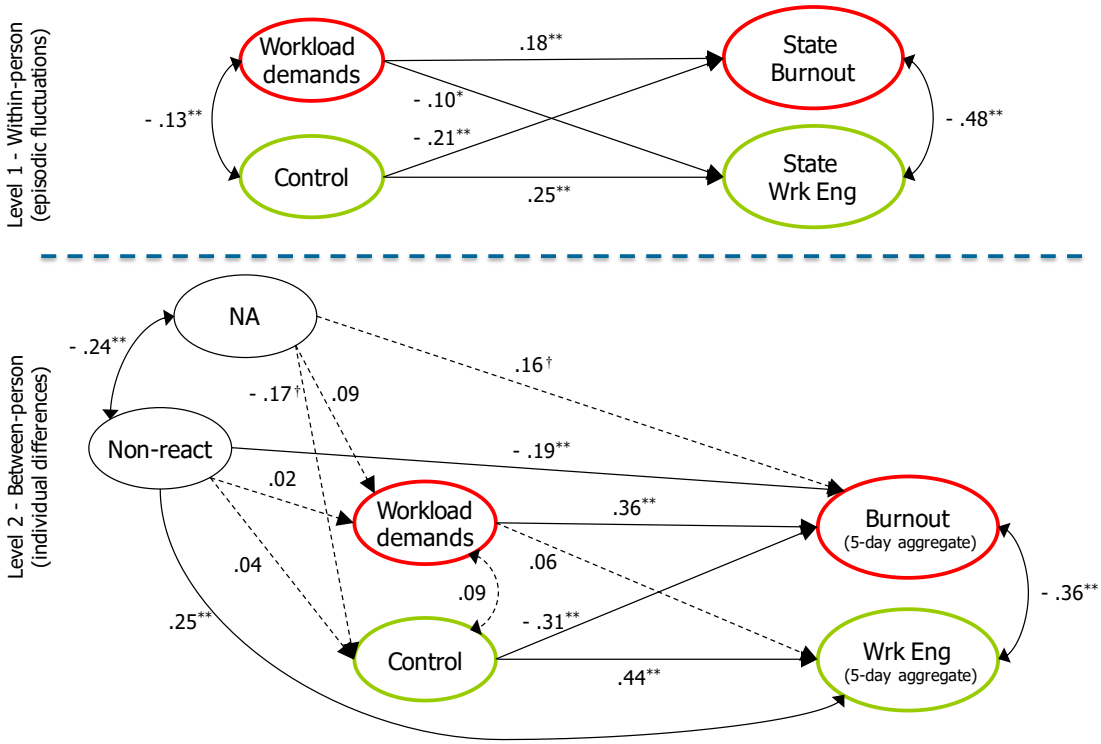

Figure 25. Multilevel path model of the direct relationships between non-reactivity and job demands, control, burnout and work engagement at the person level.

Discussion

This daily diary study examined the five facets of trait mindfulness – observing, describing, acting with awareness, nonjudgment and non-reactivity – in context of the dynamic health-impairment and motivation processes of the JD-R theory. The study extended the findings of study 1 of this thesis which reported that trait mindfulness as a personal resource buffered the relationship between high-strain jobs and job burnout at the between-person level and enhanced the effect of control on work engagement in jobs with manageable demands at the between-person level. The present study aimed to explore whether the buffering effect of trait mindfulness overall was carried in particular by the acceptance dimensions of mindfulness at the between-person level. Drawing on the theories and empirical research highlighting a differential role of the acceptance and awareness dimension of mindfulness, the present study also aimed to explore whether a pattern of enhanced within-person episodic reactivity could be observed with respect to the awareness dimensions of mindfulness at the within-person level.

The research was led by three broad research questions. The first question and analytical phase of the study focused on the psychometric investigation of the alternative proposals of two higher-order factor structures of trait mindfulness described in the mindfulness literature (Burzler et al., 2019; Lindsay & Creswell, 2017; 2019; Linehan, 2015; Tran et al., 2013). The aim here was to find the best fitting arrangement of the five facets of the FFMQ under the two higher-order factors of awareness and acceptance. The results of the psychometric evaluation suggested that the baseline model featuring five correlated factors provided better fit than any of the two higher-order factor alternatives. Based on these results the main

analysis of this study then proceeded with the five separate facets rather than two higher-order factors of awareness and acceptance.

The second research question focused on the differential effect of the FFMQ facets broadly associated with the awareness and acceptance dimension: observe (awareness) and nonjudgment and non-reactivity (acceptance) as moderating personal resources in the energy erosion and motivation process of the JD-R model. It was hypothesised that the awareness dimension of mindfulness would enhance the within-person reactivity to both high-strain episodes and active work episodes (combining high demands and high control) and result in higher levels of self-reported episodic burnout and work-engagement respectively at the within-person level (Hypothesis 1 and 3). It was also hypothesised that the acceptance dimension (as measured by the nonjudgment and non-reactivity facet) would act as a buffer at the between-person level with employees higher in nonjudgment and non-reactivity reporting lower burnout in the high-strain jobs over time (Hypothesis 2a and b). Moreover, both awareness and acceptance dimensions were hypothesized to enhance the motivating impact of active jobs over time and result in higher work engagement at the between-person level (Hypothesis 4a, b, and c).

However, none of these study hypotheses were supported. The awareness dimension (as measured by the observing facet) of mindfulness was not associated with higher within-person reactivity to high-strain work episodes with respect to burnout and neither with higher work engagement in the active job episodes. However, employees' tendency to notice or attend to internal and external experiences (observing facet) was associated with the negative effect of episodic job demands in low-control (high-strain) work episodes on episodic work engagement (resulting in lower work engagement – but not higher burnout - at the within-person

level; see slope 1 vs 3 in Figure 12 and slope 3 vs 4 in Figure 13). Furthermore, the pattern of simple slopes did not suggest that the observing facet would act as a booster of work engagement in active job episodes but rather that the observing facet enabled the buffering effect of control in high-demand situations (see slope 1 in Fig. 13). The interactive (moderating) effects found in this study therefore seem to suggest that while the awareness dimension of mindfulness influenced the within-person reactivity to episodic work demands and control with respect to work engagement (but not burnout), the specific pattern of these effects did not match the study hypotheses.

The acceptance dimension of trait mindfulness was hypothesised to moderate the relationships between high-strain and active jobs and burnout and work engagement at the between-person level. The results did not provide support for the three-way interactive effects specified by the hypotheses. Yet, the two-way interactive effects found with respect to the nonjudgment and non-reactivity facet of FFMQ were generally in line with the hypothesised direction of the effects. The nonjudgement facet buffered the positive relationship between job demands and burnout (regardless of employees‘ job control levels) and both nonjudgment and non-reactivity facet were associated with weaker relationship between job control and burnout (regardless of job demands levels) at the between-person level. Moreover, the nonjudgment facet also enhanced the positive relationship between job control and work engagement at the between-person level.

Finally, the third research question focused on the mindfulness facets as antecedents of job crafting which was expected to result in more favourable job conditions for more mindful employees (i.e. more structural job resources such as control and lower hindering work demands) and more favourable work-related

outcomes (i.e. lower burnout and higher work engagement; Hypotheses 5 to 8). Yet, none of the FFMQ facets was a significant predictor of job control or workload demands after controlling for NA over the five days and therefore the job crafting hypothesis of mindful awareness and acceptance was not supported by these results. Furthermore, despite significant negative bivariate correlations between the non-reactivity, nonjudgment, acting with awareness and describing facets of trait mindfulness and burnout (as per zero-order correlations, see Table 6), only the non-reactivity facet was a significant predictor of burnout (and work engagement) over and above the influence of job demands, control and negative affectivity.

No hypotheses were specified with respect to the describing and acting with awareness facets of the FFMQ as they were not considered to clearly and discretely measure the awareness or acceptance dimension of mindfulness (Lindsay & Creswell, 2017). However, an exploratory analysis of the moderating and direct effects was also conducted. The pattern of results revealed that employees' ability to find and apply clear verbal labels to discriminate among nuanced internal and external experiences (describing facet) buffered the effect of high-strain jobs on employee burnout (at the between-person level). Moreover, the describing facet enhanced the effect of job control on work engagement at the within-person level. Acting with awareness facet then buffered the detrimental effect of high job demands on burnout (regardless of the control levels). Neither describe nor acting with awareness facet was a direct predictor of job demands and resources or the work-related outcomes of burnout and work engagement at the between-person level.

Theoretical Implications

This study extended the findings of study 1 by investigating the awareness (*what*) and acceptance (*how*) dimension of trait mindfulness in the dynamic energy erosion and motivation processes of the JD-R framework. While the theoretical and practical implications of study 1 findings still apply to study 2, this section will focus in particular on additional contributions gained by the more specific (facet-level) focus. This study thus contributes to the occupational health and mindfulness literature in a number of additional ways over the study 1.

The first theoretical contribution is that the present study conducted a psychometric evaluation of the alternative higher-order structure conceptualisations of mindfulness utilising the FFMQ. Tran et al. (2013) and Burzler et al. (2019) have already conducted an exploratory psychometric evaluation of a higher-order structure model of mindfulness (based on an exploratory structural equation modelling approach) in several German-speaking samples, however the present study adopted a confirmatory factor analytic approach to be able to also test theory-based models (Lindsay & Cresswell, 2017; Linehan, 2015) which have not been subjected to a psychometric evaluation yet. The results of this psychometric evaluation remain inconclusive as none of the two-factor higher-order structure models yielded a better fit than the five-factor correlated model whereas all four alternative models could be considered acceptable based on the widely accepted model fit evaluation criteria.

The second theoretical contribution of this study lies in its adoption of the MAT theory (Lindsay & Cresswell, 2017) to guide its understanding of the differential function of mindfulness dimensions in the energy erosion and motivation processes of the JD-R. Previous studies of mindfulness in the work-

related stress, recovery and motivation processes have largely operationalised mindfulness as a unidimensional construct (e.g., Fisher et al., 2019; Haun et al, 2018; Hülsheger et al., 2013; Grover et al., 2016; Lawrie et al, 2017; Tuckey et al., 2018). However, mindfulness has been increasingly viewed as a multidimensional construct and more recent theories of mindfulness highlighted the differential function of its dimensions and thus warranted a more detailed investigation of these dimensions in the work-related contexts.

For example, Liang et al. (2018) conducted a series of studies involving a variety of study designs (experimental, multi-wave field and a daily diary) to investigate the specific role of mindful awareness and mindful acceptance in regulation of aggressive behaviour at work. They reported that mindful awareness but not the acceptance dimension attenuated the relationship between employee hostility towards their supervisor and supervisor-directed aggressive behaviours (such as making fun of or acting rudely towards their supervisor) in an MTurk sample of U.S. and Canadian individuals. Notably, Liang et al. (2018) used the MAAS (Brown & Ryan, 2003; 2004) to measure mindful awareness and the acceptance subscale of the Philadelphia Mindfulness Scale (Cardaciotto et al., 2008) to measure mindful acceptance in their studies highlighting distinct roles of the different dimensions of mindfulness in regulating behavioural aggression in the workplace.

In contrast to Liang et al.'s (2018) conclusions with respect to workplace aggression, Creswell and Lindsay's (2014) stress buffering account of mindfulness and the MAT theory (Lindsay & Creswell, 2017; 2019) focused more specifically on emotion regulation processes and individual well-being, i.e., mental and physical health rather than behavioural outcomes. The MAT tenets specified that while the

present-moment awareness was a core feature of mindfulness, mindful acceptance would act as the critical emotion regulation mechanism in reducing the affective and physiological reactivity particularly in contexts in which participants carried a high stress burden. The JD-R theory of work-related stress and motivation then specified such work contexts as high-demand, low-resource work environments. And study 1 of this thesis has provided empirical support for the synergistic effect of both mindfulness dimensions (i.e., awareness and acceptance as measured by the total FFMQ score) in buffering the detrimental impact of high-strain work environments on employee burnout (at between-person level).

Based on the MAT theory and other theoretical accounts of the differential function of mindfulness dimensions (Strosahl et al., 2015; Teper et al., 2013), the present study then hypothesised that this buffering effect would be carried mainly by the acceptance dimension of mindfulness (i.e., by the nonjudgment and non-reactivity facet of the FFMQ). Despite the non-significant three-way interactive effects reported in this study, an exploratory probing of the two-way interactions seems to suggest that the nonjudgement and non-reactivity facets acted as buffers of the direct relationships between low resources and high work demands and employee burnout. Moreover, acting with awareness facet was also found to buffer the effect of high demands on burnout at the between-person level and thus this study replicated a corresponding finding of Fisher et al.'s (2019) cross-sectional study (which used the MAAS).

The third theoretical contribution of this study pertains to the describing facet. Interestingly, an exploratory analysis revealed that the describing facet of the FFMQ buffered the detrimental effect of high-strain jobs on burnout (in a significant three-way interaction) with the pattern of the simple slopes closely

matching that of the full FFMQ in study 1. Ability to apply clear verbal labels to internal and external experience has not been at the forefront of theoretical development in the mindfulness or occupational health literature. The describing facet of the FFMQ can be traced back to Linehan's (1993) original conceptualisation of the mindfulness *what* skills. Linehan (2015) viewed describing skills as firmly grounded in one's ability to observe with openness what is in our experience and as a sign of greater understanding and clarity about who we are. Similarly, Strosahl et al. (2015) considered describing skills as standing at the core of emotional processing, opening the raw emotional experience observed to the cognitively based top-down processing involving conscious access and control of the central executive network. In line with such theorising, Coffey, Harman and Fredrickson's (2010) empirical study placed the describing facet of the FFMQ under a clarity about one's own experience factor which was found to mediate between mindfulness (acceptance and observing skills) and one's ability to effectively regulate negative affect. The results of the present study suggested that the describing facet may also play an important role in moderating relationships between job characteristics and burnout and work engagement at both within- and between-person level.

Finally, the fourth theoretical contribution of this study was enabled by the daily diary design of the study and use of two different time-frames in closer exploration of the differential effects of mindfulness facets with respect to immediate within-person reactivity to episodic fluctuations in job demands and resources (the within-person trigger patterns) and with respect to more enduring effects of stable job characteristics, recovery processes and individual differences at the between-person level (the maintenance patterns). The concept of trigger and

maintenance patterns was first proposed by Dunkley and colleagues to explain how distinct appraisal and coping action patterns trigger and maintain persistent daily negative affect and low positive mood in individuals with higher levels of self-critical perfectionism over time (Dunkley et al., 2014; 2016). The time-perspective afforded by the distinction between trigger and maintenance patterns has opened up an opportunity to develop an insight into the mindful emotion regulation processes and coping with work-related stress.

A number of theoretical accounts viewed reduced emotional and cognitive reactivity enabled by adopting a decentered, open and accepting perspective to one own's experience as a central mechanism in mindful emotion regulation (Glomb et al., 2011; Gu et al., 2016; Wheeler, Arnkoff, & Glass, 2017). However, this may seem at odds with William's (2010) and Teper et al.'s (2013) argument that basic emotional reactions, underpinned by automatic neurobiological mechanisms and elicited by situational contingencies, had an important signalling function. The perspective of trigger and maintenance patterns can provide us with a theoretical framework to meaningfully accommodate both – seemingly contradictory - views.

In line with the MAT theory, the present study argued that different mindfulness dimensions may exert their differential effects of enhanced or reduced emotional reactivity and that these effects may be observed at different stages of the energy erosion and motivation processes of the JD-R framework. These stages can be captured (using the daily diary methodology) as a pattern of the within-person reactivity to episodic fluctuations in proximal work characteristics (demands and resources), i.e., as the within-person trigger pattern of burnout and work engagement; and as a pattern of the between-person variance, i.e., the more stable and enduring between-person maintenance pattern. The findings of this study with

the awareness dimension of mindfulness moderating the within-person processes and acceptance dimension moderating mainly the between-person maintenance processes seems to lend a tentative, empirical support for such reasoning.

Practical Implications

The practical implications discussed here will focus particularly on the additional insights gained by the specific examination of the mindfulness dimensions. Nonetheless, the practical implications discussed in study 1 with respect to trait mindfulness in the energy erosion and motivation processes are still valid here. For example, organisations would be advised to consider the employees' working environments and in particular availability of job resources such as control so that a mindfulness-based training course designed to alleviate employees' stress level does not inadvertently reduce their work engagement. Anecdotal evidence for such effect has been already mentioned by Hülsheger (2015). Whilst others warned against considering mindfulness to be a panacea for the problems of modern workplaces instead of addressing the toxic work environments first (Rupprecht, Koole, Chaskalson, Tamdjidi, & West, 2019).

For organisations and managers responsible for employee well-being, the findings of the present study show that different dimensions and even facets of mindfulness affect the energy erosion and motivation processes in the workplace in different ways and in different timeframes. The observing facet was associated with enhanced negative effect of episodic changes in work demands on work engagement in low control conditions but no buffering or boosting effect of the awareness dimension was observed with respect to within-person fluctuations in burnout. The nonjudgment and non-reactivity facets (acceptance dimension) then seemed to exert their moderating influence at the between-person level of more

enduring maintenance patterns. Drawing on this pattern of results, mindfulness interventions and attention training designed to enhance individuals' capacity to notice and attend to internal and external experiences may relatively quickly erode employee engagement in non-optimal working conditions without improving employee well-being or motivation unless it also focused on developing clarity about one's own emotions and on the nonjudgmental and non-reactive attitudes. To enhance employee well-being and work engagement, both job design and individual-level interventions may be needed.

Similarly, for individual employees, the practical implications of these results may mean that they can hardly expect an instant relief from their negative affect and frustrations elicited by the high-demand, resource-poor working environments. Instead, by becoming more mindful and observant, employees may become more attuned to the emotional and visceral messaging evoked by the episodic fluctuations in their job conditions. Crucially, the clarity of understanding of their immediate experience and adopting the nonjudgmental and non-reactive stance across multiple iterations of this episodic reactivity may then prevent the negative long-term consequences of the bottom-up, fight-or-flight activation. Yet, further, more longitudinal research is still needed to provide more solid (rather than initial and tentative) empirical evidence for these suggestions.

Strengths, Limitations and Future Directions

The main strengths of the present study lie in its focus on the differential function of the two main mindfulness dimensions in the energy erosion and motivation processes of the JD-R framework at both within- and between-person level simultaneously and in its adoption of the MAT theory to guide the study hypotheses. In addition, this study conducted a psychometric evaluation of the

alternative models of the higher-order mindfulness structure to base its main hypotheses testing on a psychometrically sound model of the two higher-order dimensions. Finally, in response to Baer's (2019) recent call for research into incremental validity of mindfulness measures over neuroticism and negative affectivity, the present study included trait negative affectivity as a control variable in its analyses.

The present study has also several limitations. First, it was argued that mindful awareness and acceptance would enable employees to proactively shape their own work environments through an informal process of job crafting. However, this study did not directly measure job crafting as a study variable, a potential mediator of this effect. Instead, this study assumed that by engaging in the job crafting process, more mindful employees would find themselves in more favourable working environments which could be described as resource-rich and involving manageable levels of job demands. The results of the study have not confirmed such assumptions as none of the mindfulness facets were significantly associated with the mean level of job control or work demands over the five days. It would be recommended that future research exploring possible propensity of more mindful employee to job craft their working environments directly employs one of the validated job crafting measures such as the job crafting scale (Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012; Petrou, Demerouti, & Schaufeli, 2015).

Second, as the present study was based on the same sample as the study 1, the methodological limitations described in the study 1 also apply to this study. In particular, the daily predictors and outcomes variables were assessed repeatedly by self-report measures at the same points in time increasing the probability of

common method variance (CMV). The CMV represents a systematic error variance due to the data collections methods used in the study which may artificially inflate relationships between variables and bias the results (Podsakoff et al., 2003; Podsakoff et al., 2012; Spector, 2006). Yet a simulation study by Siemsen et al. (2010) demonstrated that interaction effects could not be artefacts of CMV as CMV severely deflated any interaction terms in the regression models and thus made it more difficult to detect these effects through statistical means. This conclusion would also apply to the multilevel interaction terms examined here and it is therefore unlikely that the interactions observed in the present study were an artefact of the CMV.

Finally, studies reporting on the differential function of the awareness and acceptance facets of mindfulness generally concluded that these differences were only detected in the non-meditating samples whereas no such differences could be detected among experienced meditators (Baer et al., 2008; Bohlmeijer et al., 2011; Gu et al., 2016). The present daily diary study recruited its participants from a general working population and measured the trait mindfulness facets as individual characteristics naturally occurring in the population without controlling for any prior meditation experience or length of any intentional meditation practice. Whilst the MAT theory does not specifically assume that the differential effects of the awareness and acceptance dimension would be associated with (a lack of) meditation practice, it may be useful to measure, control for and describe the study samples with respect to the participants' meditation experience in future studies.

Conclusion

The aim of the present study was to investigate the dimensions of trait mindfulness (awareness and acceptance) as personal resources in context of the JD-

R framework of work-related stress and motivation. Drawing on the MAT theory positing that mindful awareness and acceptance dimensions would exert differential effects in the stress processes, this study extended such theorizing to include the situational job characteristics involved in the energy erosion and motivation processes of the JD-R unfolding over five days. It was hypothesized that a pattern of enhanced within-person reactivity would be observed with respect to the awareness dimension of trait mindfulness (observing facet) at the within-person level and that a buffering effect would be observed with respect to the acceptance dimensions (nonjudgment and non-reactivity) at the between-person level.

Despite the reported findings providing only little support for the complex conditional effects of the work characteristics and of the mindfulness dimensions on the work-related outcomes hypothesized in this study, results of further exploratory examination of these conditional effects were broadly in line with the hypothesized timeframes and direction of these effects. Although the synergistic effect of the five facets of mindfulness (an overall trait mindfulness score) was associated with lower burnout in high-strain job conditions at the between-person level (in Study 1), the diverse pattern of findings with respect to the individual facets of mindfulness in the present study revealed that this buffering effect was mainly carried by the acceptance dimensions (i.e., nonjudgement and non-reactivity) together with acting with awareness and describing facet. An initial, tentative support was found for an enhanced within-person reactivity (a trigger pattern) associated with the observing facet. The practical implications pertain to the synergistic effect of all of the five facets and emphasize that both mindful awareness and acceptance may be needed for employees to experience the salutary effect of mindfulness at work.

Chapter 6: Do Mindful People Worry Less or Are They Less Vulnerable to the Detrimental Effect of Worry? Trait Mindfulness Dimensions and Work-Related Worry/Rumination in the JD-R Theory.

Abstract

The present study investigated trait mindfulness and its two broad dimensions of mindful awareness and acceptance as personal resources in the JD-R theory. Drawing on the perseverative cognition hypothesis (Brosschot et al., 2006) and theories of active mechanisms of mindfulness (e.g., Lindsay & Cresswell, 2017; 2019), this study examined whether mindful employees worried less when faced with high job demands or whether they were less vulnerable to the detrimental effect of worry. A sample of 173 employees completed weekly diary surveys over three weeks recording a total of 479 weekly diary entries. The results of multilevel path analyses supported the mediating role of work-related worry/rumination in the energy erosion (but not in the motivation) process of the JD-R at the between-person level. The multilevel modelling moderation analyses then supported the buffering role of trait mindfulness in the relationship between job demands and work-related worry/rumination at the between-person level. A more complex pattern of results emerged at the facet level. While the non-reactivity and acting with awareness facets were associated with lower levels of worry/rumination in high demand conditions, the nonjudgment facet was also found to buffer the detrimental effect of work-related worry and rumination on emotional exhaustion at the between-person level. (i.e., at the level of allostatic load reactions and more enduring processes). In contrast, the observing facet was associated with higher within-person reactivity to work-related worry/rumination as an internalised stressor.

Introduction

The overarching aim of the first two studies in this thesis was to examine trait mindfulness in context of the JD-R theory (Bakker & Demerouti, 2017), one of the most popular, well-established frameworks of work-related stress and motivation, which highlights importance of the job characteristics in predicting work-related well-being. Both studies argued that the buffering effect of trait mindfulness (and in particular of its acceptance dimension) on the relationship between more enduring high-strain working conditions (at the between-person level) and employee burnout could be explained by more long-term processes such as reduction in perseverative cognitions, and especially in work-related worry and rumination, over time. Such reasoning is in line with the current theories of mindfulness mechanisms suggesting that one of the underlying mechanisms of mindfulness is a greater awareness of and an ability to disengage from repetitive negative thinking (see review by Gu et al., 2015). While research into effectiveness of mindfulness training suggests that mindfulness is associated with reductions in perseverative cognition and ruminative patterns (e.g., Gaynor, 2014; Hawley et al., 2014; Querstret et al., 2017). Moreover, work characteristics research reports that job demands are associated with diverse patterns of work-related ruminative thoughts linked to both negative and positive outcomes over time (e.g., Kinnunen et al., 2017). Yet, an empirical examination of these propositions in one overarching model including work characteristics as well as mindfulness is still lacking.

The present study will therefore aim to explore the within- and between-person effects of trait mindfulness (and its attentional and attitudinal dimension) in the relationship between work characteristics, work-related worry and rumination and the positive and negative indicators of employee well-being (i.e., job burnout

and work engagement). To be able to tap into the chronic or more enduring nature of these processes, the timeframe of this study will extend to three weeks (as opposed to five days in study 1 and 2). The present study will be guided by the following four broad research questions: (1) Does work-related worry and rumination explain the relationship between job characteristics (both positive and negative) and their respective outcomes (as proposed by the dual pathway of the JD-R theory) over three weeks? (2) Does work-related worry and rumination mediate the relationship between mindfulness and employee burnout and work engagement? And in addition, what is the incremental validity of trait mindfulness and its facets in explaining variance in work-related worry and rumination and the employee outcomes over the influence of the work characteristics and trait neuroticism?

Moreover, study 1 and 2 reported that trait mindfulness (overall and some of its facets) buffered the relationship between high-strain job conditions and burnout. The next research question therefore aims to take a closer look at the mechanisms of this buffering effect: (3) Do more mindful employees worry less when faced with high workload demands? Or are they less vulnerable to the detrimental effect of work-related worry on job burnout? And finally, given the theoretical propositions and empirical evidence for the differential effect of the awareness and acceptance dimensions of mindfulness, the fourth question aims to explore (4) whether we could also observe this differential effect with respect to the moderating role of the awareness and acceptance dimensions of trait mindfulness (in this mediated path through worry) at both levels of the multilevel analysis, i.e. in the within-person reactivity or trigger patterns and in the between-person maintenance patterns.

