PROACTIVE VITALITY MANAGEMENT

Taking Control over Well-Being, Job performance, and Creativity

EMMA M. OP DEN KAMP

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Proactive Vitality Management

Taking control over well-being, job performance, and creativity

Het proactief reguleren van vitaliteit

Controle nemen over welzijn, prestaties, en creativiteit

Proefschrift

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Voor Kees.

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1

GENERAL INTRODUCTION

While recent years have continuously brought innovative technological developments that changed the nature of work, human capital remains key in determining organizational success. However, human beings are not robots: delivering high quality work takes effort and requires physical and mental energy. Many individuals seem to deal with a substandard quality of their work life, accompanied by physical and mental health issues with high personal and societal costs. For example, recent statistics indicate that approximately 1 in 6 to 7 employees in the Netherlands suffer from burn-out related complaints (CBS, 2021). While individuals need physical and mental energy to perform their work, such resources are volatile and deplete easily. Accordingly, most organizations and individuals recognize the need to recover from exerted effort, to deal with strain, and to remedy exhaustion and other physical and psychological issues.

Organizations may aim to impact employee health and performance through various ways, such as HR strategies, leadership, job design, organizational climate, formal policies or other forms of workplace health promotion. While such 'top-down' approaches may be valuable, they cannot accommodate every situational need and personal preference. In addition, people are not passive recipients of their environment, they may take control and exert influence on their own experiences and outcomes. Perhaps nowadays more than ever, it may be important to focus on the role of the individual in this process – that is, adopting a 'bottom-up' approach. Technological developments and corresponding changes in the nature of work (e.g., virtual teams, flex work) bring additional challenges to regulate occupational health and performance. Moreover, organizations increasingly deal with employees working remotely – making it even more difficult for managers to reach and support them. In this new way of working, people are more dependent on themselves and are required to take responsibility and manage their own work, work-life balance, and well-being. Especially when it comes to managing personal and volatile resources like physical and mental energy on a daily basis, I argue that an individual, proactive approach is key. Accordingly, the main purpose of the present dissertation is to introduce and explore a phenomenon I call 'proactive vitality management' – defined as 'individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work'.

VITALITY AT WORK

Many scholars have dedicated their own energy and time to the study of vitality in the work context. Throughout the literature, the concept of vitality has been defined and studied in different ways, but there is general consensus regarding the idea that it is a state that involves both a physical and a mental or psychological element. Vitality has been described as a dynamic phenomenon, involving the conscious experience of possessing energy and aliveness, and feelings of enthusiasm, alertness, and energy available to the self (Nix et al., 1999; Ryan & Deci, 2008; Ryan & Frederick, 1997; Quinn & Dutton, 2005; van Scheppingen et al., 2015). Accordingly, vitality is a multifaceted construct comprised of physical, affective, and cognitive components that are interlinked (Lavrusheva, 2020). The circumplex model of affect categorizes affective states along the dimensions of valence and activation (Russell, 1980). Based on the definitions and descriptions of vitality, it may evidently be positioned in this model as high on the positive (vs. negative) valence dimension and high on the activation (vs. deactivation) dimension.

While vitality is not necessarily a work-related state, it has often been studied in an organizational setting, focusing on the importance of employee vitality at work. In the current research, I also embed the concept in the work context by arguing that individuals may purposefully manage their vitality in order to promote optimal functioning at work. The body of literature on vitality at work supports the idea that positive, energized and active employees are an important asset for organizations. Indeed, vitality and its physical, cognitive, and affective subcomponents have been widely linked to favorable work outcomes, such as effective personal functioning and sustainable employability (Hendriksen et al., 2016; Strijk et al., 2013; van Scheppingen et al., 2015), career success (Baruch et al., 2014), organizational citizenship behavior and commitment (Kleine et al., 2019; Spanouli & Hofmans, 2021), job performance (Dubreuil et al., 2014; Carmeli, 2009; Carmeli et al., 2009; Kleine et al., 2019), innovation (Carmeli & Spreitzer, 2009; Huang & Chen, 2021), and creative work performance (Amabile et al., 2005; Atwater & Carmeli, 2009; Baas et al., 2008; Binnewies & Wörnlein, 2011; Chen & Sengupta, 2014; De Dreu et al., 2012; Fredrickson, 2001; Kark & Carmeli, 2009).

Summing up, scholars have provided valuable insights on the importance of employee vitality for performance at work. However, these studies have predominantly focused on physical, affective, and cognitive *states*, and how they relate to outcomes, and not as much on individual proactive *behaviors* to manage, mobilize, or promote physical and mental energy for work purposes. Indeed, when it comes to factors that may activate or inhibit physical, affective, and cognitive states, studies often point towards contextual variables that may be influenced through top-down processes. For example, a well-established theory that is based on how elements of job design may impact employee health and motivation, and subsequent performance outcomes, is job demands-resources (JD-R) theory (Bakker & Demerouti, 2017; Demerouti et al., 2001). In the so-called 'health impairment process', physical and mental resources may be exhausted by job demands, leading to strain and health problems. In contrast, a 'motivational process' may be instigated by job resources that satisfy basic psychological needs, and foster work engagement and performance. Accordingly, these processes suggest that organizations may aim to impact employee health and motivation through top-down processes that involve job redesign (e.g., Holman et al., 2010; Holman & Axtell, 2016).

Moreover, the studies that do focus on individual behavior in relation to well-being usually involve processes that are rather reactive in nature. For example, scholars have studied how employees may recover and unwind after work through evening activities that facilitate the experience of relaxation, psychological detachment, or mastery (Sonnentag et al., 2017). Others have focused on how employees may recover during the workday, for example by taking micro-breaks, such as having a snack (Fritz et al., 2011; Trougakos & Hideg, 2009; Zacher et al., 2014). While the importance of replenishing energy reservoirs after (periods of) work is undisputed, recovery involves a *reaction* to strain from work. In order to promote optimal functioning at work, and especially in the context of preventing work-related physical and mental health issues in the long run, a bottom-up and *proactive* approach from the individual is key.

PROACTIVE BEHAVIOR

Traditional theories of motivation and performance have usually considered individuals as rather passive and reactive recipients of their environment (Parker et al., 2010). However, people are active contributors to their life circumstances, not just products of them. Human beings possess personal agency, and may act intentionally and deliberately, make choices and decisions, formulate and follow plans of action, and set goals and pursue them (Bandura, 2001). The idea that individuals are not necessarily reactive creatures has also been adopted in the stress and coping literature. Traditionally, the coping literature focused on how individuals react to and deal with stressors and threats. However, the notion that coping may not only involve the reactions to stressful past events but may also be aimed at anticipated events in the future has gained traction among scholars (Aspinwall, 2005; Aspinwall & Taylor, 1997; Schwarzer, 2000). This 'forward time perspective' is inherent to proactive motivation and behavior (Parker et al., 2010).

Similarly, in the organizational literature, scholars have theorized and shown that individuals may take an active role in their approach toward work, creating favorable situations and conditions and shaping their own work experiences and outcomes (Crant, 2000; Grant & Parker, 2009). Parker and colleagues (2010) developed a model of proactive motivation, describing proactivity as a goal-driven process in which individuals may set and strive to achieve proactive goals. Such proactive behavior is a) self-starting – initiated by the individual, b) change-oriented – aimed at changing and improving the situation or oneself – and c) future-focused – involving goal-oriented processes (Parker et al., 2010). These characteristics distinguish proactive constructs from top-down approaches and more passive or reactive patterns of behavior (Crant, 2000).

Multiple forms of proactive behaviors have been studied and described in the organizational literature. Examples of such behaviors include – but are not limited to – personal initiative (Frese et al., 1997), taking charge (Morrison & Phelps, 1999), voice (LePine & Van Dyne, 1998), job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001), and playful work design (Scharp et al., 2019). While it has been theorized that proactive behavior aims at changing aspects of the situation or the self (i.e., locus of change; Parker et al., 2010), most of the studied examples involve behavior aimed at changing

the situation, such as the task, the job, or the social work environment. In contrast, in this dissertation the focus is on proactive behavior aimed at changing aspects of the self – or more specifically, one's physical, affective, and cognitive state. By doing so, individuals strive to achieve their goal of optimal functioning at work (i.e., a different future; Parker et al., 2010).

PROACTIVE VITALITY MANAGEMENT

Individuals may proactively employ a wide range of strategies to manage their vitality for work, of which the effectiveness and favorableness may vary between individuals and from moment to moment (cf. Sonnentag & Fritz, 2007; Thayer et al., 1994). To illustrate, some people may try to wake up early and exercise each morning to become energized for the workday ahead, while others may focus on getting enough sleep to start the workday feeling physically and mentally rested. In addition to such individual differences, the number and type of proactive vitality management strategies individuals employ may vary from one day to another. For example, when deadlines call for uninterrupted time to work on projects, people may want to look for a quiet place to work and turn off their e-mail alerts for a while (e.g., incorporate a 'quiet hour'; König et al., 2013). At other times, people may choose to go for a walk to clear their mind and come up with new ideas (Oppezzo & Schwartz, 2014) or listen to their favorite music while working to promote an energized and driven mindset (Lesiuk, 2005). Important here is the idea that the vitality management strategies are *goal-directed* and *purposefully initiated*. Thus, in this self-regulatory process, individuals must develop and implement strategies, and continuously monitor and evaluate what works best for them to achieve the desired results.

In summary, the overall research question I formulated for this dissertation is: Can individuals proactively manage their physical and mental energy to promote optimal functioning at work? The research objectives of the present dissertation can be summarized into three sub questions that build on each other. These research questions will be answered with the use of eight empirical studies described throughout the different chapters included in this dissertation.

Research Question 1: How can proactive vitality management be conceptualized and reliably measured?

The first goal of this dissertation is to identify and explore a particular type of behavior that I call 'proactive vitality management.' To this end, proactive vitality management is conceptualized and embedded into the existing literature in Chapter 2. To thoroughly explore proactive vitality management, an instrument to capture the phenomenon and foster systematic research on it is required. Such an instrument allows for an examination of potential individual differences and within-person fluctuations in proactive vitality management. Moreover, the instrument may be used to gain insights into the underlying mechanisms, consequences, and other relevant factors and conditions surrounding the proactive vitality management process (research goals 2 and 3). These insights support theory-building and, therefore, contribute to the literature and help yield valuable practical implications and recommendations.

In Chapter 2, the development and validation of the proactive vitality management (PVM) scale is presented. The items for the scale are formulated to capture the goal-oriented nature of the construct, referring to behaviors aimed at promoting work. Moreover, based on the vitality literature, the physical, affective, and cognitive aspects inherent to vitality are included in the scale. The psychometric quality of the instrument is tested by examining its reliability and factor structure. In addition, because there may be intraindividual fluctuations in the use of proactive vitality management, the validation of the state-version of the scale is presented in Chapter 2 as well. Finally, the nomological network of both scales is examined to ensure that proactive vitality management has some conceptual overlap, but may also be meaningfully distinguished from theoretically associated constructs.

Research Question 2: What are the consequential processes of proactive vitality management?

The second objective of this dissertation is to explore the consequential processes of proactive vitality management. In line with the key attributes of proactive behavior established by Parker et al. (2010), proactive vitality management is not only self-starting, but also inherently change-oriented, and future-focused. By using proactive vitality management, individuals may aim to achieve a different future – more specifically, optimal functioning at work (see Figure 1). Throughout the chapters in this

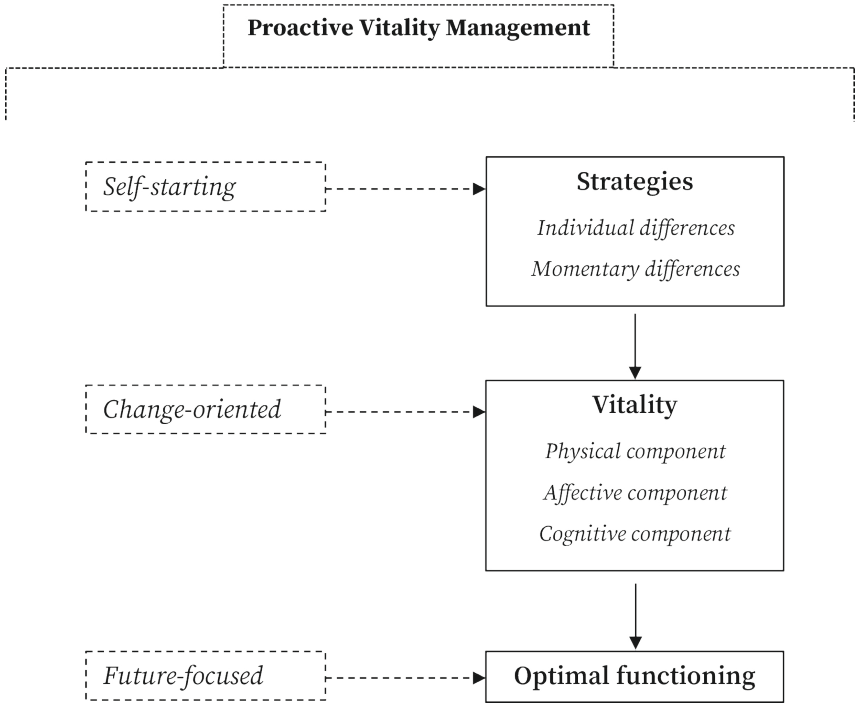

FIGURE 1

Theorized process model of proactive vitality management.

dissertation, I focus on several potential work-related outcomes of proactive vitality management, namely job performance (Chapter 2), functional capacity (Chapter 6), and absenteeism (Chawpter 6). Moreover, special attention is given to creative performance as a potential outcome of proactive vitality management. The focus on creativity corresponds to the idea that human beings are not robots. While people need physical and mental energy to perform, a unique human quality that cannot simply be automated is to be able to think creatively. Therefore, I examine whether people who use proactive vitality management may perform more creatively (Chapters 2-6). In addition, I examine the underlying mechanisms of the link between proactive vitality management and work-related outcomes. Proactive vitality management involves changing aspects of the self to achieve a different future (cf. Parker et al., 2010) – more specifically, altering one's physical, affective, and cognitive state to promote optimal functioning (see Figure 1). So, while the 'different future' may be represented by work-related outcomes, the 'changed self' may be manifested in process variables that reflect the physical, affective, and cognitive components of vitality (Lavrusheva, 2020; Ryan & Frederick, 1997). Accordingly, these process variables may theoretically answer the question *how* proactive vitality management relates to work-related outcomes. Throughout the chapters in this dissertation, I focus on several potential process variables, such as exhaustion (i.e., physical; Chapter 2 and 6), cognitive liveliness and mindfulness (i.e., cognitive; Chapter 2 and 5, respectively), and work engagement (i.e., affective; Chapter 2, 4, and 6).

Summing up, with the studies presented throughout the chapters in this dissertation, I aim to illustrate how individuals who use proactive vitality management may experience improved physical and mental well-being, and, in turn, may perform better and more creatively at work. The consequential processes of proactive vitality management are displayed in Figure 2.

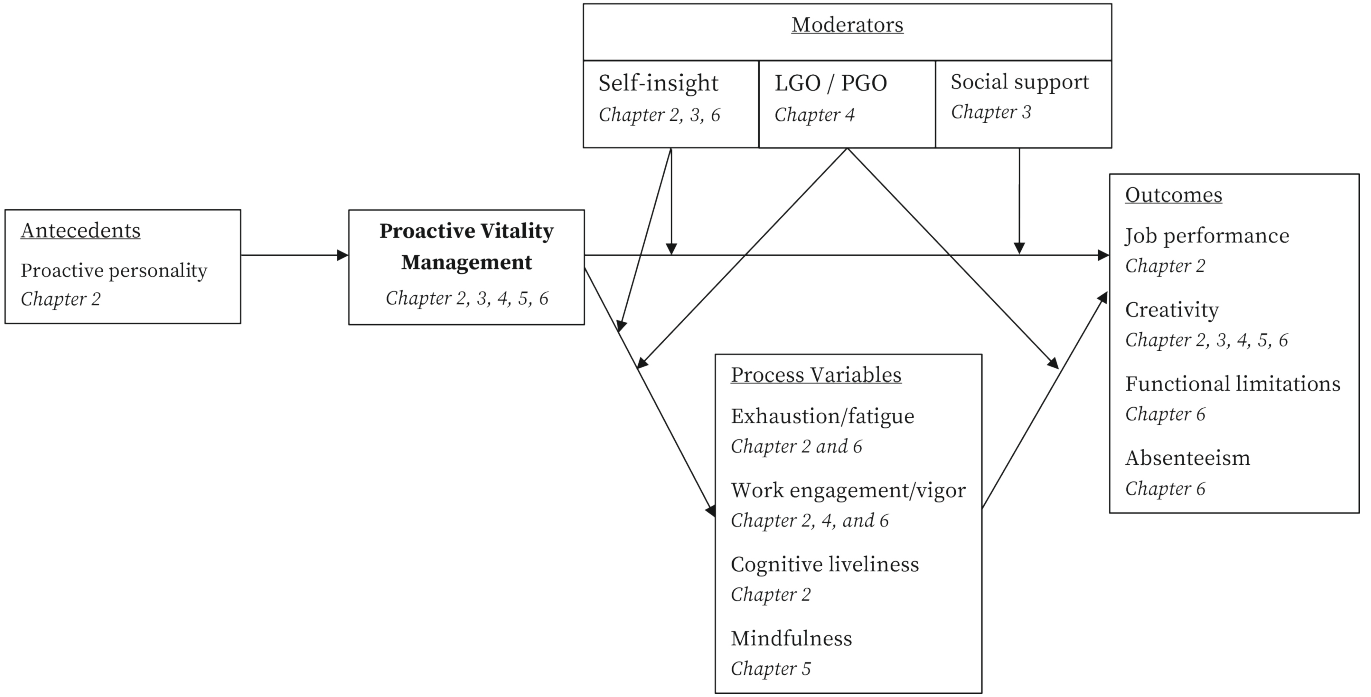

FIGURE 2

Overview of the theoretical model and the variables that are included in the studies presented in this dissertation.

Research Question 3: Who may benefit from using proactive vitality management?
The third objective of this dissertation is to examine who may (especially) benefit from using proactive vitality management. To this end, I explore proactive vitality management among different samples of working individuals throughout the studies presented in this dissertation. While the studies presented in Chapter 2, 3, 4, and 5 employ heterogeneous working samples, in Chapter 5 I focus specifically on people working in the creative industry. Moreover, in Chapter 6, I investigate the role of proactive vitality management for employees with chronic illness, a highly relevant yet understudied population in the context of occupational health and performance.

Secondly, I follow the inclusion of personal and contextual variables in the model of proactive motivation (Parker et al., 2010) and examine whether certain personal characteristics and contextual factors may make it more likely for an individual to – effectively – use proactive vitality management. The personal characteristics assessed in relation to proactive vitality management are proactive personality (Chapter 2), self-insight (Chapter 2, 3, and 6) and learning vs. performance goal orientation (Chapter 4). These personal characteristics are expected to increase the use of proactive vitality management or to strengthen its effect on work-related outcomes. Moreover, in Chapter 3, I examine the interplay between proactive vitality management and social support from co-workers in their effect on creative work performance. Figure 2 displays the theoretical model containing all the variables that are included in the studies presented in this dissertation.

2

PROACTIVE VITALITY MANAGEMENT IN THE WORK CONTEXT: DEVELOPMENT AND VALIDATION OF A NEW INSTRUMENT

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ABSTRACT

In the present research, we use proactivity literature and studies on energy at work to argue that individuals may proactively manage their vitality (i.e., physical and mental energy) to promote optimal functioning at work. We develop and validate a scale to measure proactive vitality management (PVM), and explore the nomological network. We conducted a five-day diary study (N = 133; 521 days), a survey study (N = 813) and a cross-sectional study measuring daily PVM (N = 246) among working individuals from various occupational sectors. The results show that PVM can be reliably measured with eight items that load on one overall factor, both on general and daily level. Furthermore, daily PVM was moderately but positively related to the use of work-related strategies and micro-breaks. Moreover, PVM related positively to relevant personal characteristics (i.e., proactive personality and self-insight) and showed moderate but positive relationships with job crafting and relaxation (convergent validity). PVM was unrelated to psychological detachment and decreasing hindering demands (discriminant validity). Finally, PVM was positively related to well-being, in-role work performance, creative work performance and performance on the Remote Associates Test (criterion validity). We conclude that employees may promote their own work performance through the use of PVM.

INTRODUCTION

Despite rapid technological advancement and corresponding changes in the nature of work and organizations, human capital remains key in determining organizational success. However, human beings are not robots: They need physical and mental energy to deal with complex tasks and deliver results. Various companies acknowledge the importance of vital employees for organizational success and have created so called 'nap rooms' or 'quite zones' where employees may meditate or take a short nap during working hours. Other examples of 'top-down' approaches to manage employee vitality may include physical and mental health programs (e.g., a gym at work or healthy lunch options). However, not all organizations are able or prepared to implement such policies or facilities. Additionally, organizations cannot take all individual and momentary differences in their employees' needs and preferences into account. That is, people may have a better idea of when (e.g., on which workdays or for which tasks) and how they prefer to boost their own levels of physical and mental energy to promote their work. Moreover, due to technological developments (e.g., telework, virtual work) and changes in the nature of work (proactivity, flex work), employees need to take responsibility for their own work outcomes as well (cf. Grant & Ashford, 2008; Grant & Parker, 2009). In the present research, we build on proactivity and energy at work literatures to argue that individuals may proactively manage their levels of physical and mental energy to promote their own work.

The purpose of the present research is threefold: 1) to introduce *proactive vitality management* as individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work; 2) to discuss the development and validation of a short scale to measure the extent to which individuals proactively manage their vitality for work, on both a general and daily level; and 3) to explore the nomological network of proactive vitality management by examining its link with relevant constructs and work outcomes. By addressing these aims we contribute to the literatures on proactivity and energy (management) at work. More specifically, an effective and reliable instrument to measure proactive vitality management allows us to examine how working individuals may take control over their own well-being and performance. This approach complements proactive perspectives aimed at the work environment, research on energy at work, and top-down approaches to manage employee vitality.

THEORETICAL BACKGROUND

Modern organizations must constantly adapt to deal with changing circumstances and competitive markets. Flexible and creative employees who are able to deal with changing environments, and who come up with new and useful work-related ideas are key to organizational effectiveness (Harari, Reaves & Viswesvaran, 2016; Unsworth & Parker, 2003). However, in order to function well, people need to feel vital (i.e., full of physical and mental energy; Ryan & Deci, Ryan & Frederick, 1997). When individuals have access to abundant physical and mental energy, they are able to invest these resources in their work and function optimally. Moreover, when levels of physical and mental energy are low, the capacity but also the willingness to perform well may decrease. Research has supported the importance of both physical and mental energy for optimal functioning at work. For example, studies have shown that energetic and positively activated employees may perform more creatively at work (Atwater & Carmeli, 2009; Baas, De Dreu, & Nijstad, 2008; Binnewies & Wörnlein, 2011). Positive activation, which is inherent to the concept of vitality, may promote flexibility, efficiency, creativity, and openness to information (Baas et al., 2008; Fredrickson, 2001). In addition, mental energy and cognitive capacity (e.g., working memory and attention) have been recognized as important contributors to effective and creative performance, as they promote a persistent, focused and systematic approach (Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012) or "the ability to focus attention, to shut out distractions, [and] to persist in search of a solution" (Lykken, 2005, p. 331).

Combining these studies with proactivity and energy management literatures, in the present research, we argue that individuals may proactively manage their physical and mental energy to promote their work. Scholars studying human energy in the work context have emphasized the importance of replenishing energy reservoirs after (periods of) work (Fritz, Lam, & Spreizer, 2011; Sonnentag, Venz, Casper, 2017; Trougakos & Hideg, 2009; Zacher, Brailsford, Parker, 2014). For example, employees may unwind after work through evening activities that help them to experience relaxation, psychological detachment, mastery, or feeling in control (i.e., recovery experiences; Sonnentag & Fritz, 2007). Additionally, employees may recover during work (Trougakos & Hideg, 2009), for example through work-related strategies (e.g., check e-mail) or micro-breaks (e.g., have a snack; Fritz et al., 2011; Zacher et al., 2014). These previous

studies provide initial evidence that physical energy can be replenished and offer some examples of activities people may engage in to renew their resources. Our approach is, however, both conceptually and methodologically different from the literature on recovery during or after work. Recovery is usually regarded as a process in which empty energy reserves are replenished after (periods of) work (cf. effort-recovery model; Meijman & Mulder, 1998). In this sense, it may be described as a reaction to strain from work. In contrast, we define proactive vitality management as having a clear *proactive* component, which refers to the idea that the behavior is self-initiated and goal-oriented (cf. Parker, Williams, & Turner, 2006). Even though recovery may promote well-being, employees may engage in activities after work (e.g., hobbies) or breaks at work (e.g., have lunch or coffee) as part of a routine or habit, for physiological reasons, to reward themselves, or simply because they are bored. In addition, few studies have linked recovery experiences to actual work performance outcomes, and the ones that have, have yielded inconsistent results (Sonnentag et al., 2017). Building on Parker, Bindl, and Strauss (2010), we argue that proactive vitality management has a clear goal (being able to function at work and achieve work-related goals), and that people strive to achieve this goal by engaging in strategies to manage both physical and mental energy.

As proactive vitality management entails individual, goal-oriented behavior, we propose that individuals may proactively manage their physical and mental energy according to their own personal, idiosyncratic needs and preferences (i.e., how, where, and when they need or prefer to do so). For example, whereas some people may start the workday with their favorite music playing in the car, others may decide to go jogging to the workplace to boost themselves physically and mentally for work (i.e., individual differences). Additionally, at certain times, one may go for a walk or cup of coffee to prepare for a long work shift, whereas at other times, this person may decide to ignore phone calls and e-mails for a while to be able to concentrate on a task (i.e., momentary differences). In other words, not all strategies or activities may be equally effective or favorable for everyone at all times, for example due to individual preferences or work-schedule factors (cf. Sonnentag et al., 2017). Moreover, research suggests that engaging in 'preferred activities' requires less effort and may be most beneficial in terms of physical and mental energy (Trougakos & Hideg, 2009; Hunter & Wu, 2016). Accordingly, we propose that a proactive approach in the vitality management process may promote work outcomes, irrespective of the specific strategies people choose to employ.

The Present Research

In order to capture proactive vitality management (PVM), we aim to develop and validate a reliable measurement instrument. In addition to measuring people's general use of proactive vitality management, we adapt the scale for use on a daily basis, and examine the validity of this day-level scale as well. We assume that there are individual differences in people's tendencies to proactively engage in vitality management to promote their work. However, it is important to also acknowledge the intra-individual nature of proactive vitality management. That is, this behavior is likely to fluctuate within persons as well – for example, due to differences between workdays and tasks, the amount of physical and mental energy work requires, and fluctuating personal needs. Moreover, research showing that proactive behavior (e.g., job crafting) and potential outcomes of proactive vitality management (e.g., work engagement, affect and energetic resources) fluctuate within persons also supports the idea that there are within-person fluctuations in proactive behavior aimed at managing vitality (e.g., Beal, Weiss, Barros, & MacDermid, 2005; Binnewies & Wörnlein, 2011; Tims, Bakker, & Derks, 2014; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Another advantage of questionnaires that are adjusted to a specific time period (e.g., day or week) is that they may reduce retrospective bias because of the proximity of the measurement to the behaviors the scale items refer to. Participants' self-evaluations and recollection of their behavior are therefore likely to be more accurate when researched using such a 'diary' measurement instrument (Ohly, Sonnentag, Niessen, & Zapf, 2010).

In the first study, we develop the PVM scale and examine its factorial validity. In the second study, we examine the validity of a daily version of the PVM scale in a five-day diary sample. Moreover, we explore a range of potential strategies that people may use while at work to manage their energy (i.e., work-related strategies and micro-breaks; Fritz et al., 2011; Zacher et al., 2014), and examine how these relate to the PVM construct. Finally, in the third study, we explore the wider nomological network of proactive vitality management. In doing so, we aim to gain more insight into the nature of proactive vitality management, and to find support for convergent, discriminant and criterion validity of the PVM scale.

STUDY 1: SCALE DEVELOPMENT AND FACTORIAL VALIDITY

METHOD

Scale Development

To investigate proactive vitality management, we need a measurement instrument that captures the proactive behavioral component (i.e., self-initiated and goal-oriented behavior), and both the physical and mental aspect of vitality. Going beyond the specific activities people may engage in (cf. Sonnentag & Fritz, 2007) allows us to capture the essence of proactive vitality management, while taking into account individual and momentary differences regarding when and how to manage physical and mental energy. More specifically, instead of listing specific actions (e.g., drinking coffee), we aim to measure the extent to which people proactively manage their physical and mental energy to promote their work outcomes in a more generic and efficient way (Zacher et al., 2014).

To develop the items for the PVM scale, we conducted an extensive literature search, in which we focused on studies including physical and mental energy at work. During this developmental phase, a wide variety of studies and literatures have inspired us throughout the process. Research that has influenced our work includes, but is not limited to, the work of Atwater and Carmeli (2009), Baas et al. (2008), De Dreu et al. (2012), Fredrickson (2001), and Shirom (2004). Combining this literature with the proactive, goal-oriented behavioral aspect of PVM, we formulated an initial pool of items with the help of two experts (work and organizational psychologists). The items all referred to managing both the physical and mental energy aspect of vitality (e.g., cognitive capacity, positivity, and physical energy~~) (~~; ?cf. Ryan & Deci, 2008; Ryan & Frederick, 1997). Additionally, all items were formulated in a way that represents the proactive, goal-oriented nature of PVM (i.e., self-initiated behavior aimed at work). After a thorough examination and discussion of all items, this time with help from various social and professional contacts of the authors, 18 items were selected to be included in the next phase of this research. To illustrate, we developed items such as "I make sure that I feel energetic during my work" and "I make sure that I can focus

well on my work". The response options to the items range from 1 (*totally disagree)* to 7 (*totally agree*). In the instructions, participants were asked to respond to statements about their behavior towards their work, to further emphasize the proactive and goal-oriented nature of PVM.

Procedure and Participants

Data were collected in the Netherlands with the help of student-assistants who sent online questionnaires to working individuals in their network (i.e., network sampling; Demerouti & Rispens, 2014). We chose this data collection method to reach a high number of individuals, working in different professions and organizations. In total, 835 people started the questionnaire, of which 813 persons (97%) actually responded to the items of our scale. The mean age of the participants was 34.98 (SD = 13.24), and 56.6% of the sample was male. Of all participants, 41.5% had completed higher vocational education and 25.7% held a university degree. Participants worked on average 38.69 hours per week (SD = 8.44) in a wide range of professions and industries, including finances (15.5%), business (12.1%), health care (9.2%), trade (8.2%), hotel and catering (7.6%), education (5.4%), construction work (4.6%), or other sectors such as government, agriculture and the creative industry. On average, participants' organizational tenure was 7.00 years (SD = 9.09). Further, 55.7% had a permanent work contract (as opposed to a temporary contract or self-employment), and 31.5% of the sample held a supervisory position.

RESULTS AND DISCUSSION

In order to examine the factorial validity of the scale, we randomly split the dataset into two separate, unique samples to be used for exploratory factor analysis (Sample 1; $N = 407$), and confirmatory factor analysis (Sample 2; $N = 406$) on the items that were intended to assess PVM.

Exploratory Factor Analysis

Using Sample 1, we performed a principal components analysis (varimax rotation) on the pool of eighteen items to examine whether a meaningful factor representing 'proactive vitality management' could be obtained. We aimed to develop a reliable instrument while avoiding an overly exhaustive scale containing too many items

for it to be used conveniently. So, while we deliberately started out with a relatively large pool of items to empirically answer the question which items functioned best together in terms of their loadings, one of our goals was to significantly reduce the number of items. In the first analysis, SPSS extracted three factors based on their Eigenvalues (> 1). However, we noted that the first factor had an Eigenvalue (7.9) that was considerably higher than the other two factors (1.7 and 1.2, respectively). Only one item had a considerable loading on factor three, so we excluded this item/factor. In addition, the second factor did not make theoretical sense, i.e., it overlapped with the first factor regarding content. In the subsequent analysis, two items had high cross loadings on the second factor in the factor solution, so we excluded these items as well. In a further iterative process, two subsequent analyses were performed in which three more items were excluded, using the same criteria. The remaining twelve items loaded on one single factor. However, in order to achieve our goal and facilitate efficient use of the scale, we performed a content analysis and finally decided to exclude four more items that did not add unique, meaningful information to the scale. We were able to exclude these redundant items without compromising construct coverage and face validity (i.e., representation of all facets of the PVM construct). For example, one item was "I make sure that I can concentrate well on my work", which is highly similar to "I make sure that I can focus well on my work". In this case, we excluded the former item because it had a lower loading on the latent factor. The eight remaining items together formed one overall factor that is representative of the proactive vitality management construct. The factor had an Eigenvalue of 4.12 and explained 51.5% of the variance. The factor-loadings of the items ranged from .67 to .78, and Cronbach's alpha of the eight-item scale was $\alpha = .86$. The total general-level sample ($N = 813$) was used to calculate means and standard deviations of the items. The eight PVM items and their descriptive statistics can be found in Table 1.

TABLE 1

Items, means and standard deviations of the proactive vitality management scale on general level (N = 813 individuals) and daily-level (N = 521 days)

	Items general level	M	SD
1	I make sure that I feel energetic during my work	5.49	.91
2	I make sure that I can focus well on my work	5.45	.89
3	I motivate myself	5.53	1.00
4	I make sure that I can approach my work with a fresh pair of eyes	5.38	.90
5	I try to inspire myself	5.41	1.01
6	I make sure that I have enough space in my head to think	5.03	1.05
7	I make sure to approach my work with a positive mindset	5.82	.87
8	I make sure that I can do things that make me enthusiastic	5.47	.96
	Items day-level	**M**	**SD**
1	Today, I made sure that I felt energetic during my work	4.70	1.69
2	Today, I made sure that I could focus well on my work	5.14	1.58
3	Today, I motivated myself	4.96	1.67
4	Today, I made sure that I could approach my work with a fresh pair of eyes	4.75	1.63
5	Today, I tried to inspire myself	4.61	1.75
6	Today, I made sure that I had enough space in my head to think	4.93	1.60
7	Today, I made sure to approach my work with a positive mindset	4.98	1.70
8	Today, I made sure that I could do things that made me enthusiastic	4.60	1.74

Note. Cronbach's alpha of the general scale was α = .86. Cronbach's alpha coefficients of the daily scale ranged from α = .95 to α = .97. Response options ranged from 1 (*totally disagree*) to 7 (*totally agree*).

Confirmatory Factor Analysis

Using Sample 2, we performed confirmatory factor analysis (CFA) on the eight proactive vitality management items using AMOS software (Arbuckle, 2013). To assess model fit, four different fit indices were used. For absolute model fit, the goodness of fit index (GFI) and the standardized root mean square residual (SRMR) were examined. In addition, for relative model fit, we examined the Tucker-Lewis index (TLI) and the comparative fit index (CFI). Values of .08 and under (for SRMR) or .90 and over (for CFI, TLI, and GFI) indicate acceptable fit, although some scholars have argued that .95 is a better cut-off point (Byrne, 2001; Hu & Bentler, 1999). The results generally indicated acceptable fit for the one-factor model (CFI = .94, TLI = .92, GFI = .95, SRMR = .044), with standardized factor-loadings ranging from .58 to .76 (all *p*'s < .001). Taken together, our results show

that proactive vitality management can be adequately and reliably measured with the proposed eight-item instrument.