Work-Related Worry/Rumination as a Mechanism the JD-R Model

Cox and Griffiths (1995) defined work-related stress as an emergent process involving five basic components: (1) the antecedents of the stress experience (i.e., physical and psychosocial hazards inherent to the work environments and design of work); (2) the cognitive processes that give rise to the emotional experience of stress; (3) the psychological, behavioural, and physiological correlates of the emotional experience of stress; (4) the secondary effects of stress involving individual health and social and organisational behaviour and its implications; and (5) the feedback reflecting effectiveness of individual's coping effort. The work-related stress models reviewed in the opening chapters of this thesis (JDC, COR and JD-R) share a clear focus on the situational, work-based antecedents of employees' stress experience (component 1), on the psychological and behavioural correlates of the stress experience (e.g., strain, emotional exhaustion, cognitive weariness or physical tiredness; component 3), and on the secondary effects of the stress process in terms of individual health and well-being outcomes and organisational performance (component 4).

All three theories share a similar view of the stress experience as being objective in its nature, and two of these theories (JDC and COR) explicitly contrasted their propositions with the appraisal-based transactional model of stress. Otherwise, they remain largely silent with respect to the cognitive processes that give rise to the emotional experience of stress (component 2). Moreover, in terms of the proposed mechanisms of action to explain how do workplace characteristics (or a threat of their loss in the case of job resources) result in employee stress experience and the associated health and well-being outcomes, their accounts vary a little, but all seem to ultimately point to the principles of the allostatic load theory

(AL; McEwen, 1998; 2006) as an explanatory theory of the active mechanisms underlying these effects.

For example, the JDC model proposed that the effect of workload demands and decision latitude was mediated by two major pathways: (1) by the lifestyle factors such as smoking, dietary habits etc.; and (2) by the direct effect of the psychosocial factors on the endocrine systems and metabolism (Karasek et al., 1998; Theorell, 2003). The COR theory noted that "there is something quite central and primitive biologically in the acquisition and maintenance of resources" (Gorgievski & Hobfoll, 2008, p. 4) and argued that individuals' intrinsic energetic resources, their energetic states, were key to human functioning. Gorgievski and Hobfoll (2008) directly referred to the AL theory to explain how individuals' energetic resources were mobilised in response to daily activities and demands that they were facing and suggested that fatigue was an adaptive response of the organism signalling a need to restore the balance between its energetic state and these demands. Moreover, a long-term fatigue due to chronic or recurring episodes of individuals' inability to replenish their energy resources lost in attempts to cope with their demands was argued to result in the 'allostatic load' and thus change the biochemical balance of the organism.

As for the active mechanisms implied by the JD-R theory, Schaufeli and Taris's (2014, p. 55) emphasized that the JD-R model's flexibility to accommodate a wide range of job characteristics came at a price of its explanatory power. In their critical review of the JD-R model, they suggested that the model specified "what kind of job and personal characteristics lead to what kind of psychological states and outcomes but it does not tell us why this would be so." They argued that this inability to provide insight into the psychological mechanisms implied in the

proposed effects was an important limitation of the model and that additional, more specific explanatory frameworks were needed to account for the hypothesized associations between specific demands, resources and outcomes.

Yet, Demerouti et al. (2001, p. 501) hinted on such an explanatory theory in the core of the JD-R model, when they defined job demands as "physical, psychological, social, or organisational aspects of one's job that require sustained physical or mental effort and are therefore associated with certain physiological and/or psychological costs (e.g., exhaustion)." And more importantly, they suggested that job demands were not considered as negative per se, but only became detrimental to employee health and well-being in situations when meeting those demands required high effort from which employees had not had sufficiently recovered. This assertion opened up a research avenue centred around the concept of recovery as an explanatory mechanism for the link between acute stress reactions in response to stressful workplace characteristics and employees' health and well-being outcomes (e.g., Bennett, Bakker, & Field, 2018; Demerouti, Bakker, Geurts, & Taris, 2009; Geurts & Sonnentag, 2009; Meijman & Mulder, 1998; Sonnentag, 2019).

The concept of recovery refers to a process of reversal of the negative physical and psychological strain effects caused by high job demands and stressful events at work so that they would not result in more long-term impairment of employee health and well-being (Sonnentag, 2019; Sonnentag & Fritz, 2015). Recovery is considered essential for employee well-being and the recovery research literature has focused in particular on three recovery-enhancing processes: specific subjective experiences (such as psychologically detaching from work during nonwork time, relaxation, or mastery), leisure-time activities, and sleep (for the most

recent review of this literature, see Sonnentag, 2019). Sonnentag and Fritz (2015) defined psychological detachment from work as refraining from work-related activities during nonwork time and disengaging mentally from work, i.e., "switching off" from work when not at work or "letting go" of work-related thoughts and activities (Sonnentag & Fritz, 2015).

Yet, it has been noted that not all thinking about work during nonwork time was detrimental to employee well-being with empirical studies linking positive reflection about work to positive outcomes such as higher work engagement (Flaxman et al., 2018) and increase in affective well-being (Meier, Cho, & Dumani, 2016; Sonnentag & Grant, 2012). A more recent stream of research has therefore focused more closely on examination of the negatively-valenced work-related cognitions experienced by employees during their nonwork time, i.e., work-related worry and rumination (Berset et al., 2011; Flaxman, Ménard, Bond, & Kinman, 2012; Flaxman et al., 2018; Kinnunen et al., 2017; Querstret & Cropley, 2012; Syrek, Weigelt, Peifer, & Antoni, 2017; Vahle-Hinz, Bamberg, Dettmers, Friedrich, & Keller, 2014; Wang et al., 2013). And thus, negative thinking about work (such as affective rumination) rather than positive work reflections in nonwork time was specifically suggested to prevent psychological detachment from work and impair the recovery processes.

Moreover, according to the perseverative cognition hypothesis, work-related worry and rumination could act as mediators through which the environmental stressors exercised their effects on the body's physiological and neurovisceral systems over time (Brosschot, Gerin, & Thayer, 2006; Ottaviani, Thayer, Verkuil, Critchley, & Brosschot, 2017). A recent meta-analysis of perseverative cognition and somatic health outcomes in 60 studies of healthy subjects, reported that

perseverative cognition was clearly associated with cardiovascular, autonomic, and endocrine nervous system activity (e.g., blood pressure, heart rate, heart rate variability, and cortisol; Ottaviani et al., 2016).

Although worry and rumination are considered distinct forms of cognitions – one concerned with the future whereas the other reminiscing about the past - they are both underpinned by a similar cognitive process of perseverative cognition. Brosschot et al. (2006, p. 114) defined perseverative cognition "as the repeated and chronic activation of the cognitive representation of one or more psychological stressors." Perseverative cognitions were proposed to act as mediators in the stressor-strain relationship but also to become stressors in themselves as they take on the activating function of the environmental stressors in situations when these stressors are no longer present. The ongoing physiological activation associated with perseverative cognitions can serve as an explanatory psychophysiological mechanism underlying the stress-disease link. The perseverative cognition hypothesis can be therefore used as a theoretical foundation to conceptualise some of the cognitive processes that give rise to the emotional experience of stress (i.e. component 2 of Cox and Griffiths's (1995) process model of stress mentioned above), especially over extended periods of time.

Furthermore, all three work-related stress models reviewed in the chapter 2 of this thesis (JDC, COR and JD-R) clearly emphasised importance of the more enduring, chronic processes triggered by the unfavourable constellations of work characteristics over their acute, episodic effects when it comes to development of job burnout and erosion of work engagement. For example, Karasek et al. (1998) suggested, that in contrast to previous stress theories which were developed to describe acute stress reactions in situations threatening an individual's survival (e.g.,

Cannon's fight-or-flight response and Seyle's general adaptation syndrome), the JDC model was specifically "developed for work environments in which stressors are chronic, not initially life threatening," (Karasek et al., 1995, p. 327). Similarly, the COR theory described stress as a dynamic process of resource loss sequences unfolding over time (Hobfoll, 1989; Hobfoll et al., 2018). And whilst a single episode during which an individual's resources would be lost or threatened was suggested to be perceived as stressful, it was the long-term effect of the resource loss spirals of increasing momentum and magnitude which was proposed to result in job burnout over time.

A more enduring or long-term view of the stress process is also supported by the perseverative cognition hypothesis, which suggests that the crucial pathogenic property of "preservative cognition is not in its acute, short-term effects on any given system (i.e., intensity or amplitude), but rather its duration and the inadequate autonomic and emotional regulation associated with it" (Brosschot et al., 2006, p. 115). Brosschot et al. (2006) argued that the perseverative cognition hypothesis of stress should be viewed as representing an "allostatic load" model rather than "reactivity" model.

This line of thinking closely reflects the theoretical implications of research findings with respect to the within- and between-person level of analysis in daily / weekly diary studies of the stressor-strain relationships (for review see Pindek et al., 2019). The within- and between-person components of daily variables are independent of each other. While the within-person component of variance (and associated findings) represents an individual's fluctuations around their characteristic mean levels over the studied period of time (and therefore could be thought of as the "reactivity" model), the between-person variance could be

conceptualised as the "allostatic load" model tapping into the more enduring processes over time (in line with Ilies et al.'s (2016) propositions and calls for the multilevel framework of employee well-being).

Such long-term view was also adopted by Kinunnen et al. (2017) to identify patterns of work-related rumination in a 2-year longitudinal study using a person-centred approach. They identified five stable patterns of rumination ((1) no rumination, (2) moderate detachment from work, (3) moderate rumination combined with low detachment, (4) affective rumination, and (5) problem-solving pondering). The moderate levels of rumination combined with low detachments and affective rumination patterns were indeed found to be associated with the highest level of job demands and higher job exhaustion, more sleeping problems and lower work engagement over the two years.

Drawing on the perseverative cognition hypothesis, the present study will therefore examine the concept of work-related worry and rumination as a mediator between the proximal work characteristics (job demands and job control) and emotional exhaustion and work engagement at the between-person level (in the "allostatic load" model which could be also described as the maintenance pattern of emotional exhaustion and work engagement). Furthermore, this study will also examine the within-person reactivity to work-related worry/rumination as an internalised stressor of the "reactivity" model proposed by Brosschot et al., (2006) or alternatively as a trigger pattern of emotional exhaustion and work engagement at the within-person level. This study thus hypotheses that:

Hypothesis 1: Job demands will be positively associated with emotional exhaustion at the between-person level and this relationship will be mediated by work-related worry.

Hypothesis 2: Job resources will be positively associated with work engagement at the between-person level and this relationship will be also (at least partially) mediated by lower levels of work-related worry.

Hypothesis 3: Weekly fluctuations in work-related worry will be positively associated with weekly fluctuations in (H3a) emotional exhaustion and (H3b) negatively associated with work engagement at the within-person level.

Mindfulness and Work-Related Worry/Rumination

Sonnentag (2019) recently observed that a certain paradoxical process may be operating when it comes to employees' exposure to high level of job stressors as employees tend to detach less from their jobs in their nonwork time, engage in less physical activity, and report impaired sleep quality. The so-called "recovery paradox" was suggested to lie in a tension between the high need for recovery when the job stressors were high and a reduced likelihood that employees would actually recover from their work-related efforts. Sonnentag suggested that this tension may be explained by several mechanisms such as (1) a high negative activation (e.g., negative affective states (irritation, tension, or anger) and negative cognitions such as rumination); (2) a depletion of energetic resources (resulting in subjective experience of exhaustion and fatigue) and associated depletion of self-regulatory resources and self-control; and (3) a constant technological connectivity to work.

Among the future research directions, Sonnentag (2019) pointed to a possible role of mindfulness in helping employees minimize the negative reactions (i.e., to reduce the negative affective and cognitive activation and depletion of energetic resources) as a typical response to high stress situations. Similarly, Kroon

et al. (2015) briefly outlined how mindfulness could be incorporated as a personal resource in the JD-R model using COR theory arguing that mindfulness could help employees become more aware of resources they might not have noticed otherwise, be more open to the full potential of each resource they encountered and – most importantly, for the purpose of this study - become less vulnerable to negative feelings associated with resource loss and therefore become more resilient to a possible or actual loss of one's job resources. Furthermore, this argument could also include perseverative cognitions such as worry and rumination in face of resource loss as well as the negative feelings.

The present study therefore aims to examine the moderating role of trait mindfulness (and its awareness and acceptance dimensions) with respect to work-related worry/rumination as a mediator of the detrimental effect of high job demands and low control on employee job burnout and work engagement. And while Haun et al. (2018) have already examined state mindfulness at work and at home (using a German version of the MAAS scale) as a buffer in the stressor-detachment model in a five-day daily diary study, the present study aims to focus more specifically on work-related worry / rumination as an important mechanism of the high negative (emotional, cognitive and physiological) activation at both within- and between-person level over an extended period of time.

Mindfulness literature suggests that reduced cognitive and emotional reactivity and reduced rumination and worry were important mechanisms of mindfulness in coping with high-stress situations. For example, Shapiro et al.'s (2006, p. 379) three axiom model of mindful intention, attention and attitude described a meta-mechanism of reperceiving which involved a shift in an individual's perspective to "experience what *is* instead of a commentary or story

about what is." Gu and her colleagues (2015) reviewed six prominent models of mindfulness mechanisms and reported that psychological processes such as greater awareness and disengagement from the repetitive negative thinking, decentering, reduced negative reactivity and improved attentional control and regulation were shared by many of these models which have all found reasonable support in empirical research.

Similarly, Glomb et al.'s (2011) model of mindfulness effects with respect to work performance and employee well-being identified three core processes of mindfulness: decoupling of self from experiences and emotions; decreased use of automatic mental processes, and greater awareness and regulation of the body's physiological response systems, which were argued to result in greater behavioural response flexibility, decreased rumination and improved affective regulation amongst other effects. To this end, Querstret and Cropley's (2013) review of intervention studies reported that mindfulness-based interventions were found to be effective in reducing both rumination and worry.

The present study will therefore examine work-related worry / rumination as a mechanism through which mindfulness could exert its influence on job burnout and work engagement as outcomes of the energy erosion and motivation processes specified by the JD-R theory. It is therefore hypothesised, that:

Hypothesis 4: Mindfulness will be negatively associated with emotional exhaustion at the between-person level and this relationship will be mediated by worry.

Hypothesis 5: Mindfulness will be positively associated with work engagement at the between-person level and this relationship will be also (at least partially) mediated by worry.

Moreover, drawing on Mäkikangas et al.'s (2013) framework to describe the role of personality characteristics in the stressor-strain relationships and on the previous empirical studies reporting the buffering role of mindfulness in the energy erosion process of the JD-R theory (e.g., Fisher et al., 2017; Grover et al., 2016; and the first two empirical studies in this thesis), the present study will also examine trait mindfulness as a moderator with respect to the work-related worry / rumination. Two conceptual configurations of this moderating effect can be specified (see Figure 26): (1) mindfulness could act as a moderator of the relationship between job / workload demands and work-related worry / rumination. This would tap into employees' cognitive reactivity to a work-related stressor as an external experience. Moreover, (2) mindfulness could also act as a buffer in the relationship between work-related worry and rumination and emotional exhaustion. This would tap into employees' emotional reactivity to their perseverative cognitions as an internalised stressor. Furthermore, these relationships can be specified at both levels of the multilevel hierarchy: at the between-person level of the maintenance patterns as well as at the within-person level of more short-term reactivity and trigger patterns. It is thus hypothesised that:

Hypothesis 6: Trait mindfulness will moderate the relationship between job demands and work-related worry at the between-person level with more mindful employees reporting lower levels of worry.

Hypothesis 7: Trait mindfulness will moderate the relationship between work-related worry and emotional exhaustion at both within- (H7a) and between-person (H7b) level.

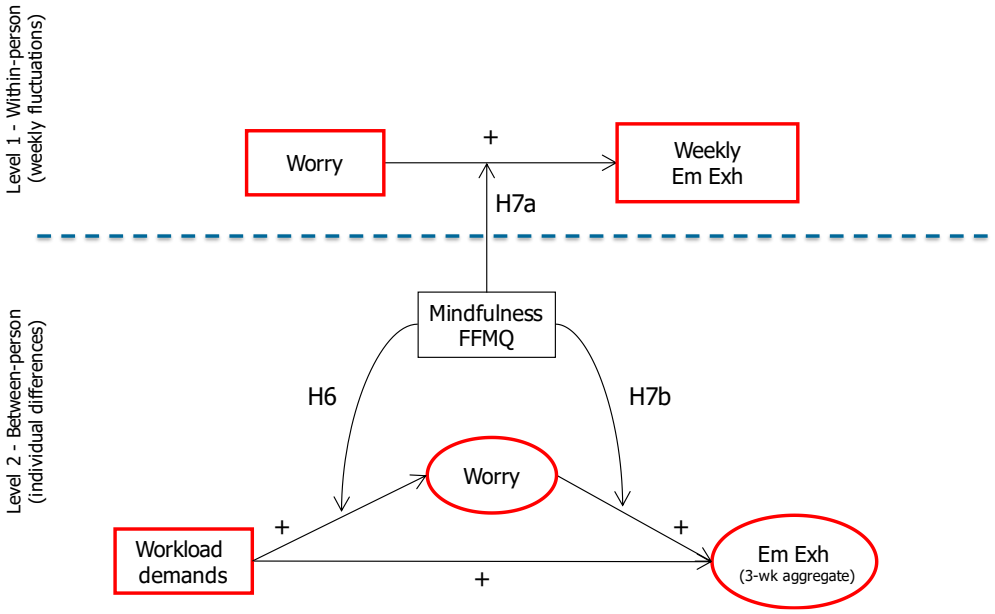

Figure 26. Conceptual model. Trait mindfulness as a moderator of the relationship between job demands and worry at the between-person level and of the relationship between worry and burnout (emotional exhaustion) at both within- and between-person level.

Awareness and Acceptance Dimensions of Mindfulness

In addition, empirical findings and more recent theoretical accounts of mindfulness mechanisms (such as the conditional process model of mindfulness and emotional regulation, CPM; Desrosiers et al., 2014; Curtis et al., 2017; or the monitor and acceptance theory, MAT; Lindsay & Creswell, 2017; 2019) pointed to a differential function of mindfulness dimensions in emotion regulation processes associated with stress and coping. Specifically, MAT theory proposed that awareness dimension of mindfulness (attention monitoring skills as assessed by the observing facet of the FFMQ) enhanced the vividness of the present-moment experience and thus could in turn intensify (both positive and negative) affective

experience and reactivity. Whereas the acceptance dimension of mindfulness (an attitude of nonjudgment, openness and equanimity towards internal and external experience) was considered a critical emotion regulation mechanism in reducing this affective and physiological reactivity.

Such propositions have already found an initial empirical support in studies mapping the individual facets of mindfulness onto symptoms of anxiety and worry. For example, Desrosiers et al., (2013) reported that the non-reactivity facet of mindfulness was negatively associated with symptoms of depression and anxiety while the observing facet was positively associated with anxious arousal in a sample of treatment-seeking adults. Similarly, Fisak and von Lehe (2012) reported that the non-reactivity to inner experience, nonjudgement of inner experience and acting with awareness facets of the FFMQ (and therefore the acceptance dimension) were negative predictors of excessiveness and intensity of worry in a non-clinical sample of adults. Yet, the observing and describing facets of mindfulness were not found to be significantly associated with worry symptoms in their cross-sectional study. While Evans and Segerstrom (2011) reported that the nonjudgment and acting with awareness facets were associated with lower levels of repetitive thought (such as worry), whereas the observing facet was associated with higher levels or repetitive thought.

The present study will therefore also examine the moderating effects of the mindfulness dimensions on the relationships between work-related worry and rumination and emotional exhaustion at both within- and between-person level. Drawing on the MAT theory, it is hypothesised that the awareness dimension will enhance the within-person reactivity to work-related worry as an internalised stressor, whereas the acceptance dimension as measured by the nonjudgment and

non-reactivity facet will act as a buffer in these relationships. It is therefore hypothesised that:

Hypothesis 8: Awareness dimension (observing facet) of mindfulness will moderate the relationship between worry and emotional exhaustion at the within-person level (with employees higher on the observing facet reporting higher within-person reactivity, i.e., higher emotional exhaustion during weeks when they worry more).

Hypothesis 9: Acceptance dimension of mindfulness (i.e., nonjudgement (*H9a*) and non-reactivity facet (*H9b*)) will moderate the relationship between job demands and work-related worry at the between-person level with more accepting employees reporting lower levels of worry.

Hypothesis 10: Acceptance dimensions of mindfulness (i.e., nonjudgement (*H10a*) and non-reactivity facet (*H10b*)) will act as buffers in the relationship between worry and emotional exhaustion at the between-person level (with the acceptance dimensions buffering the positive effect of worry on emotional exhaustion).

Furthermore, study 1 and 2 of this thesis used trait negative affectivity (NA) as a control variable to examine the influence of trait mindfulness on the energy erosion and motivation process of the J-DR over and above the effect of NA. The studies reported a significant negative association between NA and trait mindfulness overall as well as each of the five facets (except for the observing facet). Yet, trait mindfulness was found to predict job burnout over and above the influence of trait NA and the mean level of the proximal work characteristics over five days at the between-person level. This finding provides supporting evidence for the incremental

validity of trait mindfulness in predicting work-related outcomes which has not been examined before and it was pointed out as a neglected topic in the mindfulness literature (e.g., by Bear, 2019).

This may be especially relevant in context of the work-related stressor-strain research. Although, a routine use of NA or neuroticism as control variables in occupational health research has been discouraged as many studies often made little effort to explain why and how controls related to the focal variables of interest (Bernerth & Aguinis, 2016; Spector et al., 2000). There is a number of reasons to include neuroticism as a control variable in the present study. First, previous mindfulness research reported medium to high negative associations between measures of mindfulness and neuroticism ($r = -.56$, Brown and Ryan, 2003; $r = -.45$, meta-analysis by Giluk, 2009; or $r = -.56$, Iani, Lauriola, Cafaro, & Didonna, 2017). While neuroticism as a personality trait had been shown to affect both stressor exposure and the health and psychological outcomes in the stressor-strain relationships (e.g., Bolger & Zuckerman, 1995; Daniels, 2006).

Second, Bear (2019) called for a specific exploration into the incremental validity of mindfulness over these personal characteristics. And third, there is a practical implication in teasing out the unique influence of these related personal characteristics. While neuroticism is considered a stable personality trait, mindfulness was conceptualised as a set of skills which could be trained through meditation or other mindfulness and acceptance-based interventions (Quaglia et al., 2016). Therefore, trait neuroticism will be used in the present study as a control variable at the between-person level.

Method

Participants and Procedure

Participants were recruited as a voluntary convenience sample among employees of a number of international organisations by three MSc-level researchers. Organisations and individual participants were initially contacted by an email with a brief description of the study and a more detailed description of the study was provided upon interest expressed by the individual participants. Participants were informed that they were required to complete a series of four questionnaires over three consecutive working weeks; this involved an initial questionnaire followed by three identical weekly questionnaires sent out at 08:00 GMT every Friday. Participants were asked to complete the weekly surveys by the end of each week (by Sunday) at the latest. All questionnaires were created via Qualtrics, an online survey software platform, and distributed via the software's Qualtrics Mailer. In return for their participation in the study, participants were offered an executive summary of the study results and further information on workplace resiliency resources (e.g., information about mindfulness); no monetary compensation or other incentives were offered.

A total of 223 participants expressed interest in the study and completed the initial questionnaire and 173 participants who completed at least two of the three weekly surveys were retained in the final sample following data checking and cleaning (McCabe, Mack, & Fleeson, 2011). On average, participants completed 2.77 weekly surveys out of a maximum of three (M_{survey} = 2.77; *SD* = .42). This represents a total of 479 weekly diary entries over the three working weeks. Participants' average age was 40.25 years (*SD* = 10.65; range = 24 to 72 years).

There was 114 (65.9%) male and 58 (33.5%) female participants with 1 participant who did not disclose their gender.

Participants were based in 31 different countries across Europe, North, South and Central America, Asia and Australia. Majority of the participants (74%) worked for a large international organisation in the manufacturing sector, 10% of participants worked in education and 16% of participants worked in other sectors such as media and consulting. For 82% of the participants English was their second language and 15.2% of participants were based in the UK. The average tenure with the participants' current organisation was 8.47 years (*SD* = 7.99; range = 1 to 44 years). In their typical working week, participants reported working 47.28 hours per week on average (M_{hours} = 47.28; *SD* = 10.65). In terms of the current job role level, 50 (28.9%) reported working in a non-managerial role, 69 (39.9%) worked in a mid-level managerial or leadership position, and 54 (31.2%) held a senior leadership role.

Initial Survey Measures

Trait mindfulness. Mindfulness was measured as a dispositional trait using the 39-item Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). FFMQ assesses five facets of a general tendency to be mindful in daily life: non-reactivity to inner experience (e.g., "I perceive my feelings and emotions without having to react to them"), observing or noticing of internal and external stimuli (e.g., "I pay attention to how my emotions affect my thoughts and behaviour"), acting with awareness (e.g., a reverse scored item "I find it difficult to stay focused on what's happening in the present"), describing (e.g., "I'm good at finding the words to describe my feelings"), and non-judging of experience (e.g., a reverse scored item "I criticize myself for having irrational or inappropriate emotions"). All items were

rated on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). The scale demonstrated excellent reliability overall (Cronbach's α = .84) as well as in its subscales (non-reactivity α = .72; observing α = .78; acting with awareness α = .84, describing α = .86, and non-judging α = 83).

Work demands. Work demands were operationalized as time pressure and conflicting demands using five items from the perceived work characteristics measure developed by Haynes et al. (1999). An example item was: "I do not have enough time to carry out my work." Items were measured on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*a great deal*). The Cronbach's α was .82 indicating excellent reliability of the measure.

Job control. Job control was measured by six items from the perceived work characteristics measure (Haynes et al., 1999) as control over methods used and scheduling of work activities (e.g., "In your job, to what extent you determine what methods and procedures you use in your work?"). Items were measured on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*a great deal*). The Cronbach's α was .82 indicating excellent reliability of the measure.

Neuroticism. The emotional stability / neuroticism subscale of the Big Five Inventory – 10 (BFI-10; Rammstedt & John, 2007) was used to assess this trait personality characteristic. The items were: "How well do the following statements describe your personality? I see myself as someone who … is relaxed, handles stress well" [reverse scored]; "… gets nervous easily." This two-item scale was assessed on a 5-point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Cronbach's α was .68.

Demographic variables. One-item measures were used to assess gender, age, tenure, working hours in a typical week and role.

Weekly Survey Measures

The weekly surveys included measures of work-related worry/rumination, emotional exhaustion and work engagement. Participants were instructed to complete the weekly surveys at the end of their working week or over the weekend but before the start of the following week. The questionnaire instructions emphasized responding purely with respect to the past working week (Monday to Friday).

Work-related worry / rumination. Three items from the perseverative cognition scale (Flaxman et al., 2012; 2018) were used to assess work-related worry and rumination over the past week: "I worried about things I needed to do at work"; "I worried about how I would deal with a work task or issue"; and, "My thoughts kept returning to a stressful situation at work". Items were scored on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*a great deal*). At each measurement point, Cronbach's α was .85, .88, and .88.

Emotional exhaustion. Work-related exhaustion was measured by five items from the Maslach Burnout Inventory (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996) adapted to reflect responding at the weekly level (e.g., "I felt emotionally drained from my work.") under instruction to respond with respect to the past working week. Responses were rated on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Cronbach's α for each week was .78, .83, and .80.

Work engagement. Six items from the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2003) were used to measure weekly work engagement along its three dimensions: vigor, dedication and absorption (e.g., "I felt enthusiastic about

my job."). Items were measured on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Cronbach's α for each week was .79, .78, and .78.

Analytic Strategy

The data had a hierarchical structure with the weekly observations nested within persons, and multilevel modelling techniques were used to test the hypotheses in Mplus version 7.3 (Muthén & Muthén, 1998-2015). The data analysis proceeded in several phases. First, preliminary analyses examined the bivariate relationships of the study variables and calculated the intraclass correlation coefficients (ICC1) for the weekly variables to examine the degree of nonindependence in these variables and the proportion of variance attributable to the between- and within-person component.

Next, in the first phase of hypotheses testing, multilevel path models were created to test for the mediating paths proposed by the hypotheses 1 to 5. The first multilevel path model included trait mindfulness overall (the total FFMQ score), job demands and job control as the main predictors and neuroticism a control variable. Work-related worry was included as the proposed mediator of their effects on the emotional exhaustion and work engagement at the between person level. The within-person relationship between weekly fluctuations in worry and the work-related outcomes was also modelled at the within-person level. Subsequently, a series of multilevel path models was created with respect to each of the five trait mindfulness facets separately as a basis of an exploratory analysis of the mediating effects at the facet level.

Model fit of these path models was evaluated using the following benchmarks proposed in the literature: a non-significant chi-square test indicating a good fit, comparative fit index (CFI) with values ≥.95 indicating a good fit and

values ≥.90 indicating an acceptable fit, the root mean square error of approximation (RMSEA; good fit: <.06), the standardized root mean square residual (SRMR; good fit: <.08), and the Akaike information criterion (AIC) as a measure of model parsimony with the lower the value, the better the fit (Akaike, 1974; Hu & Bentler, 1999; Kline, 2016).

The second phase of hypotheses testing then examined trait mindfulness in its hypothesized role of a moderator of the relationship between job demands and worry/rumination at the between-person level and of the relationship between work-related worry/rumination and emotional exhaustion at both within- and between-person level. Similarly to study 1 and 2 in this thesis, unconflated multilevel models (UMM) were used to test the hypothesised moderating effects at both levels of the hierarchy using full information maximum likelihood (FIML) estimation (Heck & Thomas, 2015; González-Romá & Hernández, 2017; Preacher et al., 2016). The UMM requires that person-mean centered weekly variables (reflecting purely within-person variance) are entered at the within-person level (L1) and that the grand-mean centered person means (reflecting the between-person variance) are introduced at the between-person level (L2) of the model to allow for testing of associations between predictors and outcomes at both levels of the hierarchy separately. Specific unconflated interaction terms were identified between trait (L2) and weekly variables decomposed into their within (L1) and between (L2) components: trait mindfulness moderating the within-person associations (as a true cross-level interaction) and trait mindfulness moderating the between-person effects operating at the person level. Finally, the nature of the significant interaction terms was examined and graphically displayed using simple slopes analysis tools provided by Preacher et al., (2006) and Dawson (2014). The hypotheses were accepted or

rejected upon inspection of whether the form of the significant interaction effects reflected hypothesised effects rather than on basis of the significance of the interaction term itself.

Finally, in the last (third) phase of hypotheses testing, a series of multilevel models was created to test for the specific moderating effects of the mindfulness dimensions in the relationships between job demands and work-related worry/rumination at the between-person level and between work-related worry/rumination and emotional exhaustion at both within- and between-person level. The multilevel model development strategy closely followed the above steps for testing interaction terms across and within the levels of the analysis.

Results

Preliminary Analyses

Table 9 displays means, standard deviations, intraclass correlation coefficients (ICC1) and intercorrelations of the study variables. Correlations at the person level are shown in the top part of the table. Intercorrelations of the within-person variables are shown in the lower part. Results showed that 66.57% of variance in emotional exhaustion, 71.95% of variance in work engagement, and 71.63% of variance in work-related worry/rumination was attributable to the differences between people; with 33.43%, 28.04% and 22.42% of variance respectively to be explained at the within-person level of weekly fluctuations over the three weeks as captured by the study period. Approximately two thirds of the variance in the weekly variables were attributable to the between-person level of individual differences and more stable characteristics.

It is also of interest to note that trait mindfulness was significantly negatively correlated with emotional exhaustion ($r = -.240$, $p = .001$) and work-related worry/rumination ($r = -.190$, $p = .012$) and positively with control ($r = .289$, $p < .001$) and work engagement ($r = .282$, $p < .001$) at the person-level. The trait mindfulness facets of acting with awareness, nonjudgment and non-reactivity were significantly associated with emotional exhaustion (negatively) and work engagement (positively) whereas observing and describe facet were not significantly associated with emotional exhaustion and neither work engagement.

Table 9.

Means, standard deviations, intraclass correlation coefficients (ICC1) and zero-order correlations between study variables

Person-level (trait)	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	40.25	10.65	-														
2. Gender	1.35	0.49	-.06	-													
3. Tenure	8.47	7.99	.64**	-.09	-												
4. Typical working hours	47.28	13.62	.17*	-.28**	.04	-											
5. Neuroticism	2.42	0.83	-.14	.25**	-.06	-.13	-										
6. Observe	3.32	0.66	.07	.14	.07	-.05	.14	-									
7. Describe	3.67	0.62	.13	.08	.11	.02	-.11	.19*	-								
8. ActAware	3.89	0.58	.23**	-.15*	.17*	-.03	-.37**	.05	.35**	-							
9. Nonjudgement	3.58	0.67	.20**	-.16*	.04	-.16*	-.43**	-.10	.06	.29**	-						
10. Nonreactivity	3.28	0.54	.16*	-.09	.06	.03	-.40**	.18*	.07	.21**	.20**	-					
11. Mindfulness (total)	3.56	0.35	.28**	-.06	.16*	.05	-.40**	.49**	.60**	.66**	.54**	.53**	-				
12. Control	3.79	0.70	.13	-.20**	.07	.01	-.24**	-.04	.17*	.23**	.24**	.23**	.29**	-			
13. Demands	2.73	0.85	-.00	-.03	.02	.30**	.05	-.01	-.07	-.09	.05	.05	-.03	-.21**	-		
14. Wrk-rel worry	2.49	0.92	-.15*	.03	.05	.10	.23**	.02	-.01	-.13	-.29**	-.13	-.19*	-.14	.45**	-	
15. Emotional exhaustion	2.58	0.88	-.22**	.21**	-.14	-.01	.28**	.07	-.05	-.21**	-.27**	-.23**	-.24**	-.34**	.41**	.59**	-
16. Work engagement	4.17	0.71	.25**	-.16*	.13	.22**	-.14	.00	.13	.24**	.22**	.24**	.28**	.29**	.02	-.04	-.40**

Week-level (episodic)	M	SD	ICC1	1	2	3
1. Wrk-rel worry	0.00	0.43	.716	-		
2. Emotional exhaustion	0.00	0.45	.666	.33**	-	
3. Work engagement	0.00	0.33	.720	-.14**	-.22**	-

Note: Person-level N = 173. Day-level N = 479 observations nested in 173 participants. *p<.05; **p<.01

Hypotheses Testing

As per the analytical strategy described above, phase 1 of hypotheses testing involved creating a multilevel path model to examine the hypothesised mediating paths. Phase 2 of the hypotheses testing examined the trait mindfulness as a moderator of these relationships. And finally, phase 3 examined the role of trait mindfulness dimensions and specific moderating effects hypothesised at both within- and between-person level of the multilevel hierarchy.

Phase 1 – Work-Related Worry as a Mechanism of Action

Hypotheses 1 and 2 proposed that work-related worry would mediate the relationship between work demands and control and the work-related outcomes, emotional exhaustion and work engagement respectively. Hypotheses 3a and 3b then proposed that weekly fluctuations in work-related worry would be positively associated with the weekly fluctuations in emotional exhaustion and negatively with work engagement at the within-person level. Moreover, hypotheses 4 and 5 proposed that work-related worry would mediate the relationship between trait mindfulness and emotional exhaustion and work engagement at the between-person level. All of these hypotheses were tested in a single multilevel path model including both energy erosion and motivation path of the JD-R framework simultaneously whilst controlling for the effect of trait neuroticism.

The multilevel path model including the hypothesised direct and indirect relationships between job demands, job control, mindfulness, work-related worry and the work-related outcomes whilst controlling for trait neuroticism yielded an excellent model fit (χ^2 (5) = 3.411, p = .637, CFI = 1.000, RMSEA = .000, SRMR Within = .001, SRMR Between = .031, AIC = 4239.783). Standardized regression coefficients for the direct and indirect effects were calculated using the STDYX

standardization method in Mplus and the standardized coefficients for the direct paths are depicted in Figure 27.

In line with hypothesis 1, work-related worry partially mediated the relationship between work demands and emotional exhaustion at the between-person level (β_{ind} = 0.23, 95% CI [.14, .31], p < .001). Contrary to hypothesis 2, work-related worry did not mediate the significant direct relationship between job control and work engagement (β_{ind} = 0.00, 95% CI [-.01, .01], p = .715) and hypothesis 2 was therefore not supported. In support of hypothesis 3a and 3b, weekly fluctuations in work-related worry were associated with weekly fluctuations in emotional exhaustion (β_{w} = 0.34, 95% CI [.24, .43], p < .001) and weekly work engagement (β_{w} = -0.14, 95% CI [-.25, -.04], p = .026) at the within-person level. Therefore, on weeks when employees reported higher levels of work-related worry above their 3-week baseline, they also reported higher levels of emotional exhaustion and lower work engagement. Furthermore, in contrast to hypothesis 4 and 5, work-related worry was not a significant mediator in the relationship between trait mindfulness and emotional exhaustion (β_{ind} = -0.06, 95% CI [-.13, .01], p = .161) nor work engagement (β_{ind} = -0.01, 95% CI [-.03, .01], p = .509) at the between-person level. Hypothesis 4 and 5 were therefore not supported.

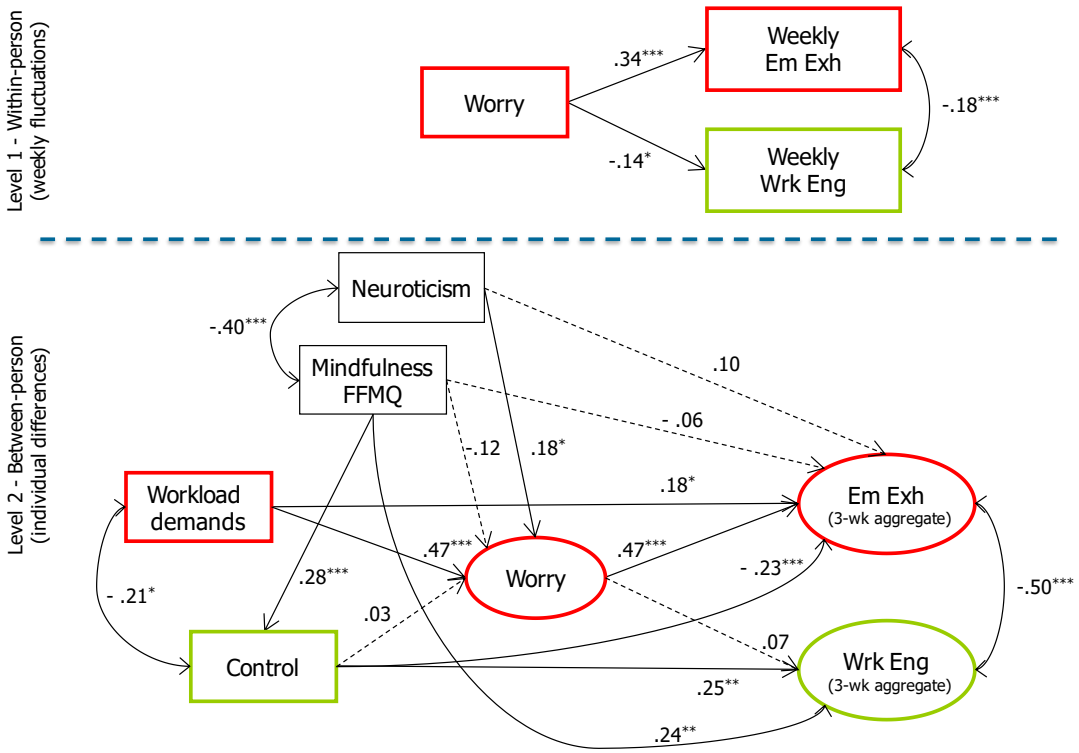

Figure 27. Path model of the person-level relationships between job demands, job resources and trait mindfulness and work-related outcomes via work-related worry/rumination.

In addition to the hypothesised effects, there was a significant indirect effect of trait mindfulness on emotional exhaustion (β_{ind} = -0.07, 95% CI [-.10, -.03], p = .007) and work engagement (β_{ind} = 0.07, 95% CI [.02, .12], p = .013) via job control at the between-person level. And despite a significant relationship between neuroticism and work-related worry, the indirect path between neuroticism and emotional exhaustion via worry was only approaching statistical significance (β_{ind} = 0.09, 95% CI [.01, .16], p = .061).

In terms of effect sizes, work-related worry only explained a non-significant amount of variance in work engagement (2.1% , R^2 = .021, z = 1.11, p = .266), and 11.2% of variance in emotional exhaustion (R^2 = .112, z = 2.91, p = .004) at the

within-person, weekly level. At the between-person level, the variables and paths included in the model (as per Figure 27) explained 8% of variance in job control (R^2 = .081, z = 2.14, p = .032), 15% of variance in work engagement (R^2 = .150, z = 2.66, p = .008), 28.7% of variance in worry (R^2 = .287, z = 4.42, p < .001), and 49% of variance in emotional exhaustion (R^2 = .490, z = 7.10, p < .001).

Phase 2 – Trait mindfulness as a buffer of worry and emotional exhaustion

Next, it was hypothesised that trait mindfulness would moderate the relationship between job demands and work-related worry at the between-person level with more mindful employees reporting lower levels of worry (hypothesis 6). And that trait mindfulness would also moderate the relationship between work-related worry and emotional exhaustion at both within- and between-person level (hypothesis 7a and 7b; see Figure 26 for the conceptual model of these moderating effects). To test for these moderating effects, two separate unconflated multilevel moderation models were created: one featuring work-related worry as the outcome variable at the between-person level (see Table 10) and another one featuring emotional exhaustion as the ultimate outcome variable split into its within- and between-person part at the respective levels of analysis (see Table 11). Both unstandardized and standardized coefficients are reported (in Table 10 and 11) using STDYX standardization method in Mplus; standardized parameter estimates provide an indication of the strength of the effect in standard deviation units.

The moderation results with respect to work-related worry as the outcome variable at the between-person level are presented in Table 10. For sake of concise presentation, only the final model is included in the table under the FFMQ column which includes the direct effects of job demands, trait mindfulness, neuroticism (as a

control variable) and the hypothesised interaction term between trait mindfulness and job demands at the between-person level. The two-way interaction term between work demands and trait mindfulness was a significant predictor of work-related worry at the between-person level (β_b = -0.17, 95% CI [-.30, -.05], p = .021). For employees low in trait mindfulness (-1 SD), there was a significant positive relationship between job demands and work-related worry (simple slope (unst.) = .59, t = 8.65, p < .001) which appeared weaker but remained statistically significant for employees who were high on trait mindfulness overall (+1 SD, simple slope (unst.) = .29, t = 2.32, p = .021; also see Figure 28). The model explained 31.9% of variance in work-related worry/rumination at the between-person level with the interaction term explaining an additional 2.8% of variance over the previous model. Hypothesis 6 was therefore supported, and trait mindfulness acted as a buffer in the relationship between work demands and work-related worry/rumination.

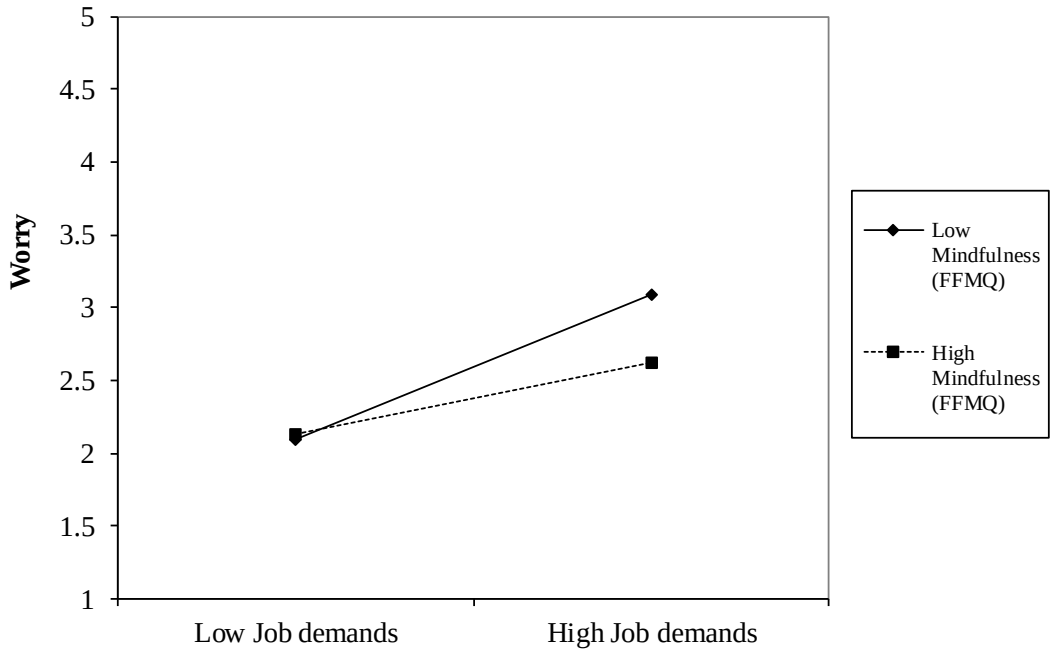

Figure 28. Trait mindfulness as a moderator of the positive relationship between job demands and worry at the between-person level. High/low values correspond to 1 SD above/below mean.

Table 10.

Multilevel Regression Analyses of Trait Mindfulness And Mindfulness Facets Predicting Work-Related Worry

	FFMQ		**Observe**		**Describe**	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Week-level model terms (Level 1)						
-	-	-	-	-	-	-
Person-level model terms (Level 2)						
Intercept	2.48*** (.06)	2.90*** (.16)	2.48*** (.06)	2.91*** (.16)	2.48*** (.06)	2.91*** (.17)
Neuroticism	.20* (.10)	.20* (.09)	.24** (.07)	.23** (.07)	.25** (.08)	.25** (.08)
Trait mindfulness/ facet (M)	-.31 (.19)	-.13 (.08)	.00 (.10)	.00 (.08)	.06 (.11)	.05 (.08)
Job demands between (JD_b)	.44*** (.08)	.44*** (.08)	.47*** (.08)	.46*** (.08)	.47*** (.08)	.47*** (.08)
$JD_b \times M$	-.43* (.19)	-.17* (.08)	-.06 (.11)	-.05 (.08)	-.11 (.14)	-.08 (.10)
Level 1 residual variance (*SE*)	.287 (.03)		.288 (.03)		.288 (.03)	
Level 2 residual variance (*SE*)	.496 (.06)		.521 (.07)		.517 (.07)	
R^2 (Level 1)	-		-		-	
R^2 (Level 2)	.319		.281		.288	
AIC	1077.625		1085.469		1084.157	

Continued

Table 10. (*Continued*)

Multilevel Regression Analyses of Trait Mindfulness And Mindfulness Facets Predicting Work-related Worry

	Aware		**Nonjudge**		**Non-react**	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Week-level model terms (Level 1)						
-	-	-	-	-	-	-
Person-level model terms (Level 2)						
Intercept	2.46*** (.06)	2.90*** (.16)	2.48*** (.06)	2.91*** (.17)	2.49*** (.06)	2.93*** (.17)
Neuroticism	.24** (.08)	.24** (.08)	.09 (.09)	.10 (.08)	.21* (.09)	.21* (.08)
Trait mindfulness/ facet (M)	-.01 (.11)	-.01 (.07)	-.38*** (.11)	-.30*** (.08)	-.15 (.13)	-.09 (.08)
Job demands between (JD_b)	.42*** (.09)	.42*** (.01)	.49*** (.08)	.49*** (.07)	.47*** (.07)	.47*** (.07)
$JD_b \times M$	-.19* (.09)	-.14* (.07)	-.01 (.12)	-.06 (.08)	-.43** (.14)	-.24** (.08)
Level 1 residual variance (*SE*)	.287 (.03)		.288 (.03)		.287 (.03)	
Level 2 residual variance (*SE*)	.512 (.07)		.469 (.06)		.480 (.06)	
R^2 (Level 1)	-		-		-	
R^2 (Level 2)	.296		.354		.338	
AIC	1082.461		1070.387		1073.116	

Note. Person-level N = 173. Week-level N = 479 observations nested in 173 participants.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Furthermore, it was also hypothesised that trait mindfulness would moderate the relationship between work-related worry and emotional exhaustion at both within- and between-person level (hypothesis 7a and 7b). The moderation results with respect to these hypotheses and emotional exhaustion as the outcome variable at the within- and between-person level are presented in Table 11. Again, for sake of concise presentation, only the final model is included in the table under the FFMQ column. The two-way interaction term between work-related worry and trait mindfulness was not a significant predictor of emotional exhaustion at the within-person level (β_w = -0.01, 95% CI [-.09, .08], p = .919). Trait mindfulness therefore did not seem to buffer the within-person reactivity to weekly fluctuations in work-related worry which was positively associated with weekly fluctuations in employee emotional exhaustion regardless of their trait mindfulness levels (β_w = 0.34, 95% CI [.25, .42], p < .001). Hypothesis 7a was thus not supported.

Contrary to hypothesis 7b, the two-way interaction term of trait mindfulness and work-related worry/rumination was not a significant predictor of employee emotional exhaustion over the three-week study period at the between-person level (β_b = -0.14, 95% CI [-.48, .21], p = .519). Trait mindfulness did not act as a buffer in the relationship between work-related worry and emotional exhaustion and hypothesis 7b was not supported by the findings. Employees who reported higher levels of work-related worry in comparison to others also reported higher levels of emotional exhaustion (β_b = 0.48, 95% CI [.35, .61], p < .001) regardless of their trait mindfulness levels and this positive association was significant over and above the influence of trait neuroticism, work demands and job control levels. The multilevel model explained 11.2% of variance in emotional exhaustion at the within-person level and 50.3% of variance in emotional exhaustion at the between-person level.

Table 11.

Multilevel Regression Analyses of Trait Mindfulness And Mindfulness Facets Predicting Emotional Exhaustion

	FFMQ		**Observe**		**Describe**	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Week-level model terms (Level 1)						
Worry within (W_w)	.35*** (.06)	.33*** (.05)	.34*** (.06)	.33*** (.05)	.35*** (.06)	.33*** (.05)
$W_w \times M$	-.02 (.18)	-.01 (.05)	.18† (.10)	.11† (.06)	-.11 (.10)	-.07 (.06)
Person-level model terms (Level 2)						
Intercept	1.43*** (.20)	1.79*** (.31)	1.43*** (.20)	1.79*** (.30)	1.43*** (.20)	1.78*** (.31)
Neuroticism	.10 (.07)	.10 (.07)	.11 (.07)	.11* (.07)	.12† (.11)	.12† (.07)
Trait mindfulness/ facet (M)	.17 (.48)	.07 (.21)	.01 (.18)	.01 (.15)	.04 (.25)	.03 (.20)
Work demands between	.14† (.07)	.14† (.08)	.14* (.07)	.15* (.07)	.14* (.07)	.15* (.07)
Job control between	-.26*** (.07)	-.23*** (.06)	-.28*** (.07)	-.24*** (.06)	-.28*** (.07)	-.24*** (.06)
Worry between (W_b)	.46*** (.08)	.48*** (.08)	.46*** (.08)	.49*** (.08)	.46*** (.08)	.49 (.08)
$W_b \times M$	-.13 (.20)	-.14 (.21)	.01 (.08)	.03 (.17)	-.01 (.11)	-.02 (.20)
Level 1 residual variance (*SE*)	.284 (.03)		.281 (.03)		.283 (.03)	
Level 2 residual variance (*SE*)	.320 (.05)		.322 (.05)		.322 (.05)	
R^2 (Level 1)	.112		.123		.117	
R^2 (Level 2)	.503		.500		.498	
AIC	2128.948		2834.183		2773.949	

Continued

Table 11. *Continued*

Multilevel Regression Analyses of Trait Mindfulness And Mindfulness Facets Predicting Emotional Exhaustion

	Aware		**Nonjudge**		**Non-react**	
Variable	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)	Est (*SE*)	Std. Est (*SE*)
Week-level model terms (Level 1)						
Worry within (W_w)	.35*** (.06)	.33*** (.05)	.36*** (.06)	.34*** (.05)	.35*** (.06)	.33*** (.05)
$W_w \times M$	-.21* (.11)	-.11* (.06)	.08 (.09)	.05 (.05)	.02 (.11)	.01 (.06)
Person-level model terms (Level 2)						
Intercept	1.43*** (.19)	1.78*** (.30)	1.46*** (.20)	1.82*** (.30)	1.46*** (.19)	1.82*** (.30)
Neuroticism	.10 (.07)	.10 (.07)	.09 (.07)	.09 (.07)	.08 (.07)	.08 (.07)
Trait mindfulness/ facet (M)	-.16 (.31)	-.12 (.23)	.31 (.21)	.26 (.18)	-.30 (.29)	-.20 (.20)
Work demands between	.15* (.07)	.15* (.07)	.15* (.07)	.16* (.08)	.16* (.07)	.17* (.08)
Job control between	-.27*** (.07)	-.23*** (.06)	-.28*** (.07)	-.24*** (.06)	-.25*** (.07)	-.22*** (.06)
Worry between (W_b)	.46*** (.07)	.49*** (.08)	.44*** (.08)	.47*** (.08)	.45*** (.08)	.48*** (.08)
$W_b \times M$	.03 (.11)	.07 (.22)	-.15† (.08)	-.34† (.18)	.05 (.12)	.09 (.21)
Level 1 residual variance (*SE*)	.280 (.03)		.284 (.03)		.284 (.03)	
Level 2 residual variance (*SE*)	.321 (.05)		.311 (.05)		.315 (.05)	
R^2 (Level 1)	.125		.114		.112	
R^2 (Level 2)	.501		.516		.510	
AIC	2703.626		2820.829		2585.322	

Note. Person-level N = 173. Week-level N = 479 observations nested in 173 participants.