STUDY 2: DAILY PROACTIVE VITALITY MANAGEMENT

Study 1 showed that PVM can be reliably measured with a short eight-item scale that represents one overall factor. To test whether these psychometric properties also hold at the day-level, we conducted a second study using a heterogeneous sample. In this diary study, we test the reliability and validity of the daily PVM scale. In addition, we aim to gain insights into example strategies individuals may use to manage their vitality. Therefore, we examine how the PVM construct relates to the daily use of work-related strategies and micro-breaks at work (Fritz et al., 2011; Zacher et al., 2014).

METHOD

Procedure and Participants

To examine PVM on a daily level, we conducted a five-day diary study using the same items, yet adapted to the day-level (e.g., "Today I made sure that I felt energetic during my work" – see Table 1 for all the items). Participants for this study were recruited via Amazon Mechanical Turk (MTurk), and were paid for their participation through this platform. While some people accentuate the potential pitfalls of this particular data collection method, studies have shown that it is an adequate way to gather data (e.g., Buhrmester, Kwang, & Gosling, 2011). Another advantage is that this method allows us to validate the PVM scale in an English-speaking (American) sample as well, which adds to the generalizability of the scale. Individuals were required to work full-time to be able to participate in the diary study. To ensure high quality data, another criterion was that participants had to have a good 'reputation' on MTurk (i.e., above 95% approval ratings), which represents the quality of their past responses and data entries in the system (cf. Peer, Vosgerau, & Acquisti, 2014). Participants were instructed to fill out each daily questionnaire at the end of their working day, over the course of five consecutive workdays. We asked participants to fill in their MTurk ID at the beginning

of each daily survey to be able to match their responses across the five days. In total, 133 participants filled out 521 daily questionnaires. The mean age of the participants was 36.26 (SD = 10.57), and 52% of the sample was male. Of all participants, 65% had a college or university degree. Participants worked on average 41.64 hours per week (SD = 6.82) in a wide range of professions and sectors, including computer and electronics (18.6%), retail (14.7%), finance and insurance (10.9%), education (6.2%), entertainment and recreation (6.2%), healthcare (5.0%), government and public administration (4.7%), hotel and food services (4.7%), or other sectors such as transportation, real estate, agriculture, and construction. A majority of the participants (74%) had a permanent employment contract (versus being a business owner or having a temporary contract), and 47% held a supervisory position.

Measures

The eight day-level PVM items and their means and standard deviations can be found in Table 1 (lower part). The response options to the PVM items ranged from 1 (*totally disagree)* to 7 (*totally agree*). In addition, we included the list of 20 work-related strategies and 22 micro-breaks composed by Fritz et al. (2011) into the diary study, and asked participants daily how often they had used each of the 44 strategies that day (1 = *not at all*, 5 = *very often*). Examples of the work-related strategies are 'check e-mail', 'seek feedback', and 'find ways to delegate'. Examples of the micro-breaks are 'surf the web', 'meditate', and 'go to the bathroom'.

RESULTS AND DISCUSSION

Multilevel Confirmatory Factor Analysis

Using Mplus (Muthén & Muthén, 1998 - 2012), we performed a multilevel confirmatory factor analysis (MLCFA) on the eight day-level items. We modeled both the within- and between-person covariance matrices simultaneously (see Figure 1). The results of the MLCFA indicated a good fit (CFI = .96, TLI = .95, SRMR within = .029, SRMR between = .033). Moreover, all items on the within-level had substantial standardized loadings on the latent construct, with coefficients ranging from .70 to .85 (all p's < .001). The loadings on between-level are even higher, with coefficients ranging from .99 to 1.35 (all p's < .001), which implies that there may be a high degree of multicollinearity

among the items on the between-level (Jöreskog, 1999). Item-level ICCs (i.e., the amount of variance that can be attributed to the person-level) ranged from .52 to .67, indicating that a considerable amount of variance remained to be explained on the within-person level. Cronbach's alpha coefficient of the daily proactive vitality management scale ranged from α = .95 to α = .97 over the five days. These results show that proactive vitality management can be adequately and reliably measured with the proposed eight-item instrument on a daily level.

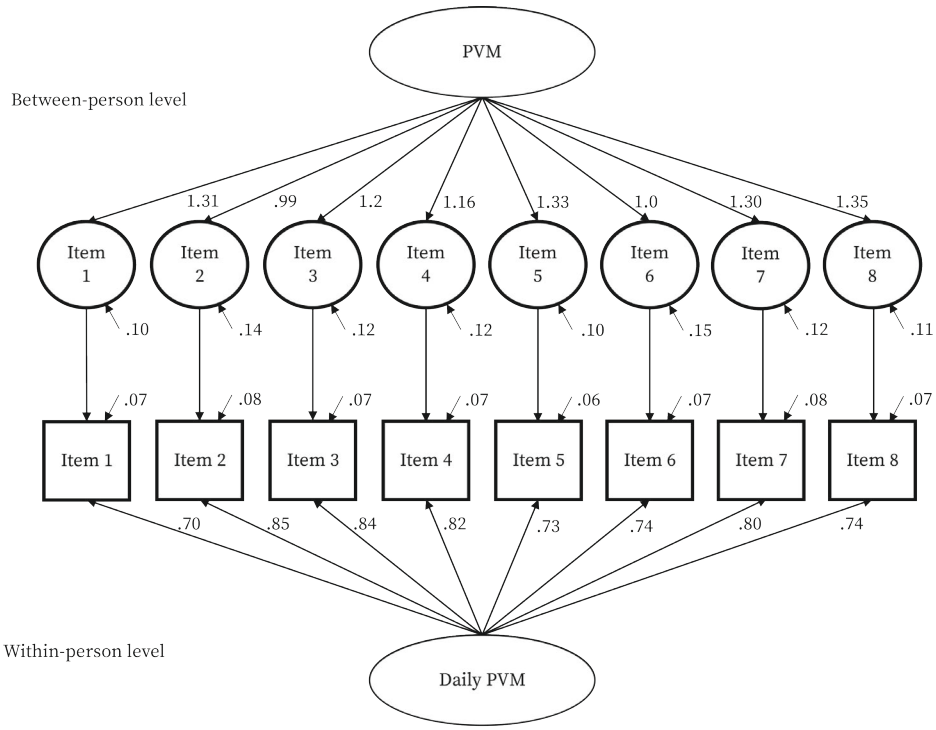

FIGURE 1

Results of the multilevel confirmatory factor analysis (MLCFA) on the eight daily PVM items. All reported values are standardized.

Work-Related Strategies and Micro-Breaks at Work

To examine how the use of work-related strategies and micro-breaks (Fritz et al., 2011; Zacher et al., 2014) relates to PVM, we measured these constructs over the course of five working days. Following the methodological strategy of Zacher et al. (2014), for each day

we created a mean score for all work-related strategies, as well as a mean score for all the micro-breaks. Overall, the results show that PVM related moderately but positively to both work-related strategies and micro-breaks. On the between-person level (i.e., aggregated mean scores), PVM correlated $r = .51$, $p < .001$ with work-related strategies, and $r = .27$, $p < .01$ with micro-breaks. On the daily level, PVM correlated $r = .49$, $p < .001$ with work-related strategies, and $r = .29$, $p < .001$ with micro-breaks. Finally, when we group-mean centered the variables to represent actual within-person fluctuations, the correlation between PVM and work-related strategies was $r = .26$, $p < .001$. However, the relationship between PVM and micro-breaks became nonsignificant ($r = .06$, $p = .157$).

It seems that work-related strategies and micro-breaks might be proactively initiated to manage vitality for work. However, the empirical overlap between these two types of strategies and proactive vitality management is relatively low, especially for micro-breaks. This supports our point of view that there are numerous strategies individuals may proactively employ to manage their vitality, and that these will likely vary according to individual and momentary needs and differences.

STUDY 3: NOMOLOGICAL NETWORK OF PROACTIVE VITALITY MANAGEMENT

The second objective of the present research is to explore the wider nomological network of proactive vitality management (PVM). In doing so, we aim to find support for convergent, discriminant, and criterion validity of the construct.

Convergent Validity

First of all, we examine whether proactive personality and self-insight are related to PVM because these personal characteristics may increase the tendency to engage in such behavior. Proactive individuals are predisposed to engage in behavior that alters their environment (Bateman & Crant, 1993). Taking control to exert influence and make changes may be accompanied by proactively managing helpful resources (i.e., physical and mental energy) to achieve such goals. In addition, proactively managing physical and mental energy to promote work goals may require some level of awareness of one's

own (fluctuating) need for such resources. Therefore, self-insight, i.e. the understanding of one's own feelings, thoughts, and behavior (Grant, Franklin, & Langford, 2002) may increase the likelihood of (effective) PVM.

Hypothesis 1: Proactive vitality management is positively related to (a) proactive personality, and (b) self-insight.

To further establish convergent validity, we examine whether theoretically associated constructs are indeed empirically related to (but can still be differentiated from) PVM. People who proactively manage their vitality for work may be more motivated to also engage in other proactive behavior at work. Job crafting refers to proactively changing aspects of one's work to improve person-job fit (Tims et al., 2014; Wrzesniewski & Dutton, 2001), and is a way to increase meaningfulness and work engagement by mobilizing job resources and challenging job demands (Tims, Derks & Bakker, 2016). Job crafting and proactive vitality management are conceptually related because they share the proactive strategy of optimizing employees' experiences. However, job crafting strategies are inherently work related and focused on (changing) the job or work environment. In contrast, PVM captures behaviors aimed to maintain or boost physical and mental energy that may or may not be work related, even though the goal is to promote optimal functioning at work (e.g., eat healthy). In addition, we propose that proactive vitality management is conceptually related to, but can be differentiated from, relaxation after work (i.e., a recovery experience; Sonnentag & Fritz, 2007). Relaxation after work involves a state of low activation, which may help to replenish empty reserves of energy at home to recover from strain. In contrast, PVM involves proactive and goal-directed behavior aimed at empowering oneself to perform well at work. However, both concepts are, in their own way, concerned with (levels of) physical energy. Moreover, while PVM may involve numerous other types of activities (e.g., eating healthy, working in a quite zone, personal pep talks, etc.), proactively undertaking relaxing activities to prepare for work may at times be seen as a form or part of PVM as well.

Hypothesis 2: Proactive vitality management is positively related to (a) job crafting (increasing job resources and challenges), and (b) relaxation.

Discriminant Validity

To thoroughly explore the nature of PVM, it is important to differentiate it from constructs that are relevant to the current context (i.e., associated with work and well-being), but should nevertheless be unrelated to PVM because of differences in nature (i.e., discriminant validity). To establish discriminant validity, one needs to demonstrate that the construct of interest is not, or only weakly correlated with other constructs that are theoretically different (Campbell & Fiske, 1959; Mitchell & Jolley, 2012).

We have proposed that job crafting strategies may be related to PVM. However, one particular job crafting strategy, decreasing hindering job demands, may not be related to PVM. While changing the nature of work by decreasing its demanding aspects may help when one's capacity to deal with work is insufficient, it is conceptually different from proactively managing physical and mental energy to promote one's work outcomes. Additionally, research has shown that this particular job crafting strategy is unrelated, or even detrimental to well-being and performance (e.g., Tims, Bakker, & Derks, 2013), while we expect PVM to promote optimal functioning. Furthermore, we expect that PVM is unrelated to psychological detachment after work (i.e., a recovery experience; Sonnentag & Fritz, 2007). Psychological detachment involves the experience of mental disengagement from work (i.e., not thinking about work) to help one recover, and can therefore be beneficial to well-being. While activities after work that stimulate psychological detachment may, theoretically, also be proactively initiated to manage vitality for work purposes, psychological detachment entails withdrawal from work in a response to strain (Sonnentag & Fritz, 2015). This may be a different process than proactively preparing oneself physically and mentally to promote work outcomes. Moreover, research has shown that high levels of psychological detachment may be detrimental to work performance and creativity (de Bloom, Kinnunen, & Korpela, 2015; de Jonge, Spoor, Sonnentag, Dormann, & van den Tooren, 2012; Sonnentag et al., 2017). As we expect PVM to promote work outcomes, such as regular task performance and creativity, this means that the two constructs may have differential predictive value, further supporting discriminant validity.

Hypothesis 3: Proactive vitality management is unrelated to (a) decreasing hindering job demands and (b) psychological detachment.

Criterion Validity

An important aspect of PVM is its potential merit for optimal functioning at work. In this research, we examine whether PVM is positively related to well-being and performance (i.e., criterion validity). We include a combination of well-being constructs into the research that correspond to the physical, affective and cognitive energy aspects of PVM. Moreover, we examine how PVM relates to different types of performance in order to provide an elaborate view of the nomological network.

Well-being. Work engagement refers to an affective state (i.e., a positive, fulfilling, and work-related state of mind; Bakker, Schaufeli, Leiter, & Taris, 2008). PVM in contrast, refers to self-initiated and goal-oriented behavior regarding one's work. However, PVM may help individuals to replenish and conserve their self-regulatory resources, and thus promote (work) goal achievement and performance (cf. Beal et al., 2005). This process may enhance feelings of fulfilment, development, and commitment regarding work. Therefore, we expect PVM will be positively related to work engagement. In a similar way, and because PVM may help one to cope with work demands and strain, we expect that PVM is negatively related to exhaustion (i.e., a consequence of intensive physical, affective, and cognitive strain; Demerouti, Bakker, Vardakou, & Kantas, 2003). Finally, we expect that individuals who proactively work on their levels of physical and mental energy are more likely to experience mental states characterized by cognitive liveliness – i.e., feeling mentally alert (Shirom, 2004).

Hypothesis 4: Proactive vitality management is positively related to (a) work engagement and (b) cognitive liveliness, and negatively related to (c) exhaustion.

Work outcomes. We expect that PVM will help to complete regular work tasks, because proactively boosting physical and mental energy may promote efficiency and productivity when one needs it. Indeed, cognitive resources (attention, working memory) are important predictors of multitasking performance, which is a day-to-day requirement in many jobs (Konig, Buhner, & Murling, 2005), and having such resources may reduce the likelihood of mistakes. Moreover, the tendency to procrastinate at work may be reduced by motivating oneself and shutting out distractions (Steel, 2007), setting goals or deadlines (Ariely & Wertenbroch, 2002), and sleeping well (Kühnel, Bledow, & Feuerhahn, 2016). All such behaviors may be categorized under PVM

when undertaken proactively. Additionally, we propose that PVM may promote work performance because people need physical and mental energy to go the extra mile and engage in creative thinking. When individuals proactively ensure that they feel fresh, energized and positive, and with enough cognitive capacity to think, creative ideas regarding work methods, products or procedures may come to live (cf. Baas et al., 2008; De Dreu et al., 2012). Additionally, PVM may help to engage in creative work behavior and innovative strategies that improve work performance (cf. Atwater & Carmeli, 2009; Kark & Carmeli, 2009). In the one-day diary study we also examine the relationship between PVM and cognitive performance using a context-free, objective measure (i.e., the Remote Associates Test; RAT; Mednick, 1968). This test is not directly applicable to one specific work setting, as it more generally measures one's cognitive capacity to think associatively and to create new combinations that are useful.

Hypothesis 5: Proactive vitality management is positively related to (a) in-role work performance, (b) creative work performance, and (c) cognitive performance.

METHOD

Participants and Procedure

To test our hypotheses and explore the nomological network of proactive vitality management, we used the total general-level sample from study 1 ($N = 813$). In addition, we wanted to measure the variables in the nomological network on a day-level. For this day-level study, approximately one-third of all participants from the general-level sample ($N = 293$) was asked and found willing to also participate in a cross-sectional study measuring daily PVM. This subsample of participants was asked to fill out the day-level questionnaire at, or near the end of one working day. We excluded participants who did not follow these instructions, leaving 246 participants (84%) for analysis of the day-level measure. Using a subsample of the general-level participants in our day-level study allowed us to more accurately compare general-level PVM and day-level PVM (i.e., regarding associations with relevant constructs). However, to increase the independency of the general and day-level samples, we asked people who participated in both studies to keep at least one but preferably multiple days between filling out the general and the day-level questionnaire. The average number of days between

the two surveys was 3.97 days (SD = 4.94). The mean age of the participants was 36.43 (SD = 12.96), and 51.6% of the sample was male. Of all participants, 71.0% had completed higher vocational education or held a university degree. Participants worked on average 38.63 hours per week (SD = 8.63) in a wide range of professions and sectors, including finances (15.7%), business (13.3%), health care (6.5%), trade (6.9%), hotel and catering (6.0%), or other sectors such as education, government and the creative industry. They worked on average 8.07 years for their current employer (SD = 9.12). More than half of the participants (57.7%) had a permanent employment contract, and 36.1% held a supervisory position.

Measures

Proactive vitality management was measured both on general and day-level using the eight-item scale that was developed and validated in this research (see Table 1). Cronbach's alphas of all the measures can be found in Table 2 (general-level) and 3 (day-level).

General Level

Proactive personality. Proactive personality was measured using the 6-item version of the Proactive Personality Scale (PPS; Bateman & Crant, 1993), validated by Claes, Beheydt and Lemmens (2005). An example item is "I excel at identifying opportunities" (1 = *totally disagree*, 5 = *totally agree*).

Self-insight. Self-insight was measured using the 8-item subscale of the Self-Reflection and Insight Scale (SRIS; Grant et al., 2002). An example item is "I usually know why I feel the way I do" (1 = *totally disagree*, 6 = *totally agree*).

Job crafting. Job crafting was measured using the 21-item Job Crafting Scale (JCS; Tims, Bakker, & Derks, 2012). Example items for all four dimensions are "I try to learn new things at work" (increasing structural job resources), "I ask colleagues for advice" (increasing social job resources), "When there is not much to do at work, I see it as an opportunity to start new projects" (increasing challenging job demands), and "I make sure that my work is mentally less intense" (decreasing hindering job demands). Participants could respond to these items on a scale ranging from 1 (*never*) to 5 (*always*).

TABLE 2

Means, SDs, AVEs, correlations and Cronbach's alphas (between brackets on the diagonal) of the general-level variables in Study 3 (N = 813)

	M (SD)	AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PVM	5.45 (.67)	.51	(.86)													
Convergent validity																
2. Proactive personality	3.65 (.49)	.42	.36**	(.73)												
3. Self-insight	4.61 (.72)	.44	.33**	.16**	(.81)											
4. JC: social resources	2.72 (.83)	.58	.21**	.24**	-.10*	(.82)										
5. JC: structural resources	3.62 (.60)	.49	.47**	.43**	.12*	.43**	(.72)									
6. JC: challenging demands	3.04 (.78)	.51	.34**	.47**	-.00	.45**	.66**	(.76)								
7. Relaxation	3.99 (.60)	.67	.18**	-.01	.13**	.09*	.04	-.03	(.84)							
Discriminant validity																
8. JC: hindering demands	2.09 (.67)	.47	-.06	.02	-.33**	.30**	.07	.16**	.07*	(.77)						
9. Psychological detachment	3.15 (.92)	.75	.03	-.12*	.08*	-.05	-.14**	-.18**	.43**	.08*	(.89)					
Criterion validity																
10. Work engagement	4.71 (.99)	.64	.62**	.37**	.20**	.24**	.54**	.49**	.02	-.07	-.20**	(.93)				
11. Cognitive liveliness	4.89 (.96)	.68	.48**	.48**	.25**	.22**	.52**	.52**	.12*	-.07	-.05	.60**	(.76)			
12. Exhaustion	2.11 (.42)	.43	-.43**	-.14**	-.37**	.00	-.19**	-.11*	-.24**	.22**	-.18**	-.41**	-.37**	(.80)		
13. In-role work performance	4.19 (.44)	.57	.30**	.27**	.26**	.13**	.29**	.24**	.09*	-.20**	.02	.36**	.36**	-.30**	(.80)	
14. Creative work performance	3.67 (.58)	.61	.37**	.47**	.13**	.24**	.47**	.56**	-.05	-.03	-.16**	.51**	.65**	-.19**	.29**	(.89)

Note. PVM = proactive vitality management and JC = job crafting. * $p < .05$. ** $p < .001$.

TABLE 3

Means, SDs, AVEs, correlations and Cronbach's alphas (between brackets on the diagonal) of the day-level variables in Study 3 (N = 246)

	M (SD)	AVE	1	2	3	4	5	6	7	8	9	10
1. Proactive vitality management	5.22 (.95)	.56	(.89)									
Convergent validity												
2. JC: social resources	2.42 (.89)	.62	.25**	(.80)								
3. Relaxation	4.04 (.77)	.78	.24**	.03	(.86)							
Discriminant validity												
4. JC: hindering demands	2.44 (.86)	.62	-.02	.27**	-.15*	(.80)						
5. Psychological detachment	3.83 (.94)	.83	.10	-.08	.58**	.04	(.90)					
Criterion validity												
6. Vigor	3.72 (.71)	.71	.64**	.13*	.24**	-.17*	.13*	(.92)				
7. Fatigue	2.01 (.88)	.75	-.48**	.02	-.34**	.20*	-.19*	-.66**	(.92)			
8. In-role work performance	4.09 (.60)	.70	.50**	.07	.22*	-.17*	.23**	.48**	-.27**	(..79)		
9. Creative work performance	2.92 (.84)	.72	.40**	.47**	.04	.11	.01	.30**	-.03	.18*	(.90)	
10. Cognitive performance (RAT)	4.15 (1.58)	-	.14*	.09	.06	-.06	.03	.12	-.10	.08	.08	(.63)

Note. PVM = proactive vitality management and JC = job crafting. $N = 246$ for Sample 3, with the exception of the RAT correlations ($N = 227$). * $p < .05$. ** $p < .001$.

Relaxation. We measured relaxation using the 4-item subscale from the recovery experience questionnaire (Sonnentag & Fritz, 2007). An example item is "During time after work, I kick back and relax" (1 = *totally disagree*, 5 = *totally agree*).

Psychological detachment. To measure psychological detachment, we used another 4-item subscale from the recovery experience questionnaire (Sonnentag & Fritz, 2007). An example item is "During time after work, I forget about work" (1 = *totally disagree*, 5 = *totally agree*).

Work engagement. Work engagement was measured using the 9-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker & Salanova, 2006). An example item is: "When I get up in the morning, I feel like going to work" (1 = *never*, 7 = *always*).

Cognitive liveliness. To measure cognitive liveliness, we used the 3-item subscale of the Shirom-Melamed Vigor Measure (SMVM; Shirom, 2004). An example item is "I feel I can think rapidly" (1 = *never*, 5 = *always*).

Exhaustion. We measured exhaustion with eight items from the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2003). An example item is "After work, I usually feel worn-out and weary" (1 = *totally disagree*, 4 = *totally agree*).

In-role work performance. We measured in-role work performance using five items developed by Williams and Anderson (1991). An example item is "I adequately complete assigned duties" (1 = *totally disagree*, 5 = *totally agree*).

Creative work performance. To measure creative work performance, we used seven items developed by Zhou and George (2001). An example item is "I come up with new and practical ideas to improve performance" (1 = *totally disagree*, 5 = *totally agree*).

Day-Level Measures

Job crafting. We measured 'increasing social job resources' (using four items), and 'decreasing hindering job demands' (using four items) from the Job Crafting Scale (JCS; Tims et al., 2012), because we deemed these strategies most relevant on daily level. We

converted the items for daily use (e.g., "Today I asked colleagues for advice", 1 = *totally disagree*, 5 = *totally agree*).

Relaxation. We used three items from the recovery experience questionnaire (Sonnentag & Fritz, 2007) to measure the extent to which participants had engaged in relaxation the evening before (e.g., "Yesterday, during my free evening, I kicked back and relaxed", 1 = *totally disagree*, 5 = *totally agree*).

Psychological detachment. We measured psychological detachment from work the evening before with three items from the recovery experience questionnaire (Sonnentag & Fritz, 2007; e.g., "Yesterday, during my free evening, I forgot about work", 1 = *totally disagree*, 5 = *totally agree*).

Vigor. We measured vigor with six items from the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971). Participants indicated the extent to which they, for example, felt "lively" or "energetic" that day (1 = *not at all*, 5 = *extremely*).

Fatigue. We measured fatigue with five items from the POMS (McNair et al., 1971). Participants indicated the extent to which they, for example, felt "exhausted" or "weary" that day (1 = *not at all*, 5 = *extremely*).

In-role work performance. We measured in-role work performance using three items developed by Williams and Anderson (1991), converted for daily use (e.g., "Today I have adequately completed assigned duties", 1 = *totally disagree*, 5 = *totally agree*).

Creative work performance. To measure creative work performance, we used five items developed by Zhou and George (2001), converted for daily use (e.g., "Today I came up with new and practical ideas to improve performance", 1 = *totally disagree*, 5 = *totally agree*).

Cognitive performance. The objective Remote Associates Test (RAT; Mednick, 1968; Dutch version by Chermahini, Hickendorff, & Hommel, 2012) was used to measure cognitive performance. In this test, participants are provided with word triplets and asked to come up with a fourth word that is associatively related to all three stimulus words. An example: participants were provided with the words 'cup', 'bean' and

'break' (answer: 'coffee'). The six items varied in difficulty level, and participants were given two minutes to (try to) complete the test. We randomly assigned participants to 'conditions' that determined whether they received the RAT items at the beginning, halfway, or at the end of the day-level questionnaire.

RESULTS AND DISCUSSION

Prior to testing our hypotheses, we calculated the Average Variance Extracted (AVE) for each of the variables to examine whether PVM can be distinguished from the other variables in the nomological network. To establish this, the AVE estimates of two variables both have to be greater than their shared variance (i.e., squared correlation) (Farrell, 2010; Fornell & Larcker, 1981). This was the case for every combination of PVM and each of the variables in the nomological network. After that, in order to establish convergent, discriminant, and criterion validity, we calculated correlations between all the variables in the nomological network. An overview of all the general-level results, including the AVE estimates, can be found in Table 2, and the day-level results are displayed in Table 3.

In the general sample, we found positive relationships between PVM and proactive personality ($r = .36$, $p < .001$) and self-insight ($r = .33$, $p < .001$), supporting hypothesis 1a and 1b. In addition, we found positive relationships between PVM and job crafting (i.e., increasing social job resources: $r = .21$, $p < .001$, increasing structural job resources: $r = .47$, $p < .001$, increasing challenging job demands: $r = .34$, $p < .001$), and between PVM and relaxation ($r = .18$, $p < .001$), providing initial support for hypothesis 2a and 2b (Table 2). In the day-level study, we only measured increasing social job resources and relaxation, which were both positively related to day-level PVM ($r = .25$, $p < .001$ and $r = .24$, $p < .001$, respectively), further supporting hypothesis 2a and 2b (Table 3).

In hypothesis 3, we tested the null-hypothesis that PVM would be unrelated to (a) decreasing hindering job demands and (b) psychological detachment. PVM did not significantly correlate with decreasing hindering job demands, both on general and day-level ($r = -.06$, $p = .114$ and $r = -.02$, $p = .816$, respectively), supporting hypothesis 3a (Table 2 and 3). Furthermore, PVM was not significantly related to psychological

detachment, both on general and day-level ($r = .03$, $p = .473$ and $r = .10$, $p = .111$, respectively), indicating support for hypothesis 3b (Table 2 and 3).

In the general-level sample, we found positive relationships between PVM and cognitive liveliness ($r = .48$, $p < .001$) and work engagement ($r = .62$, $p < .001$). Moreover, PVM was negatively related to exhaustion ($r = -.43$, $p < .001$). In addition, PVM was positively related to vigor ($r = .64$, $p < .001$), and negatively related to fatigue ($r = -.48$, $p < .001$) in the day-level study. Hypothesis 4a, 4b and 4c were thus supported (Table 2 and 3). However, due to the relatively high correlations between PVM and work engagement (general-level) and vigor (day-level), we conducted additional analyses to further test whether the constructs could be empirically discriminated. First, the Average Variance Extracted (AVE) estimates of PVM and work engagement (.51 and .64) indicate that the two constructs can indeed be distinguished, as both estimates were greater than the shared variance (i.e., squared correlation) between the two factors (.38) (Farrell, 2010; Fornell & Larcker, 1981). Similar results were found in the day-level study, in which the AVE estimates of PVM and vigor (.56 and .71) were both greater than their shared variance estimate (.41). Second, we conducted CFAs to compare a model in which the items of each construct load on their own respective latent factor, versus a model in which all items load on one overall latent factor. In the general-level data, the model in which the indicators of work engagement and PVM loaded on two separate factors fit the data significantly better than the one-factor model ($\Delta\chi^2 = 749.42$, $\Delta df = 1$, $p < .001$). Moreover, in the day-level data, the model in which the indicators of vigor and PVM loaded on two separate factors also fit the data considerably better than the one-factor model ($\Delta\chi^2 = 284.37$, $\Delta df = 1$, $p < .001$). Taken together, these results clearly show that PVM can be empirically distinguished from vigor and work engagement.

Finally, the results provided support for criterion validity, as we found positive relationships between PVM and in-role work performance ($r = .30$, $p < .001$) as well as creative work performance ($r = .37$, $p < .001$) on the general-level. Similar results were found in the day-level sample ($r = .50$, $p < .001$ and $r = .40$, $p < .001$, respectively). Furthermore, we found a significant, positive relationship between PVM and cognitive performance (scores on the RAT) in the day-level study ($r = .14$, $p < .05$). This means that hypothesis 5a, 5b and 5c were supported as well (Table 2 and 3). Overall, the findings of Study 3 show that the use of PVM relates to relevant variables in its nomological network, and provide support for convergent, discriminant, and criterion validity.

GENERAL DISCUSSION

In this paper, we introduced proactive vitality management as individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work. We developed a reliable scale to measure proactive vitality management, and the results of multiple (multilevel) factor analyses provided strong support for a one-factor model, both on general and daily level. The findings suggest that people who engage in proactive vitality management may sometimes use work-related strategies and micro-breaks at work (Fritz et al., 2011; Zacher et al., 2014). In addition, we found support for convergent, discriminant, and criterion validity on both a general and the day level. Our findings suggest that people may influence their own well-being and work performance by proactively managing their levels of physical and mental energy. Proactive individuals and people with greater self-insight seem more likely to manage their vitality for work, and people who use proactive vitality management are more likely to engage in job crafting at work and relaxing experiences after work (i.e., convergent validity). Furthermore, proactive vitality management was unrelated to decreasing hindering demands and to psychological detachment (non-significant, close to zero relationships), which supports the discriminant validity of our construct. Finally, we provided support for the relationship between proactive vitality management on the one hand, and well-being and work outcomes on the other hand (i.e., criterion validity), as proactive vitality management related negatively to exhaustion/fatigue, and positively to work engagement/vigor, cognitive liveliness, in-role work performance, creative work performance, and cognitive performance.

Theoretical Contributions

Our research on proactive vitality management as a specific type of self-regulatory behavior may make an important contribution to the literature. Combining literatures on proactivity and energy at work allowed us to introduce proactive vitality management as a bottom-up, goal-oriented behavior that may complement top-down approaches to promote employee vitality. Moreover, other proactive approaches, such as job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001) or voice (LePine & Van Dyne, 1998), focus mainly on changing aspects of the job or the work environment. In contrast, proactive vitality management involves a focus on the self, or more specifically, a focus on (managing) physical and mental energy in order to promote optimal functioning

at work. Furthermore, the goal-oriented behavioral aspect of proactive vitality management distinguishes the construct from concepts concerning (the recovery of) human energy in the work context. Previous research has provided valuable insights on the importance of physical and mental energy for various work outcomes (cf. Atwater & Carmeli, 2009; Baas et al., 2008; De Dreu et al., 2012; Fredrickson, 2001; Kark & Carmeli, 2009; Lykken, 2005). Moreover, scholars have argued and shown that such valuable resources may be replenished after (periods of) work (cf. Fritz et al., 2011; Sonnentag et al., 2017; Trougakos & Hideg, 2009). However, studies that examine the effects of such reactive processes on performance outcomes are scarce, and their results inconsistent (Sonnentag et al., 2017). The present research contributes to the literature, as we have developed a proactive construct and corresponding measurement instrument that incorporates a goal-oriented behavioral component. This approach aims to bridge energy management on the one hand, and performance outcomes on the other hand.

Strengths and Limitations

We have developed a reliable eight-item proactive vitality management scale, which facilitates efficient and convenient use of the scale in future research studies (cf. Zacher et al, 2014). In turn, the newly developed construct showed relationships with relevant constructs and outcomes that were in line with our expectations. The large number of people, both Dutch and American, from various organizations and sectors that participated in our studies allowed us to thoroughly examine the proactive vitality management construct and its nomological network, and increase the generalizability of our findings. Furthermore, we found the same relational patterns when investigating proactive vitality management on a general level and on a daily level, which suggests isomorphism and adds to the validity of our findings. The fact that we found proactive vitality management to be positively and significantly related to cognitive performance on an objective measure is an additional strength of the present research.

However, the present research is not without limitations. First, we cannot infer causal relationships from the correlations that we have calculated. That is, the current findings do not specify whether proactively managing physical and mental energy actually *results* in higher performance or creativity. However, we deem it reasonable to assume that proactively managing physical and mental energy to promote work may predict work-related outcomes. The goal-oriented nature of proactive vitality management

(i.e., aimed to promote work) is also implied in the instructions we gave participants prior to answering the items and in the formulation of the items. Nevertheless, while we believe that proactively working on one's levels of vitality should result in, for example, higher levels of work engagement, the reverse, or, a reciprocal relationship, is conceivable as well (i.e., where highly engaged individuals are willing and inclined to invest more in their work by proactively managing their vitality). The interrelatedness of proactive vitality management and work engagement/vigor is also represented in the relatively high correlations between these constructs, as compared to correlations with other variables that we used to establish convergent validity. Another limitation is that, with the exception of cognitive performance – which we measured using the Remote Associates Test (RAT; Mednick, 1968), most of the variables were measured using self-reports. Work-related, objective measures of (creative) performance are difficult to realize in practice and are a recurring subject of discussion (e.g., Zhou & Shalley, 2003). However, being able to predict quantifiable changes in work performance in field research would add to the significance of proactive vitality management. Finally, even though the samples that were used were quite heterogeneous regarding the range of industries and professions participants worked in, some of the sample characteristics may have been less representative of the entire workforce. That is, the participants were relatively highly educated and a considerable proportion of the samples held supervisory positions. Workers with relatively high levels of autonomy or skill variety may have more opportunities to engage in proactive vitality management, and/or to engage in specific strategies that are not practical or possible in all occupations. However, we argue that all workers in all industries and occupations may use proactive vitality management, as there are numerous possible strategies, small or more elaborate, that people may use.