†*p* <.10, **p* < .05, ***p* < .01, ****p* < .001.

Phase 3 – Dimensions of Trait Mindfulness as Moderators

Finally, it was hypothesised that the awareness dimension of trait mindfulness (observing facet) would enhance the within-person reactivity to work-related worry and therefore moderate the relationship between weekly fluctuations in worry and emotional exhaustion at the within-person level with more observing employees reporting higher levels of emotional exhaustion (hypothesis 8). Furthermore, it was hypothesised that the acceptance dimension of trait mindfulness (nonjudgment and non-reactivity facets) would act as a buffer in the relationship between work demands and work-related worry/rumination and between work-related worry/rumination and emotional exhaustion at the between-person level (hypothesis 9a, 9b and 10a, 10b).

Again, to test for these moderating effects, two separate unconflated multilevel moderation models were created for each facet: one featuring work-related worry as the outcome variable at the between-person level (see Table 10) and another one featuring emotional exhaustion as the ultimate outcome variable split into its within- and between-person part at the respective levels of analysis (see Table 11). Similarly to study 2, no hypotheses were specified for the effect of describing and acting with awareness facets of trait mindfulness, but an exploratory analyses were conducted and will be reported here. The results with respect to each mindfulness facet are presented below under the respective facet heading.

Observing facet

Hypothesis 8 specified that the awareness dimension of trait mindfulness (observing facet) would enhance the within-person reactivity to internal experience of work-related worry/rumination at the within-person level and moderate the relationship between weekly fluctuations in work-related worry and emotional exhaustion with more observing employees reporting higher levels of emotional exhaustion. The moderation results with respect to this hypothesis are presented in Table 10. The two-way interaction term of trait observe facet and weekly worry at the within-person level fell just outside the region of statistical significance based on the p-value of .059, however the 95% confidence interval did not include 0 and therefore simple slopes analysis was conducted to explore the possible conditional effects (β_w = 0.11, 95% CI [.01, .20], p = .059).

The pattern of the simple slopes revealed that for employees low on the observing facet of mindfulness (-1 SD), there was a significant positive relationship between work-related worry/rumination and emotional exhaustion (simple slope (unst.) = .23, t = 2.57, p = .011) which became stronger for employees who were high on this trait (+1 SD, simple slope (unst.) = .46, t = 5.59, p < .001; also see Figure 29). Hypothesis 8 can be therefore considered as receiving a tentative support suggesting that with increasing level of capacity to notice internal and external experiences, the effect of weekly fluctuations in work-related worry/rumination on weekly emotional exhaustion increases. In comparison to less observing employees, employees with higher tendency to notice internal and external experience indeed seem to experience higher emotional exhaustion on weeks when they worry more than usual.

As expected, no such moderating effect could be observed at the between-person level (β_b = 0.03, 95% CI [-.24, .30], p = .850). As detailed in Table 11, the mean level of work-related worry/rumination, and individual differences in job control and work demands predicted the individual differences in employee emotional exhaustion at the between-person level over the three weeks regardless of the employees' neuroticism and trait observing facet of mindfulness. The multilevel model explained 12.3% of variance in emotional exhaustion at the within-person level and 50% of variance in emotional exhaustion at the between-person level.

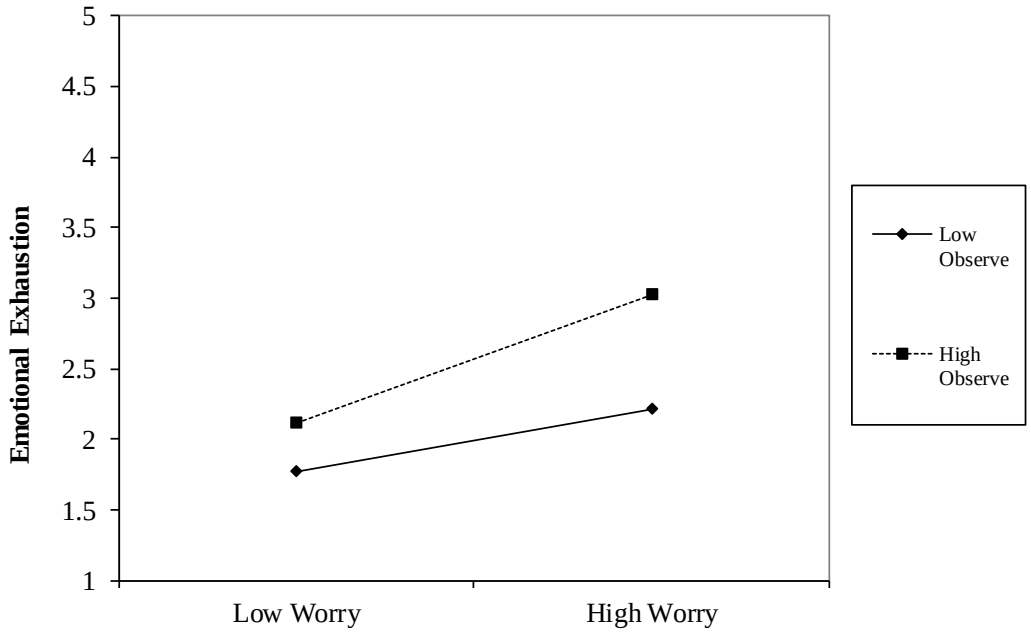

Figure 29. Trait observe facet of mindfulness as a moderator of the positive relationship between worry and emotional exhaustion at the within-person level. High/low values correspond to 1 SD above/below mean.

An exploratory analysis was also conducted to test for a possible moderating effect of the observing facet on the relationship between job demands and work-related worry/rumination at the between-person level. The moderation results are

presented in Table 10. The two-way interaction term of the trait observing facet and job demands was not a significant predictor of work-related worry/rumination over the three-week study period (β_b = -0.05, 95% CI [-.17, .08], p = .551). Instead, work demands and trait neuroticism were significant positive predictors of work-related worry/rumination at the between-person level regardless of employees' trait observing levels.

These direct relationships are also illustrated by the multilevel path model including the direct and indirect relationships between job demands, job control, observing facet of mindfulness, work-related worry/rumination and the work-related outcomes whilst controlling for the effect of trait neuroticism (see Figure 30). The multilevel path model yielded a very good model fit (χ^2 (5) = 10.626, *p* = .059, CFI = .974, RMSEA = .047, SRMR Within = .001, SRMR Between = .061, AIC = 4513.125). At the within-person level, worry explained 2.1% of variance in work engagement (R^2 = .021, z = 1.11, p = .267) and 11.2% of variance in emotional exhaustion (R^2 = .112, z = 2.92, p = .004). At the between-person level, the variables and paths included in the model explained 0% of variance in job control (R^2 = .001, z = 0.53, p = .800), 9.8% of variance in work engagement (R^2 = .098, z = 2.06, p = .040), 27.4% of variance in work-related worry/rumination (R^2 = .274, z = 3.78, p < .001), and 48.3% of variance in emotional exhaustion (R^2 = .483, z = 6.81, p < .001).

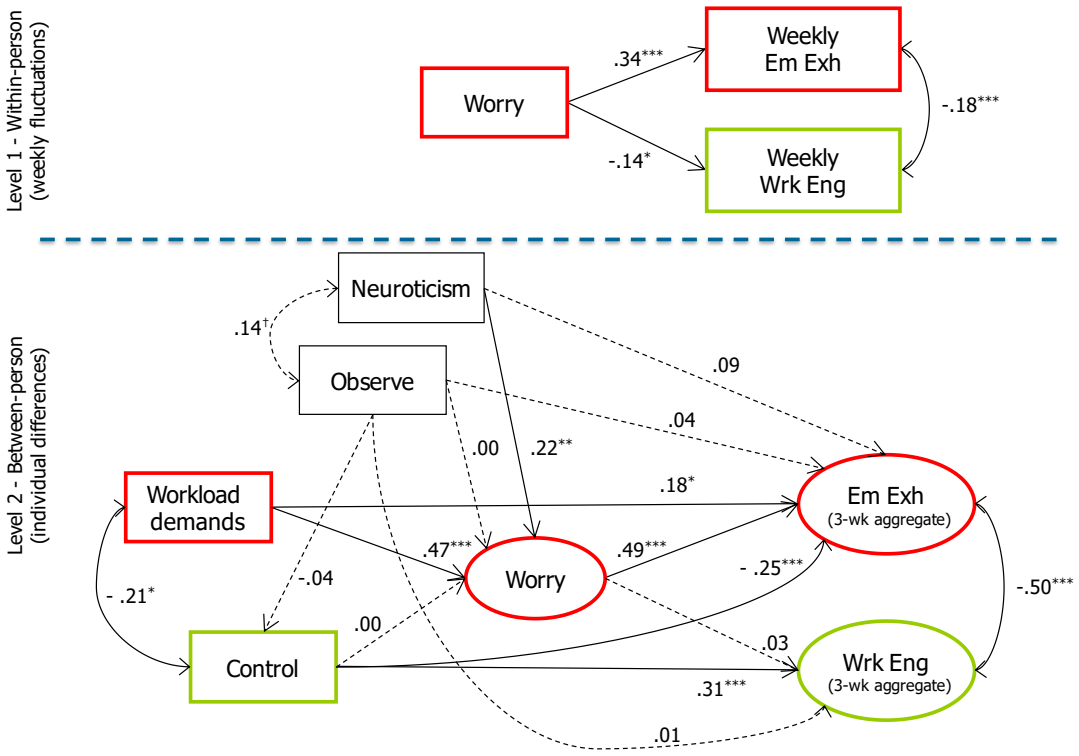

Figure 30. Multilevel path model of the person-level relationships between job demands, job resources and trait observing facet of mindfulness and work-related outcomes via work-related worry/rumination.

Describing facet

No specific hypotheses were proposed with respect to the direct, indirect or moderating effects of the describing facet of trait mindfulness, but an exploratory analysis was conducted. The direct and indirect relationships are illustrated by the multilevel path model below (see Figure 31). The multilevel path model yielded a very good model fit (χ^2 (5) = 10.626, *p* = .059, CFI = .974, RMSEA = .047, SRMR Within = .001, SRMR Between = .061, AIC = 4513.125). There was a significant indirect path between describing facet and emotional exhaustion via job control (β_{ind} = -0.04, 95% CI [-.07, -.01], *p* = .044). However, describing facet only explained a non-significant amount of variance in job control at the between-person level (R^2 = .024, z = 1.07, p = .285).

At the within-person level, work-related worry explained 2.1% of variance in work engagement (R^2 = .021, z = 1.11, p = .266) and 11.2% of variance in emotional exhaustion (R^2 = .112, z = 2.92, p = .004). At the between-person level, the variables and paths included in the model explained 10.3% of variance in work engagement (R^2 = .103, z = 2.14, p = .032), 27.8% of variance in worry (R^2 = .278, z = 3.63, p < .001), and 48.1% of variance in emotional exhaustion (R^2 = .481, z = 6.75, p < .001).

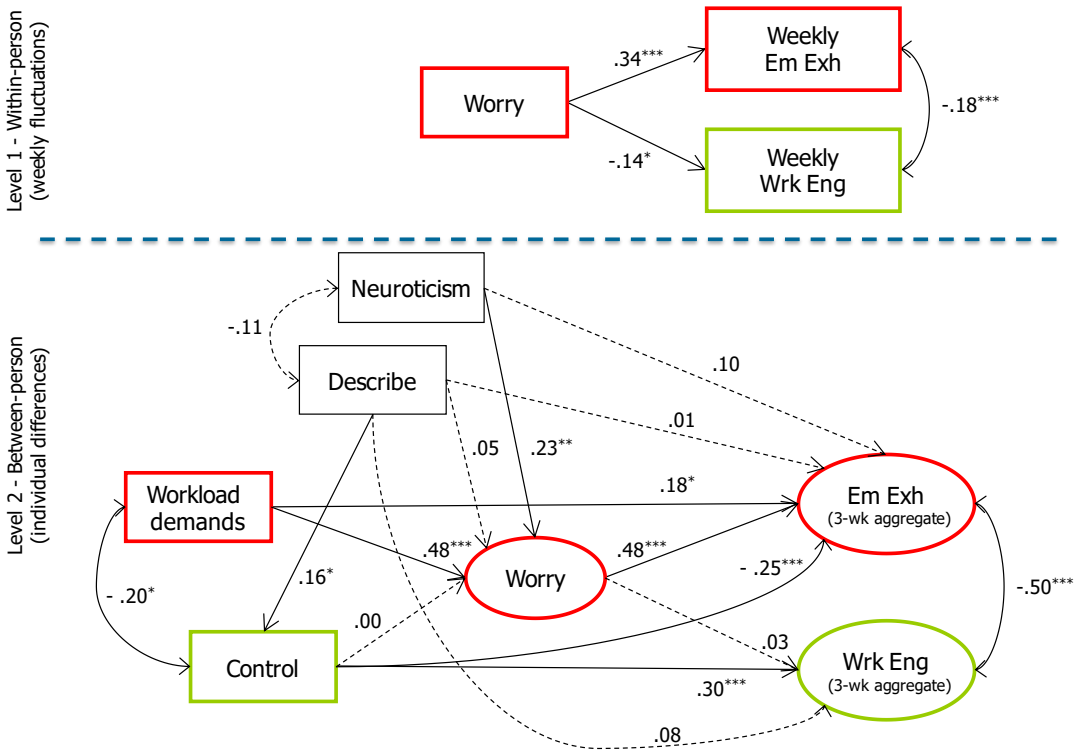

Figure 31. Path model of the person-level relationships between job demands, job resources and trait mindfulness and work-related outcomes via work-related worry/rumination.

An exploratory analysis was also conducted to test for possible moderating effects of the describing facet on the relationship between job demands and worry at the between-person level (see Table 10) and between worry and emotional exhaustion at both within- and between-person level (see Table 11). However, none of the two-way interaction terms was a significant predictor of work-related worry or emotional exhaustion.

Acting with awareness

Similarly to the describing facet, no specific hypotheses were proposed with respect to the direct, indirect or moderating effects of the acting with awareness facet of trait mindfulness as it was not thought to distinctively measure awareness or acceptance dimension of mindfulness but could be considered a measure of both. An exploratory analysis was conducted with an expectation that the pattern of results would roughly match that of the total mindfulness score. The direct and indirect relationships are illustrated by the multilevel path model below (χ^2 (5) = 5.959, p = .310, CFI = .996, RMSEA = .019, SRMR Within = .001, SRMR Between = .044, AIC = 4434.126; see Figure 32).

Acting with awareness facet of mindfulness was a significant direct predictor of work engagement (β_b = 0.20, 95% CI [.04, .36], p = .035) and there was a significant indirect path between acting with awareness facet and work engagement via job control (β_{ind} = 0.06, 95% CI [.01, .10], p = .035). In addition, there was a significant indirect path between acting with awareness and emotional exhaustion via job control (β_{ind} = -0.05, 95% CI [-.09, -.01], p = .032). However, acting with awareness facet only explained a non-significant amount of variance in job control at the between-person level (R^2 = .047, z = 1.44, p = .149). The variables and paths included in the model explained 13.4% of variance in work engagement (R^2 = .134, z = 2.66, p = .008), 27.4% of variance in worry (R^2 = .274, z = 3.79, p < .001), and 48.5% of variance in emotional exhaustion (R^2 = .485, z = 7.00, p < .001) at the between-person level.

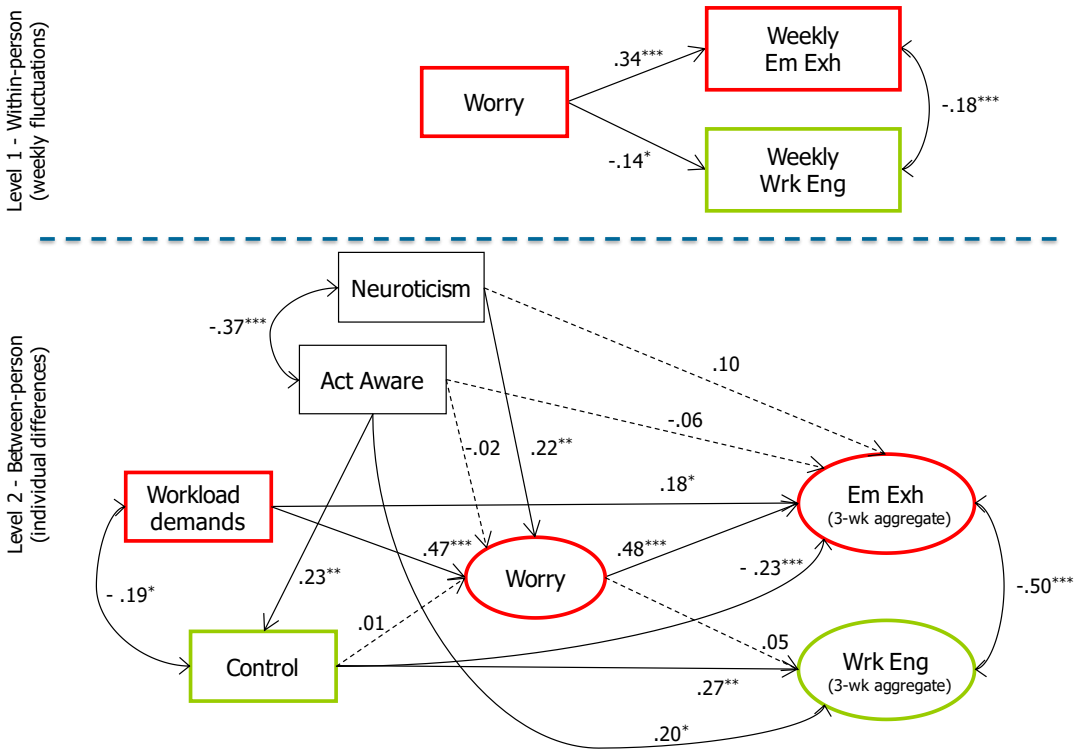

Figure 32. Multilevel path model of the person-level relationships between job demands, job resources and acting with awareness facet of trait mindfulness and work-related outcomes via work-related worry/rumination.

Again, an exploratory analysis was conducted to test for possible moderating effect of the acting with awareness facet on the relationship between job demands and work-related worry/rumination at the between-person level (see Table 10) and between worry and emotional exhaustion at both within- and between-person level (see Table 11). There was a marginally significant two-way interaction term between acting with awareness facet and work demands in predicting work-related worry (β_b = -0.14, 95% CI [-.26, -.02], p = .050). The pattern of the simple slopes revealed that for employees low in acting with awareness facet of mindfulness (-1 SD), there was a significant positive relationship between job demands and worry

(simple slope (unst.) = .53, t = 7.33, p < .001) which became weaker but still remained significant for employees who scored high on trait acting with awareness facet of mindfulness (+1 SD, simple slope (unst.) = .31, t = 2.49, p = .014; also see Figure 33).

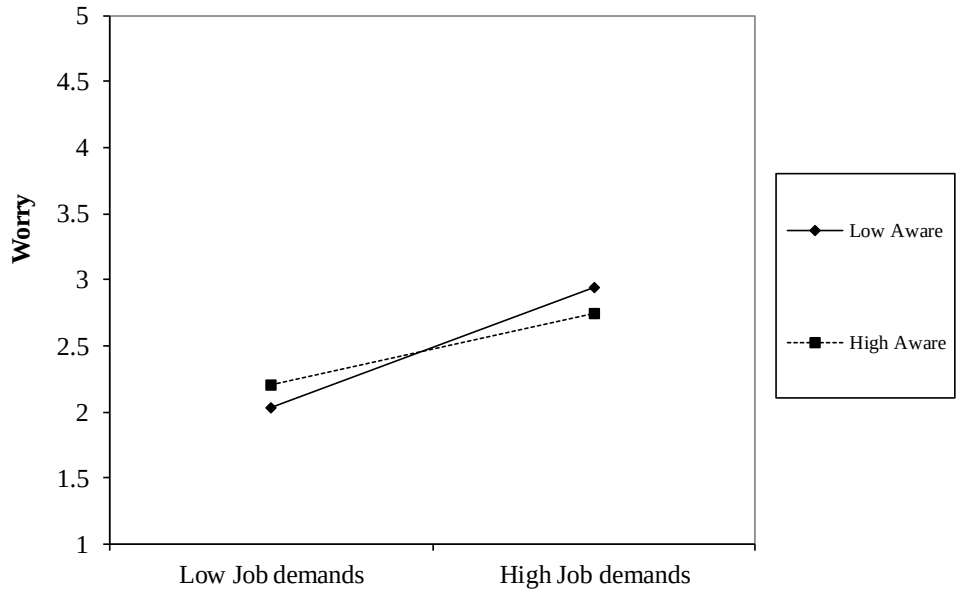

Figure 33. Trait acting with awareness facet of mindfulness as a moderator of the positive relationship between job demands and worry at the between-person level. High/low values correspond to 1 SD above/below mean.

Moreover, there was also a significant two-way interaction term between acting with awareness facet and weekly work-related worry levels in predicting weekly emotional exhaustion at the within-person level (β_w = -0.11, 95% CI [-.20, -.02], p = .042). The pattern of the simple slopes revealed that for employees low in acting with awareness facet of mindfulness (-1 SD), there was a significant positive relationship between worry and emotional exhaustion (simple slope (unst.) = .48, t = 5.41, p < .001) which became weaker but still remained significant for employees

who scored high on trait acting with awareness facet of mindfulness (+1 SD, simple slope (unst.) = .23, t = 2.83, p = .005; see Figure 34).

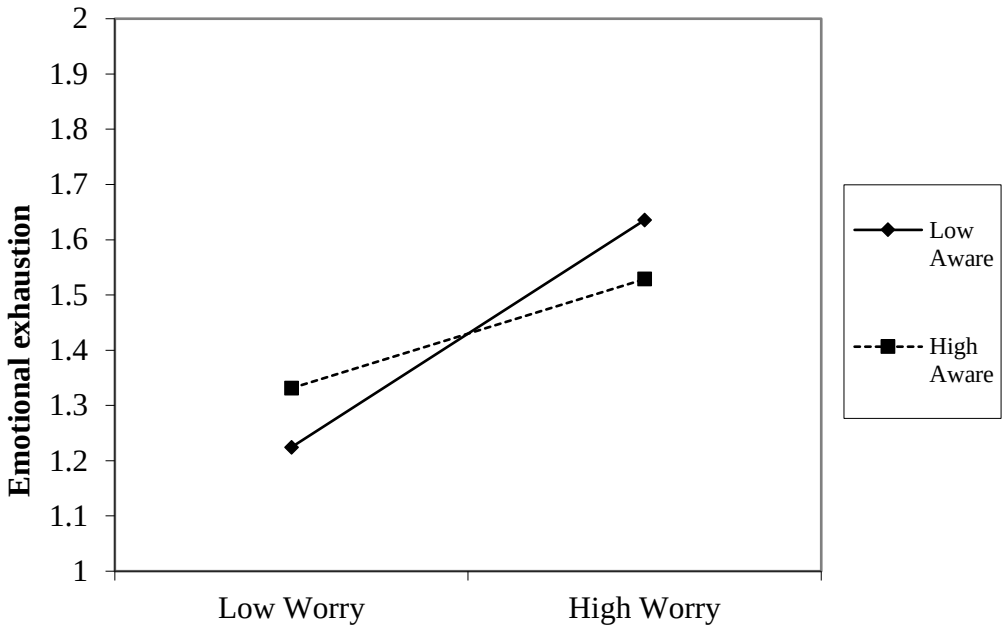

Figure 34. Trait acting with awareness facet of mindfulness as a moderator of the positive relationship between work-related worry/rumination and emotional exhaustion at the within-person level. High/low values correspond to 1 SD above/below mean.

Nonjudgment facet

Hypothesis 9a specified that nonjudgment facet of trait mindfulness would act as a buffer in the relationship between work demands and work-related worry / rumination at the between-person level. The moderation results with respect to this hypothesis are presented in Table 10. The two-way interaction term of trait nonjudgment facet and work demands was not a significant predictor of work-related worry/rumination at the between-person level (β_b = -0.06, 95% CI [-.18, .07], p = .464). Hypothesis 9a could be therefore rejected.

Moreover, hypothesis 10a specified that nonjudgment facet would act as a buffer in the relationship between work-related worry and emotional exhaustion at the between-person level. The moderation results with respect to this hypothesis are presented in Table 11. The two-way interaction term of the trait nonjudgment facet and work-related worry/rumination was only approaching statistical significance in predicting emotional exhaustion at the between-person level (β_b = -0.34, 95% CI [-.64, -.04], p = .065).