Future Research

Future research may help to gain more insights into the specific mechanisms underlying proactive vitality management in relation to work performance and other relevant outcomes. The general tendency to use proactive vitality management may possibly be relatively stable. However, as suggested by the results of the diary study, the need and opportunity to do so may fluctuate considerably due to individual and momentary needs and preferences, and due to the nature of one's work. The fluctuating nature of proactive vitality management opens up further possibilities for multilevel research. So far, studies have barely incorporated individual or contextual factors that

may influence the effectiveness of energy management and recovery (Sonnentag et al, 2017; Zacher et al., 2014). To address this gap, future studies could test cross-level interaction effects between proactive vitality management and potentially relevant boundary or facilitating conditions (e.g., degree of job autonomy or type of work tasks). Perhaps individuals who have more autonomy in their work have more opportunities to engage in preferential strategies to manage their physical and mental energy for work. Or, people may be more motivated to use proactive vitality management for workdays with challenging tasks, or on days during which they have sufficient time to think about new projects.

Practical Implications

This research may elevate awareness about the importance of physical and mental energy at work, and how individuals may proactively manage their own vitality to promote their work. The instrument that we have developed may be used in future research, and in practice as well. Organizations, but also working individuals themselves, may find it useful to examine their collective or personal levels of proactivity in this area, and the extent to which there may be room for improvement. Organizations and managers may cultivate and facilitate proactive vitality management by encouraging their employees, and by providing sufficient opportunities for employees to engage in preferential strategies to manage their vitality. Moreover, working individuals may try to approach their work proactively and think about what helps them to boost their physical and mental energy and function optimally.

Conclusion

The current labor market is characterized by a growing emphasis on proactive and flexible employees, who carry a responsibility for their own work life, well-being, and careers (cf. Grant & Parker, 2009). Accordingly, besides valuable organizational policies or programs to promote employee vitality, organizations may benefit from creating a climate in which employees are stimulated and encouraged to take control themselves. Indeed, the current findings suggest that individuals may proactively manage their own levels of physical and mental energy, and that such behavior may promote their performance at work.

3

PROACTIVE VITALITY MANAGEMENT AND CREATIVE WORK PERFORMANCE: THE ROLE OF SELF-INSIGHT AND SOCIAL SUPPORT

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ABSTRACT

Integrating proactivity and creativity literatures, we argue that people can perform more creatively at work when they proactively manage their levels of vitality. Proactive vitality management is defined as individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work. We hypothesize that this process may be facilitated by being aware of one's own state and by support from others. A total of 242 employees participated in a weekly diary study for three consecutive weeks, yielding 610 observations. Results of multilevel analyses show that participants reported more creative work performance during weeks in which they had proactively used vitality management. In addition, in line with our predictions, self-insight and social support for creativity in the workplace acted as cross-level moderators and strengthened the relationship between proactive vitality management and creativity. We conclude that a proactive approach regarding physical and mental energy is an important bottom-up strategy that may foster creativity in work settings.

INTRODUCTION

Imagine a scientist who wants to write the introduction to an article about some interesting new findings. The scientist, however, feels unable to focus and lacks the (positive) energy to get creative juices flowing to come up with a decent paragraph to start her article with. In this situation, an individual wants to perform creatively at work, but is somehow lacking the physical and mental energy needed to achieve this in that very moment. Research suggests that physical and mental energy may be essential for creativity (e.g., De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012; Fredrickson, 2001; Kark & Carmeli, 2009). The question that constitutes the basis of the present study is: To what extent can individuals promote their own levels of creative work performance? Or, more specifically, can people proactively mobilize the physical and mental energy needed to perform creatively at work?

Although some people may display more creativity than others (e.g., due to certain personality traits), most scholars assume that everyone has some creative potential (cf. Amabile, 1997). In this paper, we argue that people may promote their own level of creativity through *proactive vitality management,* defined as individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work (Op den Kamp, Tims, Bakker, & Demerouti, 2018). The researcher mentioned above may use proactive vitality management throughout the day (i.e., both during and outside of working hours) to help her achieve work goals and be creative. To illustrate, she may start the workday with a nutritious breakfast or incorporate ten minutes of exercise or meditation into her morning routine to prepare for the workday ahead. During her train commute to work, she may read relevant scientific or practitioner journal articles to promote a driven and inspired mindset. While working, she could purposefully put on some relaxing music or turn off her phone and e-mail for some hours to be better able to think and concentrate. Or, she may decide to go for a walk or a fresh cup of coffee (cf. micro-breaks; Fritz, Lam, & Spreitzer, 2011) to clear her mind and empower herself physically and mentally for the task at hand (e.g., writing the paper's introduction). These are only some examples of strategies that individuals may purposefully employ to manage their vitality. As such, strategies may vary between persons and also within persons (i.e., from moment to moment), corresponding to individual and momentary needs and preferences.

The goal of the present study is twofold. First, we investigate whether proactive vitality management and creative work performance are indeed related by examining their potential relationship over the course of three consecutive workweeks. In addition, we incorporate characteristics of both the person and the work environment into the study to examine whether proactive vitality management is more effective for certain people and in specific situations. In this process, we propose that it is important to be aware of one's own state, and to be supported by the external environment. We examine the influence of self-insight (i.e., the understanding of one's own feelings, thoughts, and behaviors; Grant, Franklin, & Langford, 2002), as it may promote the awareness of personal needs and preferences regarding how and when to boost physical and mental energy for work. Self-insight may, therefore, help individuals to use proactive vitality management more effectively. However, an unsupportive environment may hinder individuals in their attempt to boost creative work performance. Therefore, we examine the availability of social support for creativity (Madjar, Oldham, & Pratt, 2002), as it may help and encourage people to direct their efforts and energy into the creative process.

Our research contributes to the literature because it is one of the first studies to highlight the idea that people are not passive or reactive agents in the creative process and may proactively influence their own levels of creativity (cf. De Stobbeleir, Ashford, & Buyens, 2011). We introduce proactive vitality management as a specific form of goal-oriented, individual behavior that may complement the influence of more 'distal' factors that can affect creative work performance, such as organizational climate or job complexity (for an overview see, for example, Anderson, Potočnik, & Zhou, 2014). Second, our approach expands upon energy-management studies (e.g., Fritz et al., 2011), and complements proactive perspectives that are focused more directly on work and the work environment (e.g., job crafting; Wrzesniewski & Dutton, 2001), as proactive vitality management involves behavior that is directed at the self and on proactively managing physical and mental energy to promote work goals. Third, we respond to recent calls to integrate both between- and within-person approaches in organizational behavior research by using a multilevel, weekly diary design (Bakker, 2015; Ilies, Aw, & Pluut, 2015). Taking into account the within-person level allows us to examine physical and mental energy as valuable but volatile resources that people may aim to replenish or gain from time to time (cf. Schippers & Hogenes, 2011) to promote their work. Thus, we assume that people engage in proactive vitality management more during some

workweeks (e.g., to deal with challenging tasks or a heavy workload) than during other workweeks. Fourth and finally, to provide a more integrative perspective, we have extended the within-person research design by incorporating personal and situational factors (i.e., between-person variables) that may play a role in the process of proactive vitality management and creativity at work.

Proactive Vitality Management and Creative Work Performance

Modern organizations must constantly adapt to deal with changing circumstances and competitive markets. In this adaptive process, creative employees who come up with new and useful ideas regarding work procedures or products are key to organizational effectiveness and competitive advantage (Harari, Reaves & Viswesvaran, 2016; Unsworth & Parker, 2003). There have been many studies on factors that may facilitate or hinder creative work performance (Anderson et al., 2014). For example, research suggests that certain personal characteristics promote creativity, such as being open to new experiences (e.g., Xu, Jiang, & Walsh, 2016) or having a learning goal orientation (e.g., Hirst, van Knippenberg, & Zhou, 2009). In addition, contextual factors may play a role as well and may influence employee creativity. Research has shown that people perform more creatively, for example, when their work is challenging, and when they have a considerable amount of autonomy in their jobs (e.g., Oldham & Cummings, 1996). Moreover, job descriptions in which creativity is explicitly stated as a requirement or the perception that creativity is expected may stimulate creative work performance (Unsworth & Clegg, 2010; Unsworth, Wall, & Carter, 2005), as this 'creativity requirement' may motivate employees to direct their attention and efforts towards creative goals.

While such personal and contextual predictors of creativity can be of great value, they function as relatively distal influences on creative work performance, i.e. further from the individual and the creativity process. To illustrate, it may well be that the scientist who is trying to write an introduction to a new paper is open to new experiences (i.e., favorable personal characteristic for creativity) and works for a research institution that emphasizes practicing innovative science (i.e., a creativity requirement). These factors may provide a fruitful basis for creative work performance, but do not directly influence whether or not the scientist manages to come up with a captivating introduction to a new research article in any specific moment. Research indicates that physical and

mental energy may be essential for creativity to arise. For example, research suggests that energy and vitality relate positively to employee creativity (Atwater & Carmeli, 2009; Kark & Carmeli, 2009), most likely because vitality promotes and enables active involvement in creative behavior. Furthermore, mental energy and cognitive factors such as working memory capacity, cognitive persistence, and attention have been found to promote creative thoughts and ideas because they enable "focused and systematic combining of elements and possibilities" (De Dreu et al., 2012; p. 656; Nijstad, De Dreu, Rietzschel, & Baas, 2010). Higher levels of energy and cognitive capacity may thus be helpful to direct attention towards relevant stimuli, to focus on the problem at hand, and to gather information. Moreover, various scholars have argued that positive energy or moods (e.g., joy, enthusiasm) broaden people's thought-action repertoires and may promote cognitive variation and flexibility, which can promote creativity (e.g., Amabile, Barsade, Mueller, & Staw, 2005; Baas, De Dreu, & Nijstad, 2008; Fredrickson, 2001). Taken together, these studies suggest that physical and mental energy are valuable resources that may be needed for creativity to arise. We propose that people may *proactively manage* these resources when and how they feel the need to, for example in anticipation of challenging work tasks, problems that need to be solved, or when pursuing creative endeavors. In this process, the individuals themselves take control and are actively involved in activities to manage their levels of physical and mental energy. In turn, this may help them to perform (more) creatively in their work.

Hypothesis 1. Proactive vitality management is positively related to creative work performance. During weeks in which individuals engage in vitality management, they will be able to perform more creatively at work.

Self-Insight

Although there may certainly be individual differences in the extent to which people proactively engage in vitality management, an important assumption that underlies our research is that, in general, "people strive to retain, protect and build resources" (Hobfoll, 1989, p. 513). However, it may be that for some people, working on their levels of vitality is more effective than for others. That is, while most individuals may be able to recognize a personal need for physical and mental energy from time to time, people with a higher level of self-insight may be more accurate in assessing their feelings, needs and preferences in this process. Self-insight is seen as a personal characteristic

that is defined as the understanding of one's own feelings, thoughts and behavior (Grant et al., 2002). Self-insight may thus help people to more effectively use proactive vitality management. More specifically, they may signal a need for this type of self-regulatory behavior earlier and more accurately than people with lower self-insight. Moreover, self-insight may promote awareness of what will work in terms of behavioral strategies (i.e., how, when, and where). In addition, self-insight has the potential to positively influence the link between proactive vitality management and creative work performance for at least two more reasons. First, self-insight has been identified as "an important metacognitive process for stimulating adaptive, self-directed change" (Cowden & Meyer-Weitz, 2016, p. 1134; see also, Carver & Scheier, 1998). Therefore, higher levels of self-insight may facilitate the process of proactively using vitality management to promote work goals (i.e., a form of adaptive, self-directed change). Second, research suggests that people with more self-insight are more likely to believe that they will achieve their goals and live up to their potential (Cowden & Meyer-Weitz, 2016), which could motivate them to proactively use vitality management strategies to pursue their (creative) goals and reach higher levels of creativity (cf. creative self-efficacy; Tierney & Farmer, 2002). In this process, individuals with more self-insight tend to focus on their work goals and actively monitor goal process. Moreover, they use feedback to sustain or develop progress regarding performance and goal achievement (Cowden & Meyer-Weitz, 2016; Grant, 2001). All these qualities may boost the effectiveness of proactive vitality management for creative work performance.

Hypothesis 2. The positive relationship between proactive vitality management and creative work performance is moderated by self-insight, such that this relationship is stronger when employees have more self-insight.

Social Support for Creativity

Social support refers to supportive interactions between individuals and includes aspects such as helping, proving information, advice and emotional support (House, 1981). Support from social contacts may motivate working individuals and enhance well-being by promoting goal achievement and personal growth (Bakker & Demerouti, 2017; Grant & Parker, 2009) and by satisfying the need to belong, i.e., the human desire for relatedness (Deci & Ryan, 2000).

In the current study, we argue that a specific form of social support, the availability of social support for creativity in the workplace (Madjar et al., 2002), may facilitate the link between proactive vitality management and creative work performance. Employees may, for example, explore the potential value of their ideas by discussing them with others. Moreover, in further developing and perfecting a creative thought or idea, supportive colleagues could be of great help in providing feedback and advice. Individuals who proactively use vitality management strategies may be able to think (more) creatively and have the potential to come up with new ideas to improve work products and services. However, when colleagues or supervisors do not support employees in this process, their creative potential may yield less value. Laboratory studies have indeed shown that expecting critical or even threatening evaluations from others may undermine creative performance (e.g., Amabile, Goldfarb, & Brackfield, 1990). In contrast, creativity is promoted when employees feel safe and supported (Oldham & Cummings, 1996), and thus confident enough to come up with ideas and communicate about them. Emotional support may help relieve some of the tension and stress by managing potential uncertainty about one's idea and possible problems to be solved in the creative process (Madjar, 2008), and may bring strength and motivation to persist. In addition, the process may be facilitated by input from surrounding others, reflecting the informational aspect of social support. This input could refer to actual information, knowledge and feedback, but may also represent different perspectives and the activation of cognitive processes that help form associations between concepts (Madjar, 2008; Paulus & Yang, 2000). Thus, when people feel they can discuss their new and original thoughts at work to improve or find support for them, this may motivate individuals to direct their proactive vitality management towards creative endeavors and may thus translate their creative potential into higher levels of creative work performance.

Hypothesis 3. The positive relationship between proactive vitality management and creative work performance is moderated by social support for creativity, such that this relationship is stronger when employees experience more social support for creativity at work.

METHOD

Procedure and Participants

Data were collected in the Netherlands with the help of student-assistants who sent online questionnaires to working individuals in their network (i.e., network sampling; Demerouti & Rispens, 2014). This method allowed us to test our hypotheses in a heterogeneous sample consisting of individuals working in various types of professions and organizations in the Netherlands. In total, 242 individuals filled out a general survey measuring self-insight and social support for creativity. Subsequently, they participated in a three-week diary study that assessed their proactive vitality management and creative work performance on a weekly basis, yielding a total of 610 observations (i.e., an average of 2.5 observations per participant). The mean age of the participants was 35.67 (SD = 13.55), and 44.2% of the sample was male. Of all participants, 42.1% had completed higher vocational training and 27.4% held a university degree. As the present study concerns weekly assessments of work-related constructs, participants were required to work at least four days per week to be able to participate. Indeed, most participants worked full-time (according to Dutch standards; M = 37.71 hours per week, SD = 7.22) in a wide range of professions and sectors relatively representative for the Dutch population, including finances (15.3%), health care (12.4%), hotel and catering (10.0%), business (7.6%), education (7.2%), government (6.0%) trade and commerce (6.0%) and, to a lesser extent, in other sectors such as the creative industry and construction work. Of all participants, 50.9% had a permanent work contract (as opposed to a temporary contract) and 27.9% of the participants occupied a supervisory position.

Person-Level Measures

Self-insight was measured using the eight-item subscale of the Self-Reflection and Insight Scale (SRIS; Grant et al., 2002). Example items are "I usually know why I feel the way I do" and "I'm often aware that I'm having a feeling, but I often don't quite know what it is" (reversed-scored) and were responded to on a six-point scale (1 = *totally disagree*, 6 = *totally agree*). Cronbach's alpha was α = .78.

Social support for creativity was assessed with three items based on the questionnaire developed by Madjar et al. (2002). For efficiency reasons, we decided to merge highly similar items of the original six-item scale. The resulting three items we used were

"people at work give me useful feedback about my ideas concerning the workplace", "I can discuss my work-related ideas with people at work in order to improve them", and "people at work are almost always supportive when I come up with a new idea about my job" (1 = *totally disagree,* 7 = *totally agree*). Cronbach's alpha was α = .81.

Week-Level Measures

Proactive vitality management was measured with eight items developed by the authors, converted for use on the week-level. Participants were asked to report on the extent to which they had used vitality management strategies to promote their work in the past week. Example items are: "Last week, I made sure that I felt energetic during my work" and "Last week, I motivated myself" (1 = totally disagree, 7 = totally agree). Cronbach's alpha ranged from .88 to .92 over the three weeks. To further support the measurement instrument, we conducted a multilevel confirmatory factor analysis (MLCFA) over the eight weekly items. The results of the MLCFA generally indicated a good fit to the data (CFI = .95, TLI = .92, RMSEA = .06, SRMR within = .06, SRMR between = .11). Moreover, all items had substantial standardized loadings on the latent construct, with coefficients ranging from .54 to .88 (all p's < .001). In addition, item-level ICCs (i.e., the amount of variance that can be attributed to the person-level) ranged from .26 to .40, indicating that a considerable amount of variance remains to be explained on the within-person level. So, the MLCFA results show that proactive vitality management can be measured adequately and reliably on a weekly level and justify the use of a multilevel research design. The eight-item scale was developed and validated in earlier studies (Op den Kamp et al., 2018). The results of these studies also confirmed the one-factor model, and showed that the scale is reliable (Cronbach's alpha was α = .88, on average). Moreover, the findings showed that the scale has convergent validity, as it was moderately correlated with other proactive constructs (e.g., proactive personality: r = .36, p < .001); it has discriminant validity as it was unrelated to, e.g., psychological detachment (r = .03, p = .473); and has criterion validity as it was related to well-being (e.g., cognitive liveliness: r = .48, p < .001) and various (work) outcomes (e.g., in-role performance: r = .30, p < .001, and objective performance on the Remote Associations Test: r = .14, p < .05).

Creative work performance was assessed using five items developed by Zhou and George (2001), converted for use on the week-level. An example item is: "Last week, I came up

with creative solutions to problems" (1 = *totally disagree*, 5 = *totally agree*). Cronbach's alpha ranged from .86 to .90 over the three weeks.

Control Variables

Proactive personality, creative requirement, and job autonomy were included into the study and the analysis as controls because of their potential influence on proactive vitality management and creative work performance. Proactive personality and job autonomy may affect people's tendency or opportunity to proactively engage in vitality management. In addition, both control variables have been linked to creativity in earlier studies (e.g., Kim, Hon, Crant, 20009; Oldham & Cummings, 1996). Moreover, creative requirement is seen as an important determinant of employee creativity (Unsworth et al., 2005), and may thus directly influence our hypothesized effects as well. Creative requirement was measured by asking participants to what extent they are evaluated on creativity in their work (i.e., suggesting that creativity is expected or even required). Response options ranged from 1 (*not at all)* to 5 (*to a very high degree)*. A six-item version of the Proactive Personality Scale (PPS; Bateman & Crant, 1993), validated by Claes, Beheydt and Lemmens (2005) was used to measure proactive personality. An example item is "I excel at identifying opportunities" (1 = *totally disagree*, 5 = *totally agree*). Cronbach's alpha was α = .81. We measured job autonomy on a weekly basis using three items developed by Bakker, Demerouti, and Verbeke (2004), based on Karasek's (1985) job content instrument. An example item is "Last week, I could decide myself how to execute my work" (1 = *totally disagree,* 5 = *totally agree*). Cronbach's alpha ranged from .77 to .88 over the three weeks.

Strategy of Analysis

The data in the current study comprised a multilevel structure with weeks nested within persons. Therefore, we conducted multilevel analysis with the HLM 7.01 software (Raudenbush, Bryk, & Congdon, 2013) to test our hypotheses. Prior to testing our hypotheses we calculated the intra-class correlations (ICC) for both week-level variables, which shows how much of the variance can be attributed to the person-level. In line with our expectations, 42% of the variance in proactive vitality management could be attributed to the between-person level and a comparable amount (46% of the variance) was found for creative work performance. These findings indicate that a considerable amount of variance in these variables remained to be explained by the

within-person level, justifying the multilevel design of the current study and supporting a multilevel analysis approach.

In addition, we tested whether the slope between the independent variable (proactive vitality management) and the dependent variable (i.e., creative work performance) varied across respondents. The slope variance was significant (variance component = .13, $p < .001$), justifying the introduction of person-level variables (i.e., self-insight and social support for creativity) into the analyses to test cross-level interaction effects. Testing (cross-level) moderation hypotheses requires the inclusion of the main effects of the moderators into the analysis (Aiken, West, & Reno, 1991). Therefore, we controlled for the main effects of self-insight and social support for creativity when testing hypothesis 2 and 3. We conducted multilevel regression analysis based on four nested models introducing successively the intercept (Null model), the predictor (Model 1), the two moderators (Model 2), and their two hypothesized cross-level interaction effects (Model 3).

In the multilevel regression analyses, the person-level variables (i.e., self-insight, social support for creativity, proactive personality, and creative requirement) were grand-mean centered, and the week-level predictor (proactive vitality management) and control variable (job autonomy) were group-mean centered (Ohly, Sonnentag, Niessen, & Zapf, 2010). Both the outcome variable (i.e., weekly creative work performance) and the control variable 'time' remained uncentered. However, as the time variable proved to be an insignificant predictor of creative work performance and explained no variance, we decided to exclude this variable from further analyses (Hox, 2010).

RESULTS

Descriptive Statistics

Means, standard deviations and correlations of the variables in the current study are presented in Table 1.

TABLE 1

Descriptive Statistics and Correlations

Variables	M	SD	1	2	3	4	5	6	7
Person-level									
1. Self-insight	4.61	.64	-						
2. Social support for creativity	5.27	1.07	.06	-					
3. Proactive personality	3.55	.52	.16***	.13**	-				
4. Creative requirement	2.92	1.07	-.01	.14***	.27***				
Week-level									
5. Proactive vitality management	5.01	.81	.19**	.18**	.18***	.07	-		
6. Creative work performance	3.08	.63	.05	.16***	.36***	.27***	.44***	-	
7. Job autonomy	3.72	.73	.18**	.23***	.22***	.10*	.38***	.39***	-

Note. $N = 242$ employees and $n = 610$ observations. *Self-insight* was scored on a 6-point scale, *social support for creativity* and *proactive vitality management* were measured using a 7-point scale and *proactive personality, creative requirement, job autonomy* and *creative work performance* were scored on a 5-point scale. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Multilevel Confirmatory Factor Analyses

Prior to testing our hypotheses, we used Mplus software (Muthén & Muthén, 1998 - 2012) to conduct several relevant multilevel confirmatory factor analyses (MLCFAs). First, to examine the measurement model and check for construct validity and independence of our variables, we tested a measurement model containing four factors: Creative work performance (five items); Proactive vitality management (eight items); Self-insight (eight items); and social support for creativity (three items). The multilevel measurement model in which all items of all the variables in our model loaded on their respective latent factors fit the data well (CFI = .93, TLI = .91, RMSEA = .06, SRMR within = .05, SRMR between = .06). In addition, all factors had significant factor loadings ($p < .01$).

Second, we wanted to test thoroughly whether we could empirically distinguish the predictor in our model (proactive vitality management) from the outcome (creative work performance). Therefore, we conducted two multilevel confirmatory factor analyses (MLCFAs) to compare a model in which the items of each construct load on their own respective latent factor to a model in which all items load on one overall latent factor. The model in which the indicators of the two constructs loaded on two separate factors had a good fit to the data (CFI = .93, TLI = .92, RMSEA = .06). Moreover, this model

fit the data significantly better than the one-factor model ($\Delta\chi^2 = 359.06$, $\Delta df = 1$, $p < .001$; Sattora-Bentler Scaled $\Delta\chi^2 = 51.37$, $\Delta df = 1$, $p < .001$). Taken together, these results show that proactive vitality management can be empirically distinguished from creative work performance.

Hypotheses Testing

Proactive personality, creative requirement and weekly level of job autonomy were included in our analyses as control variables. However, when we analyzed our data again and tested our hypotheses without including the control variables, the results support our hypotheses in the same way. That is, including the control variables did not change the significance of any of the main or interaction effects in our multilevel regression models. As participants' scores on creativity could not be attributed to having a proactive personality, job autonomy, or a creative requirement in one's work, we decided to present the results from the more parsimonious models without the control variables. The results of the multilevel analyses showed that weekly proactive vitality management related positively to weekly creative work performance ($\gamma = .30$, SE = .036, $p < .001$), providing support for hypothesis 1 (see Table 2).

According to hypothesis 2, the relationship between proactive vitality management and creative work performance will be stronger for individuals with higher levels of self-insight. While controlling for their main effects, the interaction term of weekly proactive vitality management and self-insight was positively related to weekly creative work performance ($\gamma = .12$, SE = .056, $p < .05$), providing initial support for hypothesis 2. We conducted simple slopes tests to further examine the interaction effect. These tests showed that the relationship between proactive vitality management and creative work performance was stronger when self-insight was 1 SD higher than the mean (estimate = .35, SE = .038, $p < .001$) than when self-insight was 1 SD lower than the mean (estimate = .21, SE = .050, $p < .001$; see Figure 1), providing further support for hypothesis 2.

TABLE 2

Results of Multilevel Analyses

Variables	Null model		Model 1		Model 2		Model 3	
	γ	SE	γ	SE	γ	SE	γ	SE
Intercept	3.06**	0.04	3.07**	.04	3.06**	.04	3.06**	.04
Weekly proactive vitality management (PVM)			.30**	.04	.30**	.04	.28**	.04
Self-insight					.02	.06	.02	.06
Social support for creativity					.13***	.04	.13**	.04
Weekly PVM x self-insight							.12*	.06
Weekly PVM x social support for creativity							.11**	.03
Variance level-2	.258		.277		.261		.264	
Variance level-1	.308		.261		.261		.252	
Deviance	1283.62		1228.45		1224.13		1218.69	

*Note. N = 242 employees and n = 610 observations. *p < .05, **p < .01*

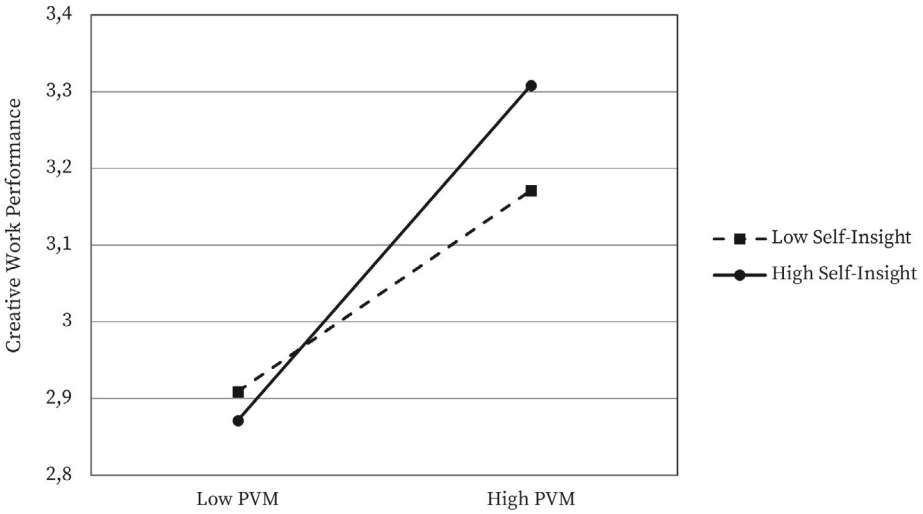

FIGURE 1

Moderation effect of self-insight on the relationship between proactive vitality management (PVM) and creative work performance.

Hypothesis 3 stated that the link between proactive vitality management and creative work performance will be stronger when there is more support for creativity available in the workplace. While controlling for their main effects, the interaction term of weekly proactive vitality management and social support for creativity was positively related to weekly creative work performance ($\gamma = .11$, SE = .034, $p < .01$), providing initial support for hypothesis 3. Simple slopes tests showed that the relationship between proactive vitality management and creative work performance was stronger when social support for creativity was 1 SD higher than the mean (estimate = .36, SE = .054, $p < .001$) than when social support for creativity was 1 SD lower than the mean (estimate = .20, SE = .048, $p < .01$; see Figure 2), further supporting hypothesis 3. In short, the results indicate that both self-insight and support for creativity moderate the proactive vitality management – creative work performance relationship. See Figure 3 for an overview model of all tested relationships.

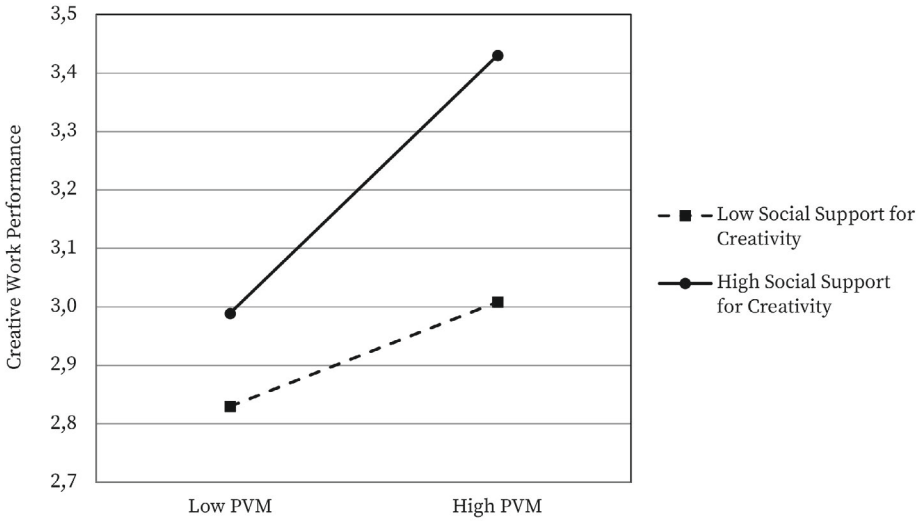

FIGURE 2

Moderation effect of social support for creativity on the relationship between proactive vitality management (PVM) and creative work performance.

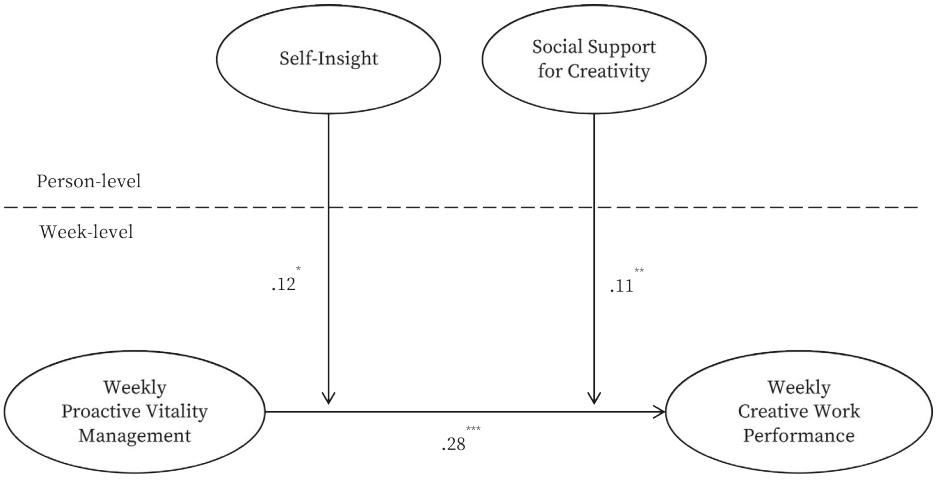

FIGURE 3

Proposed model of proactive vitality management and creative work performance.

DISCUSSION

The present study suggests that people may take control over their creative work outcomes by proactively managing their levels physical and mental energy. We examined weekly fluctuations in proactive vitality management behavior and creative work performance, within the context of more stable personal and environmental influences on this process. Our findings suggest that people may unleash their creative potential by proactively working on their levels of vitality. This process is facilitated when individuals are aware of their own state (i.e., self-insight), and when their social work environment supports them.

Contributions

The present study advances existing knowledge in various ways. First, the findings may contribute to our understanding of the creative process. People who engage in proactive vitality management may reach a state of mind, physically and mentally, in which they can perform (more) creatively. Such behavior is conceptually closer related to the outcome than traditional predictors of creativity, such as personality traits and work characteristics (Anderson et al., 2014). Because people personally undertake action when they feel the need to or when the task at hand asks for it, proactive vitality management may complement these more distal and often relatively stable factors that have been linked to creativity (e.g., job autonomy or work climate). Moreover, proactively managing vitality may enable optimal use of such favorable conditions. To illustrate, when an intelligent, open-minded individual works in a resourceful environment but fails to manage their physical and mental energy in a certain week, the chances of coming up with new and useful ideas during that week are likely to become smaller. In addition, as the current findings suggest, personal and environmental factors may facilitate the creative process by boosting the influence of proactive vitality management on creative work performance.

Second, proactive vitality management may complement the literature on proactivity, commonly defined as "self-initiated and future-oriented action that aims to change and improve the situation or oneself" (Parker, Williams, & Turner, 2006, p. 636). So far, proactive perspectives have primarily focused on (improving) the job or the work environment, and to a lesser extent on directly promoting the self. Through proactive

vitality management, individuals may promote their own physical and mental state to achieve goals and perform more creatively at work (i.e., self-initiated and goal-oriented behavior). Such behavior may thus complement existing proactive approaches, such as job crafting (Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001), voice (LePine & Van Dyne, 1998), and feedback-seeking behaviors (De Stobbeleir et al., 2011).

Third, we combine the proactivity literature with studies that have already provided some indication that certain specific strategies may be helpful to restore physical energy at work (e.g., micro-breaks; Fritz et al., 2011; Zacher, Brailsford, & Parker, 2014), or to diminish fatigue after work (cf. recovery; Sonnentag & Fritz, 2015). While recovery activities and micro-breaks are mainly used to replenish resources in reaction to strain from work (i.e. a reactive process), we focused on a more anticipatory, proactive process in which individuals purposefully manage or boost their levels of vitality to improve subsequent work performance. Moreover, proactive vitality management refers to managing more than physical energy alone, as vitality also includes a mental component of feeling positive and cognitively alert (Ryan & Frederick, 1997), which is important for (creative) work performance as well. People may use proactive vitality management both during and outside working hours, and may choose to employ certain strategies based on individual and momentary needs (e.g., in anticipation of complex work tasks) and preferences (e.g., exercising vs. meditating; seeking solitude vs. inspirational colleagues, etcetera). Subsequently, as the current findings suggest, such behavior is associated with higher creative work performance, especially when people are more aware of their own state and when they feel supported by their social environment.

Limitations and Future Research

We have tested our hypotheses using a multilevel design including multiple, consecutive workweeks. This design allowed us to examine within-person fluctuations in proactive vitality management in relation to creative work performance, and the role of personal and contextual characteristics that may strengthen the proactive vitality management-creative work performance relationship. The research sample consisted of a relatively heterogeneous group of participants, which promotes both the generalizability and the relevance or applicability of the findings. A limitation of the study is that we cannot infer causality from the current findings, even though we have been able to identify relevant

and meaningful patterns in the data that correspond to theory and to our hypotheses. Secondly, because we measured our constructs on a weekly basis, retrospective bias was reduced because of the relative proximity of the measurement to the behavior that is reflected upon. However, even *within* weeks there may be fluctuations in the extent to which individuals proactively work on their vitality to promote their work, which calls for future research that zooms in on the process even further, such as daily diary studies or even the sampling of behaviors and experiences within workdays (i.e. experience sampling studies).

Another limitation is that we have examined the constructs of interest in this study using self-report measures. It may be valuable to investigate creative work performance using less subjective measurements. However, work-related objective measures of creativity are difficult to realize in practice and are a recurring subject of discussion (e.g., Zhou & Shalley, 2003). As an alternative to objective measures, researchers have often used supervisor-ratings of creativity (e.g., De Stobbeleir et al., 2011; Oldham & Cummings, 1996; Tierney, Farmer, & Graen, 1999; Zhou & George, 2001). However, such studies usually concern general levels of creative potential or performance. As was also pointed out by Binnewies & Wörnlein (2011), it may be difficult for supervisors to adequately observe *fluctuations* in creative work performance within their employees. So, while supervisor-ratings of creativity may be very valuable, our diary approach made us opt for a self-report format to measure creative work performance. This approach is further supported by research showing that self-rated creativity is positively related to biographical information about specific creative behaviors (e.g., building websites, publishing research, composing music; Batey & Furnham, 2008), and to creativity as rated by experts (Kaufman, Beghetto, & Watson, 2006).

Although the current findings show that proactive vitality management is relevant for creativity at work, it is expected that such behavior may influence a wider array of outcomes. As it is defined, proactive vitality management entails goal-oriented, individual behavior that is aimed at increasing physical and mental energy to promote optimal functioning at work. In future studies it may be valuable to incorporate other relevant, potential outcomes, such as in-role job performance, productivity or goal achievement.

Practical Implications

The current findings may be useful for many working individuals (i.e., employees, freelancers, managers). Individuals may proactively use various vitality management strategies to improve their own levels of creative performance. Besides professions that are generally seen as 'creative', such as writers, filmmakers or artists, there are many work-scenarios conceivable in which creativity is warranted. For example, when the CEO of a large company has to pitch a new organizational strategy to the board that will ensure innovative advantage to stay ahead of competition; when an intensive care nurse wants to protect patient healthcare in times of reorganization and budget cuts by coming up with more efficient work procedures; or when a school teacher has a classroom full of unfocused students and tries to come up with a novel and exciting way to motivate them to do their homework and to learn new things.

Our results corroborate earlier studies in which (aspects of) vitality have been linked to creative performance (e.g., De Dreu et al., 2012; Fredrickson, 2001; Kark & Carmeli, 2009) and emphasize the importance of a proactive approach in the creative process. To stimulate this, interventions may be developed to encourage people to proactively work on their levels of vitality and to stimulate awareness of personal needs and preferences in this process. Moreover, supervisors may facilitate this process by encouraging their employees to use proactive vitality management, and by providing them with the opportunity to engage in preferential strategies (e.g., providing a certain degree of job autonomy). In addition, our findings show that self-insight may play a valuable role in boosting the influence of proactive vitality management on creative work performance. Being unaware of, or unable to assess personal feelings and potential needs regarding physical and mental energy may weaken the effectiveness of proactive vitality management. These insights suggest that people may benefit from engaging in self-reflection or other forms of training (cf. Saunders et al., 2007) to promote their own levels of self-insight. Third, besides being aware of one's own state, the current findings suggest that social support for creativity in the workplace may facilitate the proactive vitality management – creative work performance relationship. An unsupportive work environment (e.g., having uninterested, overly conventional, critical, or even undermining co-workers) might diminish the relationship between proactive vitality management and creativity. As a manager, it may thus be valuable to take the current findings into account and promote a social work environment in which individuals

can share and discuss their ideas. In addition, individuals themselves may actively seek feedback and support for their ideas from colleagues or their managers (cf. De Stobbeleir et al., 2011; Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001).

Conclusion

In a knowledge economy where competition is fierce, creativity is generally seen as an important facet of work performance. Which factors promote or hinder creative work performance has been a focus of many scientific studies over the years. However, while a predominant part of the working force consists of employees rather than managers or CEO's, the creativity literature traditionally focuses on how managers may foster employee creativity. Our research suggests that people may take control and make themselves more creative in their work by proactively managing their own levels of vitality. The scientist who was struggling to write the introduction to her article may find comfort in the fact that she is no exception (Grant & Pollock, 2011). However, the current findings suggest that perhaps proactively engaging in vitality management may help individuals to reach their work-related goals.

3

4

PROACTIVE VITALITY MANAGEMENT, WORK ENGAGEMENT, AND CREATIVITY: THE ROLE OF GOAL ORIENTATION

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ABSTRACT

This study tested the hypothesis that individuals can proactively manage their own energetic, affective, and cognitive resources in order to be creative at work. Building on proactivity and creativity literatures, we propose a theoretical model in which employees who proactively manage their vitality are more engaged in their work and show improved creative performance. We also tested the boundary conditions of this process. Participants were Dutch employees from various occupations who filled out a background questionnaire and five weekly surveys. The results of multilevel modelling analyses offered support for our model. Weekly proactive vitality management was positively related to changes in weekly creativity through changes in weekly work engagement. As predicted, learning goal orientation strengthened and performance goal orientation weakened the links between proactive vitality management and engagement, and between engagement and creativity. We discuss the theoretical contributions, and indicate how these findings can be used in daily working life.

INTRODUCTION

It is generally assumed that organizations need to be creative in order to stay ahead of a changing marketplace and competitors. This is easier said than done. Creative employees need to pose questions that challenge common wisdom. They also need to observe well and scrutinize the behaviors of customers, suppliers, and competitors to identify new ways of doing things. Moreover, creative ideas originate when people are flexible in their thinking and persistent (Nijstad, De Dreu, Rietzschel, & Baas, 2010) – two strategies that demand considerable energetic, affective, and cognitive resources.

In the present study, we argue that employees are not creative all the time and may need to proactively manage their own resources to reach creativity. More specifically, we use the proactivity literature (Frese & Fay, 2001; Parker, Williams, & Turner, 2006) to argue that employees who proactively build energy, inspiration, and motivation (i.e., "proactive vitality management"; masked, in press) will be more engaged and creative at their work. For example, individuals may actively work on their own motivation during or after working hours by networking to meet people with different ideas and perspectives. Similarly, individuals may take a walk in the park during the workday with the intention to change one's psychological state, or may visit an art gallery with the goal to find new inspiration. We also investigate the boundaries of this proactive behavior by examining the impact of learning versus performance goal orientation.

With this research, we aim to make the following contributions. First, whereas most scholars have focused on more distal environmental and personality factors as predictors of (work-related) creativity, we focus on a more proximal predictor of creativity – proactive vitality management. Second, although previous research has shown that energy, positive affect, and focus relate positively to creativity, most scholars have overlooked the possibility that employees may *proactively manage* such energetic, affective, and cognitive resources to be creative. This bottom-up approach originates from the proactivity literature and could be an important addition to more common top-down approaches to creativity. Third, we use a five-week follow-up study design to test whether proactive behavior aimed at vitality management is positively related to creativity, through work engagement. We complement previous cross-sectional and longitudinal survey studies on proactivity, work engagement, and

creativity with a weekly follow-up study and aim to show that employees can influence their own creativity, from week to week. The design of our study implies that we do not have complete control over causality. However, we will control for previous levels of the mediator and dependent variables in the analyses. When we refer to a causal or mediation relationship in this article, the reader should be aware that causality is assumed and cannot be claimed. Finally, we contribute to the goal setting and goal orientation literatures by investigating how goal orientation, as a motivational moderator variable, influences this creativity process. Since goal orientation determines employees' self-regulatory tactics, including their effort, persistence, and learning strategies (Brett, Uhl-Bien, Huang, & Carsten, 2016), goal orientation potentially has important implications for how proactive vitality management is related to work engagement and how engagement is related to creativity.

THEORETICAL BACKGROUND

In a highly competitive business world where the rate of change has been accelerating, organizations constantly need new ways to create value for their customers. Therefore, modern organizations are interested in creativity and new methods to facilitate creative performance. Creativity refers to the generation of ideas, insights, or problem solutions that are both novel and potentially useful (Amabile, 1997; Anderson, De Dreu, & Nijstad, 2004). Research suggests that organizations can stimulate creativity by structural interventions. For example, organizational factors like support for innovation, job complexity, climate for excellence, and supervisor empowerment are positively related to creativity (Anderson, Potočnik, & Zhou, 2014). Thus, managers could presumably follow a top-down approach and stimulate creativity by designing resourceful and challenging jobs that signal an innovation climate. In addition, research has revealed that personality factors like openness to experience and proactive personality are positively related to creativity (Feist, 1998; Ma, 2009). This suggests that managers could also stimulate creativity by implementing adequate personnel selection procedures.

It is important to note that personality and work environments are able to predict creativity, but that more proximal predictors are needed in order to explain how personal and environmental characteristics influence creativity. Daniels (2006) has

argued that individuals must "enact" job characteristics such as autonomy in order for stable job characteristics to have an impact on organizational outcomes. By using the freedom to work with self-chosen methods on a certain day, people feel a sense of volition, and this may be the reason why autonomy ameliorates strain, frees the mind, and fosters creativity on that day. The same is true for personality factors. Openness to new experiences is a relatively distal predictor of creativity (Ma, 2009), but it may explain how some individuals learn from challenging tasks whereas others who are less open to new experiences become stressed. Similarly, proactive personality (Kim, Hon, & Lee, 2010) and creative self-efficacy (Tierney & Farmer, 2002) are positively related to creativity, but if individuals do not express these personality characteristics in certain situations or during certain timeframes, they are not likely to be creative in those situations and timeframes. Indeed, research has shown that personality often has its influence on creativity through proximal mediators like positive affect and behavioral strategies that facilitate creative idea production (Shalley, Zhou & Oldham, 2004).

Proactive Vitality Management

Our starting point is that creative ideas demand considerable energetic, affective, and cognitive resources because creativity requires flexible thinking and persistence (Nijstad et al., 2010). Loosely connected ideas and impressions can only lead to a creative solution if individuals have sufficient psychological resources to flexibly switch between options and to persist till the solution has been found. Indeed, previous research has provided ample evidence for the contention that cognitive, affective, and energetic resources are important for creativity (Baas, De Dreu & Nijstad, 2008; Hennessey & Amabile, 2010; Ning, Wu, Runco, & Pina, 2015).

For example, De Dreu and his colleagues have provided convincing evidence for the contention that cognitive resources like attention and concentration are crucial for creativity (De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012). The authors assessed working memory capacity (WMC) by asking participants to engage in several trials of a delayed serial recognition task. The persons who scored higher on WMC turned out to perform better on a creative insight task. In contrast, participants whose WMC was taxed showed reduced creative performance. These findings were replicated in another study among semiprofessional cellists who were asked to improvise on three music themes (De Dreu et al., 2012; Study 3).

In addition, research has shown that affective and energetic resources are important for creativity (Amabile, Barsade, Mueller, & Staw, 2005; Kark & Carmeli, 2009). Amabile and her colleagues used a daily event sampling method to investigate more than 200 employees working in one of 27 project teams for which creativity was a possible and desirable outcome (e.g., developing new products, solving complex client problems). Participants completed an average of 52 daily questionnaires. The findings showed that self-reported positive affect and coders' ratings of positive affect in participants' daily narratives were predictive of coders' identifications of spontaneously reported creative thought and problem solving in the narratives.

The central proposition in the present study is that individuals can *proactively manage* their own, volatile energetic, affective, and cognitive resources in order to improve their own well-being and performance (masked, in press). Proactivity has more generally been defined as "self-initiated and future-oriented action that aims to change and improve the situation or oneself" (Parker et al., 2006; p. 636). We define proactive vitality management as a specific form of proactive behavior aimed at oneself by improving one's own physical and psychological state. Building on Parker, Bindl, and Strauss (2010), we argue that proactive vitality management fits well within the elaborate framework of proactive motivation provided by these authors. More specifically, whereas proactive goal generation and striving refer to more general proactive goal-driven processes, proactive vitality management may be seen as a specific form of proactivity that may indeed fall under the proactive goal generation process, and more specifically under the umbrella of proactive person-environment fit behavior (Bindl & Parker, 2010; Parker & Collins, 2010). Namely, proactive vitality management has a clear goal (being able to function at work and achieve work-related goals), and people strive to achieve this goal by engaging in self-initiated strategies to manage their physical and mental energy. When using proactive vitality management, people are not changing the work environment, but rather they are changing (aspects of) *themselves* to achieve a different future (cf. Parker et al., 2010). Due to the proactive nature of proactive vitality management, it is expected that individuals engage in this behavior when they think they can perform the behavior that is needed ("can do motivation"), have a reason to behave in a proactive way ("reason to motivation), and feel they have the resources to engage in the behavior ("energized to motivation"; Parker et al., 2010).

As proactive vitality management entails individual, goal-oriented behavior, we propose that individuals may proactively manage their physical and mental energy according to their personal needs and preferences (i.e., how, where, and when). For example, whereas some employees may use mindfulness to manage their physical and cognitive resources so that they are fit for work (Kühnel, Zacher, De Bloom, & Bledow, 2016; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010), others may visit a museum to find new inspiration, or take a walk in the park with the intention to change one's psychological state (Sianoja, Syrek, De Bloom, Korpela, & Kinnunen, in press). These examples refer to differences between individuals in proactive vitality management. Also, the same person may at certain times proactively search for interactions with colleagues in order to discuss work and find inspiration, and at other times decide to ignore colleagues, phone calls, and e-mails to be able to concentrate. The latter examples refer to differences in proactive vitality management *within* individuals, from time period to time period. All these forms of proactive vitality management may prepare employees to deal effectively with their work tasks.

It should be noted that not all activities are equally effective or beneficial for all individuals at all times. Individual preferences or work-schedule factors may influence whether specific proactive vitality management strategies work or not (cf. Oerlemans & Bakker, 2014; Sonnentag, Venz, & Casper, 2017). Moreover, research suggests that engaging in preferred activities requires less effort and may be most beneficial in terms of physical and mental energy (Trougakos & Hideg, 2009). Accordingly, we propose that proactive vitality management may promote various work-related outcomes – regardless of the specific behavioral strategies people choose to employ.

Employees who manage their energy, positive affect, and inspiration through activities in and outside the workplace have a range of resources that can be invested in work. Thus, proactive vitality management has the potential to foster work engagement – a work-related state that is characterized by vigor, dedication, and absorption (Schaufeli & Bakker, 2004). Vigor refers to high levels of energy and resilience while working, as well as the willingness to invest considerable effort in one's work. Dedication means that a person is strongly involved in work and experiences a sense of significance, enthusiasm, and challenge. Finally, absorption is characterized by being fully concentrated and happily engrossed in work activities, whereby time passes quickly

(Bakker, Demerouti, & Sanz-Vergel, 2014). Previous research has indeed suggested that energetic, affective, and cognitive resources are important for work engagement. For example, quantitative diary studies have shown that positive affect and energy in the morning facilitate work engagement during the workday (e.g., Sonnentag, Dormann, & Demerouti, 2010; Ten Brummelhuis & Bakker, 2012a). In addition, recent research has shown that daily inspiration and optimism are important drivers of daily work engagement (Breevaart et al., 2014; Tims, Bakker & Xanthopoulou, 2011). We propose that individuals may proactively manage these volatile resources with the intention to change their work engagement. Hence,

Hypothesis 1. Proactive vitality management is positively related to work engagement.

Work engagement is positively related to creativity, because engaged employees are flexible in their thinking and invest considerable effort in their work (e.g., Bakker & Xanthopoulou, 2013; Eldor & Harpaz, 2016; Koch, Binnewies, & Dormann, 2015). When employees are highly engaged in their work, they are open to new ideas on how to optimize and change their work processes. Work engagement provides employees with intrinsic task motivation that is a necessary component for reaching creative solutions (Amabile, 1997). That is, those who are engaged will be motivated to use their skills and expertise that are needed to perform creatively (Bakker & Xanthopoulou, 2013). Furthermore, the positive experience of work that is part of feeling engaged can also be linked to the propositions of broaden-and-build theory (Fredrickson, 2001), which states that positive affect allows individuals to widen their thoughts and actions making them more likely to think outside of the box and explore alternatives when they find their work enjoying and interesting.

In their study among employees working in industry, trading, business services, and health care, Demerouti, Bakker, and Gevers (2015) showed that employees who regularly optimize their work environment by seeking job resources (i.e. job crafting) show better creative performance because they are more engaged in their work. We expand this literature by arguing that proactive vitality management can foster creativity, because it increases employee work engagement. Given the above reasoning that proactive vitality management is likely to be related to work engagement because of the mobilized energy, positive affect, and inspiration, we expect that work engagement acts as the

explanatory mechanism between proactive vitality management and creativity. That is, resources are important predictors of work engagement (Bakker et al., 2014) and the positive emotions that are part of work engagement allow individuals to be flexible, explorative, and creative (Fredrickson, 2001). Research indeed supports this assertion, showing that work engagement explains the relationship between job resources and personal initiative (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008), creativity (Bakker & Xanthopoulou, 2013), and innovative behavior (Park, Song, Yoon, & Kim, 2014).

Hypothesis 2. Proactive vitality management is indirectly positively related to creativity through work engagement.

The Role of Goal Orientation

Goal orientation (GO) theory outlines how individuals use adaptive or maladaptive self-regulatory behaviors in achievement settings. Accordingly, people hold one of three types of GOs: Learning goal orientation (LGO) – a desire to develop mastery through learning, seeking challenges, and acquiring new skills; performance-prove GO (PPGO) – a desire to prove competence to gain favorable evaluations from others; and performance-avoidance GO (PAGO) – a desire to avoid displays of incompetence that could lead to negative judgments (Brett et al., 2016; Dragoni & Kuenzi, 2012; Gong, Kim, Lee, & Zhu, 2013; VandeWalle, 1997). In the present study, we focus on LGO and PAGO, because these two orientations are expected to have predictable and rather differential effects on the creativity process.[1]

GO has a powerful impact on job performance and creativity, because GO determines employees' self-regulatory tactics, including their effort, self-set goals, feedback seeking, persistence, and learning strategies (Brett et al., 2016). Since GOs influence approach/avoidance motivation and openness to experience (Payne, Youngcourt, & Beaubien, 2007), GOs have important implications for (a) how proactive vitality management relates to work engagement, and (b) how work engagement relates to creativity.

1 Unfortunately, in the present study, the scale measuring PPGO had low internal consistency (Cronbach's alpha = .57), and thus it was impossible to calculate reliable interaction terms. We therefore decided to exclude PPGO from our theoretical and empirical analyses.

Proactive vitality management and work engagement. When employees proactively manage their vitality, they have an abundance of affective, cognitive, and energetic resources to carry out their work tasks (e.g., positive affect, focus, inspiration, energy). These resources will particularly be invested in work when employees have a strong desire to develop mastery at work through learning. Employees who hold learning goals seek work-related challenges (Porath & Bateman, 2006), and are enthusiastic about the initiatives they undertake (Janssen & Van Yperen, 2004). They will actively search for possibilities to use and develop a variety of skills, and this will have a positive impact on work engagement. In contrast, employees who lack learning goals will spend their mental and energetic resources on ongoing work activities and will not search for ways to enrich their work or make it more exciting. Moreover, those low in LGO will not persist when confronted with hindrances or challenge job demands.

Furthermore, when employees hold performance avoidance goals, they may proactively manage their resources but the potential of these resources will not be used to go the extra mile. Employees high in PAGO primarily aim to circumvent displays of incompetence that could lead to negative judgments or embarrassment (VandeWalle, 1997). They avoid taking new initiatives at work in order to prevent the risk of failure (Belschak & Den Hartog, 2010). This means that for employees high in PAGO, the affective, cognitive, and energetic resources mobilized through various activities will not lead to more work engagement. In contrast, employees low in PAGO are not afraid of making mistakes and will be able to allocate all the new resources to their work tasks. Therefore, they are more likely to be dedicated to work and get immersed in their work activities (i.e. be work engaged) when they have proactively managed their vitality in or outside the work domain.

Hypothesis 3. The positive relationship between proactive vitality management and work engagement is moderated by goal orientation. More specifically, this relationship is (a) stronger when employees have a learning goal orientation, and (b) weaker when employees have a performance avoidance goal orientation.

Work engagement and creativity. Work engagement is positively related to creativity, because engaged employees are persistent and show cognitive flexibility (Eldor & Harpaz, 2016; Koch et al., 2015). This flexibility and persistence will particularly lead

to creative performance when combined with a desire to develop mastery at work through learning, because creativity is often the result of a long trial-and-error process. Employees high in LGO question the status quo (Porath & Bateman, 2006), and will be most likely to be creative when they persist in the face of difficulties (i.e. high work engagement; Schaufeli & Bakker, 2010). People who are engaged in their work find their job tasks interesting and challenging which combined with LGO is channeled towards more creativity. When engagement is combined with a low LGO, employees will have the motivation but not the right mindset to work on their innovative ideas. Low LGO individuals will not use their engagement to search for performance feedback, and therefore, work engagement will not unleash creative performance.

When employees want to avoid failure and negative social comparison evaluations, their work engagement is also not likely to influence creativity. The reason for this is that using engagement in the development of creative solutions to work problems does not guarantee success and is associated with the risk of setbacks, disappointments, and failures. Accordingly, "avoidance-oriented individuals may shy away from creative challenges" (Hirst, Van Knippenberg & Zhou, 2009; p. 284). Thus, even when they have high levels of engagement, a performance avoidance goal orientation will prevent engagement from influencing creativity. When individuals hold a PAGO, creativity becomes a risk that they are unwilling to take.

Hypothesis 4. The positive relationship between work engagement and creativity is moderated by goal orientation. More specifically, this relationship is (a) stronger when employees have a learning goal orientation, and (b) weaker when employees have a performance avoidance goal orientation.

METHOD

Procedure and Participants

Student research assistants recruited the participants of the study via network sampling (Demerouti & Rispens, 2014), which involved contacting companies from their own professional networks, using social media to promote the research, and making use of snowball sampling to find additional participants. This technique has the potential

to lead to a heterogeneous sample and sufficient variance in the study variables. Participants were employees who worked in various Dutch organizations. Out of 118 employees who were contacted, 107 employees (46 men and 61 women) completed at least three out of five weekly surveys and formed the final sample for the analyses (response rate = 91%). Respondents completed an average of 4.68 (SD = .60) of the five weekly surveys. The mean age of the participants was 39.49 years (SD = 12.53). On average, they worked 33.92 (SD = 7.54) hours per week and they had a mean tenure of 8.67 years (SD = 9.36). The majority of the respondents had completed higher-level (university) education (39.3%), followed by applied education (29.9%), and middle-level applied education (15%). They worked in occupational sectors including healthcare (39.3%), government (10.3%), commerce (7.5%), administration (7.5%), industry (6.5%), construction (5.6%), or other sectors such as finance, education or communication.

Upon agreement to participate, employees received an e-mail invitation with a link to the online survey and information introducing the study and ensuring confidentiality and voluntary participation. To increase the response rate, they were also told that upon completion of the questionnaires, they enrolled in a raffle for 25 gift vouchers of ten Euro's each. Furthermore, they were informed that once they would participate, they could receive a summary of the results via e-mail after the completion of the research. The survey was sent on Friday morning of every week. At week 1, respondents completed a survey containing demographics and the trait-level (i.e., goal orientation) scales as well as a survey containing all week-level scales (i.e., proactive vitality management, work engagement, and creativity). At weeks 2-5, the survey comprised only the week-level scales. Before presenting the week-level items, we asked respondents to think of their previous workweek overall while filling in the questionnaires.

Trait-level Survey

Goal orientation was measured with VandeWalle's (1997) questionnaire on work-domain goal orientation. A six-item subscale was used to measure learning goal orientation (e.g., "I am willing to select a challenging work assignment that I can learn a lot from"; alpha = .76), and a 4-item subscale was used to measure performance avoidance goal orientation (e.g., "I prefer to avoid situations at work where I might perform poorly"; alpha = .79). Items were rated on a scale ranging from 1 = totally disagree to 6 = totally agree.

Weekly Survey

All the items in the weekly survey were taken from validated scales, and were adjusted to the week-level. Participants could respond to the items on a scale ranging from 1 = totally disagree to 7 = totally agree.

Week-level proactive vitality management was measured with the eight-item instrument developed by [masked, in press]. Research on the psychometric properties of this scale has provided ample evidence for its reliability and validity. Two survey studies (total $N = 813$) and two diary studies (total $N = 379$) among employees from various occupational sectors showed that proactive vitality management can be reliably measured (mean Cronbach's alpha = .88) with eight items that load on one overall factor. Providing evidence for convergent validity, daily proactive vitality management was moderately strong and positively related to Fritz, Lam and Spreitzer's (2011) measure of (work-related) strategies and micro-breaks. Moreover, proactive vitality management was positively related to relevant personal characteristics (e.g., proactive personality and self-insight) and showed moderately strong positive relationships with job crafting and relaxation. Furthermore, proactive vitality management was positively related to cognitive liveliness and (creative) work performance (criterion validity). Sample items are: "Last week, I tried to inspire myself", "Last week, I motivated myself", and "Last week, I made sure I felt energetic during my work". In the present study, Cronbach's alpha ranged from .76 to .88 over the five weeks.

Week-level work engagement was measured with the week-level version (Bakker & Bal, 2010) of the nine-item Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006). Sample items are: "Last week, at work, I felt bursting with energy", and "Last week, I was enthusiastic about my work". Cronbach's alpha ranged from .91 to .94 over the five weeks.

Week-level creativity was measured with Tierney, Farmer, and Graen's (1999) nine-item employee creativity scale. Sample items are: "Last week, I demonstrated originality in my work", and "Last week, I identified opportunities for new products/processes". Cronbach's alpha ranged from .93 to .95 over the five weeks.

Analytical approach and preliminary analyses

Data comprised a multilevel structure (i.e., week-level measurements nested within employees). Therefore, we conducted multilevel analyses with MLwiN in order to test our hypotheses. One series of analyses was conducted with week-level work engagement as the dependent variable, and one series with week-level creativity as dependent variable. Prior to the analyses, we calculated the intra-class correlations for our two dependent variables, which shows the amount of variance attributed to between-level (between persons) variation. This was 56% in week-level work engagement, and 57% in week-level creativity, suggesting that considerable within-level (within persons) variation in the dependent variables remained to be explained by week-level variations in the independent variables. Furthermore, we found that a two-level null model (i.e., a model with the intercept as the only predictor) fit the data better than a one-level null model for both dependent variables, which provides additional justification to the use of multilevel analyses.

We conducted multilevel confirmatory factor analyses (MLCFA) in Mplus (Muthén & Muthén, 1998-2011) to test the discriminant validity of proactive vitality management vis-à-vis work engagement. The analyses revealed that a two-factor model, in which all proactive vitality management items loaded on one latent factor, and all work engagement items loaded on a second latent factor, fit substantially better to the data compared to a one-factor model in which all items loaded on the same factor, $\Delta\chi^2(2) = 654.00$, $p < .001$. This means that the two concepts can clearly be empirically distinguished from each other.

Between-level predictors (i.e., goal orientation) were grand-mean centered and within-level (week-level) predictors were group-mean centered (Ohly, Sonnentag, Niessen & Zapf, 2010). To control for potential carry-over effects of one's prior levels of work engagement and creativity, both dependent variables were controlled for their levels of the previous week (i.e., week-level work engagement and week-level creativity were controlled for lagged work engagement and lagged creativity). Following previous practice (Oerlemans & Bakker, 2014), both lagged variables were grand-mean centered. The use of lagged variables rendered the data of one week missing, which resulted in the use of 378 observations for both analyses.

Each regression analysis was built on the basis of four nested models introducing successively the intercept (Null model), the lagged control variable and the predictor (Model 1), the two moderators (Model 2), and the two hypothesized interaction effects (Model 3; see Tables 2 and 3). Prior to the analyses, we tested whether the slope between the independent variables (e.g., proactive vitality management and work engagement) and the dependent variables (e.g., work engagement and creativity, respectively) varied across respondents. The slope variance was significant in both cases, justifying the introduction of between-level variables (i.e., goal orientation scales) so as to test cross-level interaction effects on the week-level dependent variables.

RESULTS

Descriptive Statistics

Means, standard deviations, and intercorrelations for all study variables are presented in Table 1. To calculate intercorrelations, week-level variables were aggregated over the five weeks.

TABLE 1

Means, standard deviations and inter-correlations for the study variables (N = 107 employees and N = 501 occasions).

	M	SD	1	2	3	4	5
Trait-level							
1. Learning goal orientation	4.51	.72	-				
2. Performance avoid goal orientation	5.05	.92	.25**	-			
Week-level							
3. Proactive vitality management	5.24	.54	.27**	.09	-	.44**	.28**
4. Work engagement	5.00	.85	.23*	.21*	.55**	-	.47**
5. Creativity	4.37	1.02	.26**	.10	.49**	.53**	-

Note. Correlations below the diagonal refer to the between-level of analysis, while correlations above the diagonal refer to the within-level of analysis; means and standard deviations refer to the between-level of analysis.
*$p < .05$, **$p < .01$

Testing Hypotheses

Proactive vitality management was hypothesized to relate positively to work engagement (Hypothesis 1), and to creativity via work engagement (Hypothesis 2). Analyses revealed (see Model 1; Table 2) that week-level proactive vitality management positively related to week-level work engagement, also after controlling for lagged work engagement (estimate = .455, SE = .052, $p < .01$), providing support for Hypothesis 1. Furthermore, we used the Monte Carlo method (Selig & Preacher, 2008) to assess the indirect relationship of week-level proactive vitality management with week-level creativity via week-level work engagement. This was found to be positive ($CI_L = .149$, $CI_U = .302$), supporting Hypothesis 2. These findings and the findings below are also summarized in overall Figure 1.

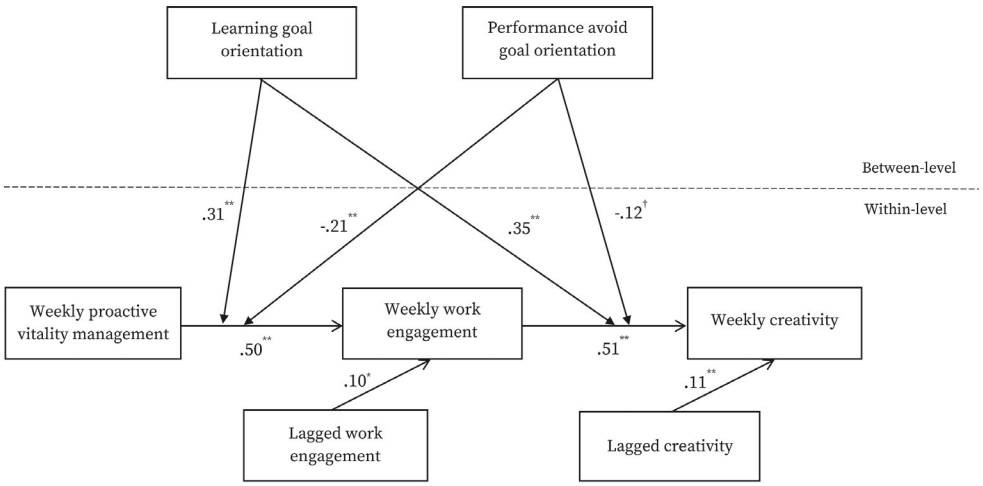

FIGURE 1

*The model of proactive vitality management and creativity: Summary of multilevel regression coefficients based on Table 2 (Model 3) and Table 3 (Model 3). ** p < .01, * p < .05, † p = .06*

TABLE 2

Multilevel estimates for models with week-level work engagement as dependent variable.

Model		M1			M2			M3	
Variables	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	5.027	.078	64.449**	5.025	.076	66.118**	5.018	.074	67.811**
Work engagement previous week	.090	.044	2.046*	.088	.044	2.000*	.104	.044	2.363*
Week-level proactive vitality management (PVM)	.455	.052	8.750**	.451	.052	8.673**	.496	.053	9.359**
Learning goal orientation				.162	.111	1.460	.198	.110	1.800
Performance avoidance goal orientation				.137	.086	1.593	.136	.084	1.619
PVM × learning							.313	.089	3.517**
PVM × avoidance							-.211	.059	-3.577**
−2 × log			872.421			866.329			849.464
Δ −2 × log			392.539**			6.092*			16.865**
df						2			2
						R^2			R^2
Within-person variance	.350	.030	28%	.350	.030	28%	.335	.029	31%
Between-person variance	.543	.089	11%	.507	.084	17%	.485	.081	21%

Notes. $N = 107$ employees and $N = 378$ occasions. The null model is not presented due to space constraints; $^{*}p < .05$, $^{**}p < .01$

TABLE 3

Multilevel estimates for models with week-level creativity as dependent variable.

Model		M1			M2			M3	
Variables	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	4.407	.090	48.967**	4.406	.086	51.232**	4.407	.091	48.429**
Creativity previous week	.143	.041	3.488**	.144	.041	3.512**	.110	.039	2.820*
Week-level work engagement	.527	.059	8.932**	.531	.059	9.000**	.511	.057	8.965**
Learning goal orientation				.362	.127	2.850*	.368	.133	2.767*
Performance avoidance goal orientation				.055	.097	.567	.058	.102	.569
Work engagement × learning							.346	.079	4.380**
Work engagement × avoidance							-.119	.061	-1.950
−2 × log			948.184			938.617			919.891
Δ −2 × log			477.627**			9.567*			18.726**
df			2			2			2
			R^2			R^2			R^2
Within-person variance	.412	.035	38%	.413	.035	39%	.371	.032	44%
Between-person variance	.746	.119	16%	.669	.109	25%	.760	.119	15%

Notes. $N = 107$ employees and $N = 378$ occasions. The null model is not presented due to space constraints; $^{*}p < .05$, $^{**}p < .01$

According to Hypothesis 3, the link between proactive vitality management and work engagement should be stronger for employees with a high learning goal orientation and weaker for employees with a high performance avoidance goal orientation. The interaction term of week-level proactive vitality management and learning goal orientation was positively related to week-level work engagement (estimate = .313, SE = .089, $p < .01$), while the interaction term of week-level proactive vitality management and performance avoidance goal orientation was negatively related to week-level work engagement (estimate = -.211, SE = .059, $p < .01$; see Table 2). Simple slope tests revealed that the positive link between week-level proactive vitality management and week-level work engagement was stronger when learning goal orientation was 1 SD higher than the mean (estimate = .718, SE = .082, $p < .01$) than when learning goal orientation was 1 SD lower than the mean (estimate = .274, SE = .083, $p < .01$; see Figure 2), providing support for Hypothesis 3a. Furthermore, the positive link between week-level proactive vitality management and week-level work engagement was weaker when performance avoidance goal orientation was 1 SD higher than the mean (estimate = .302, SE = .063, $p < .01$) than when performance avoid goal orientation was 1 SD lower than the mean (estimate = .690, SE = .087, $p < .01$; see Figure 3), providing support for Hypothesis 3b.