A closer examination of the simple slopes revealed, that for employees low in nonjudgment facet of mindfulness (-1 SD), there was a significant positive relationship between worry and emotional exhaustion (simple slope (unst.) = .54, t = 5.76, p < .001) which became a little weaker but was still significant for employees who scored high on nonjudgment facet of mindfulness (+1 SD, simple slope (unst.) = .34, t = 3.78, p = .001; see Figure 35). The moderation model explained 51.6% of variation in emotional exhaustion at the between-person level with the interaction term accounting for 1.5% of additional variance explained over the previous model. With the direction of the simple effects in line with the hypothesised effect, the

findings can be considered as providing tentative support with respect to hypothesis 10a.

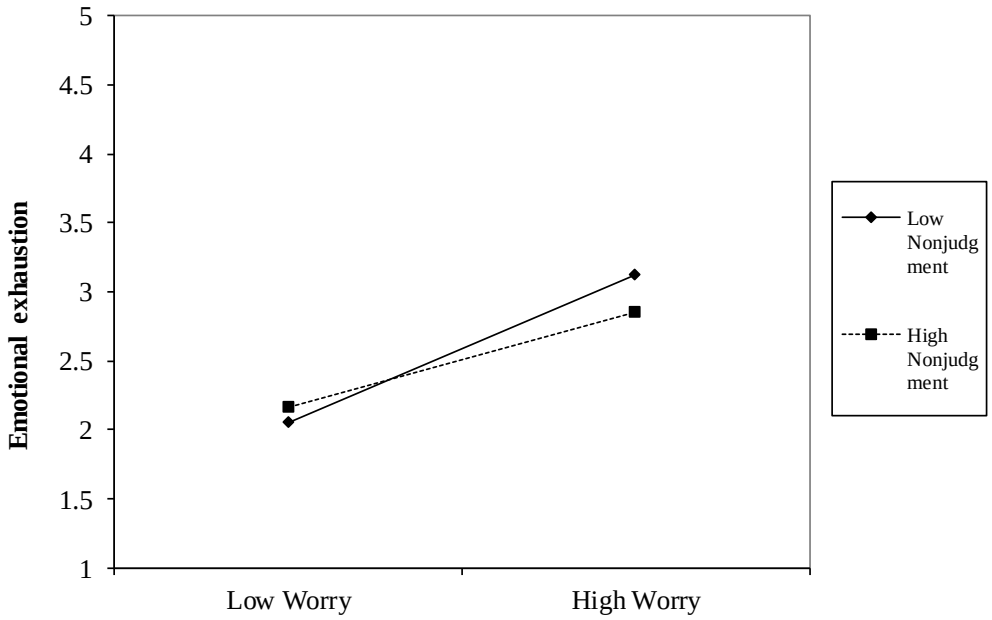

Figure 35. Trait nonjudgement facet of mindfulness as a moderator of the positive relationship between worry and emotional exhaustion at the between-person level. High/low values correspond to 1 SD above/below mean.

In addition, the nonjudgment facet of mindfulness was a significant direct predictor of work-related worry/rumination (β_b = -0.31, 95% CI [-.45, -.16], p < .001) and work engagement (β_b = 0.19, 95% CI [.06, .33], p = .016) at the between-person level. Moreover, the nonjudgment facet was also a significant indirect predictor of emotional exhaustion via work-related worry/rumination (β_{ind} = -0.14, 95% CI [-.22, -.07], p = .002), and via job control (β_{ind} = -0.06, 95% CI [-.10, -.02], p = .009). These direct and indirect relationships are depicted by the multilevel path model yielding an excellent model fit (χ^2 (5) = 4.34, p = .501, CFI = 1.000, RMSEA

= .000, SRMR Within = .001, SRMR Between = .034, AIC = 4455.778; see Figure 36).

At the within-person level, weekly work-related worry/rumination explained only 2.1% of variance in work engagement (R^2 = .021, z = 1.11, p = .269) and 11.2% of variance in emotional exhaustion (R^2 = .112, z = 2.92, p = .004). At the between-person level, the variables and paths included in the model explained 6.5% of variance in job control (R^2 = .065, z = 2.01, p = .045), 13% of variance in work engagement (R^2 = .130, z = 2.40, p = .017), 36.2% of variance in work-related worry/rumination (R^2 = .362, z = 5.51, p < .001), and 49.9% of variance in emotional exhaustion (R^2 = .499, z = 7.13, p < .001).

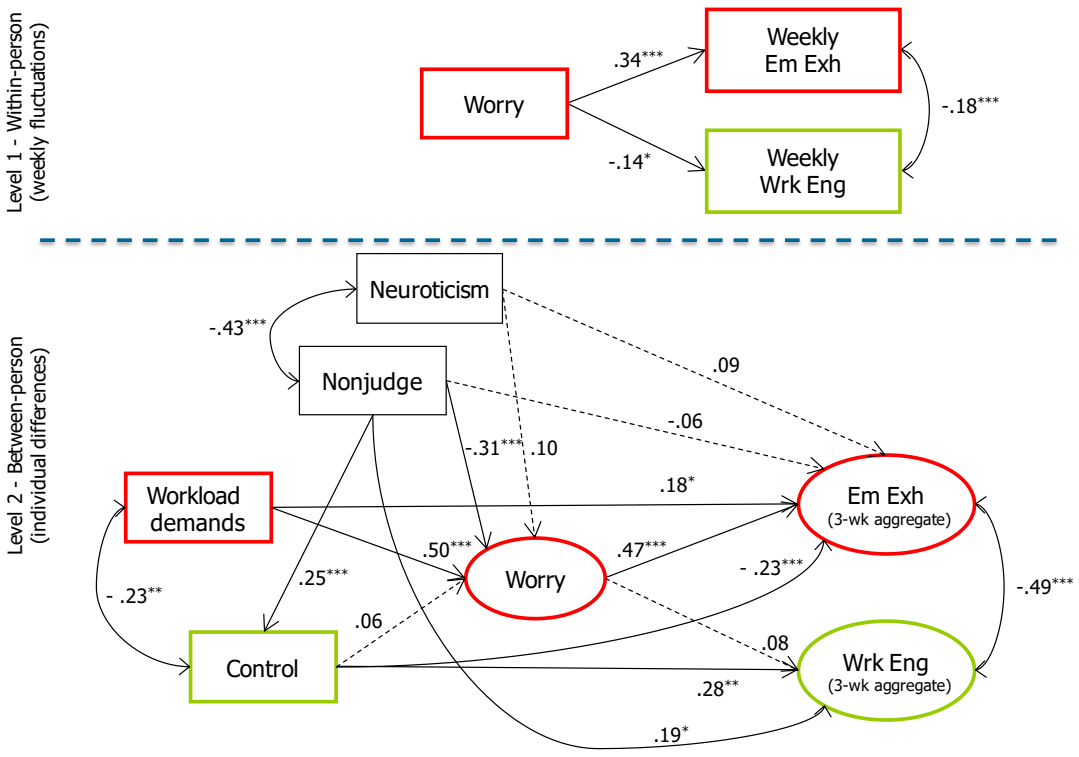

Figure 36. Path model to test person-level relationships between job demands, job resources and trait mindfulness and work-related outcomes via work-related worry/rumination.

Non-reactivity facet

The study hypotheses specified that non-reactivity facet of trait mindfulness would act as a buffer in the relationship between work demands and work-related worry (hypothesis 9b) and between worry and emotional exhaustion (hypothesis 10b) at the between-person level. The moderation results with respect to the hypothesis 9b are presented in Table 10. The two-way interaction term of trait non-reactivity facet and work demands was a significant predictor of work-related worry and rumination at the between-person level (β_b = -0.24, 95% CI [-.37, -.11], p = .002).

The simple slopes test to probe the nature of this interaction revealed, that for employees low in non-reactivity facet of mindfulness (-1 SD), there was a significant positive relationship between work demands and work-related worry/rumination (simple slope (unst.) = .70, t = 8.31, p < .001) which became weaker and fell just outside the region of statistical significance for employees who scored high on trait non-reactivity facet of mindfulness (+1 SD, simple slope (unst.) = .23, t = 1.93, p = .055; see Figure 37). The moderation model explained 33.8% of variation in work-related worry/rumination at the between-person level with the interaction term accounting for 5.8% of additional variance explained over the previous model. Hypothesis 9b was therefore supported in that the trait non-reactivity facet of mindfulness buffered the impact of work demands on work-related worry/rumination.

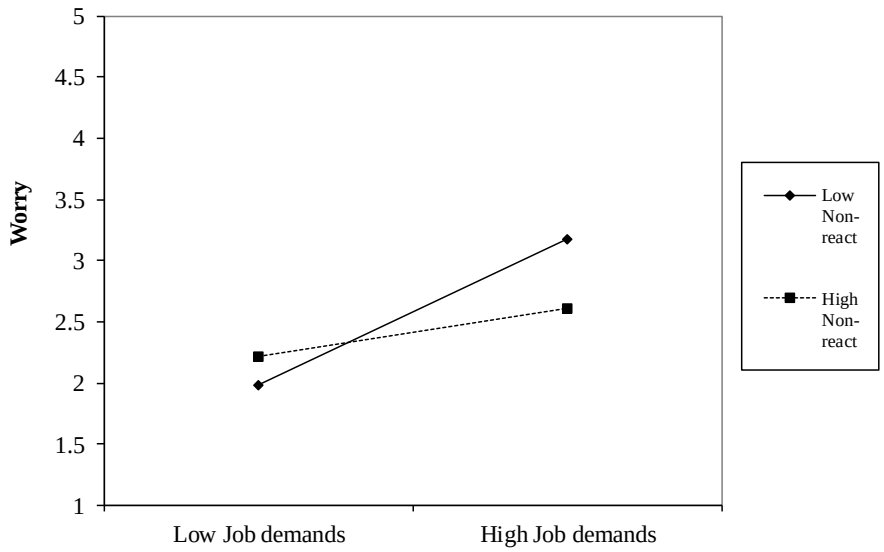

Figure 37. Trait non-reactivity facet of mindfulness as a moderator of the positive relationship between job demands and work-related worry/rumination at the between-person level. High/low values correspond to 1 SD above/below mean.

Moreover, hypothesis 10b specified that non-reactivity facet would act as a buffer in the relationship between work-related worry and emotional exhaustion at the between-person level. The moderation results with respect to this hypothesis are presented in Table 11. The two-way interaction term of trait non-reactivity facet and worry was not a significant predictor of emotional exhaustion at the between-person level (β_b = 0.09, 95% CI [-.26, .43], p = .677). Hypothesis 10b was therefore rejected.

In addition to the moderating effects described above, the non-reactivity facet of mindfulness was a significant direct predictor of work engagement (β_b = 0.20, 95% CI [.05, .35], p = .031) at the between-person level. Non-reactivity was also a significant indirect predictor of emotional exhaustion (β_{ind} = -0.05, 95% CI [-

.09, -.02], p = .011), and work engagement (β_{ind} = 0.06, 95% CI [.02, .11], p = .014) via job control. However, the non-reactivity facet only explained a small and non-significant amount of variance in job control at the between-person level (5.6%, R^2 = .056, z = 1.86, p = .062).

The direct and indirect relationships among the variables are also depicted by the multilevel path model yielding an excellent model fit (χ^2 (5) = 5.53, p = .355, CFI = .998, RMSEA = .014, SRMR Within = .001, SRMR Between = .037, AIC = 4402.217; see Figure 38). At the within-person level, work-related worry explained 2.1% of variance in work engagement (R^2 = .021, z = 1.11, p = .266) and 11.2% of variance in emotional exhaustion (R^2 = .112, z = 2.91, p = .004). At the between-person level, the variables and paths included in the model explained 13.5% of variance in work engagement (R^2 = .135, z = 2.50, p = .012), 28.3% of variance in work-related worry/rumination (R^2 = .283, z = 4.15, p < .001), and 50.5% of variance in emotional exhaustion (R^2 = .505, z = 7.48, p < .001).

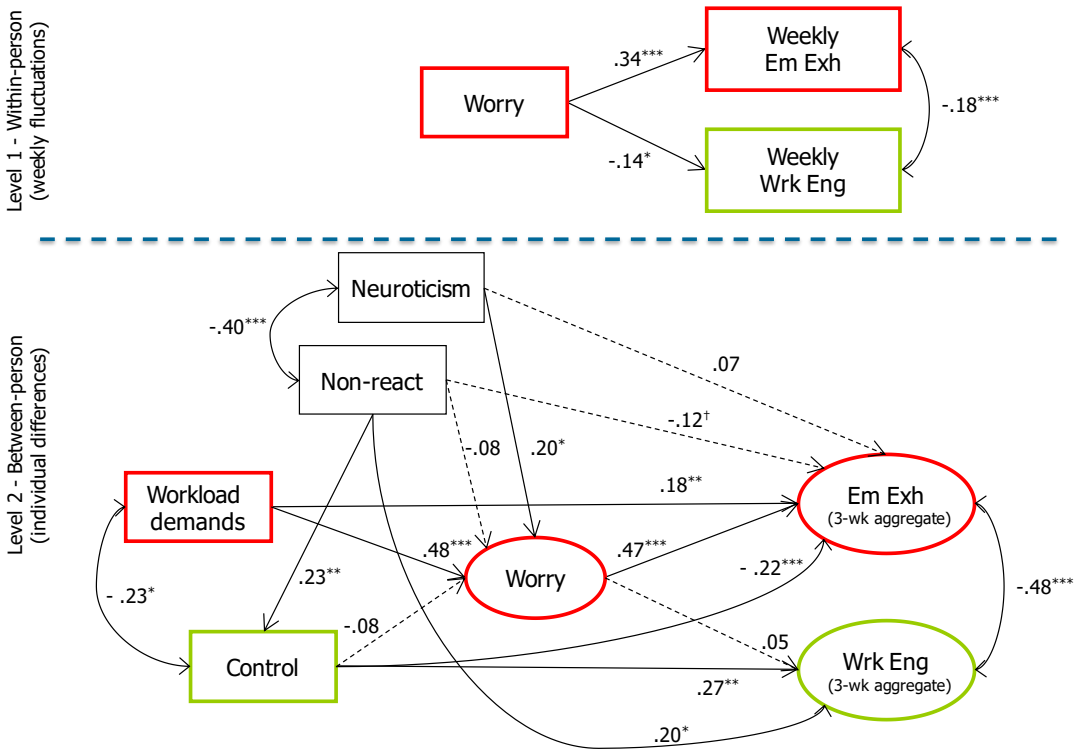

Figure 38. Path model of the person-level relationships between job demands, job resources and trait mindfulness and work-related outcomes via work-related worry/rumination.

Discussion

The present weekly diary study examined trait mindfulness (and its awareness and acceptance dimension) as a personal resource with respect to the dual process of energy erosion and motivation proposed by the JD-R theory. Previous research has linked dispositional mindfulness to better psychological health (and lower psychopathological symptoms), adaptive cognitive process such as lower levels of rumination, and better emotional processing and regulation in non-clinical samples across 93 papers (for review see Tomlinson et al., 2018) and to a range of work-related outcomes such as greater job satisfaction, better performance, and lower burnout and work withdrawal (for meta-analysis see Mesmer-Magnus et al., 2017). Yet only a handful of studies has so far examined trait mindfulness in context of work-related stress models which emphasized the role of workplace characteristics in stress and motivation processes and a recent review called for further research in this direction (Bartlett et al., 2019). In order to examine mindfulness in the energy erosion and motivation processes of the JD-R framework over 3 weeks this study therefore brought together several theoretical models of work-related stress and its active mechanisms (such as the perseverative cognition hypothesis; Brosschot et al., 2006) with more recent theories of mindfulness mechanisms with respect to coping in high-stress environments (Creswell & Lindsay, 2014) and the specific functions of mindfulness dimensions (Lindsay & Creswell, 2017; 2019).

In line with the study hypotheses, the findings suggested that the effect of job demands on job burnout (emotional exhaustion) was partially mediated by work-related worry / rumination over the three-week study period (as a latent variable reflecting the mean level of work-related worry at the between-person level). This more enduring effect of job demands on work-related worry/rumination and in turn

on emotional exhaustion can be thought of as reflecting the "allostatic load" model. In addition, weekly fluctuations in work-related worry/rumination were also positively associated with corresponding fluctuations in emotional exhaustion at the within-person level (and thus reflected the "reactivity" model). In contrast to the hypothesised role of work-related worry/rumination in the motivation processes of the JD-R model (hypothesis 2), job control was not a significant negative predictor of work-related worry/rumination over the three weeks and neither was work-related worry associated with work engagement at the between-person level (as a latent variable representing the mean level of work engagement over the three weeks).

In contrast to the study hypotheses, the total trait mindfulness was not significantly associated with work-related worry/rumination at the between-person level and therefore offered no incremental validity in explaining the between-person proportion of variance in work-related worry/rumination over the effect of job demands and neuroticism which were both significant predictors of work-related worry over the three weeks. And neither was total trait mindfulness associated with emotional exhaustion over and above the influence of workload demands and work-related worry/rumination. Mindfulness was found to be a direct significant predictor of work engagement, but this effect was not mediated by (low levels) of work-related worry/rumination.

To answer the research question whether mindful people worried less or whether they were less vulnerable to the detrimental effect of work-related worry/rumination, this study also investigated the buffering effect of trait mindfulness on the relationship between job demands and work-related worry (at the between-person level) and between work-related worry and emotional

exhaustion (at both within- and between-person level). In line with the study hypotheses, trait mindfulness was found to buffer the relationship between job demands and work-related worry and rumination over the three weeks. More mindful employees reported lower levels of work-related worry when faced with high job demands in comparison to less mindful employees. However, there was no buffering effect of trait mindfulness on the relationship between work-related worry and emotional exhaustion at within- or between-person level. This suggests that once employees experienced work-related worry as an internalised stressor, the work-related worry/rumination was in turn associated with higher levels of emotional exhaustion regardless of the employees' overall trait mindfulness levels.

Yet, a more diverse pattern of findings has emerged with a closer look at the possible differential effect of the awareness and acceptance dimension of trait mindfulness. In line with the study hypotheses, the observing facet of mindfulness was found to moderate (enhance) the within-person reactivity to the internal representation of the stressor (i.e., work-related worry/rumination) resulting in higher levels of emotional exhaustion in employees reporting higher tendency to notice or attend to internal and external experiences (as measured by the observing facet). Moreover, non-reactivity (but not nonjudgement) facet of mindfulness was found to buffer the relationship between job demands and work-related worry at the between-person level; whereas nonjudgment (but not non-reactivity) facet of mindfulness was found to buffer the relationship between work-related worry and emotional exhaustion at the between-person level. Acting with awareness facet was found to moderate the positive relationship between work demands and work-related worry/rumination at the between-person level and to buffer the within-person reactivity to fluctuations in work-related worry/rumination resulting in lower

emotional exhaustion (but no such moderating effect was observed at the between-person level). In addition, nonjudgment, non-reactivity and acting with awareness were found also to be direct predictors of work engagement at the between-person level over and above the influence of job control.

Theoretical Implications

The present study makes several theoretical contributions to a number of theoretical domains. Let us first note several important points with respect to the JD-R theory. First, work-related worry/rumination was proposed as an important mediator of the relationship between job demands and lack of job resources and work-related outcomes – emotional exhaustion and work engagement. These propositions drew on the perseverative cognition hypothesis (Brosschot et al., 2006) to provide an explanatory framework of the nature of cognitive processes through which high job demands and loss or lack of resources give rise to the emotional experience of stress over time. This narrow focus on perseverative cognitions stands in contrast to a wider concept of psychological detachment from work or "switching off" from work (Sonnentag & Fritz, 2015). The results of the present study provided empirical support for the work-related worry/rumination as an active mechanism through which job demands affected emotional exhaustion at the between-person level (of individual differences, more stable work characteristics and more enduring processes) over the three-week study period.

As a second theoretical point with respect to the JD-R theory, lack of control was not found to predict work-related worry/rumination at the between-person level (a negative relationship between control and work-related worry was expected). And while control was a direct negative predictor of emotional exhaustion and a positive predictor of work engagement at the between-person level, its effect was

not mediated by work-related worry. This finding suggests that there may be a different cognitive or affective mechanism operating with respect to the job resources or the motivation processes of the JD-R which could be perhaps better explained by the broaden-and-build theory of positive emotions (Fredrickson, 2004) or by the self-determination theory (Deci & Ryan, 2000).

As a third theoretical contribution with respect to the JD-R theory, this finding can be also understood as providing further empirical support for the distinctiveness of the dual process of energy erosion and motivation of the JD-R theory. Clearly, work engagement is not a result of absence of job stressors and perseverative cognitions such as work-related worry/rumination but is fostered in presence of job resources as motivating work characteristics. Moreover, given a recent theoretical discussion about conceptual similarities between job burnout and work engagement, this finding also points to a conceptual distinctiveness between emotional exhaustion (as a dimension of burnout) and work engagement, as opposed to being opposite ends of the same continuum (Cole, Walter, Bedeian, & O'Boyle, 2012; Goering et al., 2017; Taris, Ybema, & van Beek, 2017).

Similarly, two main theoretical contributions can be pointed out with respect to the mindfulness literature. First, and most importantly, the synergistic effect of all five mindfulness facets (an overall FFMQ score) was found to buffer the effect of job demands on work-related worry at the between-person level suggesting that more mindful employees did indeed worry less when faced with high demands over the three-week study period. But there was no evidence of a similar buffering effect of trait mindfulness on the relationship between an internalised stressor or an interal representation of the stressor (i.e., the work-related worry/rumination) and emotional exhaustion at the within- or between-person level.

A more diverse pattern of findings has emerged with a closer examination of the individual mindfulness facets. In line with the MAT theory and other theoretical accounts of the differential effect of the mindfulness dimensions (mindful awareness and acceptance), observing facet was found to moderate (enhance) the within-person reactivity to work-related worry/rumination whereas the acceptance dimension (nonjudgment and non-reactivity) together with acting with awareness facet were found to act as buffers in the relationship between work demands and work-related worry/rumination and between worry and emotional exhaustion. Such findings provide strong support for investigating the facets of mindfulness in occupational health research as important distinctions could be missed or masked by the overall, synergistic effect of the total mindfulness score.

With respect to the second theoretical contribution to the mindfulness literature, Baer (2019) recently noted that incremental validity of mindfulness measures over neuroticism and negative affectivity was a neglected topic in mindfulness research. In the present study, trait mindfulness was not found to provide any incremental validity over the work demands and neuroticism in predicting work-related worry/rumination and over both types of work characteristics (job demands and resources), work-related worry/rumination and neuroticism in predicting emotional exhaustion. However, this synergic effect of overall mindfulness can be unpacked at the facet level, whereby nonjudgment facet of mindfulness was found to be a negative significant predictor of work-related worry/rumination over and above the influence of job demands and neuroticism.

Practical Implications

The empirical findings in this study can be linked to several practical implications for both individual employees and organisations. For example, the

present study found evidence for work-related worry/rumination as the active mechanism through which high job demands translated into higher levels of emotional exhaustion while trait mindfulness (and specifically the non-reactivity and acting with awareness facets) was found to moderate (buffer) these associations at the between-person level of the more long-term, maintenance patterns. Given the key role of perseverative cognitions in sustaining the long-term activation of the stress physiological pathways of the organism which results in higher allostatic load and health symptoms over time (Ottaviani et al., 2016), enhancing individual employees' mindfulness skills may be beneficial for their long-term health and well-being.

Moreover, popularity of mindfulness training courses has been surging with MBIs being offered and readily accessible in number of different formats (instant mediation apps, brief interventions and face to face or online courses). However, it may be important to ensure that the training is well designed and includes a good focus on development of both dimensions of mindfulness (mindful awareness and acceptance). So that one does not end up with a form of attention training developing only the observing skills which could potentially result in higher within-person, episodic reactivity to everyday situations without providing the benefit of the buffering effect with respect to the more long-term of allostatic load maintenance pattern.

Strengths, Limitations and Future Directions

There are several strengths and limitations of the present study. The main strength of the study is in its focus on both the synergistic effect of the individual mindfulness facets in the overall mindfulness score as well as on the differential function of the awareness and acceptance dimension of mindfulness as personal

resources in the JD-R framework and inclusion of work-related worry/rumination as an active mechanism in the energy erosion and motivation processes. Furthermore, this study extended its perspective to cover a three-week period and used multilevel modelling techniques which allowed for a simultaneous examination of both within- and between-person processes, i.e., the within-person reactivity patterns and the between-person maintenance and recovery patterns in a series of multilevel models.

The most significant limitation of this study is then in using self-report measures for all study variables and weekly measures assessing both work-related worry/rumination and the study outcomes (emotional exhaustion and work engagement) at the same time and thus increasing probability of the common method variance (CMV). CMV was suggested to artificially inflate relationships between variables and bias the research results (Podsakoff et al., 2003; Podsakoff et al., 2012; Spector, 2006). Yet, Siemsen et al. (2010) demonstrated that interaction effects could not be artefacts of CMV as CMV severely deflated any interaction terms in their simulation regression models making it more difficult to detect these effects through statistical means. It is therefore unlikely that the interactions observed in the present study were an artefact of CMV.

Second, although this study referred to the AL model of stress and drew on the AL processes to explain the hypothesised and observed effect, it did not directly assess any of the possible AL mediators (such as salivary cortisol or heart rate variability). The future research could therefore include these physiological indicators of the stress processes as more objective indicators of these processes in context of the JD-R model.

Conclusion

The present weekly diary study investigated trait mindfulness and its dimensions of mindful awareness and acceptance as personal resources within the dual path processes of the JD-R theory. Drawing on the perseverative cognition hypothesis (Brosschot et al., 2006) and theories of active mechanisms through which mindfulness exerts its beneficial influence proposed in the mindfulness literature (Lindsay & Cresswell, 2017; 2019), this study examined whether mindful employees experienced lower levels of work-related worried/rumination when faced with high job demands or whether they were less vulnerable to the detrimental effect of worry on their emotional exhaustion and work engagement.