According to Hypothesis 4, the link between work engagement and creativity should be stronger for high learning goal orientation and weaker for high performance avoidance goal orientation. The interaction term of week-level work engagement and learning goal orientation was positively related to week-level creativity (estimate = .346, SE = .079, $p < .01$). Simple slope tests revealed that the positive link between week-level work engagement and week-level creativity was stronger when learning goal orientation was 1 SD higher than the mean (estimate = .753, SE = .079, $p < .01$) than when learning goal orientation was 1 SD lower than the mean (estimate = .269, SE = .079, $p < .01$; see Figure 4), supporting Hypothesis 4a. The interaction term of week-level work engagement and performance avoidance goal orientation was negatively related to week-level creativity (estimate = -.119, SE = .061, $p = .06$). However, although the effect was in the predicted direction, it was not significant. This effectively rejects Hypothesis 4b. We note that we

reran all analyses controlling for age, gender, and tenure but none of these analyses altered any of the results (see Figure 1 for a summary).[2,3]

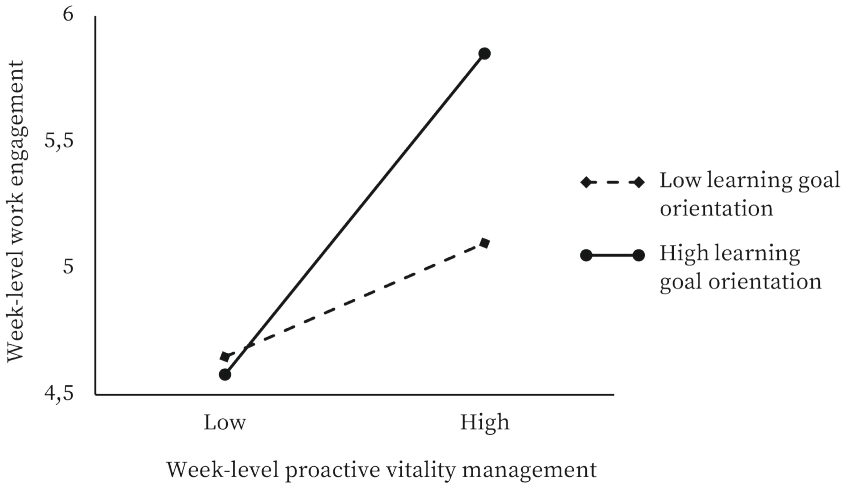

FIGURE 2

The link between week-level proactive vitality management and week-level work engagement moderated by learning goal orientation.

2 We have tested the direct effect of proactive vitality management on creativity and this was only significant when proactive vitality management was the only predictor in the regression equation (estimate = .30, S.E. = .06, $p < .05$). When proactive vitality management was added as a predictor in the regression analysis of Table 3, the effect became non-significant (estimate = .07, S.E. = .06, $p = .25$). We note that our Monte Carlo analytic approach is incompatible with the notion of full vs. partial mediation. Therefore, based on existing methodological literature (Rucker, Preacher, Tormala, & Petty, 2011), we stay away from discussions around partial vs. full mediation and we simply refer to the effect of proactive vitality management on creativity as an indirect effect.

3 We have conducted additional analyses with work engagement being the predictor of proactive vitality management and the effect was significant (estimate = .49, std. error = .06, $p < .01$). However, findings were non-significant for the two interaction effects on proactive vitality management; the interaction between work engagement and learning goal orientation (estimate = .07, std. error = .08, $p = .38$), and the interaction between work engagement and performance avoid goal orientation (estimate = -.11, std. error = .06, $p = .07$).

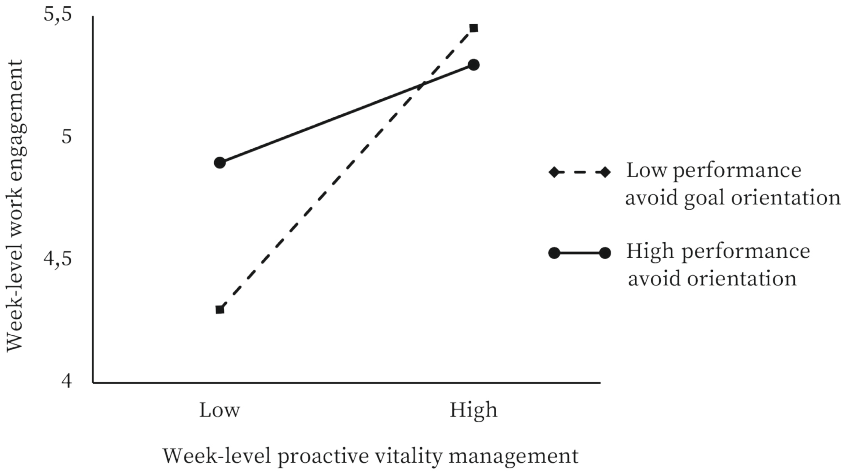

FIGURE 3

The link between week-level proactive vitality management and week-level work engagement moderated by performance avoidance goal orientation.

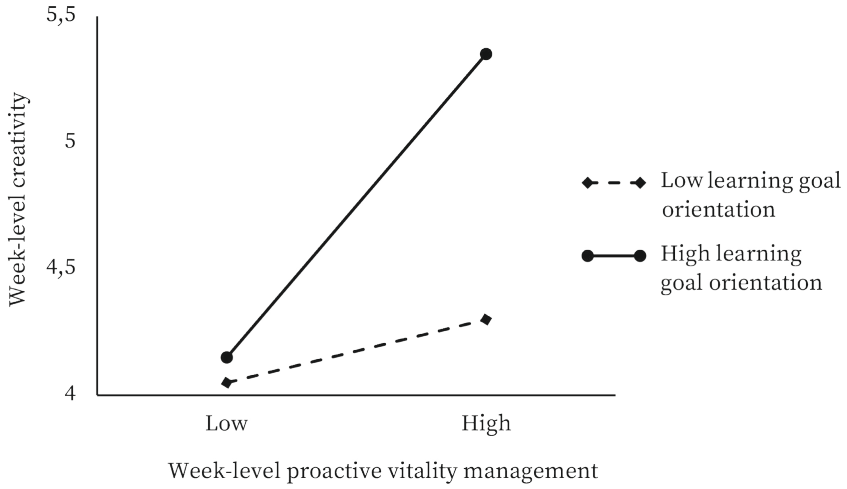

FIGURE 4

The link between week-level work engagement and week-level creativity moderated by learning goal orientation.

DISCUSSION

In this paper, we argued that employees might proactively manage their own vitality to reach creativity. We followed a heterogeneous sample of employees during five weeks, and asked them to report their weekly frequency of proactive vitality management, as well as their weekly levels of work engagement and creativity. The results showed that participants experienced more work engagement and indirectly improved their creative performance in the weeks they proactively managed their own positive affect, energy, and concentration (i.e., vitality). Employees high in learning goal orientation profited most from this process, whereas employees high in performance avoidance goal orientation profited least. In what follows, we will discuss the most important contributions of this study.

Contributions to Theory

A first important contribution of the present study is that it shows that proactively managing vitality is an important predictor of creativity, through work engagement – on a weekly basis. When employees proactively choose to engage in activities during or after work that offer them energy, positive affect, or inspiration, they have more resources available to dedicate to their work. These resources fuel the work engagement that can then be used to improve creative performance. Our findings expand the proactivity and work engagement literatures by showing the relevance of a proximal predictor of creativity – proactive vitality management. Whereas most scholars have focused on more distal environmental and personality factors as predictors of creativity (Anderson et al., 2014; Feist, 1998; Ma, 2009), we show that employees can take personal initiatives to be creative. Research in which the proactive vitality management construct was validated (masked, in press) has suggested that people may engage in a range of activities in order to increase their resources, including having lunch outside the office for a change of scenery, engaging in sports activities before work to get energized, and listening to preferential music genres to become relaxed or focused. Although earlier research has shown that energy, positive affect, and focus relate positively to creativity (Baas et al., 2008; Hennessey & Amabile, 2010; Ning et al., 2015), most scholars have overlooked the possibility that employees may proactively mobilize such volatile resources to be creative. Whereas most previous proactivity research has investigated self-initiated, future oriented, and change-oriented behavior

(Parker et al., 2010) aimed at changing the environment, proactive vitality management is a new form of proactive behavior that is aimed at changing the self (see also, Grant & Ashford, 2008). Proactive vitality management is directed to creating an internal state that allows one to focus, think, and feel inspired. This bottom-up approach to creativity could be an important addition to more common top-down approaches.

It should be noted that the present study focused specifically on the predictive validity of proactive vitality management for a specific type of performance: creativity. It is highly likely that proactive vitality management will also be able to predict other performance indicators, including in-role performance and organizational citizenship behavior (OCB). High-level in-role performance demands considerable effort, engagement, and motivation (Bakker et al., 2014), which could be proactively mobilized by employees. In addition, employees are most likely to show extra-role behaviors (OCB) when they have a surplus of energetic and motivational resources. Future research should investigate the predictive validity of proactive vitality management for these other performance indicators.

Second, we used a repeated measures design to test whether proactive behavior aimed at managing vitality relates to creativity, through work engagement. Thus, we complement previous survey studies (see, for a review, Shalley et al., 2004) with a five-week follow-up study and show that employees may be able to influence their own creativity, on a weekly basis. In the weeks employees proactively manage their vitality, they become sufficiently engaged in their work to be creative. However, in the weeks they do not look for inspiration or try to experience positive emotions, their levels of work engagement are relatively low, and do not offer the fuel needed to be creative at work.

At this point, we would like to discuss the possibility that work engagement may also predict proactive vitality management (i.e. reversed causation). Indeed, several scholars have argued and shown that positive affect – particularly high-activated positive affect (i.e. feelings of being inspired, energized and enthused) that is rather similar to work engagement – is positively related to proactive behavior (e.g., Bindl, Parker, Totterdell, & Hagger-Johnson, 2012; Den Hartog & Belschak, 2007). Bindl and colleagues argue that high-activated positive affect prompts forward-thinking, change-oriented behavior, and can be considered the fuel (the energy) of the self-starter. Using Job Demands-Resources theory, Bakker and Demerouti (2017) have argued that employees who are engaged in

their work are motivated to stay engaged, and therefore use proactive behaviors (e.g., job crafting) to optimize their own work environment. This means that proactive vitality management is most likely a predictor as well as an outcome of work engagement. In the present study, we treated proactive vitality management as the predictor of work engagement (and indirectly of creativity), because our theoretical arguments clearly suggested that proactive vitality management logically interacts with learning and avoid performance goal orientation in predicting work engagement. Future research may want to test the complete sequence of proactive vitality management predicting work engagement, which, in turn, may predict proactive vitality management. Previous recovery research has clearly indicated that engaged workers know when to recharge, in order to stay engaged (Sonnentag et al., 2017).

A third theoretical contribution of the current study is that it shows how goal orientation, as a motivational moderator variable, influences the creativity process. The findings were generally consistent with our hypotheses. When employees have a learning goal orientation, they profit most from their proactive behavior, because this orientation helps them to seek work-related challenges (Porath & Bateman, 2006). They use their inspiration and energy to actively search for possibilities to use and develop a variety of skills, and this will have a positive impact on work engagement and creative performance. In contrast, when employees hold a performance avoidance goal orientation, proactively managing vitality does not help to be more engaged and creative. The reason for this is presumably that individuals who avoid making mistakes prefer not to be enthusiastic about new initiatives or to take the risk of failures by suggesting new solutions for existing problems. Consistent with this interpretation, Zhou (2003) demonstrated that employees were more creative when interacting with creative colleagues, but only when their supervisors did not engage in close monitoring. Moreover, the findings revealed that creativity only crossed over between co-workers when supervisors provided developmental feedback. Thus, in order to be creative, employees need to be in a learning mode, and should not be closely monitored or judged.

It should be noted that proactive vitality management has some similarities, but is not the same as recovery. Whereas recovery from work refers to reducing or eliminating job stress to replenish depleted resources (Sonnentag & Fritz, 2015), proactive vitality management is intentional and anticipatory behavior and may also occur when people

feel already rested. Second, most recovery activities are carried out during off-job time (i.e., in the evening or weekend, during vacation), while proactive vitality management can be done at any time, any place (e.g., during lunchtime at work, early in the morning at home, in the night while going out). Third, proactive vitality management aims at finding inspiration through small positive interventions in one's daily work or private life. For example, people can try to find new inspiration through reading books (Bal, Butterman, & Bakker, 2011), using social media, and watching a TED-talk on You-tube during work, or by indulging in artwork at a fair – and they do not need to experience job stress to motivate them to engage in such activities. Recovery activities are aimed at detaching from work to reduce physical and psychological strain symptoms (Sonnentag & Fritz, 2015).

The present study investigated the moderating role of goal orientation, but did not examine the role of the work environment. It should be noted that the participants in our study all had a reasonable work schedule in that they worked on average less than 40 hours a week. This may imply a built-in sort of slack resources in participants' work life – they could afford time. If individuals have 60-hour workweeks, they may have less time for proactive vitality management, although such behaviors may be even more important for work engagement and creativity during long working hours. Long workweeks may also have important implications for when and where employees should proactively manage their vitality. Future research among other samples and in other cultural contexts may test the impact of context on proactive vitality management.

Practical Implications

Our findings have practical implications for individual employees and for managers. A first implication is that we should make employees aware of the importance of individual proactive vitality management. Organizations may want to offer professional training and smartphone applications through which employees learn what the best activities are for them to improve their vitality. In order to be creative, employees need to be engaged. Employees can proactively optimize their own levels of work engagement by engaging in a range of activities during work and during off-job time. For example, while at work, they can decide to have lunch with colleagues outside the office in order to get a fresh view on existing work problems. They may also take short micro breaks during the workday in order to increase their levels of energy (Trougakos & Hideg, 2009).

During off-job time, they may actively engage in sports activities or read a book with the intention to change their mood state. Moreover, our construct validity research (masked, in press) indicates that employees may engage in a range of activities that raise their levels of energy, positive affect, and concentration.

Second, managers may facilitate the process of proactive vitality management, by creating a work-family culture that prevents overwork and offers opportunities to choose for flexible working times (Thompson, Beauvais, & Lyness, 1999). Such a culture would also offer employees more autonomy during work and leisure time for activities that foster resources. Third, the findings indicate that learning goal orientation is crucial for the relationship between proactive vitality management and work engagement and creativity. Organizations that are highly dependent on creative performance may want to select employees on the basis of their goal orientations, or could offer their employees trainings in which they learn to focus on learning from mistakes (Noordzij, van Hooft, van Mierlo, Dam, & Born, 2013).

Strengths and Limitations

The present study has some limitations that should be acknowledged. First, we used one source of information, which may raise concerns regarding the validity of the findings. However, we combined the survey method with repeated measurements using a weekly questionnaire, and created a theoretically valid cross-level interaction model. Specifically, we integrated two different methods and analyzed relationships of proactive vitality management with work engagement and creative performance after controlling for previous (week) levels of work engagement and creative performance – alleviating problems of common method bias. Although we do think that future research may profit from using objective outcomes of the creativity process, we are confident that we used a robust test of our hypotheses. It seems highly unlikely that our participants would have been able to produce exactly the theoretically predicted interaction patterns if they would have been inclined to please the researchers and would have tried to produce consistent answers. Thus, we believe that demand characteristics are not a major threat to the validity of our findings. A second possible limitation is that students were asked to collect data, which resulted in a convenience sample. This means that our sample may not be representative of the working population. However, Demerouti and Rispens (2014) have argued that student-recruited samples may actually enhance external validity, because

this approach facilitates labor-intensive research designs, and results in heterogeneous samples at relatively low costs. Moreover, since we analyzed how within-person effects are different for groups scoring low versus high on goal orientations, we are less concerned about representative mean scores on the study variables.

A third limitation of our study is the low reliability of the subscale intended to measure performance prove goal orientation. The low internal consistency did not allow us to investigate in a robust fashion how this goal orientation dimension would interact with proactive vitality management. Note, however, that the performance avoidance goal orientation dimension is arguably most different from learning goal orientation, and offered perhaps the best contrasting analysis. Indeed, our findings were consistent with our theoretical analysis. Nevertheless, it is interesting and relevant to test how performance-prove goal orientation interacts with proactive vitality management in the prediction of work engagement and creativity. Finally, we used self-reports of creativity, which is suboptimal, because participants may give socially desirable responses and indicate that they are creative. However, we analyzed *changes* in creativity, and focused on deviations from participants' "baseline". The fact that we analyzed how changes in self-reported creativity could be predicted by changes in work engagement and proactive vitality management means that social desirability cannot explain our findings. In addition, previous research has shown that self-rated creativity is positively related to biographical information about specific creative behaviors (e.g., designing gardens, writing stories, building websites, composing music; Batey & Furnham, 2008), and to expert-ratings of creativity (Kaufman, Beghetto, & Watson, 2016).

Conclusion

This study shows that employees can manage their own volatile resources, in the form of increasing positive affect, inspiration, and energy. In the weeks employees proactively managed their vitality, their work engagement was higher, as well as their creative performance. Particularly employees high in learning goal orientation seem to profit most from this process, whereas employees high in performance avoidance goal orientation seem to profit least. These findings underscore the importance of employee proactive initiatives. While employers are responsible for healthy working environments, employees are also responsible for their own vitality, and may mobilize their vitality proactively in order to stay engaged and be creative.

5

CREATING A CREATIVE STATE OF MIND: PROMOTING CREATIVITY THROUGH PROACTIVE VITALITY MANAGEMENT AND MINDFULNESS

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ABSTRACT

Most research on employee creativity has been focused on relatively distal antecedents, such as personality or job characteristics, which has resulted in top-down organizational approaches to promote employee creativity. However, such approaches overlook the self-regulating potential of employees and may not explain intra-individual fluctuations in creativity. In the present research, we build on proactive motivation theory to examine how employees may promote their own creativity on a daily basis through the use of proactive vitality management (PVM). To better understand the PVM – creativity link, we zoom in on this process by examining the role of mindfulness as an underlying mechanism. In two daily diary studies, employees from the US (N = 133 persons, n = 521 data points) and the creative industry in Germany (N = 62 persons, n = 232 data points) reported on their use of PVM and states of mindfulness for five consecutive workdays. Additionally, participants completed a daily creativity test (brainstorming task) in Study 1, while supervisors rated participants' daily creative work performance in Study 2. In both studies, multilevel analyses showed that daily PVM was positively related to creative performance through daily mindfulness, supporting our hypotheses. These replicated findings suggest that individuals may bring themselves in a cognitive, creative state of mind on a daily basis, emphasizing the importance of proactive behavior in the creative process.

INTRODUCTION

Creativity is generally seen as a valuable phenomenon to promote innovation and growth in all aspects of life – artistically, personally, culturally, scientifically, and professionally. The constant desire and need to develop creative (i.e., new and useful) ideas regarding work procedures, services, and products can also be seen in today's competitive business environment (Harari et al., 2016; Unsworth & Parker, 2003). There is some debate on the origin of creativity; is there such a thing as a natural 'creative genius' or, in contrast, could anyone possess a capacity to perform creatively to some extent? Scholars have been considering this matter for decades and have brought forth insights supporting both perspectives (Amabile, 1997). The present research is based on the idea that, although some people may generally perform more creatively than others, there is creative potential in all individuals (Amabile, 1997; Nijstad et al., 2010). Research has shown that organizations can deploy tactics to foster employee creativity, for example by providing a resourceful environment in which creativity is valued, encouraged, and facilitated (Hunter et al., 2007; Shalley & Gilson, 2004). Yet individuals do not perform equally creative at all times, and such relatively distal factors are less likely to predict intra-individual variations in creative performance. Moreover, researchers have theorized and shown the importance of individuals' self-regulatory and proactive behaviors in the creative process (Bakker et al., 2020; De Stobbeleir et al., 2011; Op den Kamp et al., 2018, 2020). Indeed, although top-down approaches can be effective, they implicitly identify individuals as "relatively reactive agents in the creative process who need to be motivated and led by others" (De Stobbeleir et al., 2011, p. 824). In reality, people often show self-initiated and anticipatory action aimed at changing either the situation or oneself (Unsworth & Parker, 2003), and it is suggested that individuals may be proactive agents in their own creative process too (De Stobbeleir et al., 2011; Grant & Parker, 2009; Op den Kamp et al., 2020).

Research indicates that physical and mental energy are essential to reach a state that is conducive to creativity (e.g., Binnewies & Wörnlein, 2011; Chen & Sengupta, 2014; De Dreu et al., 2012; Fredrickson, 2001; Kark & Carmeli, 2009; Op den Kamp et al., 2020). As proactive vitality management involves intentionally and proactively managing our own physical and mental energy to promote optimal functioning (Op den Kamp et al., 2018), individuals may use it deliberately to bring themselves in such a state

and, at that moment, elevate the quality of their own creative process. Proactive vitality management has theoretically been positioned as an overarching behavioral construct encompassing the affective, cognitive, and physical components of vitality. Accordingly, using proactive vitality management may trigger multiple, intertwined processes that may subsequently promote creativity (cf. Lavrusheva, 2020; Op den Kamp et al., 2018; Ryan & Deci, 2008; Ryan & Frederick, 1997). Research has shown, for example, that work engagement may play a role in the mechanism underlying the link between proactive vitality management and creativity, primarily addressing the affective aspect of the process (Bakker et al., 2020). Based on the large body of literature on the role of (un)conscious processing in the creative process, we aim to dive deeper into the cognitive aspect of proactive vitality management and examine how it may translate into elevated creative performance on a daily basis. To this end, we focus on daily states of mindfulness as a potential underlying mechanism that may contribute to a better understanding of the proactive vitality management-creativity link.

As a mindful state is characterized by having a wide attentional breadth combined with a present-moment focus, it theoretically makes for an ideal cognitive state to elicit creativity (Dane, 2011). Indeed, previous studies have linked mindfulness to creativity (Lebuda et al., 2016), although inconsistent findings have been reported, resulting in a call for more studies on the value of mindful attention and awareness for creativity (Baas et al., 2014). While mindfulness – and its link to creativity – has often been examined at the person-level (i.e., as a trait-like variable), mindfulness is inherently concerned with varying levels of awareness and attention to ongoing events and experiences (Brown & Ryan, 2003). To better reflect this volatile process, we adopt a daily diary approach to investigate mindfulness as a *state* that fluctuates within persons, from situation to situation. This methodology provides more detailed and ecologically valid insights (cf. Hülsheger et al., 2013; Tuckey et al., 2018). Finally, our research contributes to the literature by addressing the call for studies on how individuals may *attain* a mindful state (cf. Dane, 2011; Hülsheger et al., 2018). While many scholars have focused on the mostly beneficial consequences of mindfulness, we propose that individuals may use proactive vitality management on a daily basis with the aim of achieving a state of mindfulness and, subsequently, a boost in their creative performance.

THEORETICAL BACKGROUND

Research has shown that organizations can foster employee creativity by providing an environment that is fruitful for creativity. In such an environment, for example, attention may be given to personnel selection as well as job design (e.g., Oldham & Cummings, 1996; Unsworth et al., 2005), leadership styles (e.g., Hughes et al., 2018), organizational values and climate (e.g., Anderson et al., 2014; Goncalo & Staw, 2006), and team work and composition (e.g., Goncalo & Duguid, 2012; Hülsheger et al., 2009; Miron-Spektor et al., 2011; Paulus & Yang, 2000; Sung & Choi, 2012). Traditionally, such studies have primarily adopted a top-down perspective in which relatively distal predictors of creativity (i.e., factors that are relatively far away from the creative process) are examined as antecedents of creative performance. However, such factors are less likely to explain daily, intra-individual variations in creative performance. Indeed, while selecting employees on certain personality characteristics and providing favorable work conditions may certainly offer a fruitful basis for creativity to arise, it may not always be sufficient to elicit actual creativity. More specifically, even individuals who, for example, are open to new experiences, have a considerable amount of autonomy in their work, and who are surrounded by helpful and inspiring colleagues, do not achieve the same level of creativity every day. In line with this, we direct attention to the proposition that creativity research can benefit from an additional way to unleash creativity, namely the self-regulating potential of employees who proactively stimulate their own creativity on a daily basis (Op den Kamp et al., 2020; De Stobbeleir et al., 2011). In support of this perspective, research has shown that proactively seeking feedback helps individuals to perform more creatively (De Stobbeleir et al., 2011; Harrison & Dossinger, 2017). De Stobbeleir et al., (2011) hinted towards the potential role of other self-regulatory, goal-driven, and proactive behaviors in the creative process. In line with this, more recent studies have linked the use of proactive vitality management to creative performance (Bakker et al., 2020; Op den Kamp et al., 2018, 2020). In the current research, we dive deeper into the proactive vitality management process and examine how it may be used by individuals to create a favorable, cognitive mindset for creativity on a day-to-day basis.

Proactivity Literature

The idea that individuals are not necessarily reactive creatures has been widely adopted in the stress and coping literature. Traditionally, the coping literature focused on how individuals react to and deal with stressors and threats. However, the notion that coping may not only involve the reactions to stressful past events but may also be aimed at anticipated events in the future has gained traction among scholars (Aspinwall, 2005; Aspinwall & Taylor, 1997; Schwarzer, 2000). Similarly, literature on proactive behavior in organizational settings suggests that people may adopt a proactive approach to achieve a different future (Parker et al., 2010). This 'forward time perspective' is inherent to proactive motivation and behavior (Parker et al., 2010) and has also been emphasized in earlier research on proactive vitality management (Op den Kamp et al., 2018). Accordingly, working individuals may take an active role in how they approach their work by creating favorable situations and conditions (Crant, 2000). Such proactive behavior is inherently goal-directed – aimed at changing and improving the situation or oneself – and involves self-starting and future-focused action (Parker et al., 2006). These characteristics distinguish proactive constructs from conceptually related experiences and behaviors that are more reactive, top-down, or passive in nature (Crant, 2000). The literature has put forward multiple forms of proactive behavior, including but not limited to job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001), feedback-seeking (De Stobbeleir et al., 2011), voice (LePine & Van Dyne, 1998), and, focal to the current research, proactive vitality management (Op den Kamp et al., 2018).

Proactive vitality management. To achieve proactive goals, individuals can either change the self or the environment (i.e., locus of change; Parker et al., 2010). Proactive vitality management, in contrast to most proactive behaviors investigated in organizational settings, involves behavior aimed at changing aspects of the self – or more specifically, one's own physical and psychological state – to achieve optimal functioning (De Bloom et al., 2020; Op den Kamp et al., 2018). In other words, proactive vitality management involves intentional behavior consciously aimed to feel vital in order to perform well at work. As a goal-directed construct, proactive vitality management may thus be contrasted with behaviors that are, for example, performed as a health routine – e.g., exercising regularly – or as a reaction to fatigue, physiological needs, or even boredom – e.g., recovery, micro-breaks (Fritz et al., 2011; Op den Kamp et al., 2018; Sonnentag & Fritz, 2007). The perspective that individuals

may proactively promote their own functioning, such as their creative performance, is also consistent with self-regulation theory, which focuses on how individuals "guide their own goal-directed activities and performance by setting their own standards and monitoring their progress toward these standards" (De Stobbeleir et al., 2011, p. 812; Vohs & Baumeister, 2004). Indeed, in order to succeed in such an individual, goal-driven process, people need to use their self-regulatory skills to develop, implement and flexibly maintain planned behavior (Balkis & Duru, 2016; Wang et al., 2021; Zimmerman, 2000). Individuals may proactively employ a wide range of strategies to manage their vitality, of which the effectiveness and favorableness may vary between individuals and from moment to moment (Op den Kamp et al., 2018; Sonnentag & Fritz, 2007; Thayer et al., 1994). In this self-regulatory process, individuals must thus develop and implement strategies, and continuously monitor and evaluate what works best for them to achieve the desired results.

The various terminology used in the literature suggests that vitality is a rich and multifaceted concept, comprised of both physical and mental components that are interlinked with each other (Lavrusheva, 2020). Proactive vitality management has been conceptualized accordingly – as comprising physical, affective, and cognitive components – and may thus trigger multiple, intertwined processes that may subsequently promote creativity (cf. Lavrusheva, 2020; Op den Kamp et al., 2018; Ryan & Deci, 2008; Ryan & Frederick, 1997). In support of this theoretical framework, studies indicate that people need physical and mental energy for creativity to flourish, as physical and mental energy promote active involvement in creative behavior, and facilitate relevant steps in the creative process, such as directing attention towards relevant stimuli or thinking flexibly (e.g., Fredrickson, 2001; Kark & Carmeli, 2009; Nijstad et al., 2010). The link between proactive vitality management and creativity has been theorized and evidenced in earlier studies (Op den Kamp et al., 2018, 2020). In a closer investigation of the aforementioned underlying processes, Bakker et al. (2020) showed that the relationship between weekly proactive vitality management and creativity was mediated by work engagement (i.e., a positive, affective-motivational state of fulfillment; Schaufeli et al., 2006), thus addressing primarily the affective side of the process. However, an important part of the process may also be cognitive in nature. Indeed, it has been suggested that creativity is inherent to cognitive functioning and that non-cognitive factors may impact creativity through their influence on human

cognition (Nijstad et al., 2010; Ward et al., 1999). Therefore, the current research aims to focus on an alternative mechanism underlying the link between proactive vitality management and creativity by investigating the role of mindfulness.

A State of Mindfulness

Mindfulness can be defined as a state of "attention to and awareness of present events and experiences" (Brown et al., 2007, p. 212), and can be contrasted with states and feelings of carelessness, mind wandering, and being on automatic pilot (cf. Brown & Ryan, 2003). The body of literature on mindfulness is quite extensive and comprises various streams of research, including Eastern literature and philosophy, clinical psychological research, and, more recently, studies on the role of mindfulness within organizations (for a review, see Good et al., 2016). Overall, research suggests that 'being mindful' is positively related to favorable personal and professional outcomes. For example, a recent meta-analysis (Mesmer-Magnus et al., 2017) indicates that trait mindfulness relates positively to mental health, emotional regulation and confidence, and relates negatively to stress. Moreover, trait mindfulness relates positively to higher job satisfaction and performance, and negatively to burnout and work withdrawal. Various studies have also shown a positive association between trait mindfulness and mental and physical well-being (e.g., Brown & Ryan, 2003; Mesmer-Magnus et al., 2017). In addition, even though studies on *state* mindfulness are relatively scarce, Brown and Ryan (2003) found that people felt more positive during states of mindfulness within the day. Theoretically, mindfulness may help people to feel healthier – both physically and mentally –especially when practiced regularly. However, higher levels of physical and mental energy may also, subsequently, help people to be more mindful and direct their attention towards present events and experiences (cf. Hülsheger et al., 2018; Tuckey et al., 2018). In line with this, we argue that proactive vitality management may relate to the emergence of a mindful state in more ways than one.

Proactive vitality management involves an intentional, goal-driven process in which individuals manage valuable resources to achieve work goals by promoting favorable physical and mental states. On the days a person uses more proactive vitality management, they may have a higher capacity to be mindful. First of all, the cognitive resources generated or freed up by proactive vitality management – e.g., by taking the initiative to listen to relaxing music or by intentionally going for a walk to clear one's

head, or by proactively shutting of one's phone and e-mail for a while to be able to focus – may make it much easier to achieve a mindful state. This is because mindfulness requires attentional and cognitive resources that in practice are often scarce (Suelmann et al, 2018). In addition, proactive vitality management may provide the physical and mental energy needed to achieve and sustain a mindful state. Indeed, when individuals feel tired, they are less likely to attain mindfulness (Suelmann et al., 2018). Along similar lines of thought, Hülsheger and colleagues (2018) found that fatigue in the morning was negatively related to subsequent mindfulness states, a finding explained by the idea that people need physical and mental energy to be mindful and engage in effortful attention regulation. Finally, mindfulness may be defined as a state of consciousness in which attention is focused on present-moment phenomena occurring both externally and internally (Dane, 2011). When individuals are intentionally and actively involved in how they feel and how they can mobilize their physical and mental energy, they may automatically become more aware and attuned to such phenomena and cues (i.e., be mindful).

Hypothesis 1: Daily proactive vitality management is positively related to daily mindfulness.

Mindfulness in the Creative Process

A mindful state may promote creative performance on a daily basis due to several characteristics associated with mindfulness. The dual pathway model of creativity suggests that creativity is a function of cognitive flexibility and persistence (Nijstad et al., 2010). In line with this well-established theory, mindfulness has been shown to involve and promote cognitive and attentional flexibility, which enables deliberate shifting of one's focus of attention from one object or experience to another (Bishop et al., 2004; Glomb et al., 2011; Moore & Malinowski, 2009). Moreover, as mindfulness promotes alignment between goals and values, mindful states are associated with greater persistence (Glomb et al., 2011). Another important feature of mindfulness is its association with higher levels of attention and working memory capacity (e.g., Brown & Ryan, 2003; Glomb et al., 2011), which can contribute to the generation of new and original ideas. Working memory capacity promotes the creative process because it enables sustained attention focused on the task and prevents undesirable mind wandering (De Dreu et al., 2012). In contrast, *reduced* attention capacity impairs

creative problem solving and leads to narrowed or stereotypical thinking (cf. Elsbach & Hargadon, 2006; Gilbert & Hixon, 1991).

Being mindful may also help individuals to perform more creatively because it involves a wide attentional breadth and increased awareness of internal and external stimuli (e.g., Brown et al., 2007; Dane, 2011), which may serve as relevant cues or pieces of information that promote the creative process. Finally, mindfulness may facilitate de-automatization, a process involving the discontinuation of automatic mental operations (Kang et al., 2013). The present-moment orientation and higher level of awareness that are characteristic of a mindful state help to inhibit habitual and automatic evaluations and routines, and facilitate flexible and adaptive responses to events. Consequently, a mindful state may help one to overcome dominant, but uncreative, responses and open up possibilities for fresh, creative ones (cf. Bishop et al., 2004; Brown et al., 2007; Ostafin & Kassman, 2012).

Hypothesis 2: Daily mindfulness is positively related to daily creative performance.

In the present research, we emphasize the importance of a proactive approach of working individuals in shaping their own work experiences (cf. Grant & Parker, 2009). People may proactively manage their vitality when they feel the need to, for example in anticipation of challenging and busy workdays, or when pursuing creative endeavors (cf. Op den Kamp et al., 2020). We argue that the use of proactive vitality management will help individuals to reach a mindful state at work, which, in turn, relates to higher levels of creative performance. Thus, we propose that mindfulness functions as an explanatory mechanism underlying the link between daily proactive vitality management and creative performance.

Hypothesis 3: On a daily basis, proactive vitality management is positively related to creative performance through a state of mindfulness.

STUDY 1

In Study 1, we test our hypotheses among working individuals using a quantitative diary study spanning five workdays. This approach advances earlier studies on the link between

mindfulness and creativity, which were often cross-sectional in nature and/or employed student samples (for a meta-analysis, see Lebuda et al., 2016). Moreover, we use a general measure of daily creativity (i.e., a brainstorming task) that has often been used in previous studies to enable comparisons between our results and earlier findings. Finally, we extend previous research by focusing on an additional explanatory mechanism between proactive behaviors, such as proactive vitality management, and creative performance. Whereas Bakker et al. (2020) addressed the affective side of the process by advancing work engagement as a mediating mechanism, we aim to broaden our understanding of the proactive vitality management-creativity link by focusing on the cognitive aspect of the process. To support our investigation and the added value of the proposed cognitive mechanism, we included work engagement as a control variable in our analyses in Study 1.

METHOD

Procedure and Participants

Participants were recruited via Amazon Mechanical Turk (MTurk), and were paid for their participation through this platform. To ensure high-quality data, one criterion was that participants had to have a good 'reputation' on MTurk (i.e., above 95% approval ratings), which represents the quality of past responses and data entries in the system (cf. Peer et al., 2014). Several studies have shown that data collected through the MTurk platform are reliable and valid (e.g., Buhrmester et al., 2011; Peer et al., 2014). In the introductory message, participants were explained that the study aimed to gain insights on their daily work experiences and well-being through five daily surveys. Participants were instructed to fill out each questionnaire at the end of each working day, over the course of five consecutive workdays, requiring full-time work for participation. We asked participants to fill in their MTurk ID at the beginning of each daily survey to be able to match their responses across the five days. In total, 133 participants signed in to participate in our study, who eventually filled out 521 daily questionnaires in total (3.92, on average). Participants' mean age was 36.26 (SD = 10.57), and 52% of the sample was male. Of all participants, 65% held a college or university degree. Participants worked on average 41.64 hours per week (SD = 6.82) in a wide range of professions and sectors, including computer and electronics (18.6%), retail (14.7%), finance and insurance (10.9%), education (6.2%), entertainment and recreation (6.2%), healthcare (5.0%), government and public administration (4.7%), hotel and food services

(4.7%), or other sectors such as transportation, real estate, agriculture, and construction. The majority (74%) had a permanent employment contract (versus being a business owner or having a temporary contract), and 47% was employed in a position that involves the supervision of other employees.

Measures

Proactive vitality management. We used the eight-item proactive vitality management (PVM) scale developed by Op den Kamp et al. (2018). The instructions prepared participants to respond to statements about their proactive behavior towards their work. More specifically, participants were asked to report on the extent to which they had proactively managed their vitality to promote their work that day. Example items are: "Today, I made sure that I felt energetic during my work" and "Today, I motivated myself" (1 = *totally disagree,* 7 = *totally agree*). The average Cronbach's alpha over the five days was .96.

Mindfulness. The state version of the Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003) was used to measure mindfulness. The MAAS was created to assess mindfulness in the general population in samples that do not have experience with meditation or other mindfulness trainings. The five-item state version of the scale we used was validated by Brown and Ryan (2003), and suits the context and daily nature of the present study. An example item is: "Today, I found myself doing things without paying attention" (1 = *strongly disagree* to 7 = *strongly agree*; reversed scored). The average Cronbach's alpha over the five days was .95.

Creative performance. We used a brainstorming task that is conceptually based on the classical Alternate Uses Task (AUT; Guilford, 1967) to measure creative performance. Each day, participants were asked to come up with as many as possible alternative uses for a common object in two minutes. The object varied over the five days as follows: 'brick' on Monday, 'rope' on Tuesday, 'tin can' on Wednesday, 'knife' on Thursday, and 'sock' on Friday. For each object, we counted the number of ideas generated by the participants (i.e., *fluency*) and originality (the extent to which the ideas are unusual and novel) on a scale from 1 (*not original*) to 5 (*highly original*). To assess reliability of the originality ratings, a second coder rated the ideas generated on Monday (for 'brick') and Friday (for 'sock'). The interrater agreement was high, as indicated by Intraclass Correlation Coefficients of .90, $p < .001$ and .91, $p < .001$, respectively (Cicchetti, 1994).

Work engagement. We used the adapted version (Breevaart et al., 2012) of the nine-item Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006) to measure daily work engagement. Example items are "Today at work, I felt bursting with energy" (vigor), "Today, I was inspired by my job" (dedication) and "Today, I was immersed in my work" (absorption) (1 = *totally disagree*, 7 = *totally agree*). The average Cronbach's alpha over the five days was .96.

Strategy of Analysis

In our data, daily measurements were nested within persons. Therefore, we tested our hypotheses using multilevel analysis (HLM 7.01 software; Raudenbush et al., 2013). For each variable, we calculated the intra-class correlation (ICC) in order to obtain the percentage of variance that can be attributed to the within-person level. The resulting percentages (i.e., 65% for originality, 41% for fluency, 44% for mindfulness, and 31% for proactive vitality management) justified the use of a multilevel design. The outcome variables (i.e., fluency and originality) and the control variable 'time' remained uncentered, while proactive vitality management and mindfulness were centered at each individual's mean value (Ohly et al., 2010). To take into account the potential carry-over effects of one's prior level of mindfulness and creativity, we created lagged variables and performed a more stringent test by including these previous-day measures of the mediator (i.e., mindfulness) and outcomes (i.e., fluency and originality) in our analyses. In the multilevel analyses with either fluency or originality as the outcome, we first entered the control variables time and work engagement and the lagged variable of the respective outcome (Model 1). In the next step, we entered mindfulness (Model 2). In addition, we tested the indirect effect of proactive vitality management on creative performance through mindfulness using the Monte Carlo method for assessing multilevel mediation (Preacher & Selig, 2010). To ensure robustness of our findings, we followed the recommendation to also test our hypotheses without including any control variables (Becker et al., 2016). Without the control variables, the results supported our hypotheses in the same way – there were no differences in the direction or significance of the resulting relationships.[3]

3 The results without the control variables may be requested from the first author.

RESULTS AND DISCUSSION

Descriptive Statistics

Means, standard deviations, and correlations between the variables in Study 1 can be found in Table 1.

TABLE 1

Descriptive Statistics and Within-Person Correlations, Study 1

Variables	M	SD	1	2	3	4	5
1. PVM	4.83	1.49	-				
2. Mindfulness	5.27	1.44	.54**	-			
3. Fluency of ideas	5.30	2.85	-.04	-.13**	-		
4. Originality of ideas	4.27	1.53	.22**	.16**	.45**	-	
5. Work engagement (control)	4.10	1.53	.59**	.47**	-.11*	.11*	-

Note. $N = 133$ persons and $n = 521$ observations. PVM = proactive vitality management.
*$p < .05$, **$p < .01$

Multilevel Confirmatory Factor Analyses

Prior to testing our hypotheses, we conducted a multilevel confirmatory factor analysis (MCFA) using Mplus software (Muthén & Muthén, 1998 - 2012). The aim of the MCFA was to examine the measurement model and check for construct validity and independence of our variables, as well as to test thoroughly whether we could empirically distinguish the predictor in our model (proactive vitality management) from the mediator (mindfulness).

We modeled both the within- and between-person covariance matrices simultaneously and included latent factors for proactive vitality management (eight items) and mindfulness (five items). The outcome variables originality and fluency are both represented by singular indicators (i.e., scores) and were thus included in the model as observed variables. This multilevel model, in which all items of the variables in our model loaded on their respective latent factors, fit the data well (CFI = .96, TLI = .96, RMSEA = .04, SRMR within = .05, SRMR between = .06). In addition, all factor loadings were significant ($p < .001$). Finally, this model fit the data significantly better than an alternative model in which the items of proactive vitality management and mindfulness

loaded on one overall latent factor ($\Delta\chi^2 = 879.80$, $\Delta df = 6$, $p < .001$). Taken together, these results show that, besides theoretically, proactive vitality management can also empirically be distinguished from daily mindfulness.

Hypotheses Testing

Hypothesis 1 stated that daily proactive vitality management is positively related to daily mindfulness. Results of the multilevel analyses showed that participants indeed experienced more mindfulness on days that they proactively managed their vitality ($\gamma = .68$, SE = .07, $p < .01$). These findings provide support for hypothesis 1. We proceeded by testing hypothesis 2, which stated that daily mindfulness relates positively to daily creative performance. To correct for possible effects of the number of ideas (fluency) on the originality ratings of the ideas, we controlled for fluency in the analyses with originality as the outcome variable. Daily mindfulness was not significantly related to the number of ideas (fluency) on the daily brainstorming task ($\gamma = .07$, SE = .16, $p = .666$) but it was positively and significantly related to the originality of those ideas ($\gamma = .24$, SE = .08, $p < .01$; see Table 2). Moreover, the findings indicated that mindfulness explained additional variance in originality over and above the variance explained by work engagement. Overall, these findings provide partial support for hypothesis 2.

Finally, we used the Monte Carlo method (Preacher & Selig, 2010) to examine the hypothesized role of mindfulness as an explanatory mechanism underlying the link between proactive vitality management and creative performance. Significant indirect effects are indicated by confidence intervals that do not include zero. In line with the former findings, the results showed an insignificant indirect effect of proactive vitality management on fluency through mindfulness (-.07, CI 95% [-.20, .05]) and a positive indirect effect of proactive vitality management on originality through mindfulness (.11, CI 95% [.01, .19]). These findings provide partial support for hypothesis 3. Overall, the results show that proactively managing physical and mental energy for work relates positively to daily states of mindfulness, which related positively to the originality of ideas. For an overview of the results from Study 1, see Figure 1.

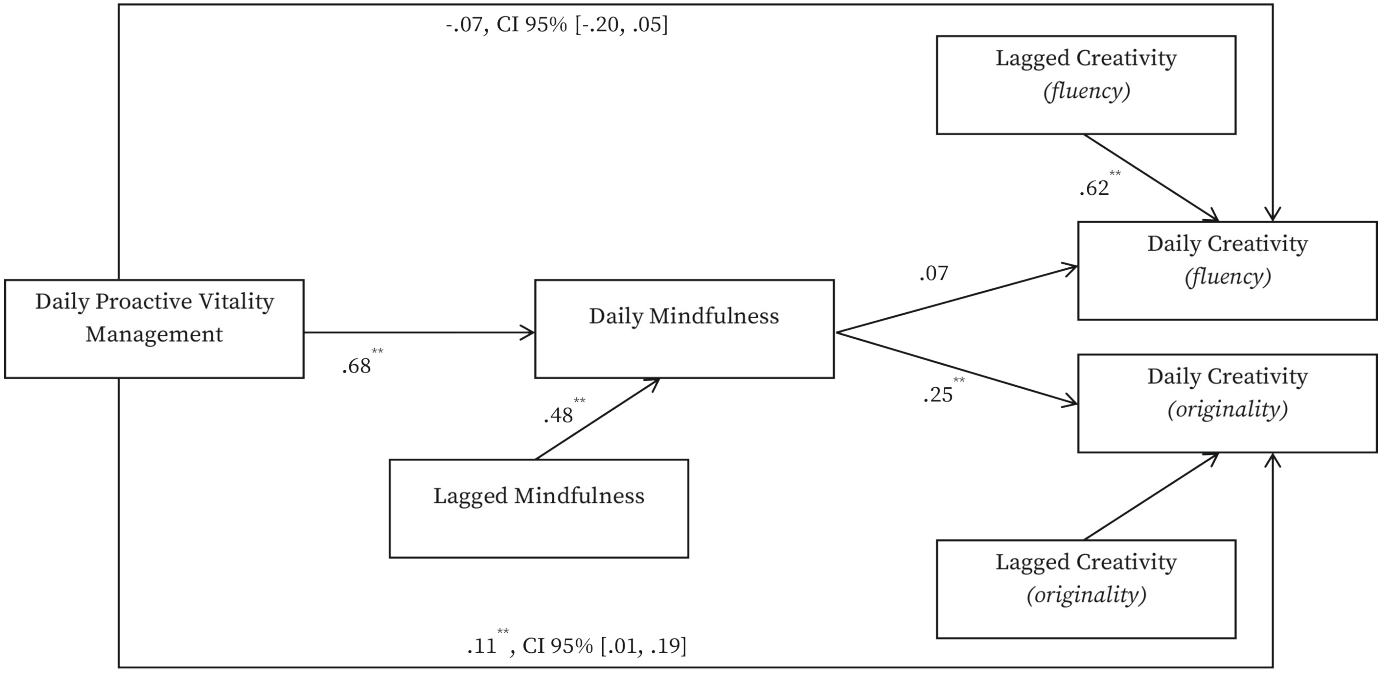

FIGURE 1

Overview of the findings from Study 1.
$^{*}p < .05$, $^{**}p < .01$.

TABLE 2

Results of multilevel analyses, Study 1 (outcome = creative performance: fluency and originality)

Variables	Fluency				Originality			
	Model 1		Model 2		Model 1		Model 2	
	γ	SE	γ	SE	γ	SE	γ	SE
Intercept	5.43**	.37	5.54**	.36	4.30**	.19	4.33**	.20
Time (weekday)	-.05	.09	-.05	.09	-.01	.04	-.01	.05
Fluency					.35**	.05	.36**	.04
Lagged fluency	.62**	.04	.62**	.05				
Lagged originality					.06	.04	.08*	.04
Work engagement	-.40*	.18	-.44	.22	.31**	.08	.16	.09
Mindfulness			.07	.21			.24**	.08
Pseudo ΔR^2	14%		1%		23%		5%	

*$p < .05$, **$p < .01$

STUDY 2

The findings from Study 1 suggested that a proactive, goal-oriented approach regarding one's own physical and mental energy may help employees in various sectors to be more mindful and to produce ideas that are more creative. In Study 2, we aimed to replicate these findings in a daily diary study among working people in the creative industry, who are evaluated on their daily creative output by their supervisors. In order to achieve a constructive replication study (Köhler & Cortina, 2021), Study 2 thus involves a sample highly relevant for an examination of creative performance, along with the use of a more 'context-specific' measure of creative work performance. In addition, we take a critical look by taking into account the potential influence of the work environment on creative performance by controlling for job characteristics that may be of influence in the proactive vitality management – creativity process (Köhler & Cortina, 2021).

METHOD

Procedure and Participants

Data collection took place in Germany. The sample consisted of 62 employees from 13 creative agencies in northern Germany, ranging in size from small ones (< 10 employees) to some bigger ones with approximately 50 employees. Work tasks of the participants ranged from activities such as designing magazine layouts, advertisements, commercials, and webpages, to counseling services for customers (suggesting and conceptualizing creative design solutions, such as advertising campaigns) and administrative tasks. The agencies were approached by a graduate student via phone or e-mail with information about the study and the request for their participation. To encourage participation, the creative agencies were offered to receive a data report after completion of the study. Data was collected online, using the Questback platform. Participants received daily links to the surveys via e-mail, which they could fill out via their smartphone or computer. They were instructed to fill in the surveys each day between 6 pm and 12 pm. To be able to match their daily entries, participants filled out a predefined code in each survey. Which supervisor would be most suitable to rate which employee – i.e., in terms of how closely they worked together – was discussed prior to the study. The creative performance ratings of the supervisors were matched with the employee data with the use of the same predefined codes provided to the supervisors by the participating employees.

Of the total sample, 58.1% were female. On average, participants were 32.9 years old (SD = 9.3) and had 10.3 years of work experience (SD = 9.3). Of the participants, 50% had obtained a middle or high school degree, whereas the other 50% had finished college or university. The majority of the sample held a permanent position (72.6%) as opposed to a temporary contract. Participants were asked to fill out the daily surveys at the end of each workday throughout the course of one typical work week. In total, the 62 participants filled out 232 daily surveys (3.74 on average). Through means of the personal code participants filled in at the beginning of each survey, we were able to match their daily responses. In case there was no pre-existing German version of the measurement instruments available, we translated the items to German using back-translation.

Measures

Proactive vitality management. We measured daily proactive vitality management with the same instructions and items as in Study 1. The average Cronbach's alpha over the five days was .89.

Mindfulness. We measured state mindfulness with the same scale as in Study 1, this time using the German version of the scale (Michalak et al., 2008). The average Cronbach's alpha over the five days was .90.

Creative work performance. Supervisors of the participants assessed daily creative work performance with five items from the creativity scale of Tierney et al. (1999), adjusted to the daily level. Four items were dropped from the original scale because they either were not applicable to the work tasks of the participants in the current sample or did not capture creative behavior that occurs every day (e.g., "generated ideas revolutionary to our field"). Examples of the items that were used in the study are: "Today, this employee tried out new ideas and approaches to problems" and "Today, this employee generated novel, but operable work-related ideas" (1 = *strongly disagree*, 7 = *strongly agree*). The average Cronbach's alpha over the five days was .83.

Control variables. We included workload and job autonomy into our investigation as control variables, as both these job characteristics have been shown to predict creativity (e.g., Binnewies & Wörnlein, 2011; Ohly & Fritz, 2010). In addition, higher levels of job autonomy may provide an individual with more opportunities to engage in preferential strategies of proactive vitality management on a daily basis. Moreover, individuals may use proactive vitality management on a daily basis to deal with higher levels of workload. Furthermore, daily workload may impact daily levels of creative work performance. Working in the creative industry may require one to perform creatively in general (i.e., general creativity requirement, Unsworth et al., 2005), but daily fluctuations in workload may represent the relative necessity to display creativity on particular days (i.e., daily creativity requirement). We measured job autonomy and workload on a daily basis using three items for each variable developed by Bakker et al. (2004), based on Karasek's (1985) job content instrument. An example item for job autonomy is "Today, I could decide by myself how to execute my work" (1 = *totally disagree,* 5 = *totally agree*). The average Cronbach's alpha for job autonomy was .86. An

example item for workload was: "Today, I had to work very fast." The average Cronbach's alpha for workload was .94.

Strategy of Analysis

In Study 2, we used a similar analytical approach as described in Study 1. The data in Study 2 again comprised a multilevel structure, but this time with three levels: workdays nested within persons who were, in turn, nested within different agencies/organizations. Therefore, we added an extra level in our multilevel model, and we calculated the proportion of variance explained by the within-person level with reference to level 2 (person) and level 3 (agency). The findings supported our multilevel approach, with percentages of 51% for mindfulness, 59% for proactive vitality management, and 48% for the supervisor ratings of creative work performance. Throughout the analyses, all daily variables except time and the outcome variable were centered at each individual's mean value (Ohly et al., 2010). To take into account the potential carry-over effects of one's prior level of mindfulness and creativity, we created lagged variables and performed a more stringent test by including these previous-day measures of the mediator (i.e., mindfulness) and outcomes (i.e., creative work performance) in our analyses. As the control variable job autonomy did not relate significantly to the outcome or the predictor in our model, we dropped it from further analyses. Similar to Study 1, we also tested our hypotheses without including any control variables (Becker et al., 2016). Without the control variables, the results supported our hypotheses in the same way – there were no differences in the direction or significance of the resulting relationships.

RESULTS AND DISCUSSION

Descriptive Statistics

Means, standard deviations, and correlations between the study variables can be found in Table 3.

TABLE 3

Descriptive Statistics and Within-Person Correlations, Study 2

Variables	M	SD	1	2	3	4	5
1. PVM	4.49	1.18	-				
2. Mindful attention	5.37	1.39	.21**	-			
3. Creative work performance (supervisor)	4.95	1.04	.16*	.22**	-		
4. Workload (control)	4.48	1.84	.32	.13*	.11	-	
5. Job autonomy (control)	5.20	1.36	.31**	.23**	.06	-.07	-

Note. PVM = proactive vitality management.
*$p < .05$, **$p < .01$

Multilevel Confirmatory Factor Analyses

Similar to Study 1, we conducted MCFAs to examine the measurement model and check for construct validity and independence of our variables, as well as to test thoroughly whether we could empirically distinguish the predictor in our model (proactive vitality management) from the mediator (mindfulness). We modeled both the within- and between-person covariance matrices simultaneously and included latent factors for proactive vitality management (eight items), mindfulness (five items), and creative work performance (five items). The fit of the multilevel model in which all items of the variables in our model loaded on their respective latent factors was reasonable (CFI = .91, TLI = .89, RMSEA = .05, SRMR within = .08, SRMR between = .13). Furthermore, all factors had significant factor loadings ($p < .001$). In addition, this model fit the data significantly better than an alternative model in which the items of proactive vitality management and mindfulness loaded on one factor ($\Delta\chi^2 = 153.56$, $\Delta df = 4$, $p < .001$). Overall, these results show that besides theoretically, proactive vitality management can also be distinguished from daily mindfulness empirically.

Hypotheses Testing

Hypothesis 1 stated that daily proactive vitality management is positively related to daily states of mindfulness. Results of the multilevel analysis were in support of this hypothesis ($\gamma = .42$, SE = .08, $p < .01$). Hypothesis 2 stated that daily mindfulness is positively related to daily creative work performance. In support of this hypothesis, the multilevel results showed a positive relationship between daily mindfulness and creative work performance as assessed by supervisors ($\gamma = .17$, SE = .08, $p < .05$; Table 4).

TABLE 4

Results of multilevel analyses Study 2 predicting supervisor-ratings of creative work performance

Variables	Model 1		Model 2	
	γ	SE	γ	SE
Intercept	4.79**	.12	4.80**	.12
Time (weekday)	.11*	.04	.12**	.04
Workload	.07	.07	.14	.08
Lagged creative work performance	.39**	.07	.34**	.07
Mindful attention			.17*	.08
Pseudo ΔR^2	20%		7%	

*$p < .05$, **$p < .01$

Finally, in line with hypothesis 3, there was a positive indirect effect of proactive vitality management on creative work performance through mindfulness (.12, CI 95% [.02, .18]).

Summing up, the results show that daily proactive vitality management related to daily mindfulness, which, in turn, related to higher levels of creative work performance. Overall, we were thus able to replicate the findings of Study 1 in this new study. For an overview of the results of Study 2, see Figure 2.

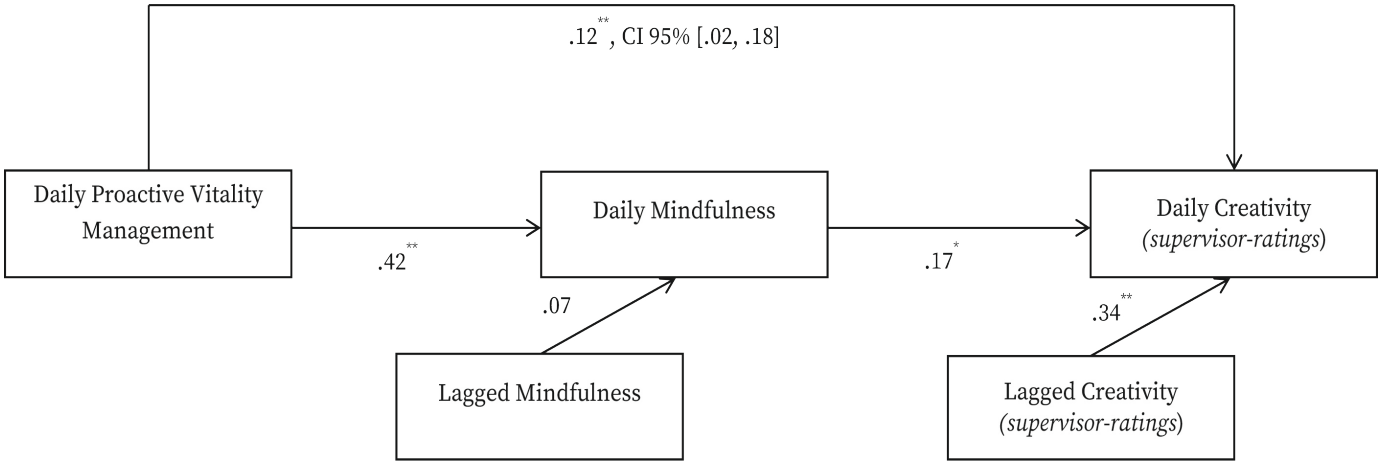

FIGURE 2

Overview of the findings from Study 2.
*$p < .05$, **$p < .01$

GENERAL DISCUSSION

In the present research, we aimed to integrate the proactivity, mindfulness, and creativity literatures to describe a process in which individuals may proactively promote their own creativity on a daily basis by purposefully managing their vitality for work and thereby altering their state of mind. Replicated findings from two daily diary studies among working individuals largely supported our hypotheses, emphasizing the added value of a proactive approach in the creative process. In what follows, we will discuss the theoretical contributions of our research.

Theoretical Contributions

The creativity literature is quite extensive, and scholars have provided many insights into factors that may either benefit or harm creative performance. Traditionally, creativity studies have employed top-down perspectives and a focus on distal predictors of creativity that are relatively far away from the creative process, such as personality and job characteristics (e.g., Anderson et al., 2014; Shalley & Gilson, 2004). However, such factors are less likely to explain daily, intra-individual variations in creative performance. Moreover, researchers have theorized and shown the importance of individuals' self-regulatory and proactive behaviors in the creative process (Bakker et al., 2020; De Stobbeleir et al., 2011; Op den Kamp et al., 2018, 2020). This perspective contributes to and integrates proactivity and creativity literatures and alludes to a potential interplay in the creative process between more distal contextual factors on the one hand and daily proactive behaviors on the other hand. For example, the effective management of physical and mental energy on a day-to-day basis may, on those days, enable individuals to enact and make optimal use of potentially fruitful contextual conditions for creativity that are available to them, such as supportive colleagues and useful resources (cf. Daniels, 2006).

Our research provides additional support for proactive motivation theory, which states that individuals may initiate goal-directed behavior to change aspects of the self or the environment (i.e., locus of change) in order to achieve a different future (Parker et al., 2010). Accordingly, we have investigated a proactive process where individuals change aspects of the self (i.e., their physical and mental energy) to achieve a different future (i.e., optimal functioning in terms of creative performance). Our findings address

the call for insights into the consequential processes of proactive behavior – or how a certain type of proactivity may bring about a certain type of 'change' (cf. Parker et al., 2010). In this case, we aimed to explore a process in which proactive vitality management relates to changes in how individuals feel and perform on certain days relative to other days.

Our research builds further upon previous work by Op den Kamp et al. (2018, 2020) and Bakker et al. (2020), who showed that proactive vitality management is positively related to creativity. Our findings corroborate and complement these earlier studies by providing a more detailed look and robust test of the process with a constructive daily diary replication involving various samples and objective and dual-source measures of creativity. Besides such methodological considerations, our research theoretically expands upon these earlier studies as well. More specifically, we have focused on an additional explanatory mechanism between proactive vitality management and creative performance. Indeed, based on the vitality literature, proactive vitality management has been conceptualized as an overarching construct – comprising physical, affective, and cognitive components – that may trigger multiple, intertwined processes that may subsequently promote creativity (cf. Lavrusheva, 2020; Op den Kamp et al., 2018; Ryan & Deci, 2008; Ryan & Frederick, 1997). Whereas Bakker et al. (2020) addressed the affective side of the process by advancing work engagement as a mediating mechanism, we aimed to broaden our understanding of the proactive vitality management-creativity link by focusing on the cognitive aspect of the process. The findings suggest that mindfulness plays an important role in connecting proactive vitality management to creative outcomes – even over and above the influence of work engagement – supporting the proposed cognitive mechanism.

Even though studies sometimes focus on vitality's either physical or mental components and effects, the components are intertwined (Lavrusheva, 2020). Accordingly, we propose that the cognitive, affective, and physical processes spurred by proactive vitality management are partly overlapping and may occur simultaneously. For example, physical energy may play a role in the process of activated positive affect and may also enable a fresh pair of eyes and headspace. At the same time, some aspects of the different processes may be rather unique. For example, feeling physically energetic is not necessarily accompanied by happiness, and being able to focus well need not

require one to experience positive affect. With regard to the current research focus, we propose that the relative importance of a primarily affective versus a cognitive mechanism in the proactive vitality management - creativity process may also depend on person and situation. For example, individuals who tend to mind wander a lot – providing them with valuable inspirational thoughts – may sometimes require the attention and clarity inherent to being mindful to bring the ideas into focus and develop them further. At other times, individuals may especially benefit from activated positive energy or moods (e.g., joy, enthusiasm) that broaden their thought-action repertoires to become inspired and invest resources into the creative process (e.g., Amabile et al., 2005; Fredrickson, 2001). Future research may take a closer look specifically at how physical energy plays a role in the process, as studies have indicated a link between proactive vitality management and physical energy (Bălăceanu et al., 2021; Op den Kamp et al., 2018; Ye et al., 2020) and between physical energy and creativity (e.g., Atwater & Carmeli, 2009). Even though the processes may be intertwined, focusing in more detail on the various potential underlying mechanisms in such a valuable process may bring more detailed theoretical and practical suggestions on how individuals promote their own creativity on a daily basis through their own intentional behaviors.

While many scholars have focused on the consequences and potential benefits of mindfulness, only a few studies so far have examined how experiences of mindfulness can be promoted (Dane, 2011; Hülsheger et al., 2018). Traditionally, mindfulness was seen as a phenomenon that could be reached by practicing meditation. Yet, the emergence of a mindful state does not necessarily require meditation (Brown & Ryan, 2003); it can be reached by anyone who focuses "their attention on events and phenomena *transpiring* in the present moment" (Dane, 2011, p. 998). We have argued that proactive vitality management may facilitate the emergence of a mindful state through its intentional, goal-driven nature and by supplying the cognitive and energetic resources needed to achieve and sustain a mindful state. Accordingly, we have addressed the scarcity of insights on the origin of fluctuations in mindfulness by putting forward proactive vitality management as a behavior that may promote daily states of mindfulness.

Our findings clearly indicate that on days participants proactively managed their vitality, they experienced more mindfulness at work. In turn, they unexpectedly did

not generate more ideas during a brainstorming task at the end of the day in Study 1, but their ideas were more creative nonetheless. Although these findings were unexpected, fluency and originality can be seen as correlated but highly separable constructs (Dumas & Dunbar, 2014). Indeed, fluency is not a sufficient nor necessary requirement for originality (Cotter et al., 2020; Runco et al., 2011), and one may argue that the most important feature of creativity is whether the ideas are, in fact, original (Dumas & Dunbar, 2014; Runco et al., 2011). The nature of the brainstorming task used in Study 1 may have evoked a creative expectation among participants, potentially reducing variation in the number of ideas they reported. The findings suggest that a state of mindfulness may pave the way for more focus and efficiency in the creative process, which may (partially) be due to 'de–automatization' – facilitated by mindfulness (Kang et al., 2013). Engaging in mindful reasoning may have helped the participants to think clearly and to overcome habitual and dominant but uncreative responses (cf. Bishop et al., 2004; Brown et al., 2007; Zedelius & Schooler, 2015).

A similar pattern emerged in the second study among workers in the creative industry, whose creative work performance was evaluated by their supervisors. On days that the participants proactively managed their physical and mental energy for work, they were more mindful, and their work was assessed as more creative. Overall, these findings corroborate earlier research on the mindfulness-creativity link (Lebuda et al., 2016). However, some studies have shown inconsistent or inconclusive results regarding the benefits of mindfulness for creativity (e.g., Baas et al., 2014). As both mindfulness and creativity are relatively complex and multidimensional constructs, it is not surprising that their relationship may be complex as well. Moreover, methodology may play a role. Although there are a few daily diary studies on mindfulness (e.g., Haun et al., 2018; Hülsheger et al., 2013), the link between mindfulness and creativity has not been studied on a within-person or daily level. Research has shown little or no relationship between trait and state mindfulness (Bravo et al., 2018; Thompson & Waltz, 2007), and because mindfulness is *inherently* concerned with varying levels of awareness and attention to ongoing events and experiences (Brown & Ryan, 2003), a diary approach that captures fluctuations in mindfulness seems highly suitable to examine this phenomenon. Indeed, it has been argued that between-person variation may not be used as a surrogate for within-person variation, and that the correlates and causes of between-person and within-person variation need to be analyzed as

distinct phenomena (Brose et al., 2015; Molenaar, 2004). In turn, examining such daily fluctuations in state mindfulness in relation to fluctuations in creative performance may yield different results than studies involving trait measures of mindfulness and/or general creative potential (cf. Lebuda et al., 2016; Molenaar, 2004).

Our findings further contribute to this ongoing discussion regarding the role of executive processing in the creative process (cf. Barr et al., 2015; Smeekens & Kane, 2016). For example, some studies have shown that states of *mindlessness*, such as mind wandering, may promote creative insight (Baird et al., 2012). While mindfulness and mind wandering are usually seen as polar opposites (Mrazek et al., 2012), both are suggested to involve a relatively wide attentional breadth (Dane, 2011). An important feature distinguishing mindfulness from mind wandering is its present-moment orientation characterized by increased awareness and attention to ongoing events and stimuli. Even though unconscious thought (e.g., during mind wandering and incubation periods) can help to form relevant associations and gain inspiration, conscious thought is needed to bring the associations into awareness and to actually come up with the solutions, ideas, and/or new creations (Zhong et al., 2008). On a daily level, working individuals seem to benefit from the higher consciousness, attention, and awareness associated with a mindful state to perform creatively (cf. Brown & Ryan, 2003). Moreover, mind wandering may sometimes even be undesired, especially in work settings where people need to be able to focus on their work and produce results. Future research may build further on our findings to yield insights on a potentially ideal balance between valuable mind wandering on the one hand and mindful attention and awareness on the other hand (cf. Mrazek et al., 2012; Wiley & Jarosz, 2012).

Strengths and Limitations

Scholars have called for research taking into account the various aspects, levels, and forms of creativity in relation to mindfulness (Lebuda et al., 2016). Addressing this call, we have tested our hypotheses and replicated our results in two daily dairy studies among working individuals. Moreover, we measured creative performance with both a domain-general measure of creativity (i.e., brainstorming task) and a more context-specific measure of creative performance in the workplace, as rated by supervisors. This approach allows us to bridge laboratory and field research to some extent. Indeed, the present research is the first to examine *daily* performance on a brainstorming task

(i.e., spanning multiple days). In addition, we asked supervisors to rate their employees' creative work performance to increase the relative objectivity of the ratings. Using supervisor ratings is a common practice in creativity research in work settings, even though there can be pitfalls to this method as well. Supervisors are only able to report on visible manifestations of creativity, while creativity may not always be visible to others because the creative process involves many internal psychological processes as well.

Overall, our approach has enabled a detailed examination and replication of our findings, which show a relatively robust, daily pattern in which proactive vitality management is related to creative performance through states of mindfulness. However, our research is not without limitations. First, we cannot infer causality from our findings, as doing so would warrant the experimental manipulation of proactive vitality management. In the present research, we were interested in processes and experiences that take place naturally and simultaneously, on the same day. Accordingly, the findings indicate that daily fluctuations in proactive vitality management are indirectly related to daily fluctuations in creative outcomes, linked together via daily fluctuations in mindfulness. In addition, scholars have argued that there is good reason to assume causation in the mindfulness-creativity link (cf. Lebuda et al., 2016). Nevertheless, future research may aim to implement an intervention encouraging working individuals to engage in proactive vitality management and examine its effects on (daily) states of mindfulness and creative performance. For example, an intervention focused on awareness and instruction may involve a workshop in which participants in the experimental group learn about their well-being in relation to work, and about how they can proactively improve this from day to day. During the training, participants may set personal goals and come up with various initiatives they can take to be physically active and get involved in interesting activities with the aim to feel energized and motivated.

Another limitation is the sole focus on mindful attention and awareness as a mechanism in the link between proactive vitality management and creativity, without examining the influence of other cognitive states (e.g., mind wandering). Moreover, mindfulness was measured using the MAAS (Brown & Ryan, 2003), which has sometimes yielded inconsistent findings in previous creativity studies. However, previous studies involved different research designs than ours (e.g., of cross-sectional nature), while the MAAS

seems highly suitable to measure within-person fluctuations in mindfulness. In the future, though, scholars may want to draw comparisons by using different measures of mindfulness and by examining the influence of other cognitive or psychological states on creative performance as well.

Finally, our daily diary design allowed us to take a close look at and examine within-person fluctuations in proactive vitality management, mindfulness, and creativity. However, one may argue that these phenomena may also fluctuate *within* the day. Future studies could therefore zoom in on this process even further by adopting an experience sampling method (i.e., measuring variables multiple times within a day; Beal, 2015).