To briefly summarize the study findings, in high-demand working conditions, employees higher on trait mindfulness experienced lower levels of work-related worry/rumination on average over the three weeks. This effect was accounted for in particular by the acceptance dimension of mindfulness, i.e., by the direct effect of the nonjudgment facet and by the buffering effect of the non-reactivity and acting with awareness facets on the work-related worry/rumination. While the nonjudgment facet also buffered the detrimental effect of work-related worry/rumination on emotional exhaustion at the between-person level (i.e., at the level of more enduring processes and allostatic load reactions). In contrast to these buffering effects, the observing facet of mindfulness was associated with higher within-person reactivity to weekly fluctuations in work-related worry/rumination as an internalised stressor which takes on the activating function of the environmental stimulus even when it is no longer present. While the acting with awareness facet of mindfulness was found to buffer this within-person reactivity to the weekly fluctuations in work-related worry/rumination with employees higher on the acting

with awareness facet reporting lower emotional exhaustion than less aware employees during the weeks when they worried more.

Chapter 7: General Discussion

7.1 Theoretical Approach

The three empirical studies presented in this thesis drew on several theoretical domains to examine trait mindfulness and its awareness and acceptance dimensions as personal resources in context of the JD-R framework of work-related stress and motivation processes. Several well-established and validated theoretical accounts of stress and motivation have been developed in the occupational health literature over the last 50 years with a particular emphasis on the importance of the situational, work characteristics in predicting employee health, well-being and performance outcomes. While research on mindfulness at work has been flourishing in recent years, only a handful of studies has so far examined trait mindfulness or its dimensions in context of these theories.

The need to address this research gap was also noted in a recent review of workplace mindfulness training randomized controlled trials which called for a further integration of the mindfulness construct within the JD-R and other work-stress theories (Bartlett et al., 2019). In particular, Bartlett and colleagues (2019) argued that while there was an emerging theoretical and experimental support for the role of mindfulness as protective for work-related stress, more research was still needed with respect to wider individual and organisational outcomes and beyond education and healthcare sectors. The empirical studies presented in this thesis adopted the latest, expanded version of the JD-R theory (Bakker, Demerouti, & Sanz-Vergel, 2014; Bakker & Demerouti, 2017) to conceptualise trait mindfulness and its awareness and acceptance dimensions as personal resources in the dual

energy erosion and motivation process of the JD-R model and thus may present a timely response to this research call.

In line with the most recent theoretical advancements in the mindfulness literature, this thesis conceptualised mindfulness as a multi-dimensional construct (Baer, 2019) and used the FFMQ scale to assess trait mindfulness along its five facets: observing, describing, acting with awareness, nonjudgement and non-reactivity. In addition, more recent theoretical discussions and empirical research findings opened up a new perspective in terms of a specific focus on the dimensions of mindfulness, the so-called *what* and *how* of mindfulness (i.e., mindful awareness as the attention itself, and accepting attitudes as the qualities of this attention), and the possibility of their differential effects (Baer, 2019; Desrosiers et al., 2014; Lindsay & Creswell, 2017; 2019; Teper et al., 2013). The empirical studies in this thesis therefore investigated trait mindfulness in its synergistic form, combining the unique effects of all five facets in one overall mindfulness score, but also provided a closer look at the differential effects associated with the individual facets of trait mindfulness under these two broad (albeit a little fuzzy) dimensions of the mindful awareness and acceptance.

Drawing on the wealth of active mechanisms proposed to underlie the salutary effects of mindfulness across various domains of mindfulness literature, this thesis attempted to simplify the complexity of these theoretical accounts and summarise these mechanisms under three broad processes through which trait mindfulness was proposed to influence the work-related health and well-being outcomes. These included (1) a greater awareness of the present-moment experience, (2) a lower emotional and stress reactivity, and (3) a faster recovery to the emotional and homeostatic baseline (see chapter 1). Greater awareness of the

present-moment experience was theoretically linked to the awareness dimension of trait mindfulness assessed by the observing facet of the FFMQ. Whereas faster recovery to one's emotional and homeostatic baseline following a stressful event was thought to be enabled by the accepting attitude assessed by the nonjudgment and non-reactivity facets of the FFMQ. However, the proposed mechanism of lower emotional and stress reactivity turned out to be conceptually more complex and differentially associated with different dimensions of mindfulness across different contexts – i.e., higher immediate within-person reactivity was theoretically associated with the observing facet of FFMQ in contrast to a pattern of lower between-person, more enduring reactivity associated with nonjudgment, non-reactivity and acting with awareness facets which become apparent over multiple stress encounters and episodes.

Furthermore, in line with recent calls for the development and research of a multilevel model of employee well-being (Ilies et al., 2016), the daily/weekly diary studies in this thesis attempted to adopt this multilevel perspective in applying the explanatory theoretical accounts of mindfulness to hypothesize that trait mindfulness and its dimensions would exert their influence at both levels of the multilevel hierarchy. Mindfulness was argued to affect the stress and motivation processes both at the within-person level of episodic reactivity and transient trigger patterns of burnout and work engagement as well as at the between-person level of more enduring processes, individual differences and more stable job characteristics which can be also viewed as maintenance patterns of the work-related outcomes over time. Such view is theoretically aligned with the allostatic load model, a prominent physiological model of stress (AL model; McEwen, 1998; 2007; 2018); and the perseverative cognition hypothesis (Brosschot et al., 2006), a

psychophysiological model of cognitive processes underlying the chronic activation of the physiological pathways of stress.

Overall, the theoretical concepts and hypothesised relationships in the studies were loosely anchored in Cox and Griffiths' (1995) description of work-related stress as an emergent process involving the following five basic components: (1) the situational antecedents of the stress experience (i.e. physical and psychosocial hazards inherent to the work environments and the design of work); (2) the cognitive processes that give rise to the emotional experience of stress; (3) the psychological, behavioural, and physiological correlates of the emotional experience of stress; (4) the secondary effects of stress involving individual health and social and organisational behaviour and its implications; and (5) the feedback reflecting effectiveness of one's coping effort. Cox and Griffiths' theoretical account provides a wider theoretical lens than any of the more specific work-related stress theories reviewed in this thesis which focus on the particular elements of this process. The role of personal characteristics in this emergent process of stress and motivation was then conceptualized in line with Bolger and Zuckermann's (1995) and Mäkikangas et al.'s (2013) frameworks to describe the role of personality and individual differences in the relationship between (both positive and negative type of) work characteristics and their respective individual work-related outcomes (e.g., job burnout and work engagement).

7.2 Summary of Findings

All three empirical studies in this thesis conceptualised trait mindfulness (and each of its facets) as personal resources in the energy erosion and motivation processes proposed by the JD-R theory. Study 1 and 2 (in chapters 4 and 5) adopted

the five-day view of these processes using the daily diary design, whereas study 3 (in chapter 6) expanded its perspective to capture these energy erosion and motivation processes across three weeks using the weekly diary methodology. The main advantage of the daily/weekly diary methodology is in its ability to break down variance in the study variables assessed across repeated measurement occasions into its two main components reflecting the within-person and between-person variance. As Pindek et al. (2019) pointed out, the within- and between-person variance components or effects at the within- and between-person level were independent of each other and represented entirely different information pertinent to the stressor-strain relationship: the within-person episodic reactivity and more stable effects (respectively).

The relative proportion of the within- and between-person variance in the study variables across these studies is thought to reflect the different perspectives adopted by these studies, i.e., the five day vs. three-week view. The daily diary studies assessing the study variables twice daily reported that 50.3% of variance in burnout and 40.9% proportion of variance in work engagement was attributable to the within-person level of episodic reactivity and transient effects, whereas 49.7% and 59.1% of variance in these variables respectively was attributable to the between-person level of more stable processes endemic to the work environment and individual differences. In comparison, the weekly diary study reported a somewhat lower proportion of variance at the within-person level. Specifically, the study 3 observed that 33.4% of variance in emotional exhaustion, 28% of variance in work engagement and 22.4% of variance in work-related worry/rumination was attributable to the within-person level of weekly fluctuations, whereas 66.6%, 72%, and 71.6% of variance in these variables respectively was attributable to the more

stable effects of the job and personal characteristics. These findings are consistent with a notion that with increasing length of time between the assessment points, the study measures become less sensitive to the within-person episodic, unsystematic variability (or fluctuations) and reflect more systematic variance.

Study 1 of this thesis (in chapter 4) investigated the synergistic effect of all five facets as the overall trait mindfulness variable in the dynamic processes of energy erosion and motivation unfolding in the workplace over five working days. The study focused in particular on how employees' trait mindfulness affected the within-person trigger process whereby episodic fluctuations in employee job conditions translated into corresponding episodic fluctuations in job burnout and work engagement as well as the between-person processes whereby more stable job characteristic were argued to maintain the employees' wellbeing and motivation levels over a longer period of time (i.e., five working days in the study 1).

The multilevel moderation analyses showed that trait mindfulness (the synergistic effect of all five facets combined) did not affect the within-person episodic reactivity and trigger processes. Hence regardless of employees' trait mindfulness, the episodic fluctuations in workload demands and job control were associated with corresponding fluctuations in employees' episodic burnout (i.e., episodes of emotional, cognitive and physical fatigue) and episodic work engagement (i.e., episodes of vigour, dedication and absorption) at the within-person level. However as per the study hypothesis, trait mindfulness was found to act as a buffer in the more long-term relationship between high-strain job conditions (characterised by high demands and low control) and job burnout at the between-person level. Higher trait mindfulness was therefore found to moderate the

maintenance pattern of job burnout in employees repeatedly reporting higher demands and lower control relative to others.

Furthermore, study 1 also hypothesized that mindfulness would act as a moderator to enhance the positive relationship between active jobs (characterised by high demands and high levels of control) and work engagement. Despite the significant moderating effect found in the study, this hypothesis was not supported as trait mindfulness was not associated with higher work engagement in high demand-high control jobs. Instead, a closer examination of the simple slopes revealed that mindfulness was associated with an enhanced effect of job control in 'low' workload demands job conditions on employee engagement at the between-person level. The highest levels of work engagement were thus reported by more mindful employees in high control-low demand jobs (i.e., jobs characterised by high control and manageable demands), whereas mindful employees in low demand-low control jobs reported the lowest levels of work engagement. In addition to these moderating effects, mindfulness was also found to directly predict job burnout (but not work engagement) over and above the effect of trait negative affectivity at the between-person level.

Study 2 (in chapter 5) then took a "deep dive" to follow-up and further explore these direct and moderating effects at the facet level of trait mindfulness drawing on the theories of mindfulness mechanisms and empirical research findings highlighting the differential role of the awareness (observing facet) and acceptance (nonjudgement and nonreactivity facets) dimension of mindfulness. To start with, the study 2 conducted a psychometric evaluation of several alternative proposals with respect to the factorial higher-order structure of trait mindfulness suggested in the mindfulness literature. The aim was to establish the best arrangement of the five

facets of the FFMQ under the two higher-order factors of awareness and acceptance. However, results of the confirmative factor analyses suggested that the baseline model featuring five correlated factors provided the best model fit in comparison to any of the two higher-order factor models tested in the study and thus the study 2 analyses were conducted at the facet level, rather than with the two higher-order dimensions.

Next, the study 2 examined whether a pattern of enhanced within-person reactivity could be observed with respect to the awareness dimension (as measured by the observing facet) and whether the buffering effect of trait mindfulness at the between person-level would be carried in particular by the acceptance dimension (as measured by the nonjudgment and non-reactivity facets). The results revealed that employees' tendency to notice and attend to internal and external experiences (the observing facet) was associated with enhanced within-person reactivity to high-strain episodes resulting in an episodic drop in work engagement (but not in higher burnout). Whereas the nonjudgement facet acted as a buffer of the direct positive relationship between job demands and burnout and of the negative relationship between control and burnout at the between-person level. The non-reactivity facet buffered the direct negative relationship between control and job burnout and was a significant direct predictor of both burnout and work engagement at the between-person level over and above the influence of the work characteristics and trait negative affectivity.

No hypotheses were specified with respect to the describing and acting with awareness facets of the FFMQ as they were not considered to clearly and distinctly measure neither the awareness nor the acceptance dimension of trait mindfulness (Lindsay & Creswell, 2017). An exploratory analysis revealed that

these two facets also contributed to the conditional effects of the overall trait mindfulness with the effect of the describing facet closely matching the pattern of findings with respect to the overall mindfulness in study 1. Overall, despite finding only little empirical support for the complex conditional hypotheses proposed by study 2, the general direction of the conditional effects reported with respect to the individual facets of mindfulness was broadly in line with the expectations.

Moreover, in line with Mäkikangas et al.'s (2013) framework of personality characteristics in the relationship between work characteristics and well-being, study 2 also examined the individual mindfulness facets as antecedents of more favourable job conditions (i.e. more structural job resources such as control and lower hindering work demands) and more favourable work-related outcomes (i.e. lower burnout and higher work engagement) in an effect which could be explained as a result of possible job crafting efforts by the more mindful employees. However, none of the FFMQ facets was found to act as a significant predictor of job control or workload demands over the five days and therefore the job crafting hypothesis of mindful awareness and acceptance (and exposure hypothesis of Mäkikangas et al.'s (2013) framework) was not supported by the study results. Moreover, despite significant negative bivariate correlations between the non-reactivity, nonjudgment, acting with awareness and describing facets of trait mindfulness and burnout, only the non-reactivity facet was a significant negative predictor of job burnout (and a positive predictor of work engagement) at the between-person level when taking into account the influence of proximal job demands, control and trait negative affectivity.

Finally, the third empirical study in this thesis (study 3 in chapter 6) adopted a weekly perspective to examine the within- and between-person effect of

trait mindfulness (and its awareness and acceptance dimensions) in the relationship between work characteristics and the positive and negative indicators of employee well-being (i.e., emotional exhaustion and work engagement) over three weeks. The study also investigated an active mechanism through which these work characteristics were proposed to influence the respective outcomes over time via a perseverative cognitive process of work-related worry/rumination. The timeframe of this study was extended to three weeks to be able to tap into the chronic or more enduring nature of these processes at the between-person level. The main research aim of this study was to establish whether mindful people worried and ruminated less when faced with high levels of work-related stressors and whether they were also less vulnerable to the detrimental effect of the work-related worry/rumination on emotional exhaustion (as a dimension of job burnout).

In line with the study hypotheses, the multilevel path models suggested that the positive relationship between job demands and emotional exhaustion was partially mediated by the work-related worry/rumination over the three-weeks at the between-person level. In contrast to the study hypotheses, job control was not associated with work-related worry/rumination at the between-person level. Trait mindfulness was not found to be directly associated with the work-related worry/rumination or emotional exhaustion over and above the trait neuroticism at the between-person level. However, trait mindfulness was associated with work engagement over and above the effect of control.

To answer the main research question of the study, trait mindfulness was found to buffer the relationship between job demands and work-related worry/rumination over the three weeks with more mindful employees reporting lower levels of work-related worry when faced with high job demands in

comparison to less mindful employees. But no buffering effect of trait mindfulness was found with respect to the relationship between work-related worry/rumination and emotional exhaustion at the within- or between-person level. This finding seems to suggest that once employees experienced work-related worry/rumination as an internalised stressor, the work-related worry/rumination was in turn associated with higher levels of emotional exhaustion regardless of employees' overall trait mindfulness.

A more diverse pattern of findings emerged with a closer look at the possible differential effect of the awareness and acceptance dimensions of trait mindfulness. In line with the study 3 hypotheses, the observing facet of mindfulness was associated with enhanced within-person reactivity to the internal representation of the stressor (i.e., work-related worry and rumination) resulting in higher levels of emotional exhaustion in employees reporting higher tendency to notice or attend to internal and external experiences (as measured by the observing facet). Moreover at the between-person level, the non-reactivity (but not nonjudgement) facet of mindfulness was found to buffer the relationship between job demands and work-related worry, whereas the nonjudgment (but not non-reactivity) facet of mindfulness was found to buffer the relationship between work-related worry and emotional exhaustion. In addition, at the between-person level, nonjudgment, non-reactivity and acting with awareness were also found to directly predict work engagement but not emotional exhaustion over and above the influence of the work characteristics and trait neuroticism.

7.3 Theoretical Contributions

This thesis aims to contribute to the occupational health and mindfulness literature in several ways. The first theoretical contribution is that the three

empirical studies build upon and extend previous knowledge about trait mindfulness as a moderating personal resource in context of the energy erosion process of the JD-R framework. Previous cross-sectional studies reported supportive evidence for the buffering effect of trait mindfulness on the relationship between job demands and burnout (Fisher et al., 2019; Grover et al., 2016). The empirical studies in this thesis replicated this finding (as a significant moderating effect at the between-person level) and provided a more detailed insight into these effects from the multilevel perspective of within-person reactivity and between-person more enduring, allostatic load processes underlying employee well-being. To outline the practical significance of these findings, the studies drew on the JD-R theory (Bakker & Demerouti, 2017), the AL model (McEwen, 2018) and the perseverative cognition hypothesis (Brosschot et al., 2006). Moreover, this thesis adopted a multidimensional view of trait mindfulness and explored its effects at the facet level in line with more recent theories of mindfulness mechanisms and the differential effect of its awareness and acceptance dimensions (Lindsay & Creswell, 2017; 2019).

The second theoretical contribution of this thesis lies in its use of the daily and weekly diary methodology and multilevel modelling analyses to decompose the variance in the daily and weekly variables into their within- and between-person components. These two components correspond to different, unrelated processes which can be interpreted as the *trigger patterns* involving episodic and transient fluctuations in the state variables (e.g., both work characteristics and employee outcomes of job burnout and work engagement) and the *maintenance patterns* involving more enduring, allostatic load processes which build up over a number of days or weeks. The proportion of variance attributable to the within- and between-

person component of variance across these studies is consistent with previous daily and weekly diary studies (e.g., Demerouti et al., 2015; Haar et al., 2018; Xanthopoulou & Meier, 2014) and in line with the theoretical explanations of the significance of study effects found at the within- and between-person level (Chen et al., 2005; Ilies et al., 2016; Pindek et al., 2019; Sonnentag, 2015).

Furthermore, adoption of the multilevel perspective to disentangle the within- and between-person processes with respect to the energy erosion and motivation processes in the workplace is also relevant to a broader discussion of the concept of burnout and its temporal nature. Traditionally, burnout has been long defined and studied as an enduring syndrome of exhaustion, cynicism, and reduced professional efficacy caused by persistent unfavourable or demanding work conditions that drain employees' energetic resources (Maslach, Schaufeli & Leiter, 2001; Schaufeli et al., 1996; Shirom, 2003). It was reported to co-occur with somatic health symptoms (e.g., musculoskeletal, cardiovascular or respiratory), and common mental health disorders (e.g., depression, anxiety, and alcohol dependence; Ahola & Hakanen, 2014). Several prospective longitudinal studies reported that burnout was related to future depressive symptoms over a number of years (e.g., Ahola & Hakanen, 2007; Toker & Biron, 2012) indicating that prolonged work-related stress can generalise over time and affect employees' life beyond their work environments. However, a long-term discussion has been also unfolding in the clinical psychology literature with some researchers questioning whether burnout and depression were at all distinct constructs given a large overlap between the two concepts (e.g., Bianchi, Schonfeld & Laurent, 2015, 2019; Koutsimani, Montgomery & Georganta, 2019).

The empirical studies in this thesis adopted a close-up view of burnout (and work engagement), a micro-perspective which assumes that employees' experiences may vary within the same person from one day or week to another as a response to specific work events. Previous daily diary research adopting this view reported that 38% to 79% of the total variance in the exhaustion / fatigue dimension of burnout could be attributed to the within-person level (see review by Xanthopoulou & Meier, 2014). A similar proportion of the within-person variance was also observed in the empirical studies in this thesis. It has to be noted that the most popular measures of burnout such as the MBI (Maslach & Jackson, 1981) or the SMBM (Shirom & Melamed, 2006) were developed with respect to the chronic, long-term nature of the phenomenon and the state measures used in the daily and weekly diary research were developed as shortened adaptations of these general scales. The hierarchical nature of the diary data (with daily and weekly observations nested within persons) then requires that the scale reliability is calculated for each level (rather than for each measurement occasion) and that the multilevel factorial structure of the construct is established via a multilevel confirmatory approach (Nezlek, 2017). Both procedures were used by the empirical studies in this thesis.

More importantly though, the micro-perspective adopted by the daily and weekly diary studies opens up new avenues in development of the theoretical understanding of the phenomena in question. Specifically, assumptions that have been supported by the cross-section and longitudinal studies of burnout (with respect to the between-person level of analysis) may no longer apply to the within-person level. For example, a recent series of daily diary studies revealed that a different pattern of distinct appraisal and coping strategies operated at the within- and between-person level to trigger low mood and to maintain it over 7 days in a

sample of depressed patients (Dunkley et al., 2016) as well as in a sample of working adults over 14 consecutive days (Dunkley et al., 2014). Hence, different processes were found to operate at the different levels of analysis and different theoretical frameworks were used to explain the observed effects.

Similarly, each of the studies presented in this thesis hypothesized and found a different pattern with respect to the conditional processes unfolding at the within- and between-person level of the energy erosion and motivation path of the JD-R model. For example, study 1 reported that daily job demands were negatively associated with work engagement at the within-person level but not at the between-person level. This means that on the days when employees faced excessively high levels of conflicting demands they experienced corresponding episodic drop in their work engagement. However, no such effect was found at the between-person level. For more enduring levels of work engagement, the presence of job resources (job control) but not absence of job demands mattered. Moreover, study 1 also found that trait mindfulness buffered the effect of high-strain working conditions on job burnout at the between-person level but no such effect was found at the level of the within-person episodic reactivity. Study 3 hypothesized and reported interactive effects of the individual mindfulness facets at the within- or between-person level which were only found at one level of the analysis but not the other. Such findings are in line with other studies which also reported different pattern of results at the within- and between-person level of analysis (e.g., Hülsheger et al., 2014; Johnston et al., 2016). And thus these studies provide further empirical evidence for the non-homology of findings at the different levels on analysis in multilevel studies and justify calls for further theoretical exploration of stressor-strain and motivation

processes at both levels of analysis (Chen et al., 2005; Pindek et al., 2019; Sonnentag, 2015).

The third theoretical contribution of this thesis pertains to the two-dimensional conceptualisation of mindfulness and measurement of the awareness and acceptance dimensions using the FFMQ. Study 2 (in chapter 5) conducted a psychometric evaluation of several alternative configurations of the FFMQ facets under the two higher-order factors of mindful awareness and acceptance proposed in the literature (Burzler et al., 2019; Lindsay & Creswell, 2017; Linehan, 1995; Tran et al., 2013). However, the confirmatory factor analyses of these alternative proposals did not yield a conclusive result. The five-factor correlated model provided the best fit to the data but each of the two-higher order factor alternatives also yielded an acceptable fit. The worst model fit was observed when all FFMQ items were loaded onto a single mindfulness factor providing evidence for the dimensionality of the mindfulness construct as measured by the FFMQ. However, further exploration of the mindfulness structure with respect to the two higher-order dimensions would be recommended, perhaps performing the factor analyses at the item-level rather than using item parcels (although this is a standard practice which was also adopted by Baer et al., 2008; Bohlmeijer et al., 2011; and Gu et al., 2016).

The fourth theoretical contribution of the present thesis lies in its exploration of the trait mindfulness role in the energy erosion and motivation processes of the JD-R at the facet level. The studies 2 and 3 (in chapter 5 and 6) adopted the MAT theory (Lindsay & Cresswell, 2017; 2019) to guide their understanding of the differential function of the mindfulness dimensions and extrapolated this theory to propose their hypotheses with respect to the within- and between-person level of analysis in the multilevel model. Previous studies of mindfulness in the work-

related stress, recovery and motivation processes have largely operationalised mindfulness as a unidimensional construct (e.g., Fisher et al., 2019; Haun et al, 2018; Hülsheger et al., 2013; Grover et al., 2016; Lawrie et al, 2017; Tuckey et al., 2018). However, mindfulness has been increasingly viewed as a multidimensional construct and the differential results reported here with respect to the awareness and acceptance dimensions of the FFMQ illustrate importance of such close-up perspective.

The fifth theoretical contribution pertains to exploration of the active mechanisms through which job demands were proposed to affect work-related well-being outcomes over time, i.e., the mediating role of work-related worry and rumination based on the perseverative cognition hypothesis (Brosschot et al., 2006), in relation to the buffering role of the personal resource of trait mindfulness and its dimensions. The synergistic effect of all five mindfulness facets (an overall FFMQ score) was found to buffer the effect of job demands on work-related worry at the between-person level suggesting that more mindful employees indeed worried less when faced with high demands over the three-week study period. But no evidence was found for a similar buffering effect of trait mindfulness on the relationship between an internalised stressor (i.e., work-related worry and rumination) and emotional exhaustion at the within- or between-person level. These findings extend previous evidence with respect to the negative association between mindfulness and worry and rumination (e.g., Evans & Segerstrom, 2011; Fisak & von Lehe, 2012).

A more diverse pattern of findings emerged with a closer examination of the individual mindfulness facets. In line with the MAT theory and other theoretical accounts of the differential effect of mindfulness dimensions (mindful awareness and acceptance), the observing facet was found to enhance the within-person

reactivity to work-related worry and rumination whereas a different buffering pattern of the acceptance dimension (nonjudgment and non-reactivity) together with the acting with awareness facet was found at the between-person level. Interestingly, the describing facet was not found to moderate any of these relationships whereas in study 2 the moderating effects of the describing facet closely matched that of the total FFMQ. On the other hand, study 2 hypothesized and tested for a buffering effect of mindfulness with respect to high-strain jobs (high-demand, low-control constellation of work characteristics), whereas study 3 looked at the 2-way interactive effects between describing facet and job demands in predicting work-related worry/rumination but not burnout.

Finally, as another theoretical contribution to the mindfulness literature, the three studies in this thesis controlled for the personality characteristics of trait negative affectivity (study 1 and 2) and neuroticism (study3). Baer (2019) noted that incremental validity of mindfulness measures over neuroticism and negative affectivity had been a neglected topic in the booming mindfulness research. Study 3 reported that trait mindfulness was not found to provide any incremental predictive value in predicting work-related worry/rumination over the work demands and neuroticism; and over both types of work characteristics (demands and resources), work-related worry/rumination and neuroticism in predicting emotional exhaustion. However, when the effect of overall mindfulness was decomposed at the facet level, the nonjudgment facet of mindfulness was found to be a negative significant predictor of work-related worry/rumination over and above the influence of job demands and neuroticism. The synergistic effect of the five factors subsumed under the total mindfulness score may therefore mask important effects of mindfulness

which may be only revealed when the unique contribution of the individual mindfulness facets is examined.