Practical Implications

Our findings suggest that not only individuals working in the creative industry but also employees from a wide range of professions and industries may take control over their own levels of vitality to promote their creativity. To stimulate this process, individuals may aim to develop self-awareness and insight regarding when and how to effectively manage their own levels of physical and mental energy for work (cf. Op den Kamp et al., 2020). For example, it could be beneficial to think about situations in which physical and mental energy is particularly scarce and/or valuable and to try out strategies that may help to manage vitality effectively. In addition, organizations may play a facilitative and empowering role to encourage their employees to engage in proactive vitality management. Such a proactive 'growth' mindset may be promoted by, for example, emphasizing, praising, and rewarding effort (as opposed to results) and by allowing employees to set their own challenging yet attainable (creative) goals. In addition, organizations may provide their employees with opportunities to purposefully manage their vitality for work, corresponding to their own personal needs and preferences (cf. Trougakos & Hideg, 2009). Examples of such strategies may include going for a walk to clear their mind or to seek inspiration (Oppezzo & Schwartz, 2014), incorporating 'quiet hours' in a workday to be able to focus (König et al., 2013), or listening to their favorite music while working to promote an energized and driven mindset (Lesiuk, 2005). As such, organizations may aim to complement valuable top-down approaches to promote creativity with the opportunity for a 'bottom-up' approach in which individuals take control themselves in creating healthy circumstances for creativity to arise.

Conclusion

While some people may generally display more creativity than others, all individuals have some creative potential (cf. Amabile, 1997). This perspective implies that each person may aim to unleash their own creative potential to promote growth and innovation. The present research suggests that people do not need to wait for uncontrollable 'AHA-moments', but may proactively create a mindset in which creativity can flourish on a daily basis by managing their levels of physical and mental energy.

6

PROACTIVE VITALITY MANAGEMENT AMONG EMPLOYEES WITH CHRONIC LIVER DISEASE: IMPLICATIONS FOR OCCUPATIONAL HEALTH AND PERFORMANCE

This chapter has been submitted for publication as:

Op den Kamp, E. M., Bakker, A. B., Tims, M., & Demerouti, E. (2022). Proactive vitality management among employees with chronic liver disease: Implications for occupational health and performance.

ABSTRACT

Employees with a chronic disease are confronted with health problems, pain, and a limited energy reserve, which may hinder their day-to-day functioning at work. In the current study, we use job demands-resources (JD-R) and proactive motivation theories to hypothesize that chronically ill individuals may optimize their own well-being and work performance by using proactive vitality management (PVM). Employees with chronic liver disease were followed over the course of 2.5 years and filled out surveys at three points in time. Consistent with JD-R theory's health impairment hypothesis, results showed that exhaustion mediated the relationship between PVM and (a) absenteeism and (b) functional capacity. Consistent with the motivational hypothesis, work engagement mediated the relationship between PVM and creative work performance. In addition, results of moderated mediation analyses indicated that these indirect effects were stronger for employees with more (vs. less) self-insight – i.e., a developed understanding of one's own thoughts, feelings, and behaviors. These findings contribute to JD-R and proactive motivation theories and suggest that PVM is an important behavioral strategy that may protect chronically ill employees' occupational health and promote their performance, especially when combined with self-insight.

INTRODUCTION

Work provides people with income, promotes social interaction, and contributes to feelings of self-worth – perhaps especially when living with a chronic medical condition (Beatty & Joffe, 2006). Due to medical advancement, population aging, and the rise in retirement age, the number of chronically ill individuals within the labor force continues to rise (Beatty 2012; Brzykcy et al., 2019). As energetic resources are essential to perform well (Beal et al., 2005; Hockey, 1997), these individuals, who experience relatively intense drops in energy more regularly due to their medical condition, are subjected to a disadvantage regarding occupational health and performance. Governments and organizations may support employees with chronic health conditions by implementing formal policies and facilities – for example, opportunities for reduced work hours, job task modifications, or sick leave. However, such a top-down approach cannot take all individual differences in needs and abilities into account. Based on job demands-resources (JD-R; Bakker & Demerouti, 2017) and proactive motivation (Parker et al., 2010) theories, we propose that chronically ill employees can be proactive agents who take initiatives to shape their own work-related well-being and outcomes to some extent, in accordance with their personal needs and health restrictions (Grant & Parker, 2009).

More specifically, we suggest that chronically ill employees may use proactive vitality management, i.e., "goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work" (Op den Kamp et al., 2018, p. 493) to influence their own occupational health and performance. People with chronic illness form an understudied population in general (Beatty, 2012), and, thus far, the value of proactive vitality management has been evidenced only in studies among the healthy working population (Bakker et al., 2020; Op den Kamp et al., 2018, 2020). Proactive behavior involves undertaking self-initiated actions to change the status quo. This may seem especially challenging for individuals dealing with chronic illness, limiting their 'can-do' motivation (Parker et al., 2010). Yet precisely for individuals who need to deal with physical limitations, like employees with a chronic health condition, it is important to adopt a proactive approach towards their vitality to remain functional.

Applying JD-R theory (Bakker & Demerouti, 2017), we focus on its two core processes to uncover the potential value of proactive vitality management for chronically ill employees. Previous studies have examined processes in which proactive vitality management relates to higher work engagement, performance, and creativity (Bakker et al., 2020; Op den Kamp et al., 2020; Tisu et al., 2021; Ye et al., 2021). These findings primarily pertain to the 'motivational process' in JD-R theory (Bakker & Demerouti, 2017). However, the role of proactive vitality management in the 'health impairment process' has not been examined before, while this process may be especially relevant for individuals with a chronic illness. In the current study, we propose that these employees may find ways to mobilize personal resources needed to deal with strain ('health impairment process'), resulting in lower functional limitations and absenteeism over time despite their illness. In addition, we postulate that proactive vitality management will make chronically ill employees more motivated ('motivational process'), subsequently manifesting itself in higher creative work performance over time. Moreover, in line with earlier studies, we hypothesize that those individuals with a more developed understanding of their own feelings, thoughts, and behaviors (i.e., self-insight; Grant et al., 2002) will benefit most from using proactive vitality management (Op den Kamp et al., 2020). Especially for individuals working with chronic illness, self-insight may help overcome barriers and assess their personal needs, preferences, and restrictions more accurately.

In this study, we follow chronically ill employees over a time span of 2,5 years and investigate whether they may use the strategy of proactive vitality management to promote their own functioning at work (see Figure 1 for the proposed model). We carried out our study among individuals with a chronic liver condition. Like many other chronic illnesses, chronic liver conditions are typically characterized by a deterioration of general health (e.g., fatigue, pain, cognitive impairment) that limits day-to-day functional capacity, even under optimal disease management (Newton & Jones, 2012). Our investigation of proactive vitality management among a specific group of individuals for which this proactive strategy may be particularly important aims to make several contributions.

FIGURE 1

The proposed theoretical model of proactive vitality management among chronically ill individuals at work.

First of all, our research integrates and contributes to JD-R theory (Bakker & Demerouti, 2017) and proactive motivation theory (Parker et al., 2010) by exploring the hypothesized consequential processes of proactive vitality management for chronically ill employees. More specifically, we expand JD-R theory by investigating a recently proposed individual behavioral strategy aimed at mobilizing the resources individuals need to function effectively at work that may influence the model's two main processes (cf. Bakker & Demerouti, 2017). Moreover, we focus on the distinct, work-related outcomes of the two processes over time, addressing the call for insights on the outcomes of proactive behavior (Parker et al., 2010). Secondly, we examine the potential protective role proactive vitality management may play with regard to health impairment, distinguishing it from maladaptive or even self-destructive behaviors that may cause health impairment to progress (Bakker & De Vries, 2021; Bakker et al., 2022). Studying proactive vitality management (i.e., individual, goal-directed, and self-starting behavior) among individuals living with a chronic disease may bring insights from a new and different perspective that may complement top-down practices and research involving chronically ill employees. Finally, our research builds further on the suggestion of personal factors that exert a moderating influence on the proactive process incorporated in the framework developed by Parker and colleagues (2010). Aside from a few exceptions (e.g., Bakker et al., 2010; Li & Mao, 2014), the role of personal characteristics in the JD-R processes has not been studied extensively before. In this study, we consider the potential moderating role of self-insight in the proactive, self-regulatory attempts of chronically ill employees to promote their own occupational health and performance.

THEORETICAL BACKGROUND

Self-regulation theory posits that individuals guide their own goal-directed activities and performance by setting their own standards and monitoring their progress towards these standards (Vohs & Baumeister, 2004). Research concerning chronic illness has suggested that such self-regulatory processes also play an important role in how a chronic disease influences health and work outcomes. Leventhal et al.'s (1998) self-regulatory model, for example, has been applied to a wide range of chronic health conditions. The model is used to describe and examine how patients' emotional

reactions and beliefs about their condition influence the selection, performance, and maintenance of coping responses. These coping responses, in turn, influence work and health outcomes because they may alleviate physical symptoms and emotional distress (Hagger & Orbell, 2003; Hale et al., 2007; Leventhal et al., 1998).

The central mechanism described in the self-regulatory model is how patients select coping strategies in reaction to cognitive and emotional representations of their condition. Indeed, the coping literature has traditionally focused on how individuals react to and deal with stressors and threats. However, scholars have embraced the idea that coping may not only involve the reactions to stressful past events but may also take the form of anticipating events in the future (Aspinwall, 2011; Aspinwall & Taylor, 1997; Schwarzer, 2000). Aspinwall and Taylor (1997) coined the term proactive coping, which they described as "the process through which people anticipate or detect potential stressors and act in advance to prevent them or to mute their impact" (p. 417). More recent theorizing on proactive coping has made room for concepts such as purpose, challenge, and personal growth (Schwarzer & Luszczynska, 2008). For example, Schwarzer and Taubert (2002; p. 9) define proactive coping as "efforts that facilitate promotion toward challenging goals and personal growth." Proactive coping involves having a general promotion vision in which difficult situations are appraised as challenges and explains what motivates people to strive for ambitious goals and commit themselves to personal quality management (Greenglass et al., 1999; Schwarzer, 2000). Having a promotion vision subsequently translates into the initiation of all kinds of goal management activities that create opportunities for general life improvement and personal growth (Schwarzer & Taubert, 2002).

In a similar vein, literature on proactive behavior in organizational settings suggests that people may adopt a proactive approach to achieve a different future (Parker et al., 2010). This means that working individuals may take an active role in how they approach their work by creating favorable situations and conditions (Crant, 2000). The common denominator of proactive coping and other types of proactive behavior lies in the 'forward time perspective,' which is also inherent in proactive vitality management (Op den Kamp et al., 2018; Parker et al., 2010). Indeed, proactive behavior is goal-directed – aimed at changing and improving the situation or oneself – and involves self-starting and future-focused action (Parker et al., 2006).

According to proactive motivation theory (Parker et al., 2010), individuals are more likely to be proactive about something when they recognize that change toward the envisioned future is important for themselves, others, or both (i.e., 'reason-to' motivation). Chronic illnesses are health conditions that are persistent and long-lasting in their effects, require medical treatment, and are accompanied by some degree of functional limitation. Accordingly, chronically ill employees' challenging health condition may provide ample reason to proactively engage in efforts that protect their well-being and day-to-day functioning. Doing so may enable them to continue spending time with friends and family, and engaging in meaningful activities. Moreover, and fundamental to the subject at hand, individuals may protect their value to society and the organizations they work for by trying to retain functional work capacity. Accordingly, retaining an optimal degree of functioning in their work may be very important and rewarding to chronically ill employees. Such reason-to motivation can stimulate them to proactively manage their vitality in pursuit of that goal (Parker et al., 2010).

JD-R Theory

Central to JD-R theory (Bakker & Demerouti, 2017; Demerouti et al., 2001) are two parallel, core processes: the 'health impairment process' and the 'motivational process.' In the first process, high demands exhaust the individuals' mental and physical resources, leading to strain and health problems. In contrast, the second, motivational process is instigated by job resources that satisfy basic psychological needs, and foster work engagement and performance. Research has provided ample support for these two processes and their distinct outcomes in terms of functioning at work (for a short review, see Bakker et al., 2014). For example, Schaufeli and Bakker (2004) showed that job demands were particularly positively related to health problems through increased levels of burnout, whereas job resources were particularly negatively related to turnover intentions through work engagement. In a similar vein, De Beer et al. (2016) provided evidence for the health impairment process and showed that work overload leads to burnout and psychological ill-health symptoms over time. Research in support of the motivational process showed that organizational resources fuel work engagement and indirectly contribute to job performance and customer loyalty (Salanova et al., 2005).

More recently, Bakker and Demerouti (2017; see also Bakker, 2017) integrated employee behaviors in JD-R theory and argued that employees may use various behavioral

strategies to influence their own health and motivation. For example, through job crafting, individuals may influence their levels of exhaustion and work engagement by altering their levels of job demands and job resources, respectively (Tims et al., 2012). Additionally, individuals may engage in 'playful work design' behaviors to create a more fun and challenging work experience for themselves, thereby increasing their own work engagement (Bakker et al., 2020; Scharp et al., 2019). Based on the importance of physical and mental energy for occupational health and performance, the present study centers on how chronically ill individuals may use proactive vitality management as a behavioral strategy to directly influence JD-R theory's two main processes.

The Health Impairment Process

Central to the health impairment process is the premise that, as a consequence of physical, affective, and cognitive strain, people may experience higher exhaustion levels. In turn, higher exhaustion may result in reduced functional capacity at work – indicated by, for example, performance decrements and absenteeism (e.g., Bakker et al., Bakker et al., 2003a; 2004, 2008; Cropanzano et al., 2003; Demerouti et al., 2001; Schaufeli et al., 2009; Taris, 2006). According to Hockey (1997), individuals may employ performance-protection strategies to cope with demanding situations. However, while performance on primary tasks may be protected, this requires increased subjective effort, and may produce performance decrements on secondary tasks or activities, as well as fatigue after-effects. Therefore, it is important that individuals aim to protect their 'working effort reserves' to be able to deal with demanding situations.

Findings from earlier studies suggest that proactive vitality management relates to lower levels of fatigue and exhaustion (Bălăceanu et al., 2021; Op den Kamp et al., 2018; Ye et al., 2020). We hypothesize that chronically ill employees may also be able to conserve and replenish valuable physical and psychological resources through proactive vitality management. By proactively managing their physical and mental energy, they may become better equipped with essential resources to deal with challenges or job demands at work. Doing so may mitigate health impairment effects, including exhaustion and corresponding drops in functional work capacity over time. Based on earlier health impairment studies and taking into account the context of working with chronic illness, we have operationalized (reduced) functional work capacity as experienced functional

limitations in work – such as cognitive or physical difficulties in performing work tasks – and the number of days missed work (i.e., absenteeism).

Notwithstanding the importance of the health impairment process among healthy employees (e.g., Bakker et al., 2003a, 2003b; De Beer et al., 2016; Schaufeli & Bakker, 2004), we expect that this process may be even more pronounced for chronically ill employees. Working individuals who suffer from a chronic illness are hindered by the additional burden of their condition (Kirk-Brown & Van Dijk, 2016; McGonagle et al., 2014), which may limit their working effort reserves. They may therefore experience more difficulty dealing with demanding situations (cf. Hockey, 1997). Nonetheless, the aforementioned reason-to motivation may impact the cost-benefit decisions of chronically ill employees about the expenditure of increased effort relative to the value of their goals, swaying them to invest the additional resources needed to remain functional (Hockey, 1997; Parker et al., 2010). Accordingly, they may be driven to find and implement effective strategies to manage their physical and mental energy, which may protect or even expand their working effort reserves (cf. Hockey, 1997). For example, they may try to organize their work tasks in time blocks that are manageable and seek out their colleagues for energizing social interaction in between those blocks. Gathering the personal resources they need to become better equipped to deal with work may lower their exhaustion levels and associated functional limitations over time (see also Figure 1).

Hypothesis 1: Time 1 (T1) proactive vitality management is negatively related to (a) T3 functional limitations and (b) T3 absenteeism, through T2 exhaustion.

The Motivational Process

Parallel to the health impairment process, proactive vitality management may activate a motivational process in which work engagement plays a pivotal role. The motivational process in JD-R theory describes how job resources ignite individuals' feelings of commitment and dedication to their work, which lead to positive outcomes for them and the organizations they work for (Bakker & Demerouti, 2017). We consider proactive vitality management as a behavioral strategy that individuals can deploy to directly influence the motivational process by impacting work engagement and, subsequently, performance at work.

Findings from earlier studies indicate that proactive vitality management is associated with higher levels of work engagement (Bakker et al., 2020; Bălăceanu et al., 2021; Op den Kamp et al., 2018; Tisu et al., 2021; Ye et al., 2020, 2021). We expect that chronically ill employees who proactively manage their physical and mental energy may experience a similar, beneficial influence on their work-related well-being over time. Indeed, when they proactively conserve and mobilize their physical and psychological resources, not only their capacity but also their willingness to perform well may increase (Op den Kamp et al., 2018; Parker et al., 2010). Through proactive vitality management, individuals can promote their own goal achievement and performance by replenishing valuable energetic resources that they can invest in work (cf. Beal et al., 2005). This process may increase a sense of ownership over one's work and fuel feelings of vigor, dedication, and absorption regarding work, i.e., work engagement. In turn, this may enable chronically ill employees to reach higher levels of performance. Going beyond regular job performance, in the current research, high-quality performance is represented by 'going the extra mile' – coming up with new and novel ideas, and approaching work tasks in original ways, i.e., being more *creative* at work (Amabile, 1983).

An important assumption underlying our perspective on the motivational process is that one needs energetic, cognitive, and affective resources to perform creatively (e.g., Amabile et al., 2005; Baas et al., 2008; Kark & Carmeli, 2009). Work engagement, a positive, affective-motivational state of fulfillment (Schaufeli et al., 2006), has shown to be crucial in sustaining workers' well-being and productivity (de Lange et al., 2008). Higher levels of work engagement may promote creative performance because engaged individuals are more driven to invest their resources and use their skills and expertise needed in the creative process (e.g., Bakker et al., 2020; Bakker & Xanthopoulou, 2013). We hypothesize that chronically ill employees may motivate themselves by proactively undertaking strategies to manage their physical and mental energy. Engaging in such proactive strategies that help them to feel vital, such as purposefully going for a walk in-between work sessions to energize and clear their mind, may help them to benefit from and capitalize on available opportunities or job resources, such as job autonomy (Tisu et al., 2021), thereby creating the optimal circumstances to perform creatively in their work over time (see also Figure 1).

Hypothesis 2: T1 proactive vitality management is positively related to T3 creativity, through T2 work engagement.

The Role of Self-Insight

In order to protect and replenish their physical and mental energy for work, chronically ill individuals may purposefully employ a wide range of strategies that may all fall under the umbrella of proactive vitality management. For instance, some may consciously focus on getting enough sleep to start the workday feeling as physically and mentally prepared as possible. Alternatively, others may aim to mindfully derive positive energy for work through regular breaks filled with social interaction or by listening to their favorite music during the workday. In a similar vein, an individual may try to start certain workdays with a healthy and energizing breakfast, while on other days, they may choose to prepare for their work through meditation or exercise. Important here is the idea that the vitality management strategies are goal-directed and purposefully initiated; which specific behaviors or activities are most effective and preferred may vary between individuals and be different over time (Op den Kamp et al., 2018; see also, Sonnentag & Fritz, 2007; Thayer et al., 1994). For individuals dealing with a chronic illness, it may be especially important to cultivate awareness of their physical and psychological state, and the individual and situational needs they may have due to their illness. As such, they must use self-regulation skills to develop and implement behavioral strategies, and should continuously monitor and evaluate what works best for them to achieve the desired results (Balkis & Duru, 2016; Wang et al., 2021; Zimmerman, 2000). Chronically ill employees with higher levels of self-insight may navigate this self-regulatory process more effectively.

Self-insight can be defined as the understanding of one's feelings, thoughts, and behaviors (Grant et al., 2002) and has been linked to various indicators of psychological well-being (e.g., Harrington & Loffredo, 2010; Lyke, 2009; Silvia & Phillips, 2011). Chronically ill employees may be more successful in their proactive vitality management attempts when they have higher self-insight, because the need or opportunity for proactive vitality management may be detected more accurately and timelier. Conversely, low self-insight could lead chronically ill employees to overlook the signals indicating that they are running out of energy or that it is time to try to cultivate a more focused and driven mindset, decreasing the effectiveness of any

proactive vitality management strategies. Moreover, a better understanding of the self could facilitate the selection of suitable behavioral strategies that correspond to their situational and personal needs, preferences, and restrictions (Op den Kamp et al., 2020). Self-insight has been identified as "an important metacognitive process for stimulating adaptive, self-directed change" (Cowden & Meyer-Weitz, 2016, p. 1134; see also Carver & Scheier, 1998). In this process, chronically ill employees with more self-insight may monitor the effectiveness of their attempts at change, and use this feedback to sustain or develop progress towards their goals (Grant, 2001). Accordingly, as a form of self-directed change, individuals with high (vs. low) self-insight may more effectively use proactive vitality management to promote optimal functioning at work. Research also suggests that self-insight tends to increase confidence that one will achieve their goal and live up to their potential (Cowden & Meyer-Weitz, 2016). This could boost can-to motivation (Parker et al., 2010), stimulating individuals with a chronic health condition to persist and continue their proactive vitality management efforts even when they encounter difficulties or adversity in the process.

Hypothesis 3: The negative relationships between T1 proactive vitality management and (a) T3 functional limitations and (b) T3 absenteeism through T2 exhaustion are stronger for individuals with high (vs. low) self-insight.

Hypothesis 4: The positive relationship between T1 proactive vitality management and T3 creative work performance through T2 work engagement is stronger for individuals with high (vs. low) self-insight.

METHOD

Procedure and Participants

The current study was carried out among individuals with a chronic liver condition. Data collection took place in the Netherlands. Participants were recruited with the help of the Dutch Association for Liver Patients (NLV). Information on the study and a link to an online survey (i.e., programmed in Qualtrics) were distributed to the associations' members via e-mail, a newsletter, and the website. After clicking on the link to the survey, participants received more information about the study and were

asked to indicate their consent for participation in the study. At the end of the survey, participants were asked if they were willing to participate in a follow-up study. If so, these participants received an e-mail with a link to the second survey three months after filling out the first survey (i.e., T2). The period of three months was chosen because we expected that such a time interval would be sufficiently long to allow change in the focal mediators (exhaustion, work engagement). Again, at the end of the survey, participants were asked if they were willing to participate in a follow-up study in the future. The third survey was sent to the participants two years later (i.e., T3). We opted for a two-year follow-up because this time period would presumably be sufficiently long to allow considerable change in the outcome variables (functional limitations, absenteeism, creative work performance). Thus, the entire research period comprised 2.5 years. We obtained approval for our research study from the ethics committee of a Dutch university (#19-042.R1).

The total member base of the NLV that may theoretically have been reached through the e-mails we sent and the call in the newsletter and website we posted comprises 1500 members. Of these members, 327 (22%) filled out the first questionnaire. All participants suffered from chronic liver disease, such as primary sclerosing cholangitis (27%), autoimmune hepatitis (26%), primary biliary cholangitis (22%), liver cirrhosis (7%), hepatitis B (3%), and hepatitis C (3%). Additionally, 19% of the participants were on the waiting list or had received a liver transplant. Participants were either still working, in rehabilitation trajectories, recipients of social security benefits (i.e., working fewer hours or not at all), or retired. In total, 192 of the participants (59%) were still working to some extent and were, therefore, able to answer our work-related questions and participate in the current study. We matched Time 1 (T1), Time 2 (T2), and Time 3 (T3) data based on their self-provided e-mail addresses, which were deleted from our records afterwards. There were 99 working participants (52%) who participated on at least two time points, and 83 working participants who participated on all three time points (44%). Consequently, the latter group of participants together formed the sample we used in our hypotheses testing analyses. At T1, the mean age of the participants was 48.73 (SD = 10.75), and 67% of the sample was female. Of all participants, 37% had completed higher vocational training, and 16% held a university degree. On average, participants worked 25.65 hours per week (SD = 14.05) in a wide range of professions and industries, including health care (25%), government (15%), education (11%),

finances (10%), trade and commerce (6%), creative/cultural industry (5%), building and construction (5%), ICT (5%), and, to a lesser extent, in sectors such as hotel and catering, manufacturing, and transportation.

Measures

Except for 'self-insight,' which we measured at the trait-level, we measured the study variables with reference to the past month. Doing so yielded more robust measurements of the variables and increased the accuracy of the self-reported experiences and behaviors because retrospective bias is reduced when adopting a specific, relatively short time period. To be able to control for earlier levels of the model variables in our analyses, we measured the mediator both at T1 and T2, and the outcome variables both at T2 and T3.

Proactive vitality management (PVM) was measured at T1 with the PVM scale, consisting of eight items (Op den Kamp et al., 2018). Participants were asked to what extent they had tried to ensure that they felt mentally and physically well so that they could do their job to the best of their ability. Example items are: "Last month, I made sure that I felt energetic during my work," "Last month, I motivated myself," and "Last month, I made sure to approach my work with a positive mindset" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was .90.

Self-insight was measured at T1 using the eight-item subscale of the Self-Reflection and Insight Scale (SRIS; Grant et al., 2002). Example items are "I usually know why I feel the way I do," and "I'm often aware that I'm having a feeling, but I often don't quite know what it is" (reversed-scored) (1 = *totally disagree*, 6 = *totally agree*). Cronbach's alpha was .86.

Exhaustion was measured at T1 and T2 with four items from the Oldenburg Burnout Inventory (Demerouti et al., 2010). An example item is "Last month, there were days when I felt tired before I arrived at work," and "Last month, I felt worn out and weary after work" (1 = *totally disagree*, 4 = *totally agree*). Cronbach's alpha was .85 at T1 and .87 at T2.

Work engagement was measured at T1 and T2 with the nine-item Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). Example items are: "Last month, at

my job, I felt strong and vigorous," and "Last month, I was enthusiastic about my job" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was .91 both at T1 and T2.

Functional limitations were measured at T2 and T3 using eight items based on the Functional Capacity Questionnaire. This measurement instrument is developed by the Social Medical Affairs division of the Dutch Employee Insurance Agency (UWV) and is primarily used by occupational physicians in the Netherlands. Participants were asked to what extent they experienced functional limitations within different aspects of their work. Example items are: "Last month, I was able to concentrate on my work tasks during the workday," "Last month, I was able to maintain a normal working pace at work," and "Last month, I was able to handle any heavy loads during the workday" (1 = *not limited at all*, 5 = *strongly limited*). Cronbach's alpha was .87 at T2 and .86 at T3. Because this measurement instrument is mostly used in practice, we wanted to further support its validity by conducting a confirmatory factor analysis (CFA) over the eight items. The results of the CFA indicated a good fit to the data (CFI = .98, IFI = .98, TLI = .97, RMSEA = .06, SRMR = .05). Moreover, all items had substantial standardized loadings on the latent construct, with coefficients ranging from .61 to .93 (all p's < .001).

Absenteeism was measured at T2 and T3 with the number of reported missed workdays (i.e., absence) due to illness during the last month (cf. Darr & Johns, 2008).

Creative work performance was measured at T2 and T3 using five items developed by Zhou and George (2001). Participants indicated to what extent they agreed with statements such as "Last month, I came up with creative solutions to problems," and "Last month, I came up with new and practical ideas to improve performance" (1 = *totally disagree*, 5 = *totally agree*). Cronbach's alpha was .89 both at T2 and T3.

Health complaints were measured with one item as a control variable at T2 and T3 because the particular variables and processes examined in the study may be influenced when individuals experience fewer or more severe health complaints. Participants were asked to rate the severity of any health complaints they were experiencing on a Visual Analog Scale (VAS; 0 = *not severe at all*, 10 = *extremely severe*), a validated method frequently used in both research and clinical settings (e.g., Delgado et al., 2018; Price et al., 1994).

Analytical Strategy

Before testing our hypotheses, we examined the factor structure of our measurement model through confirmatory factor analysis (CFA) using AMOS 25 software (Arbuckle, 2017). After that, structural equation modeling (SEM) with maximum likelihood estimation was used to test our theoretical model. Due to the relatively complex theoretical model and the relatively small sample size, we ran separate structural equation models for the health impairment process and for the motivational process (i.e., for the upper and lower half of the model in Figure 1, respectively). The indirect effects were tested using bootstrapping. The moderated mediation hypotheses were tested by including a product term representing the interaction between self-insight and proactive vitality management in their potential effect on exhaustion and work engagement (i.e., to examine first-stage moderated mediation). Subsequently, we further inspected the conditional indirect effects by creating user-defined estimands. We controlled for the potential influence of participants' concurrent health complaints on the hypothesized processes by adding paths from T2 health complaints to both T2 mediators, and from T3 health complaints to the T3 outcomes in our analyses. Finally, to thoroughly test our hypotheses, we also performed more stringent tests in which we added paths for earlier levels of the mediators (i.e., T1) and outcome variables (i.e., T2) to control for their potential explained variance. Below, we report the results for each hypothesis both with and without including these additional paths. All reported results are standardized.

RESULTS

Descriptive Statistics

Means, standard deviations, and correlations of the measured variables in our study are presented in Table 1. To examine the measurement model and check for construct validity and independence of our variables, we conducted a CFA on the latent factors included in our theoretical model (see Figure 1): Self-insight (T1; eight items), proactive vitality management (T1; eight items); work engagement (T2; nine items), exhaustion (T2; four items), functional limitations (T3; eight items), and creative work performance (T3; five items). Absenteeism (T3) was omitted from the CFA because it is not a latent variable. The measurement model in which all items loaded on their

TABLE 1

Descriptive statistics and correlations among the study variables

Variables	M (*SD*)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 PVM	5.24 (.95)	-													
2. T1 Self-insight	4.66 (.83)	.16	-												
3. T1 Exhaustion	2.80 (.69)	-.40**	-.33**	-											
4. T2 Exhaustion	2.57 (.73)	-.39**	-.34**	.62**	-										
5. T1 Work engagement	4.45 (1.14)	.58**	.28**	-.57**	-.34**	-									
6. T2 Work engagement	4.52 (1.23)	.33**	.30**	-.29**	-.59**	.47**	-								
7. T2 Health complaints	4.27 (2.57)	-.10	-.19	.30**	.55**	-.26**	-.45**	-							
8. T3 Health complaints	3.87 (2.37)	-.16	-.22*	.51**	.50**	-.36**	-.37**	.67**	-						
9. T2 Functional limitations	2.00 (.76)	-.22*	-.29*	.60**	.51**	-.39**	-.35**	.37**	.32**	-					
10. T3 Functional limitations	1.91 (.76)	-.21*	-.33**	.53**	.57**	-.38**	-.46**	.46**	.61**	.65**	-				
11. T2 Absenteeism	.86 (3.00)	.01	-.09	.04	.20	-.10	-.31**	.16	-.03	.15	.02	-			
12. T3 Absenteeism	1.44 (4.65)	-.12	-.17	.23*	.34**	-.28**	-.29*	.21	.18	.41**	.49**	.01	-		
13. T2 Creative work performance	3.12 (.83)	.24*	.19	-.04	-.17	.30**	.56**	-.16	-.26*	-.20	-.26*	-.28**	-.06	-	
14. T3 Creative work performance	3.02 (.81)	.30**	.16	-.20	-.20	.35**	.35**	-.15	-.22	-.26*	-.45**	.01	-.34**	.34**	-

Note. PVM = Proactive vitality management. $N = 192$ on T1, $N = 93$ on T2, and $N = 86$ on T3. $^{*}p < .05$, $^{**}p < .01$

respective latent factors fit the data reasonably well (CFI = .90, IFI = .90, TLI = .88, RMSEA = .08, SRMR = .09). Moreover, model fit improved when taking into account the three-dimensional structure of work engagement – i.e., the subdimensions vigor (3 items), dedication (3 items), and absorption (3 items) (CFI = .93, IFI = .94, TLI = .92, RMSEA = .06, SRMR = .07). All items loaded significantly on their respective latent factors (all factor-loadings > .62; *p*'s < .05).

Hypotheses Testing

The Health Impairment Process

According to hypothesis 1, T1 PVM is negatively related to T3 functional limitations (hypothesis 1a) and T3 absenteeism (hypothesis 1b), through T2 exhaustion. We started with analyzing the simple model without including the paths for earlier levels of the mediators (i.e., T1) and outcome variables (i.e., T2). The model involving the health impairment process fit reasonably well to the data (CFI = .91, IFI = .92, TLI = .90, RMSEA = .08, SRMR = .09). In line with our predictions, the results showed significant paths from T1 PVM to T2 exhaustion (estimate = -.39, $p < .01$), from T2 exhaustion to T3 functional limitations (estimate = .59, $p < .01$), and from T2 exhaustion to T3 absenteeism (estimate = .36, $p < .01$). See Table 2 for all direct path coefficients. The indirect relationship between T1 PVM and T3 functional limitations through T2 exhaustion was negative and significant (AMOS bootstrapping estimate = -.24 [CI: -.40 to -.12], $p < .01$), and the indirect relationship between T1 PVM and T3 absenteeism through T2 exhaustion was negative and significant as well (AMOS bootstrapping estimate = -.14 [CI: -.28 to -.05], $p < .01$). Overall, these results provide initial support for hypotheses 1a and 1b.

To control for earlier levels of the mediator and outcome variables, we added T1 exhaustion, T2 functional limitations, and T2 absenteeism to our structural equation model. Doing so did not affect the direction and significance of the results. T1 PVM was still negatively and significantly related to T3 functional limitations through T2 exhaustion (AMOS bootstrapping estimate = -.11 [CI: -.26 to -.03], $p < .05$). Moreover, T1 PVM was still negatively and significantly related to T3 absenteeism through T2 exhaustion (AMOS bootstrapping estimate = -.09 [CI: -.21 to -.04], $p < .01$). These findings provide further support for hypotheses 1a and 1b.

TABLE 2

Coefficients of the direct paths in the structural equation model (SEM) analyses

Health impairment process		
T1 PVM to T2 exhaustion	-.39**	-.27*
T1 exhaustion – T2 exhaustion		.58**
T2 exhaustion to T3 functional limitations	.59**	.38**
T2 functional limitations – T3 functional limitations		.48**
T2 exhaustion to T3 absenteeism	.36**	.32**
T2 absenteeism – T3 absenteeism		.02
Motivational process		
T1 PVM – T2 work engagement	.47**	.04†
T1 work engagement – T2 work engagement		.66**
T2 work engagement – T3 creative work performance	.34*	.29*
T2 creative work performance – T3 creative work performance		.24*

The Motivational Process

We proceeded with testing hypothesis 2, which states that T1 PVM is positively related to T3 creativity through T2 work engagement. We started with analyzing the simple model without including the paths for earlier levels of the mediators (i.e., T1) and outcome variables (i.e., T2). Again, the fit of the structural equation model involving the motivational process was reasonable (CFI = .92, IFI = .92, TLI = .90, RMSEA = .08, SRMR = .10). The findings further showed significant, positive paths between T1 PVM and T2 work engagement (estimate = .47, $p < .01$), and between T2 work engagement and T3 creativity (estimate = .34, $p < .05$). See Table 2 for all the direct path coefficients. Moreover, in line with our hypothesis, T1 PVM was indirectly related to T3 creativity, mediated by T2 work engagement (AMOS bootstrapping estimate = .17 [CI: .06 to .37], $p < .05$). After controlling for earlier levels of work engagement (i.e., T1 work engagement) and creativity (i.e., T2 creativity), the path between T1 PVM and T2 work engagement became nonsignificant. Therefore, the indirect relationship between T1 PVM and T3 creativity via T2 work engagement was no longer significant (AMOS bootstrapping estimate = .01 [CI: -.06 to .12], $p = .893$). Overall, the results thus provide only partial support for hypothesis 2.