7.4 Practical Implications

The empirical studies in this thesis examined mindfulness as a naturally occurring dispositional characteristic. However, this thesis ultimately aims to contribute to a broader discussion on mindfulness practice in organisational context (Hülsheger, 2015; Rupprecht, Koole, Chaskalson, Tamdjidi, & West, 2019). The present study thus examined the dispositional mindfulness as a trait personal resource characteristic without a priori limiting its focus on the effects of mindfulness developed through any particular form of mindfulness training. However, it is widely assumed, and empirical evidence suggests, that mindfulness training conveys its benefits through increasing participants' more stable levels of dispositional mindfulness (i.e., as a greater propensity to experience mindful states inside and outside of the training environment; Quaglia et al., 2016). There are several implications of the findings reported in this thesis which are therefore not only relevant with respect to mindfulness as a naturally occurring personal characteristic, but which also pertain to the effects of mindfulness training aiming to increase trait mindfulness of employees in the workplace.

The results of the empirical studies suggested that trait mindfulness buffered the negative effect of high-strain jobs (study 1 and 2) or high-demand working conditions (study 3) on employee burnout over time and therefore expanded on the existing empirical evidence supporting the use of mindfulness-based interventions as an effective strategy to reduce stress in working populations (Chiesa & Serretti, 2009; Creswell, 2017; Jamieson & Tuckey, 2017; Lomas et al., 2017). However, the

results of the study 1 suggested that the beneficial effect of trait mindfulness in preventing burnout did not seem to go beyond mitigating the negative effects of low control and it can be also pointed out that employees who reported high control and manageable workloads experienced the lowest level of burnout regardless of their trait mindfulness. Such finding implies that addressing the job design or combining features of individual- and job re-design interventions (e.g., Bond, Flaxman, & Bunce, 2008) may be needed for the most effective reduction of employee burnout.

Furthermore, for organisations and managers responsible for employee well-being, the findings with respect to mindfulness facets show that different facets affect the energy erosion and motivation processes in the workplace in different ways and in different timeframes. The observing facet was found to enhance the within-person reactivity and the negative effect of episodic changes in work demands (in study 2 and 3). Whereas the nonjudgment and non-reactivity facets (acceptance dimension) were found to exert their buffering influence at the between-person level of more enduring maintenance patterns. This pattern of results emphasises importance of the acceptance dimension in fostering employee well-being and prevention of the maintenance patterns with respect to the allostatic load processes. Mindfulness interventions which do not pay sufficient attention to development of acceptance skills but only understand mindfulness as a form of an attention training may miss out on the beneficial effects of mindfulness and instead only increase employees' within-person reactivity to episodic fluctuations in their working conditions.

Similarly, for individual employees, the practical implications of these results may mean that they can hardly expect an instant relief from their negative affectivity and frustrations elicited by high-demand and resource-poor working

environments when they engage in some form of mindfulness training to become more mindful. Instead, by becoming more observant and mindfully aware of their present moment experience, they may become more attuned to the emotional and visceral messaging of their body evoked by the episodic fluctuations in their job conditions. Crucially, mindfulness was not found to be associated with reduced within-person reactivity to episodic fluctuations in their working conditions. However, an ability to adopt an accepting stance (i.e., the nonjudgmental and non-reactive quality of their awareness) together with a clearer understanding and ability to attach clear verbal labels to their own immediate experience applied over multiple iterations of this episodic reactivity may then prevent development of the more long-term negative consequences of the fight-or-flight activation over time.

Another important practical (and theoretical) implication needs to be discussed here, one of clinical (rather than statistical) significance of an effect observed in a study. Kazdin (1999, p. 332) defined clinical significance as "the practical or applied value or importance of the effect of an intervention – that is, whether the intervention makes a real (e.g., genuine, palpable, practical, noticeable) difference in everyday life to the clients or to others with whom the clients interact." Although Kazdin referred specifically to an effect of a therapeutic treatment or a clinical intervention, the question of clinical significance may equally apply to participants of the correlational studies reported in this thesis.

Would more mindful participants observe a genuine, palpable, practical and noticeable difference in their everyday life when it comes to how much they worry and ruminate in high-demand situations or to their everyday experiences of state burnout (measured as physical fatigue, emotional exhaustion and cognitive weariness) and work engagement? The answer here has to be a 'no'. The significant

conditional effects of mindfulness (either as a general trait or in its facets) were mainly observed at the between-person level of more enduring allostatic load processes. For example, study 3 reported that the nonreactivity facet of mindfulness acted as a buffer in the relationship between job demands and work-related worry/rumination at the between-person level with the moderation model including non-reactivity, job demands and neuroticism accounting for 33.8% of variance in work-related worry/rumination and the interaction term (the conditional, buffering effect of non-reactivity) explaining 5.8% over the previous, direct effects model. For an individual employee, these between-person effects involving more long-term mean levels of job characteristics (as latent variables) would be almost certainly drowned in the everyday noise of the within-person, episodic fluctuations in their working conditions and episodic reactivity. Yet, a rapidly changing everyday weather pattern may mask a slow trajectory of a climate change.

The main advantage of the daily and weekly diary studies in this thesis is in their ability to disentangle these fast and slow effects and examine the within-person episodic processes as well as the between-person effects over longer time periods simultaneously. Whilst the episodic fluctuations and their immediate correlates can be directly noticeable to an individual, the between-person effects may represent a repeated and prolonged stress exposure as it builds up over time in a slow, cumulative process in which initially reversible psychophysiological reactions develop into more serious health problems in line with the main propositions of the AL theory (McEwen, 1998; 2004; 2007; 2018). As such the slow, between-person effects may unfold without notice. However, the daily diary methodology may be well-suited to unpack and examine these trigger and maintenance patterns of work-related health and wellbeing over time. This theoretical argument put forward by

Ilies and his colleagues (2015) relatively recently certainly calls for future research using daily or weekly diary bursts in a longitudinal design to provide more empirical evidence with respect to the multilevel model of employee wellbeing.

7.5 Research Limitations and Future Directions

The empirical studies presented in this thesis share several main limitations. First, the daily and weekly diary design and the multilevel modelling methodology were used to investigate micro-level processes at the daily and weekly level. As such the diary data collected in these studies still need to be regarded as a type of cross-sectional data in their nature and thus the multilevel modelling analytical methods used here are "better suited for understanding the social and emotional circumstances in which a phenomenon occurs, or the conditional effects of environmental events on psychological processes" and thus better suited to answering descriptive or correlational questions rather than causal questions (Conner & Lehman, 2012; p. 91). An alternative approach would be to use lagged analyses to investigate precedence of the phenomena in a day or a week (e.g., mindfulness and work engagement measured at mid-day were both found to predict mindfulness at the end of the day at the within-person level, Tuckey et al., 2018). Yet neither such lagged analyses would be sufficient to indicate causality. Hence, any causal interpretation of findings from these daily and weekly diary studies with no experimental control or manipulation of the proximal work characteristics or psychological states as can be done in experimental designs should be regarded with caution.

The second limitation pertains to a contentious issue of the statistical power to detect interaction effects among three continuous variables in multilevel multiple

regression models. Statistical power refers to the ability of a statistical test to detect an effect (and reject the null hypothesis given that the null hypothesis is false in the population). Mathieu, Aguinis, Culpepper and Chen (2012) summarised that power of a test depends on (a) the size of the effect in the population; (b) the sample size (i.e., degrees of freedom); (c) the preset Type I error rate; (d) whether predictors and criterion variables are measured with high fidelity (i.e., reliability of the measures used); (e) on unrestricted variable distributions; and (f) on meeting assumptions of the statistical tests used (e.g., homogeneity of error variances, linear relationships etc.). In context of the multilevel regression analysis, these considerations have to be made with respect to both levels of the analysis, hence the studies in this thesis calculated the multilevel reliability coefficients for their daily variables.

Observed interactions in the psychological science typically account for only a few percentage points of variance over and above the first-order (direct) effects (Cohen, Cohen, Aiken & West, 2003). Cohen (1988) suggested that squared partial correlations of .02, .13, and .26 of a term in multiple regression represented small, moderate, and large effect size respectively. Cohen et al. (2003) argued that if predictors *X* and *M* were measured without error (reliability of 1.0), the sample size required to detect an interaction would be 26 for large effect size, 55 for moderate effect, and 392 for a small effect size interaction. However, with .88 reliability for each predictor, the required sample size for power .80 to detect a moderate interaction effect ranges between 100 to 150 or more, and for a small interaction effect may exceed 1000 cases, depending on the amount of variance accounted for by the main effects of *X* and *M*. Kreft and de Leuuw (1998) discussed statistical power for multilevel models and a provided a more lenient estimate of at least 20 groups (i.e., participants) at level 2 of the analysis needed to detect a cross-level

interaction effect if the group sizes (i.e., a number of observations per participant) are ‘not too small’.

The sample size in study 1 and 2 involved 144 participants at the level 2 (between-person level) with 1083 daily diary measurements at the level 1 (within-person level of daily observations). The study 3 in this thesis analysed weekly diary data from 173 participants and 479 weekly surveys. Given the sample sizes of the studies, the statistical power to detect interaction effects in the multilevel analyses may have been only just sufficient or perhaps just under the suggested guidelines to detect moderate effects. Insufficient sample size would increase the risk of a Type II error and thus future studies with larger sample sizes at both levels would be needed to replicate the findings reported here. Yet, the sample sizes of the present studies are comparable to other studies published in highly respected occupational psychology journals. For example, Meier et al. (2008) used a sample of 96 employees to report on a three-way interaction effect between internal resources, job control and stressors at work. While Syrek et al. (2017) used a sample of 59 employees providing a total of 357 weekly measurements to examine direct and indirect effects of unfinished tasks and rumination on sleep at the within- and between-person level in their (multilevel) weekly diary study extending over three months.

As a closely related but a separate issue, the number of statistical tests employed to detect the hypothesized effects and their potential effect on the Type I error rate needs to be discussed here. Based on the reviewed theoretical propositions with respect to the salutary effects of mindfulness and the synergistic role of work characteristics in the energy erosion and motivation processes, the study hypotheses were specified to capture the complex conditional effects between three continuous

variables: job demands (*X*), job control (*M*) and trait mindfulness or its facets (*W*). In order for such a three-way interaction test to be valid, all simple effects (*X, M, W*) and their two-way interactive terms (*XM, XW,* and *MW*) have to be entered into the model to produce a valid test of the three-way interactive term (Hayes, 2017). The significant three-way interaction terms were plotted and followed-up with the simple slopes tests. However, the issue of how the Type I error would be allocated in testing the interaction must be considered here.

Cohen at al. (2003) compare this issue to tests of multiple contrasts in ANOVA. If there was only one global hypothesis that *X, M,* and *W* interact, then it would be appropriate to assign the nominal Type I error rate (α = .05) to the overall omnibus test of the interaction (the three-way term) and to control the collective error on the set of tests of the individual interaction components that comprise the overall test (e.g., by using the Bonferroni principle of dividing an overall α into as many parts as there are hypotheses or using a less conservative alternative; Cohen et al., 2003; Dawson & Richter, 2006). However, if a priori hypotheses about the individual components of the overall interaction are specified as was the case in the studies here (i.e., mindfulness was hypothesized to buffer the effect of high-demand, low-control conditions on burnout), the nominal Type I error rate was assigned to the individual contrast, in line with Cohen et al.'s (2003) recommendations following the practice in ANOVA. Cohen and colleagues (2003) also argue that the issue of statistical inference becomes more complex with multiple hypotheses whereby the Type I error rate could be also calculated per a group of related hypotheses (e.g., "experiment-wise") or even larger units (e.g., "investigation-wise"). As the hypotheses for the studies in this thesis were planned in advance, the Type I error rate was considered per hypotheses.

The third limitation of the studies in this thesis then closely relates to a wider discussion of research integrity regarding hypothesis testing and balancing of the Type I and Type II errors in light of the "replication crisis" in psychological science (Open Science Collaboration, 2012; 2015). None of the hypotheses nor any of the analysis plans in the present studies were pre-registered at the time, i.e., declared publicly and in advance with respect to how the studies would be conducted or how the data would be analysed using an independent registry such as the Open Science Framework (https://osf.io/). The preregistration revolution has gained substantial momentum especially in the recent years (Nosek, Ebersole, DeHaven & Mellor, 2018). Yet, the studies reported in this thesis were designed and conducted some years before preregistration has become the norm outside of the clinical research domain. It would be advisable that future applied / field studies conducted to replicate or follow up on the findings reported in this thesis preregister their research plans and their confirmatory as well as exploratory hypotheses in advance.

Fourth limitation pertains to the scope of the research undertaken here, none of these studies directly tested any of the proposed AL mechanisms through which mindfulness was proposed to influence the work-related outcomes such as possible AL mediators (e.g., salivary cortisol or heart rate variability) over time and associated emotional and stress reactivity or recovery processes suggested to underlie the moderating role of mindfulness and its facets in the context of the energy-erosion path of the JD-R theory. It would be recommended to follow-up the findings in these studies with further research including some of the more objective indicators of the stress-related physiological activation (such as cortisol levels or heart rate variability).

In addition, the studies in this thesis also referred to more chronic processes, yet they only spanned over 5 days and 3 weeks. And while for example 5-day daily diary designs are not uncommon in occupational health research (e.g., Debus et al., 2014; Orth & Volmer, 2017; van Hooff & Geurts, 2015; Xanthopoulou et al., 2009), it would be recommended to conduct a more systematic exploration of different timeframes. However, further theory development is still needed with respect to the timescale of when within-person reactivity translates into between-person differences and true chronic effects (Ganster & Rosen, 2013; Ilies et al., 2016).

Fifth limitation is that all study variables in this thesis were assessed by self-report measures at the same points in time which was argued to increase the probability of common method variance (CMV; Podsakoff et al., 2003; Podsakoff et al., 2012; Spector, 2006). Yet, Siemsen et al., (2010) demonstrated that interaction effects could not be artefacts of CMV as CMV severely deflated any interaction terms in their simulation regression models and thus made it more difficult to detect these effects through statistical means. It is therefore unlikely that the interactions observed in the present study were an artefact of the CMV. Nevertheless, it would still be beneficial to further validate and extend the present findings by future studies utilising different time measurement frames to separate the predictor, moderator and outcome measurements and to employ other than self-report measures where practically possible.

Finally, several studies which reported on the differential function of the awareness and acceptance facets of mindfulness concluded that these differences were only detected in the non-meditating samples whereas no such differences could be detected among experienced meditators (Baer et al., 2008; Bohlmeijer et al., 2011; Gu et al., 2016). The empirical studies in this thesis recruited their

participants as a sample from a general working population and measured trait mindfulness facets as naturally occurring individual characteristics without controlling for any meditation experience or intentional mindfulness practice. Whilst the MAT theory did not specifically assume that the differential effects of the awareness and acceptance dimension would be associated with (a lack of) meditation practice, it may be useful to control for and describe the study samples with respect to the participants' meditation experience in future studies.

7.6 General Conclusion

The aim of the empirical studies in the present thesis was to examine trait mindfulness and its dimensions of mindful awareness and acceptance as personal resources in context of the JD-R framework. The studies brought together several theoretical frameworks from different domains of scientific literature. The JD-R model (Bakker & Demerouti, 2017) was adopted as the overall study framework for its flexibility to include situational as well as personal characteristics in predicting employee wellbeing outcomes, its ability to capture the dual nature of the energy erosion and motivation process and its frequent use in other daily/weekly dairy studies which would enable wider comparisons of the research findings. However, an additional configural framework for the role of personality characteristics (Mäkikangas et al., 2013) had to be brought in to help clarify the various conceptual roles that trait mindfulness could play within the two JD-R processes.

Moreover, several explanatory models were used to provide greater theoretical insight into the nature of the possible relationships and hypothesised conditional effects. For example, the AL theory (McEwen, 2018) and the perseverative cognition hypothesis (Brosschot et al., 2006) helped to draw attention to the active mechanisms in the energy erosion process and to explain the

theoretical and practical significance of the within-person reactivity and more enduring effects at the between-person level. In addition, specific theories of mindfulness mechanisms were drawn upon to provide a greater understanding of the active mechanisms through which mindfulness and its dimensions may influence the energy erosion and motivation process at the within- and between-person level of the multilevel hierarchy in the present daily and weekly diary studies.

The complex pattern of results which emerged across these three studies broadly supported the hypothesised buffering effect of mindfulness in the stressor-strain relationship and provided empirical evidence for the role of mindfulness in the motivation processes. Furthermore, the close-up exploration of these effects at the facet level provided a further empirical support to the theories of mindfulness mechanisms highlighting the differential function associated with the individual mindfulness facets (or more broadly with the mindful awareness and acceptance dimension). To conclude, although trait mindfulness (and especially its acceptance dimension) may be associated with lower burnout and higher work engagement, either directly or indirectly via a conditional process, it cannot be expected to help employees thrive in toxic or resource-poor working environments.

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Appendices

Appendix A - Study 1 and 2 General Questionnaire

Q1 Dear Participant, First of all - a huge thank you for agreeing to take part in my dissertation research conducted as part of my MSc in Organisational Psychology at the City University! My study aims to investigate how specific daily work demands and resources together with individuals' personal resources influence employee work experience and well-being. The research will be used to improve current understanding of the role of personal resources in the mix of work demands and resources and add to the growing body of research in this area. To participate please fill in this general questionnaire - which should not take longer than 15 to 20 minutes to complete - and very brief daily 'temperature' measures each lunchtime and just before the end of the day for 5 working days. I am extremely grateful and realise that this process can be a bit time consuming, but you will be helping me tremendously and will be part of an important piece of research. As a member of the British Psychological Society, I am bound by strict ethical guidelines. All information that I collect will be anonymous and confidential and only aggregate results will be reported. Your participation is voluntary and you have the right to withdraw from the study at any time. If you have any questions, please do not hesitate to contact me directly and in confidence. I will be more than happy to discuss any aspect of this research with you. Once again, thank you for completing the questionnaires and for supporting me by doing so. With kind regards, Lucie Zernerova

○ I have read the information provided above and I agree to participate (1)

Q2 IMPORTANT Please think of a unique identification number (this can be your employee number or another RANDOM 5-digit number such as the last 5 digits of your telephone number - please steer clear of 00000, 12345, 54321 or similar non-random numbers!) and use this number each time you take the surveys so as I can link your responses on the separate occasions together whilst maintaining your anonymity. Please note that it is VITALLY important that you use the same identification number each time you respond to the surveys so either use a number that you can easily remember or write it down for your reference NOW! Enter you unique identification number here:

_____

Q3 Background Information Gender

- ○ Male (1)
- ○ Female (2)

Q4 Age

▼ less than 20 (1) ... 65 a vice (46)

Q5 How many years have you been working with your current employer?

▼ 1 (1) ... 41 and more (41)

Q7 What is your role?

- ○ Management (1)
- ○ Engineering / technical (2)
- ○ Non-engineering / non-technical (3)

Q12 Attention in everyday life questionnaire Instruction: Please rate each of the following statements using the scale provided. Indicate which of these options best describes your own opinion of what is generally true for you.

	Never or very rarely true (1)	Rarely true (2)	Sometimes true (3)	Often true (4)	Very often or always true (5)
I perceive my feelings and emotions without having to react to them. (1)	○	○	○	○	○
When I'm walking, I deliberately notice the sensations of my body moving. (2)	○	○	○	○	○
I find it difficult to stay focused on what's happening in the present. (3)	○	○	○	○	○
I'm good at finding the words to describe my feelings. (4)	○	○	○	○	○
I criticize myself for having irrational or inappropriate emotions. (5)	○	○	○	○	○
I watch my feelings without getting lost in them. (6)	○	○	○	○	○
When I take a shower or a bath, I stay alert to the sensations of water on my body. (7)	○	○	○	○	○
It seems I am "running on automatic" without much awareness of what I'm doing. (8)	○	○	○	○	○
I can easily put my beliefs, opinions, and expectations into words. (9)	○	○	○	○	○
I tell myself that I shouldn't be feeling the way I am feeling. (10)	○	○	○	○	○
In difficult situations, I can pause without immediately reacting. (11)	○	○	○	○	○

I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. (12)	○	○	○	○	○
I rush through activities without being really attentive to them. (13)	○	○	○	○	○
It's hard for me to find the words to describe what I'm thinking. (14)	○	○	○	○	○
I believe some of my thoughts are abnormal or bad and I shouldn't think that way. (15)	○	○	○	○	○
When I have distressing thoughts or images, I am able to notice them without reacting. (16)	○	○	○	○	○
I pay attention to sensations, such as the wind in my hair or sun on my face. (17)	○	○	○	○	○
I do jobs or tasks automatically, without being aware of what I'm doing. (18)	○	○	○	○	○
I have trouble thinking of the right words to express how I feel about things. (19)	○	○	○	○	○
I make judgments about whether my thoughts are good or bad. (20)	○	○	○	○	○
When I have distressing thoughts or images, I feel calm soon after. (21)	○	○	○	○	○
I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. (22)	○	○	○	○	○
I find myself doing things without paying attention. (23)	○	○	○	○	○

When I have a sensation in my body, it's hard to describe it because I can't find the right words. (24)	○	○	○	○	○
I tell myself I shouldn't be thinking the way I'm thinking. (25)	○	○	○	○	○
When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. (26)	○	○	○	○	○
I notice the smells and aromas of things. (27)	○	○	○	○	○
When I do things, my mind wanders off and I'm easily distracted. (28)	○	○	○	○	○
Even when I'm feeling terribly upset, I can find a way to put it into words. (29)	○	○	○	○	○
I think some of my emotions are bad or inappropriate and I shouldn't feel them. (30)	○	○	○	○	○
When I have distressing thoughts or images, I just notice them and let them go. (31)	○	○	○	○	○
I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow. (32)	○	○	○	○	○
I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. (33)	○	○	○	○	○
My natural tendency is to put my experience into words. (34)	○	○	○	○	○

I disapprove of myself when I have irrational ideas. (35)	○	○	○	○	○
I pay attention to how my emotions affect my thoughts and behaviour. (36)	○	○	○	○	○
I am easily distracted. (37)	○	○	○	○	○
I can usually describe how I feel at the moment in considerable detail. (38)	○	○	○	○	○
When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought / image is about. (39)	○	○	○	○	○

Q9 Work-related Experience Instruction: Below you will find a list of statement about your work experience. Please rate how true each statement is for you using the scale to make your choices.

	never true (1)	very seldom true (2)	seldom true (3)	sometimes true (4)	frequently true (5)	almost always true (6)	always true (7)
I am able to work effectively in spite of any personal worries that I have. (1)	○	○	○	○	○	○	○
My performance would suffer if I had an overly critical boss. (2)	○	○	○	○	○	○	○
I can't work effectively when there is uncertainty in the work environment. (3)	○	○	○	○	○	○	○
Worries do not get in the way of my success. (4)	○	○	○	○	○	○	○
In order to work productively, I need to be recognised for the work that I do well. (5)	○	○	○	○	○	○	○
I can perform as required, no matter how I feel. (6)	○	○	○	○	○	○	○
If I am going to do a good job on something, I need to feel in control. (7)	○	○	○	○	○	○	○
I cannot work with overly critical people. (8)	○	○	○	○	○	○	○

I can work effectively, even when I doubt myself. (9)	○	○	○	○	○	○	○
My thoughts and feelings do not get in the way of my work. (10)	○	○	○	○	○	○	○

Q10 How do you feel at work? Below is a number of statements that describe different feelings that you may feel at work. Please indicate how often do you GENERALLY have each of the following feelings at work:

	Never or almost never (1)	Very infrequently (2)	Quite infrequently (3)	Sometimes (4)	Quite frequently (5)	Very frequently (6)	Always o almost always (7)
I feel tired. (1)	○	○	○	○	○	○	○
I have no energy for going to work in the morning. (2)	○	○	○	○	○	○	○
I feel physically drained. (3)	○	○	○	○	○	○	○
I feel fed up. (4)	○	○	○	○	○	○	○
I feel like my "batteries" are "dead". (5)	○	○	○	○	○	○	○
I feel burned out. (6)	○	○	○	○	○	○	○
My thinking process is slow. (7)	○	○	○	○	○	○	○
I have difficulty concentrating (8)	○	○	○	○	○	○	○
I feel I'm not thinking clearly (9)	○	○	○	○	○	○	○
I feel I'm not focused in my thinking (10)	○	○	○	○	○	○	○

I have difficulty thinking about complex things (11)	○	○	○	○	○	○	○
I feel I am unable to be sensitive to the needs of colleagues and clients (12)	○	○	○	○	○	○	○
I feel I am not capable of investing emotionally in colleagues and clients (13)	○	○	○	○	○	○	○
I feel I am not capable of being sympathetic to colleagues and clients (14)	○	○	○	○	○	○	○

Q11 Please read the following statements carefully and decide if you ever feel this way about your job.

	Never (1)	Almost never (A few times a year or less) (2)	Rarely (Once a month or less) (3)	Sometimes (A few times a month) (4)	Often (Once a week) (5)	Very Often (A few times a week) (6)	Always (Every day) (7)
At my work, I feel bursting with energy. (1)	○	○	○	○	○	○	○
At my job, I feel strong and vigorous. (2)	○	○	○	○	○	○	○
I am enthusiastic about my job. (3)	○	○	○	○	○	○	○
My job inspires me. (4)	○	○	○	○	○	○	○
When I get up in the morning, I feel like going to work. (5)	○	○	○	○	○	○	○
I feel happy when I am working intensely. (6)	○	○	○	○	○	○	○
I am proud of the work that I do. (7)	○	○	○	○	○	○	○
I am immersed in my work. (8)	○	○	○	○	○	○	○
I get carried away when I am working. (9)	○	○	○	○	○	○	○

Q13 Please read the following statements carefully and rate how accurately they reflect your general experience at work. When I am at work...

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I feel I am competent enough to meet the high demands of the situation. (1)	○	○	○	○	○	○	○
I do things spontaneously and automatically without having to think. (2)	○	○	○	○	○	○	○
I have a strong sense of what I want to do. (3)	○	○	○	○	○	○	○
I have a good idea while I am performing about how well I am doing. (4)	○	○	○	○	○	○	○
I am completely focused on the task at hand. (5)	○	○	○	○	○	○	○
I have a feeling of total control. (6)	○	○	○	○	○	○	○
I am not worried about what others may be thinking of me. (7)	○	○	○	○	○	○	○
The way time passes seems to be different from normal. (8)	○	○	○	○	○	○	○
The experience is extremely rewarding. (9)	○	○	○	○	○	○	○

Q14 ...and the last scale in this set: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent do you GENERALLY feel this way, that is, how do you feel on the average.

	Very slightly or not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
interested (1)	○	○	○	○	○
irritable (2)	○	○	○	○	○
distressed (3)	○	○	○	○	○
alert (4)	○	○	○	○	○
excited (5)	○	○	○	○	○
ashamed (6)	○	○	○	○	○
upset (7)	○	○	○	○	○
inspired (8)	○	○	○	○	○
strong (9)	○	○	○	○	○
nervous (10)	○	○	○	○	○
guilty (11)	○	○	○	○	○
determined (12)	○	○	○	○	○
scared (13)	○	○	○	○	○
attentive (14)	○	○	○	○	○

hostile (15)	○	○	○	○	○
jittery (16)	○	○	○	○	○
enthusiastic (17)	○	○	○	○	○
active (18)	○	○	○	○	○
proud (19)	○	○	○	○	○
afraid (20)	○	○	○	○	○

Q15 That's all for now! You have now completed the general questionnaire. From now on you will be only asked to take brief daily 'temperature' measures each lunchtime and just before the end of the day over the next 5 working days - these should not take longer than 5 mins to complete. If you have any questions, please do not hesitate to contact me directly and in confidence on [redacted] I will be more than happy to discuss any aspect of this research with you. Once again, thank you for completing the questionnaires and for supporting my dissertation research by doing so! With kind regards, Lucie

Appendix B - Study 1 and 2 State Survey

Q1 Dear Participant, First of all - thank you for remembering and dipping into this brief daily 'temperature' measure - which should not take longer than 5 minutes to complete. As a member of the British Psychological Society, I am bound by strict ethical guidelines. All information that I collect will be anonymous and confidential and only aggregate results will be reported. Your participation is voluntary and you have the right to withdraw from the study at any time. If you have any questions, please do not hesitate to contact me directly and in confidence. I will be more than happy to discuss any aspect of this research with you. Once again, thank you for completing the questionnaires and for supporting my dissertation research by doing so. With kind regards, Lucie IMPORTANT It is essential that you use the same identification number on each occasion when you respond to the daily "temperature" questionnaires so as I can link the individual questionnaires over the 5 days whilst maintaining your anonymity. Enter your unique identification number here (this is your employee number or another 5-digit number such as the last 5 digits of your telephone number):

_____

Q12 How has your morning / afternoon at work been today? Please answer the following questions with respect to how you experienced different aspects of your work environment over the last several hours of the morning / afternoon TODAY. Autonomy and control The following questions concern the amount of choice you had at work this morning / afternoon.

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
To what extent did you choose what work you carried out? (1)	○	○	○	○	○
To what extent did you determine the methods and procedures you used in your work? (2)	○	○	○	○	○

Q13 **Feedback**

The following statements concern the information you got about your work performance this morning / afternoon.

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
I know whether or not my work was satisfactory. (1)	○	○	○	○	○
I had trouble figuring out whether I was doing well or poorly. (2)	○	○	○	○	○

Q14 Influence over decisions The questions below concern the influence you had over decisions at work this morning / afternoon.

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
To what extent were you allowed to participate in decisions which affected you? (1)	○	○	○	○	○
To what extent did you have the opportunity to contribute to meetings on new work developments? (2)	○	○	○	○	○

Q15 Leader support The following questions deal with your working relationship with your immediate supervisor, that is, the person who most immediately supervises you and to whom you are responsible for your work.

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
How much did your immediate supervisor encourage you to give your best effort? (1)	○	○	○	○	○
How much did your immediate supervisor set an example by working hard him/herself? (2)	○	○	○	○	○

Q16 Professional compromise In your opinion, to what extent did you or your colleagues meet the following problems in carrying out their work this morning / afternoon?

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
Having to make trade-offs between quality of output and cost savings. (1)	○	○	○	○	○
Having to do an acceptable minimum of work rather than the best quality work possible. (2)	○	○	○	○	○

Q17 Role clarity To what extent do the following statements reflect your experience at work this morning / afternoon?

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
I knew exactly what was expected of me. (1)	○	○	○	○	○
I knew what my responsibilities were. (2)	○	○	○	○	○

Q18 Role conflict To what extent did you find these issues arising in carrying out your work this morning / afternoon?

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
Professionals made conflicting demands of me. (1)	○	○	○	○	○
I did things which were accepted by one person, but not by another. (2)	○	○	○	○	○

Q19 Peer support The following questions ask about the extent to which other people provide you with help or support. To what extent could you...

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
Count on your colleagues to back you up at work? (1)	○	○	○	○	○
Count on your colleagues to help you with a difficult task at work this morning / afternoon? (2)	○	○	○	○	○

Q20 Work demands To what extent did you find yourself meeting the following problem in carrying out your work this morning / afternoon?

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
I didn't have enough time to carry out my work. (1)	○	○	○	○	○
I could not meet all the conflicting demands made on my time at work. (2)	○	○	○	○	○

Q23 Skill variety How true are the following statements about your work this morning / afternoon?

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a large extent (4)	To a very large extent (5)
How much variety was there in your work this morning / afternoon? That is, to what extent did your work require you to do many different things, using a variety of your skills and talent? (1)	○	○	○	○	○
My work required me to use a number of complex or high-level skills. (2)	○	○	○	○	○

Q10 How did you feel at work this morning / afternoon? Below is a number of statements that describe different feelings that you may have felt at work. Please indicate to what extent have you felt each of the following during this morning / afternoon:

	Not at all (1)	Very little (2)	Just a little (3)	Somewhat (4)	Quite a lot (5)	A great deal (6)	Extremely (7)
I felt tired. (1)	○	○	○	○	○	○	○
My thinking process was slow. (2)	○	○	○	○	○	○	○
I felt I was unable to be sensitive to the needs of my colleagues and clients. (3)	○	○	○	○	○	○	○
I felt physically drained. (4)	○	○	○	○	○	○	○
I had difficulty concentrating. (5)	○	○	○	○	○	○	○
I felt I was not capable of being sympathetic to my colleagues and clients. (6)	○	○	○	○	○	○	○

Q21 How did you feel at work this morning / afternoon?

	Not at all (1)	Very little (2)	Just a little (3)	Somewhat (4)	Quite a lot (5)	A great deal (6)	Extremely (7)
I felt bursting with energy. (1)	○	○	○	○	○	○	○
I was enthusiastic about my work. (2)	○	○	○	○	○	○	○
I was immersed in my work. (3)	○	○	○	○	○	○	○
I felt strong and vigorous. (4)	○	○	○	○	○	○	○
I am proud of the work that I did this morning / afternoon. (5)	○	○	○	○	○	○	○
I got carried away when I was working. (6)	○	○	○	○	○	○	○

Q11 Please read the following statements carefully and indicate to what extent are they true about your work experience in the course of this morning / afternoon:

	Not at all (1)	Very little (2)	Just a little (3)	Some what (4)	Quite a lot (5)	A great deal (6)	Extremely (7)
I felt I was competent enough to meet the high demands of the situation. (1)	○	○	○	○	○	○	○
I did things spontaneously and automatically without thinking. (2)	○	○	○	○	○	○	○
I had a strong sense of what I wanted to do. (3)	○	○	○	○	○	○	○
I had a good idea while I was working about how well I was doing. (4)	○	○	○	○	○	○	○
I was completely focused on the task at hand. (5)	○	○	○	○	○	○	○
I had a feeling of total control. (6)	○	○	○	○	○	○	○
I was not worried about what others might be thinking of me. (7)	○	○	○	○	○	○	○
The way time passed seemed to be different from normal. (8)	○	○	○	○	○	○	○
The experience was extremely rewarding. (9)	○	○	○	○	○	○	○

Q22 That's all for now! You have now completed the brief daily 'temperature' measure. Please remember to take the next measurement over the lunchtime or just before the end of your working day. If you have any questions, please do not hesitate to contact me directly and in confidence on [redacted]. I will be more than happy to discuss any aspect of this research with you. Once again, thank you for completing the questionnaires and for supporting my dissertation research by doing so! With kind regards, Lucie

Appendix C – Study 3 Ethics Approval

Psychology Research Ethics Committee
School of Social Sciences
City University London
London EC1R 0JD

31st May 2016

Dear [redacted]

Reference: PSYETH (T/L) 15/16 231
Project title: How mindfulness works in the workplace: the role of authentic functioning

I am writing to confirm that the research proposal detailed above has been granted approval by the City University London Psychology Department Research Ethics Committee.

Period of approval
Approval is valid for a period of three years from the date of this letter. If data collection runs beyond this period you will need to apply for an extension using the Amendments Form.

Project amendments
You will also need to submit an Amendments Form if you want to make any of the following changes to your research:

(a) Recruit a new category of participants
(b) Change, or add to, the research method employed
(c) Collect additional types of data
(d) Change the researchers involved in the project

Adverse events
You will need to submit an Adverse Events Form, copied to the Secretary of the Senate Research Ethics Committee [redacted], in the event of any of the following:

(a) Adverse events
(b) Breaches of confidentiality
(c) Safeguarding issues relating to children and vulnerable adults
(d) Incidents that affect the personal safety of a participant or researcher

Issues (a) and (b) should be reported as soon as possible and no later than 5 days after the event. Issues (c) and (d) should be reported immediately. Where appropriate the researcher should also report adverse events to other relevant institutions such as the police or social services.

Should you have any further queries then please do not hesitate to get in touch.

Kind regards

[redacted]

CITY UNIVERSITY LONDON

Psychology Research Ethics Committee
School of Social Sciences
City University London
London EC1R 0JD

31st May 2016

Dear [redacted]

Reference: PSYETH (T/L) 15/16 230
Project title: The role of mindfulness in the Job Demands-Resources Model: A longitudinal study investigating the role of mindfulness on burnout and work engagement

I am writing to confirm that the research proposal detailed above has been granted approval by the City University London Psychology Department Research Ethics Committee.

Period of approval
Approval is valid for a period of three years from the date of this letter. If data collection runs beyond this period you will need to apply for an extension using the Amendments Form.

Project amendments
You will also need to submit an Amendments Form if you want to make any of the following changes to your research:

(a) Recruit a new category of participants
(b) Change, or add to, the research method employed
(c) Collect additional types of data
(d) Change the researchers involved in the project

Adverse events
You will need to submit an Adverse Events Form, copied to the Secretary of the Senate Research Ethics Committee [redacted] in the event of any of the following:

(a) Adverse events
(b) Breaches of confidentiality
(c) Safeguarding issues relating to children and vulnerable adults
(d) Incidents that affect the personal safety of a participant or researcher

Issues (a) and (b) should be reported as soon as possible and no later than 5 days after the event. Issues (c) and (d) should be reported immediately. Where appropriate the researcher should also report adverse events to other relevant institutions such as the police or social services.

Should you have any further queries then please do not hesitate to get in touch.

Kind regards

[redacted]

CITY UNIVERSITY LONDON

Psychology Research Ethics Committee
School of Social Sciences
City University London
London EC1R 0JD

31st May 2016

Dear [redacted]

Reference: PSYETH (T/L) 15/16 232
Project title: The role of mindfulness in the Job Demands-Resources Model: A longitudinal study investigating the role of mindfulness on burnout and work engagement

I am writing to confirm that the research proposal detailed above has been granted approval by the City University London Psychology Department Research Ethics Committee.

Period of approval
Approval is valid for a period of three years from the date of this letter. If data collection runs beyond this period you will need to apply for an extension using the Amendments Form.

Project amendments
You will also need to submit an Amendments Form if you want to make any of the following changes to your research:

(a) Recruit a new category of participants
(b) Change, or add to, the research method employed
(c) Collect additional types of data
(d) Change the researchers involved in the project

Adverse events
You will need to submit an Adverse Events Form, copied to the Secretary of the Senate Research Ethics Committee[redacted] in the event of any of the following:

(a) Adverse events
(b) Breaches of confidentiality
(c) Safeguarding issues relating to children and vulnerable adults
(d) Incidents that affect the personal safety of a participant or researcher

Issues (a) and (b) should be reported as soon as possible and no later than 5 days after the event. Issues (c) and (d) should be reported immediately. Where appropriate the researcher should also report adverse events to other relevant institutions such as the police or social services.

Should you have any further queries then please do not hesitate to get in touch.

Kind regards

[redacted]

Appendix D – Study 3 Participant Flyer

ASSESSING WELL-BEING AT WORK

An opportunity to be involved in research examining employee week-to-week wellbeing and experiences

MSc students at City University London are recruiting employees to participate in a research project to contribute towards their dissertation. The project has been designed to assess wellbeing in the workplace on a weekly basis.

The primary aims of the project are as follows:

1. Understand the effects of both individual characteristics, work demands and work recovery on wellbeing metrics
2. Understand how different cognitive mechanisms influence workplace wellbeing
3. Provide feedback to employers about how to maximise resilience in the workplace

The project is being led by students [redacted] and is supervised by [redacted], member of the organisational psychology research team at City University London.

What's involved?

If you participate in this project, you will be invited to complete an initial on-line questionnaire, followed by a brief on-line survey once per week for three consecutive weeks. The surveys assess your experiences of work along with various aspects of your general well-being. The brief weekly surveys take no more than 10 minutes of your time to complete on each occasion. Your responses to these surveys will be seen by the City University research team only and will remain strictly confidential.

What do I get in return for my participation?

In return for your participation, you will be provided with an overall summary of the results, along with some of the latest recommendations for workplace resiliency resources.

TO REGISTER YOUR INTEREST IN THIS PROJECT, OR TO REQUEST FURTHER INFORMATION, PLEASE EMAIL: [redacted]

Appendix E – Study 3 Qualtrics Surveys – Initial Questionnaire

Q1 Assessing well-being over three consecutive working weeks.

Q36 Please read these points before you begin completing your surveys: The aim of this research is to assess people's well-being across three consecutive working weeks. Participation in this research involves completing an initial online survey that assesses various aspects of your work and personality characteristics. This initial survey takes approximately 10 to 15 minutes to complete. Following the initial survey, you are invited to complete briefer well-being surveys at the end of three consecutive working weeks (ideally on a Friday at the end of the work day or first thing Saturday morning). Each of these weekly well-being surveys takes around 5 minutes to complete on each occasion. Once the project is completed you will be sent a summary of the findings, along with some recommendations on ways to enhance your well-being. The research team hopes to publish the findings of this project in academic journals, and communicate the results and recommendations to other employees and organisations. On the next page you will find on some further information on data confidentiality and how your anonymity will be protected.

Q37 Information About the Research Your personal responses to these surveys will only be seen by researchers at City University London. No-one else will ever know how you personally responded. A reference number will be allocated to you by the research team. This number will be linked to your electronic survey data (rather than your name or email address) to ensure anonymity and data confidentiality. When the results of this research are communicated and published, no information will be included that could identify you as a participant Your participation in this research is entirely voluntary. If you do not want to complete the surveys you do not have to. Also, you may withdraw from the project at any stage without having to explain why. If you have any questions or concerns about the research please do not hesitate to contact [redacted] Thank you for your participation.

Q38 Note. This study has been approved by City University London Psychology Department Research Ethics Committee. [PSYETH (T/L) 15/16 230, PSYETH (T/L) 15/16 231, PSYETH (T/L) 15/16 232]If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone [redacted]. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: Assessing Well-Being at Work. You could also write to the Secretary at: [redacted], Secretary to Senate Research Ethics Committee, Research Office, E214, City University London, Northampton Square, London, EC1V 0HB. [redacted] Please click below to confirm that you have read the

above points, that you are 18 years or older, and that you wish to proceed to the initial survey. Once you have done so, please press next to continue.

○ I can confirm I have read the above statements. (1)

Q2 Initial Questionnaire

Thank you for participating in this research. The initial survey will take approximately 10 to 15 minutes and will ask you about a range of areas of your personal and work life. Please take the initial survey prior to taking the first follow-up survey. Thank you.

Q5 The items below assess some of the most common personality characteristics. Please indicate how much each item describes your own personality by clicking your level of agreement. I see myself as someone who....

	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
… is reserved (1)	○	○	○	○	○
… is generally trusting (2)	○	○	○	○	○
… tends to be lazy (3)	○	○	○	○	○
… is relaxed, handles stress well (4)	○	○	○	○	○
… has few artistic interests (5)	○	○	○	○	○
… is outgoing, sociable (6)	○	○	○	○	○
… tends to find fault with others (7)	○	○	○	○	○
… does a thorough job (8)	○	○	○	○	○
… gets nervous easily (9)	○	○	○	○	○
… has an active imagination (10)	○	○	○	○	○
… is considerate and kind to almost everyone (11)	○	○	○	○	○

Q3 Please read the following statements and rate from 1 (being never or very rarely true) to 5 (being very often or always true), how much the statements resemble you.

	1. Never or very rarely true (1)	2. Rarely true (2)	3. Sometimes true (3)	4. Often true (4)	5. Very often or always true (5)
I perceive my feelings and emotions without having to react to them. (1)	○	○	○	○	○
I watch my feelings without getting lost in them. (2)	○	○	○	○	○
In difficult situations, I can pause without immediately reacting. (3)	○	○	○	○	○
When I have distressing thoughts or images, I am able just to notice them without reacting. (4)	○	○	○	○	○
When I have distressing thoughts or images, I feel calm soon after. (5)	○	○	○	○	○
When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. (6)	○	○	○	○	○
When I have distressing thoughts or images, I just notice them and let them go. (7)	○	○	○	○	○
When I'm walking, I deliberately notice the sensations of my body moving. (8)	○	○	○	○	○
When I take a shower or a bath, I stay alert to the sensations of water on my body. (9)	○	○	○	○	○
I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. (10)	○	○	○	○	○
I pay attention to sensations, such as the wind in my hair or sun on my face. (11)	○	○	○	○	○
I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. (12)	○	○	○	○	○
I notice the smells and aromas of things. (13)	○	○	○	○	○
I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow. (14)	○	○	○	○	○
I pay attention to how my emotions affect my thoughts and behavior. (15)	○	○	○	○	○

I find it difficult to stay focused on what's happening in the present. (16)	○	○	○	○	○
It seems I am "running on automatic" without much awareness of what I'm doing. (17)	○	○	○	○	○
I rush through activities without being really attentive to them. (18)	○	○	○	○	○
I do jobs or tasks automatically, without being aware of what I'm doing. (19)	○	○	○	○	○
I find myself doing things without paying attention. (20)	○	○	○	○	○
When I do things, my mind wanders off and I'm easily distracted. (21)	○	○	○	○	○
I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. (22)	○	○	○	○	○
I am easily distracted. (23)	○	○	○	○	○
I'm good at finding the words to describe my feelings. (24)	○	○	○	○	○
I can easily put my beliefs, opinions, and expectations into words. (25)	○	○	○	○	○
It's hard for me to find the words to describe what I'm thinking. (26)	○	○	○	○	○
I have trouble thinking of the right words to express how I feel about things. (27)	○	○	○	○	○
When I have a sensation in my body, it's hard for me to describe it because I can't find the right words. (28)	○	○	○	○	○
Even when I'm feeling terribly upset, I can find a way to put it into words. (29)	○	○	○	○	○
My natural tendency is to put my experiences into words. (30)	○	○	○	○	○
I can usually describe how I feel at the moment in considerable detail. (31)	○	○	○	○	○
I criticize myself for having irrational or inappropriate emotions. (32)	○	○	○	○	○

I tell myself that I shouldn't be feeling the way I'm feeling. (33)	○	○	○	○	○
I believe some of my thoughts are abnormal or bad and I shouldn't think that way. (34)	○	○	○	○	○
I make judgments about whether my thoughts are good or bad. (35)	○	○	○	○	○
I tell myself I shouldn't be thinking the way I'm thinking. (36)	○	○	○	○	○
I think some of my emotions are bad or inappropriate and I shouldn't feel them. (37)	○	○	○	○	○
I disapprove of myself when I have irrational ideas. (38)	○	○	○	○	○
When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about. (39)	○	○	○	○	○

Q9 The following statements ask you about your job. Please indicate your answer by clicking your response to the right hand side of every statement. How often do you find yourself meeting the following problems in carrying out your job?

	Not at all (1)	Just a little (2)	Moderate amount (3)	Quite a lot (4)	A great deal (5)
I do not have enough time to carry out my work. (1)	○	○	○	○	○
I cannot meet all the conflicting demands made on my time at work. (2)	○	○	○	○	○
I never finish work feeling I have completed everything I should. (3)	○	○	○	○	○
I am asked to do work without adequate resources to complete it. (4)	○	○	○	○	○
I cannot follow best practice in the time available. (5)	○	○	○	○	○
I am required to do basic tasks which prevent me completing more important ones. (6)	○	○	○	○	○

Q10 In your job, to what extent can you.....

	Not at all (1)	Just a little (2)	Moderate amount (3)	Quite a lot (4)	A great deal (5)
Determine what methods and procedures you use in your work? (1)	○	○	○	○	○
Choose what work you will carry out? (2)	○	○	○	○	○
Decide when to take a break? (3)	○	○	○	○	○
Vary how you do your work? (4)	○	○	○	○	○
Plan your own work? (5)	○	○	○	○	○
Carry out your work in the way you think best? (6)	○	○	○	○	○

Q11 To what extent can you.....

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a great extent (4)	To a very great extent (5)
Count on your colleagues to listen to you when you need to talk about problems at work? (1)	○	○	○	○	○
Count on your colleagues to back you up at work? (2)	○	○	○	○	○

Q12 How much does your immediate supervisor:

	To a very little extent (1)	To a little extent (2)	To some extent (3)	To a great extent (4)	To a very great extent (5)
Encourage those who work for him/her to work as a team? (1)	○	○	○	○	○
Encourage you to give your best effort? (2)	○	○	○	○	○

Q13 The following statements concern the information you get about your work performance.

	Strongly agree (1)	Agree (2)	Neither agree nor disagree (3)	Disagree (4)	Strongly disagree (5)
I usually know whether or not my work is satisfactory in this job. (1)	○	○	○	○	○
I often have trouble figuring out whether I'm doing well or poorly on this job. (2)	○	○	○	○	○

Q25 The final set of questions are designed to collect some basic demographic information (your gender, age etc). This information is required for statistical purposes only and will not be used to identify you.

Q15 Please complete all of the sections below. Please state your age below:

Q40 Gender:

- ○ Male (1)
- ○ Female (2)
- ○ Prefer not to say (3)

Q26 Which country do you work in?

Q27 Is English your first language?

- ○ Yes (1)
- ○ No (2)

Q18 How long have you worked for your current organisation?

Q19 How long have you been in your current job role? (to the nearest year)

Q20 In which industry do you work? (e.g., finance, retail, education, local government, catering, services, charitable industry etc). Please state industry in the text box below.

Q21 Approximately how many hours do you work in a typical working week? (Please include any overtime hours in your estimation).

Q22 Do you work full-time or part time?

- ○ Full-time (1)
- ○ Part-time (2)

Q23 Please select one of the following options to indicate the approximate level of your current job role:

- ○ Non-managerial role (1)
- ○ Mid-level manager or leader (2)
- ○ Senior leader (3)

Appendix F – Study 3 Qualtrics Surveys – Weekly Survey

Q35 Week 1 Follow-Up Survey. Please press the forward button below.

Q11 Before we begin, please select how many days this week you have worked:

- ○ 1 day (1)
- ○ 2 days (2)
- ○ 3 days (3)
- ○ 4 days (4)
- ○ 5 days (5)

Q18 The following questions are to assess how you have felt over this past working week. Below you will find a list of words that describe different feelings and emotions. Please click an option to the right of every word, to indicate how much you experienced each of these feelings/emotions during the past working week (i.e., Monday through to Friday). Over this past working week I have felt.....

	Not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
Anxious (1)	○	○	○	○	○
Depressed (2)	○	○	○	○	○
Worried (5)	○	○	○	○	○
Nervous (6)	○	○	○	○	○
Miserable (8)	○	○	○	○	○
Tense (15)	○	○	○	○	○
Sad (16)	○	○	○	○	○
Gloomy (17)	○	○	○	○	○

Q8 The statements below describe different types of feelings and other experiences that can be induced by work. Focusing on how you felt over this past working week (i.e., Monday to Friday), please indicate how much you agree or disagree with each of the statements. Over this past working week……

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)
I was immersed in my work. (4)	○	○	○	○	○	○
I felt burned out from my work. (5)	○	○	○	○	○	○
I became more cynical about whether my work contributes anything. (10)	○	○	○	○	○	○
When I got up each morning, I felt like going to work. (11)	○	○	○	○	○	○
I felt that I'm working too hard on my job. (12)	○	○	○	○	○	○
I felt frustrated by my job. (13)	○	○	○	○	○	○
I felt emotionally drained from my work. (14)	○	○	○	○	○	○
I felt happy when I was working intensely. (15)	○	○	○	○	○	○
I felt like I was 'at the end of my rope'. (16)	○	○	○	○	○	○
I doubted the significance of my work. (17)	○	○	○	○	○	○
I felt I was not capable of being sympathetic to others. (18)	○	○	○	○	○	○
I worried that my job is hardening me emotionally. (19)	○	○	○	○	○	○
My job inspired me. (20)	○	○	○	○	○	○
I was enthusiastic about my job. (21)	○	○	○	○	○	○
I felt bursting with energy. (22)	○	○	○	○	○	○
I felt unable to be sensitive to the needs of others. (23)	○	○	○	○	○	○
I was strongly influenced in the workplace by the opinions of others this week. (24)	○	○	○	○	○	○
I have been true to myself at work in most situations this week. (25)	○	○	○	○	○	○
At work this week, I felt alienated. (26)	○	○	○	○	○	○
I behaved in accordance with my values and beliefs in the workplace this week. (27)	○	○	○	○	○	○
At work this week, I felt out of touch with the real me. (28)	○	○	○	○	○	○
At work this week, I felt the need to do what others expect me to do. (29)	○	○	○	○	○	○