Moderated Mediation Hypotheses

According to moderated mediation hypothesis 3, higher levels of T1 self-insight strengthen the indirect relationships between T1 PVM and T3 functional limitations (hypothesis 3a) and between T1 PVM and T3 absenteeism (hypothesis 3b), both mediated by T2 exhaustion. We first tested this hypothesis without including the paths for earlier levels of the mediators (i.e., T1) and outcome variables (i.e., T2). The interaction effect between PVM and self-insight on exhaustion was significant (estimate = -.20, $p < .05$; see Figure 2). Further examination of the conditional indirect effect showed that the negative relationship between T1 PVM and T3 functional limitations through T2 exhaustion was stronger at self-insight levels +1 SD above the mean (estimate = -.21, $p < .01$) than at self-insight levels -1 SD below the mean (estimate = -.04, $p = .662$). In addition, in line with hypothesis 3b, the negative relationship between T1 PVM and T3 absenteeism through T2 exhaustion was stronger at self-insight levels +1 SD above the mean (estimate = -.83, $p < .01$) than at self-insight levels -1 SD below the mean (estimate = -.18, $p = .490$). Overall, these results provide initial support for hypothesis 3a and 3b.

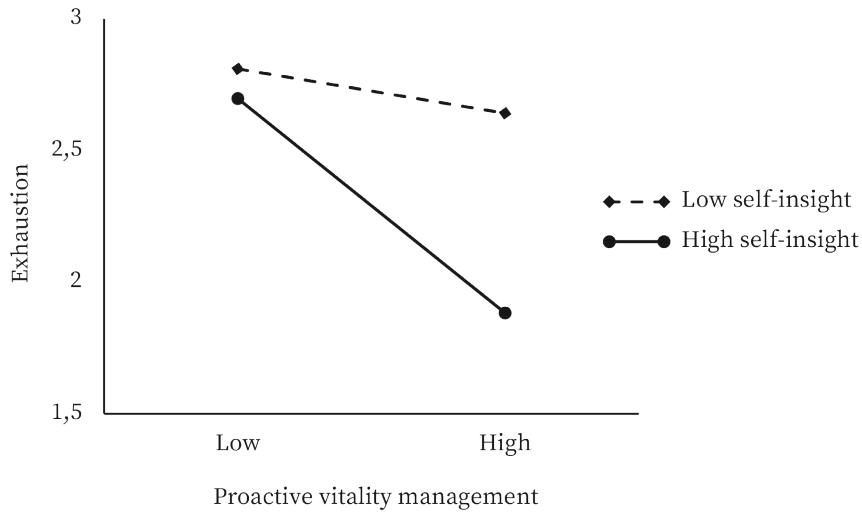

FIGURE 2

Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work exhaustion. Low levels of proactive vitality management and self-insight are represented by values of -1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means. management.

We proceeded by testing hypothesis 3a and 3b again while controlling for earlier levels of exhaustion (i.e., T1 exhaustion), functional limitations (i.e., T2 functional limitations), and absenteeism (i.e., T2 absenteeism). The conditional indirect effect for hypothesis 3a – stating that higher levels of T1 self-insight would strengthen the indirect relationship between T1 PVM and T3 functional limitations through T2 exhaustion – was no longer significant (estimate = -.05 [CI: -.20 to .01], $p = .214$). However, the direction and significance of the findings for hypothesis 3b were unaffected. The negative relationship between T1 PVM and T3 absenteeism through T2 exhaustion was again stronger at self-insight levels +1 SD above the mean (estimate = -.57, $p < .05$) than at self-insight levels -1 SD below the mean (estimate = -.08, $p = .784$). These findings provide additional support for hypothesis 3b.

Finally, we tested moderated mediation hypothesis 4, which stated that higher levels of T1 self-insight strengthen the indirect relationship between T1 PVM and T3 creativity through T2 work engagement. We first tested this hypothesis without including the paths for earlier levels of the mediators (i.e., T1) and outcome variables (i.e., T2). The interaction effect between PVM and self-insight on work engagement was significant (estimate = .35, $p < .01$; see Figure 3. Moreover, in line with our hypothesis, the positive relationship between T1 PVM and T3 creativity through T2 work engagement was stronger at self-insight levels +1 SD above the mean (estimate = .20, $p < .05$) than at self-insight levels -1 SD below the mean (estimate = .02, $p = .652$). After controlling for earlier levels of work engagement (i.e., T1 work engagement) and creativity (i.e., T2 creativity), the direction and significance of the findings for hypothesis 4 were unaffected. The positive relationship between T1 PVM and T3 creativity through T2 work engagement was again stronger at self-insight levels + 1SD above the mean (estimate = .07, $p < .05$) than at self-insight levels -1 SD below the mean (estimate = -.05, $p = .158$). These additional findings provide further support for hypothesis 4.

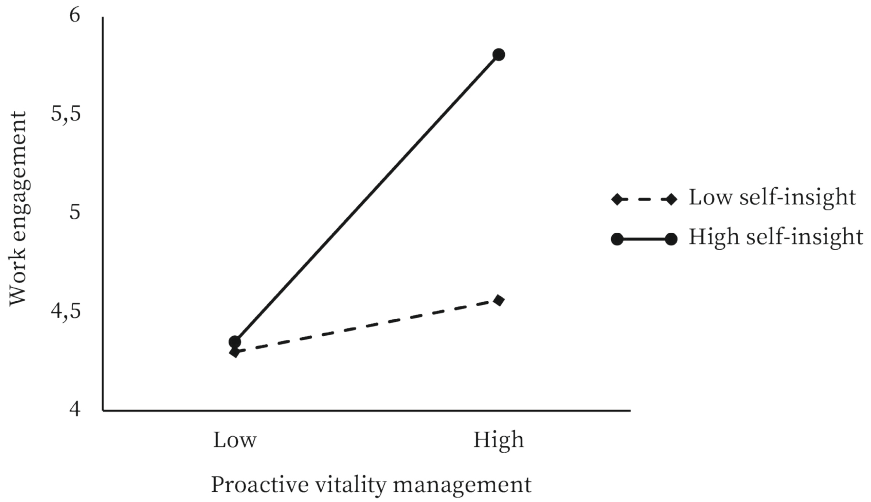

FIGURE 3

Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work engagement. Low levels of proactive vitality management and self-insight are represented by values of -1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means. management.

DISCUSSION

The aim of the present study was to examine whether chronically-ill employees can use proactive vitality management as a strategy to protect and promote their own occupational health and performance. Integrating and contributing to JD-R and proactive motivation theories, we found that proactive vitality management may mitigate a health impairment process and instigate a motivational process, with important implications for functional limitations, absenteeism, and creative work performance.

Theoretical Contributions

Although employees with chronic diseases are generally more likely to leave the workforce early (De Boer et al., 2018; De Jong et al., 2015), the number of employees with a chronic medical condition within the workforce is growing. Chronically ill employees carry a considerable disadvantage in the context of occupational health and performance, having to manage their personal illness at work on top of managing

regular work demands. Even though studies involving chronically ill employees are relatively scarce, scholars have provided relevant insights into how organizations may support employees dealing with a chronic medical condition through top-down approaches. For example, organizations may invest in empowering interventions that address the psychosocial aspects of working with a chronic disease (Varekamp et al., 2006, 2011) and coaching interventions aimed at personal resources to deal with work challenges (McGonagle et al., 2014). In addition, organizations may aim to establish a climate of psychological safety where chronically ill employees feel valued and respected (Kirk-Brown & Van Dijk, 2016) or redesign elements of the job to better suit the employees' needs, such as providing them with more autonomy. While JD-R theory focuses on physical and mental health outcomes, only few studies in the context of JD-R theory have included the health status of employees as a factor. However, Kirk-Brown and Van Dijk (2016) showed that the relationship between job resources and affective commitment was more pronounced for chronically ill employees. Moreover, Cook and Zill (2021) suggest that health status may function as a personal resource in the JD-R framework, with their study showing that chronic illness predicted lower engagement and higher burnout over and above job characteristics. In addition, the value of personal resources for employees dealing with health and medical conditions has been evidenced in earlier studies. For example, Hakanen and Lindbohm (2008) showed that optimism was strongly related to work engagement for cancer survivors, and could even buffer against the negative impact of avoidance behavior by supervisors on work engagement. Moreover, a coaching intervention among chronically ill employees positively impacted work ability and burnout complaints through an increase in personal resources, such as core self-evaluations, mental resources, and resilience (McGonagle et al., 2014).

Our current investigation focused on a proactive behavioral strategy aimed at a specific type of personal resources individuals need to function effectively at work – namely physical and mental energy. Chronically ill employees may use this proactive strategy themselves to promote their occupational health and performance. Earlier studies among employees from various occupational sectors have evidenced the value of proactive vitality management for several indicators of well-being, such as vigor and fatigue - and for several indicators of job performance, such as in-role performance and creativity (Bakker et al., 2020; Op den Kamp et al., 2018, 2020). A principal aim of the current research was to refine and broaden our understanding of proactive vitality

management in a potentially vulnerable group of people. By exploring proactive vitality management among working individuals with a chronic health condition, we have focused on a strategy that seems especially relevant for those who may be confronted with a disadvantage regarding their occupational health and performance. Indeed, considerable evidence supports the link between illness and poorer work experiences, functional limitations, and absenteeism (e.g., Boot et al., 2011; Darr & Johns, 2008; Fouad et al., 2017; Newton & Jones, 2012). Despite their potentially demanding health condition, these employees are still willing to invest effort into their work to remain functional (Hockey et al., 1997; Parker et al., 2010). Especially for chronically ill individuals, taking some control over their own occupational health and performance in spite of their illness may promote feelings of self-reliance and fulfillment, and may have considerable, beneficial effects (Beatty & Joffe, 2006; Saunders & Nedelec, 2014). Our findings show that proactive vitality management relates to improved well-being and more favorable work and personal outcomes over time. These results correspond with the notion of 'personal agency' (Bandura 2006; Montano & Kasprzyk, 2015) and show that the proactive behavior of chronically ill individuals themselves may complement efforts from other relevant parties that play a role in their occupational health, such as medical care, the government, employers, and supervisors. Indeed, while those parties carry a responsibility to provide social support and a healthy work environment, chronically ill employees carry a responsibility for their own occupational health and performance too (cf. Beatty & Joffe, 2006; Grant & Parker, 2009).

Proactive Motivation and JD-R Theories

Our research provides additional support for proactive motivation theory, which states that individuals may initiate goal-directed behaviors to change aspects of the self or the environment (i.e., locus of change) in order to achieve a different future (Parker et al., 2010). Examples of proactive behavior in an organizational context often involve actions directed at the job or the work environment, such as job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001), voice (LePine & Van Dyne, 1998), or playful work design (Bakker et al., 2020; Scharp et al., 2019). In contrast, proactive vitality management involves behavior aimed at changing aspects of the self – more specifically one's physical, affective, and cognitive state. To uncover the potential value of proactive vitality management for individuals with a chronic health condition, we integrated proactive motivation theory with JD-R theory to investigate possible psychological

mechanisms as well as important personal and work-related outcomes over time. Our findings indicate that chronically ill employees who used proactive vitality management (i.e., changing aspects of the self) reported lower levels of exhaustion three months later, which subsequently related to fewer functional limitations and reduced absenteeism two years later (i.e., a different future). In parallel, proactive vitality management was positively related to work engagement and, subsequently, to creative work performance across the same time span. These findings address the call for research on the consequential processes of proactive behavior (Parker et al., 2010), and contribute to the literature by presenting a detailed and long-term picture of how chronically ill individuals feel and function over time spurred by proactive vitality management.

In addition, our longitudinal examination of JD-R's two core processes among a sample of chronically ill employees also provides additional support for JD-R theory. More specifically, our findings contribute to the JD-R literature by showing how a proactive behavioral strategy that employees with chronic health conditions may employ seems to play a role in the two proposed psychological processes in this theory. A core assumption in JD-R theory is that job demands influence fatigue, and may have a negative indirect impact on functional capacity ('health impairment process'). In contrast, job resources influence employee work engagement, and have an indirect impact on job performance ('motivational process'). Accordingly, previous research has shown that organizations and their managers can play an important role in mitigating or instigating the two processes through job redesign (e.g., Holman et al., 2010; Holman & Axtell, 2016). However, such a top-down approach cannot take all individual differences in needs and abilities into account. As noted by Bakker and Demerouti (2017), individuals may also use bottom-up, proactive behavioral strategies to influence the processes described in JD-R theory. Our findings suggest that employees with a chronic illness may impact their own occupational health and performance by using proactive vitality management strategies that are in accordance with their personal needs, preferences, and restrictions. Our research thus emphasizes the perspective of the individual and how they may trigger the JD-R processes themselves. This bottom-up approach may be contrasted with – but also complement – the top-down perspective in which the organization influences occupational health and performance through job redesign.

JD-R theory proposes two independent processes, and the current findings suggest that proactive vitality management may play a role in both of them for chronically ill employees, resulting in both health and motivational outcomes. These findings may be explained by the nature of the proactive vitality management construct. Proactive vitality management has theoretically been positioned as an overarching construct comprising multiple facets – affective, cognitive, and physical. Accordingly, the behavior may trigger various processes that may subsequently promote optimal functioning (cf. Op den Kamp et al., 2018; Ryan & Deci, 2008; Ryan & Frederick, 1997). With regard to the health impairment process, proactive vitality management may play a protective role (i.e., mitigating health impairment). As such, it can be contrasted with more reactive or even destructive behaviors that cause health impairment to progress, such as self-undermining (Bakker & Wang, 2020). Self-undermining refers to a process in which individuals may lose self-regulatory resources in reaction to job demands and strain, causing them to show undesirable behaviors that undermine their own effective functioning, again leading to increased levels of demands and stress. In contrast, through proactive vitality management, chronically ill individuals may intervene in a more proactive and timely manner, undertaking action before they might become depleted and their functioning impaired (Hockey, 1997; Op den Kamp et al., 2018).

Parallel to the health impairment process, proactive vitality management seems to play an important role in the motivational process. Other behavioral strategies that have been studied in relation to the motivational process include, for example, job crafting (Tims et al., 2013) and playful work design (Scharp et al., 2019), with findings indicating that individuals may optimize their job and work conditions to become more engaged in their work. While proactive vitality management is focused on changing aspects of the self rather than the job, our findings suggest that the behavior may play a similar role for chronically ill employees, in mobilizing and activating resources that promote work engagement and, subsequently, creative work performance.

Self-Insight

The bottom-up approach that forms the basis of the current research centers around the idea that, compared to top-down parties that may play a valuable role, individuals are more equipped to take into account their own situational and personal needs, preferences, and restrictions. Building further on this, our findings suggest that higher

levels of self-insight may strengthen the effectiveness of proactive vitality management. These findings are in line with proactive motivation theory, which explains how certain factors, such as emotional regulation, can have a moderating influence on the proactive process (Parker et al., 2010). Specifically, our results showed that proactive vitality management was particularly related to work and personal outcomes through exhaustion and work engagement for chronically ill employees with high (vs. low) self-insight. These findings are consistent with previous research evidencing the facilitating role of self-insight in the link between proactive vitality management and creative performance (Op den Kamp et al., 2020). Similar to other key personal resources, such as emotional intelligence and optimism, self-insight may thus function as a higher-order personal resource that facilitates the mobilization of other resources (Bakker & De Vries, 2021). Indeed, while physical and mental energy are volatile personal resources, self-insight may thus function as a relatively more structural personal resource (Ten Brummelhuis & Bakker, 2012) that may help employees to effectively manage their vitality. More specifically, self-insight refers to an understanding of one's own thoughts, feelings, and behaviors. For individuals dealing with a chronic illness it may be especially important to cultivate an intimate understanding of the self – knowing oneself better than others would – because of the varying individual and situational needs they may have due to their illness (Morrison et al., 2021). As such, it may be essential for them to be continuously aware of their current physical and psychological state and to monitor and evaluate what works best for them in order to effectively manage their vitality (Balkis & Duru, 2016; Wang et al., 2021; Zimmerman, 2000). Chronically ill employees with higher levels of self-insight may navigate this self-regulatory process more effectively, because self-insight may help them to assess their needs and preferences, and to recognize their strengths and weaknesses in the process.

Practical Implications

Our findings may have important implications, not in the least for chronically ill individuals who wish to take some control over their own occupational health and well-being. Practical recommendations would primarily center around awareness, education, and encouragement regarding proactive vitality management. Trainings on proactive vitality management may be adjusted to specifically suit individuals with a chronic health condition (cf. McGonagle et al., 2014). Proactive behavior is spurred by motivational drivers that represent feelings of capability, feasibility, expectancies

and the "why" behind taking action. In addition, it is essential that individuals feel responsible in order to take action (Parker et al., 2010). Accordingly, it is important that chronically ill employees not only feel confident and motivated to take control, but actually feel responsible for their own occupational health and performance.

Parties that carry a co-responsibility, such as healthcare professionals and employers, may play an influential role in providing advice, guidance, and support to individuals with a chronic health condition (Beatty & Joffe, 2006). For example, they may stimulate awareness on the role of physical and mental energy, and how to effectively manage these valuable resources to retain functional capacity. Moreover, organizations and supervisors may provide additional support and opportunities for chronically ill employees to facilitate their proactive vitality management efforts (see also, Op den Kamp et al., 2018). As there are many different strategies to purposefully manage physical and mental energy that seem to be bearing fruit, self-insight may help to become more aware of the relative value of those different behavioral strategies. There are several ways in which individuals and organizations may aim to develop or train levels of self-insight (Klimoski & Hu, 2011). Moreover, chronically ill employees may aim to cultivate their self-insight while they proactively managing their vitality by first coming up with strategies that may mobilize their physical and mental energy for work, and then monitor, evaluate, and adjust the strategies where needed.

Limitations

The relatively long time period that spans the current research addresses the call for longitudinal studies on proactive processes (Parker et al., 2010) and provides valuable insights into how processes unfold over time. Moreover, our research involves an ecologically valid study among chronically ill employees, i.e., a disadvantaged, yet understudied population within organizational settings (Beatty, 2012; Kanengoni & Murugan, 2013). However, our research design is not without limitations. First, our design is not experimental in nature and so it does not allow for causal attributions. Future studies may explore the effectiveness of interventions that provide education, coaching and inspiration to chronically ill individuals on proactive vitality management. Second, even though we aimed to support the validity of our measures and measurement model, the measure we used for the outcome variable functional capacity was not thoroughly validated in earlier scientific studies. Third, due to the

limited size of the population (i.e., individuals with chronic liver disease), the sample size in our study is relatively small, limiting statistical power. This may have affected the robustness of the model tests. Finally, even though chronic liver patients encounter many obstacles that are representative of other chronic illnesses, the results may not be generalizable to chronic patients with every other kind of medical condition. Moreover, the current sample consisted of chronically ill individuals who were still, or again, working to some extent. Accordingly, our findings may not generalize to individuals with a chronic health condition who are – at present – more severely ill and are not currently working.

Future Research

The current research suggest that chronically ill employees may be able to directly influence their own health impairment and motivational processes through the use of proactive vitality management. Nonetheless, further research is needed to examine when chronically ill employees may be more inclined to proactively manage their vitality than others. Theoretically, we may assume that individuals with a chronic health condition have ample reason to proactively manage their vitality in order to remain functional. However, while individuals need reason-to motivation to be proactive about something first and foremost, proactive behavior is driven by 'can-do' motivation as well. Can-do motivation involves perceptions of self-efficacy and feasibility regarding the goal one aims to achieve (Parker et al., 2010). In practice, and perhaps particularly for chronically ill individuals, can-do motivation may sometimes pose an obstacle to bringing about proactive behavior. More specifically, they may not always feel able or confident to change the status quo, and influencing their own occupational health and performance may not always seem (or be) feasible for them. Indeed, research shows that chronic illness can have a negative effect on work self-efficacy (Beatty, 2012).

In addition to self-efficacy, can-do motivation may also be affected by the relative presence or absence of job demands and available job resources. The current investigation focuses on proactive behaviors aimed at changing aspects of the self. Nevertheless, every job comes with potentially fluctuating levels of demands and resources. To what extent these job demands and resources play a role in the proactive vitality management process is a question beyond the scope of the current study, but may be worth addressing in future research. For example, individuals may show different

behavioral responses to high versus low levels of workload. Some individuals may adopt an adaptive and approach-oriented coping style to deal with their job demands, for instance by seeking support, planning ahead, and by proactively managing their physical and mental energy (see also, Bakker & De Vries, 2021). However, high workload may also trigger a more maladaptive and avoidance coping style, in which people act passively or even disengage (Bakker & De Vries, 2021; Roth & Cohen, 1986).

Moreover, chronically ill employees often encounter stigmatization and inconsiderate supervisors and colleagues at work (Beatty, 2012; McGonagle & Barnes-Farrell, 2014), which may make it more difficult to engage in proactive vitality management in a way that is favorable and beneficial to them (Op den Kamp et al., 2020). At the same time, instead of being a passive recipient influenced by external resources, individuals may proactively seek to capitalize on available resources by engaging in goal-directed behaviors (Bakker, 2017; Demerouti et al., 2019; Tisu et al., 2021). Indeed, the effective management of physical and mental energy may enable individuals to enact and make optimal use of favorable contextual conditions that may be available to them, such as job autonomy and opportunities for social interaction (Daniels, 2006; Op den Kamp et al., 2020; Tisu et al., 2021). As such, while we focus on changing aspects of the self in contrast to adjusting the job, proactive vitality management may help chronically ill individuals to benefit from available resources and deal with job demands more effectively. Future studies could examine how various job demands and resources – and perhaps related behavioral strategies such as job crafting – interact with proactive vitality management in their impact on occupational health and performance.

Even when chronically ill individuals – driven by reason-to and can-do motivation – aim to use proactive vitality management to promote their functional capacity, they may not always succeed and achieve the intended, beneficial effect. Proactive, self-regulatory behaviors are prone to various personal and contextual influences, and sometimes having a certain goal and feeling one is capable of achieving the goal may not suffice in achieving the desired outcome (Parker et al., 2010). Our findings suggest that it may be helpful to be aware of personal needs and preferences in the process, i.e., about when and how to employ which specific strategies to manage physical and mental energy for work. Future research may examine more closely the drivers of proactive vitality management and the potential boundary conditions that

have an impact on its effectiveness for different groups of individuals and in different contexts. Such examinations may shed light on how, when, and for whom proactive vitality management may especially yield beneficial effects. Not only are such insights significant for theory building, but knowledge about potential facilitating factors also increases the validity of our research and mitigates the research-practice gap by producing more precise and useful practical recommendations (Busse et al., 2017).

Conclusion

Being able to work contributes greatly to quality of life, not in the least so for individuals suffering from chronic disease. Work provides them with feelings of normality and identity, financial support, and socialization (Saunders & Nedelec, 2014). At the same time, chronically ill employees are particularly vulnerable because of the challenge their medical condition poses on them (Beatty & Joffe, 2006; De Jong et al., 2015). The current longitudinal study among working individuals with a chronic illness suggests that proactive vitality management may protect and promote their own occupational health and performance over time.

6

7

SUMMARY AND GENERAL DISCUSSION

The overarching aim of the current dissertation was to introduce and explore a behavioral phenomenon I call 'proactive vitality management'. To this end, I conducted eight empirical studies described throughout the previous chapters. Together, the studies sought to examine (1) how to conceptualize and reliably measure proactive vitality management; (2) the hypothesized consequential processes of proactive vitality management; and (3) who may benefit from using proactive vitality management. In this final chapter, I will answer the research-guiding questions of this dissertation with a summary of the main findings, while positioning these findings in the broader literature. Subsequently, I will discuss the limitations of the studies and provide directions for future research. This chapter will be closed with a discussion of the practical implications and a conclusion.

DISCUSSION OF MAIN FINDINGS

Research Question 1: How can proactive vitality management be conceptualized and reliably measured?

In order to conceptualize proactive vitality management, I have integrated and built further on several streams of literature to introduce proactive vitality management as 'individual, goal-oriented behavior aimed at managing physical and mental energy to promote optimal functioning at work'. The conceptualization of proactive vitality management has been elaborated upon throughout the various chapters in this dissertation, but most thoroughly in Chapter 2. In line with the key attributes of proactive behavior established by Parker et al. (2010), proactive vitality management involves self-starting behavior that is inherently change-oriented and future-focused. Indeed, individuals may purposefully initiate actions aimed to manage their vitality for work based on their own situational needs and personal preferences.

According to the proactivity framework developed by Parker et al. (2010), individuals can either change the self or the situation to achieve their goals (i.e., locus of change). However, studied examples of proactive behavior in an organizational context, such as job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001), voice (LePine & Van Dyne, 1998), or playful work design (Bakker et al., 2020; Scharp et al., 2019), mostly involve behavior aimed at changing the situation, such as the task, the job or the

(social) work environment. In contrast, proactive vitality management distinguishes itself from other studied examples of proactive behavior because it involves proactive behavior aimed at changing aspects of the *self* – or more specifically, one's physical, affective, and cognitive state – to achieve optimal functioning. Vitality has been defined and conceptualized as encompassing both a physical and mental – i.e., affective and cognitive – component (Lavrusheva, 2020; Ryan & Frederick, 1997). These explicit features of not only feeling physically fit, but also positive and mentally alert is what distinguishes vitality from the mere concept of physical energy. In line with this, proactive vitality management has been conceptualized in this dissertation as an overarching behavioral construct comprising the proactive management of the physical, affective, and cognitive components inherent in vitality.

Finally, proactivity involves goal-driven processes, and this intentional, goal-directed aspect is inherent in the proactive vitality management construct as well. Individuals may strategically use proactive vitality management to satisfy their personal need for energy conservation in order to achieve optimal functioning at work (De Bloom et al., 2020). By doing so, they may achieve a better personal fit within one's work environment (Parker et al., 2010). As such, proactive vitality management may be used by individuals to influence their own occupational health and performance. This 'bottom-up' approach may be contrasted with – but also complement – top-down approaches in which organizations aim to impact employee well-being and performance, for example through job redesign (cf. JD-R theory; Bakker & Demerouti, 2017; Holman et al., 2010; Holman & Axtell, 2016).

Measurement Instrument

To support the conceptualization of proactive vitality management and to explore it further, I developed a measurement instrument for it, as detailed in Chapter 2. The results from two survey studies (total N = 813) showed that proactive vitality management can be reliably measured with a scale consisting of eight items. Moreover, a state version of the scale that captures within-person fluctuations in proactive vitality management was tested. Results from a five-day diary study (N = 133) and a cross-sectional study on the day-level (N = 246) showed that daily proactive vitality management can be reliably measured with the same eight items when adapted to the day-level. Throughout the studies presented in this dissertation, the reliability

of both the general and state version of the proactive vitality management scale was good (Cronbach's alphas varied between .86 and .97). The newly developed proactive vitality management scale behaved consistently throughout the studies described in the previous chapters, suggesting that the scale is applicable to and may reliably be used across different settings, nationalities, organizations, as well as measurement levels. For example, the studies involved samples of working people from various organizations and occupations, as well as nationalities, namely Dutch (Chapter 2, 3, 4 and 6), but also German (Chapter 5) and American individuals (Chapter 2 and 5). Moreover, the empirical studies described in the previous chapters indicate that the scale may be used to examine both between-person differences as well as intraindividual fluctuations in the use of proactive vitality management.

Intraindividual Variation

Some individuals may use proactive vitality management on a regular basis, making it somewhat of a habit to anticipate the workdays ahead and manage their physical and mental energy accordingly. In this way, proactive vitality management may become part of one's personal way of living, likely related to general work motivation and personality characteristics. However, most people are not that steadfast all the time, and not every day or week is the same. As such, proactive vitality management is inherently a fluctuating phenomenon. It refers to proactive behavior individuals may display to a more or lesser extent, day in and day out. In support of this view, the amount of variance in proactive vitality management that could be explained at the within-person level ranged from 33% to 69% throughout the studies included in this dissertation. These percentages indicate that the use of proactive vitality management fluctuates considerably from week to week (Chapters 3 and 4) and from day to day (Chapters 2 and 5).

A within-person approach may capture the relative use of proactive vitality management on moments (e.g., days) compared to other moments, and how those relative deviations from the mean may meaningfully relate to (fluctuating) outcomes. Moreover, questionnaires that are tailored to specific time periods (e.g., day or week) reduce retrospective bias and increase the accuracy of the self-reported behaviors (Ohly et al., 2010). Besides such a methodological advantage of being 'on top' of the process, there is also a conceptual difference between using a within-person design compared

to a between-person design. Indeed, considering a certain phenomenon as fluctuating – showing intraindividual variation – is conceptually different from approaching the phenomenon on a between-person level (i.e., as a trait, general phenomenon, or other stable construct). Moreover, it has been argued that between-person variation may not be used as a surrogate for within-person variation, and that the correlates and causes of between-person and within-person variation need to be analyzed as distinct phenomena (Brose et al., 2015; Molenaar, 2004). While variation at the between-person level may be attributed to more stable factors related to the person and their environment, as discussed above, intraindividual fluctuations are likely determined by situations and person by situation interactions (Brose et al., 2015). With regards to proactive vitality management, such determinants could be, for example, differences between workdays and tasks, the amount of physical and mental energy work requires, and varying personal needs.

Nomological Network

As part of the validation process, I explored the nomological network of proactive vitality management to examine how it relates to theoretically associated constructs. The findings, discussed in Chapter 2, show a pattern that is consistent with the conceptualization of proactive vitality management. First of all, the findings on the person-level indicated that proactive vitality management was moderately to strongly associated with higher levels of work engagement and cognitive liveliness, and lower levels of exhaustion. Moreover, findings on the day-level indicated that individuals experience more vigor and less fatigue when they had proactively managed their vitality for work that day, similarly indicated by moderate to strong correlations. So, while these measures of well-being represent the physical, affective, and cognitive *states* inherent in vitality, they share considerable overlap with proactive vitality management *behavior*. These findings correspond to the conceptualization of the construct, as an overarching behavioral construct comprising the proactive management of the physical, affective, and cognitive components inherent in vitality.

Additional findings discussed in Chapter 2 showed that proactive vitality management shares conceptual overlap with other proactive constructs, further supporting its conceptualization. For example, individuals with a proactive personality were more likely to use proactive vitality management, as indicated by a moderate correlation

between the two constructs on the person-level. Moreover, the use of proactive vitality management was associated with the use of job crafting, as indicated by moderately strong correlations with increasing social and structural job resources and challenging demands on the person-level, and a moderate correlation with increasing social job resources on the day-level. The common denominator of all proactive constructs lies in the 'forward time perspective', which is also inherent in proactive personality, job crafting, and proactive vitality management. Proactive personality refers to an individual characteristic that makes one predisposed to take control and engage in behavior that brings about change (Bateman & Crant, 1993), and it has been frequently associated with many forms of proactive behavior (Fuller & Marler, 2009; Parker & Collins, 2010). Accordingly, while proactive personality is a trait as opposed to a behavior, proactive individuals may be more likely to engage in various proactive behaviors, including proactive vitality management. Moreover, job crafting and proactive vitality management are conceptually related because they share the proactive strategy of optimizing employees' experiences. However, job crafting refers to proactively changing aspects of one's work environment, whereas proactive vitality management involves intentional behavior aimed at changing aspects of the self – or more specifically, one's physical, affective, and cognitive state. Both behaviors may subsequently improve the fit of the person with their job or work environment fit (cf. Parker et al., 2010; Tims et al., 2014; Wrzesniewski & Dutton, 2001).

Finally, in the context of divergent validity, proactive vitality management may be contrasted with behaviors that are more reactive and less goal-driven in nature. Indeed, findings from the nomological network in Chapter 2 showed that there were weak or non-existent relationships between proactive vitality management and decreasing hindering demands, as well as recovery-related constructs, such as taking micro-breaks and psychological detachment from work, both on general and day-level. While decreasing one's job demands and recovering after (periods of) work may potentially counter strain and protect well-being, it may sometimes be 'too little too late' in the long run. Trying to stay ahead of strain or empty energy reserves is key, and proactive vitality management involves preparing for what is to come rather than recovering from or reacting to what was. As shown in this dissertation, through proactive vitality management, individuals may thus act in a more timely and therefore effective manner to reduce the risk of potential physical and mental health issues.

According to the Effort-Recovery Model (Meijman & Mulder, 1998), effort expenditure at work leads to fatigue, but when an individual is no longer exposed to the work or similar demands, this process may be reversed and recovery occurs. At the same time, people may engage in recovery-like activities – e.g., hobbies after work or coffee breaks at work – as part of a routine or habit, in response to physiological triggers, because they have little to do, because they are not feeling well, because they dislike their task, or to reward themselves (Bosch & Sonnentag, 2019). Moreover, studies that examine the effects of recovery on performance outcomes are scarce, and their results inconsistent (Sonnentag et al., 2017). In contrast, proactive vitality management involves intentional and goal-directed behavior. Moreover, following the conceptualization of proactive vitality management, the studies in the current manuscript show a robust pattern linking proactive vitality management to various indicators of performance at work.

Research Question 2: What are the consequential processes of proactive vitality management?

The findings from the studies presented in this dissertation generally indicate that individuals who proactively manage their vitality for work – e.g., by intentionally going for an energizing walk or by taking the initiative to talk to inspiring colleagues – feel better in terms of physical and mental energy – they are more enthusiastic and more cognitively flexible. In addition, they tend to have more creative ideas and they perform better. For example, findings detailed in Chapter 2 showed that proactive vitality management was related to better job performance and more creative work performance, both on the person- and day-level. Moreover, on days individuals had proactively managed their vitality, they performed better on the Remote Associates Test, which measures one's cognitive capacity to think associatively and to create new combinations that are useful. These findings were corroborated in a weekly diary study detailed in Chapter 3, which showed that employees performed more creatively at work during weeks in which they had proactively managed their vitality. These results provide initial support for the value of proactive vitality management. In the studies described throughout Chapter 4-6, I aimed to take a closer look by focusing on the underlying mechanisms that bridge proactive vitality management to favorable outcomes.

Proactive Vitality Management Processes

Proactive vitality management has been conceptualized as a proactive behavior that involves changing aspects of the self to achieve a different future (cf. Parker et al., 2010). In the proactive vitality management process, individuals may alter their physical, affective, and cognitive states to promote optimal functioning at work. So, while the 'different future' may mostly be represented by work-related outcomes, the 'changed self' may be manifested in process variables that reflect the physical, affective, and cognitive components of vitality (Lavrusheva, 2020; Ryan & Frederick, 1997). These process variables may theoretically answer the question *how* proactive vitality management relates to work-related outcomes.

As discussed earlier, the findings in this dissertation show that proactive vitality management is associated with, for example, lower levels of exhaustion and fatigue (i.e., physical), and higher levels of work engagement (i.e., affective) and cognitive liveliness (i.e., cognitive). These findings are corroborated by recently published studies similarly showing that proactive vitality management is associated with lower fatigue and exhaustion, as well as higher work engagement and mental health (Bălăceanu et al., 2021; Tisu et al., 2021; Ye et al., 2020, 2021). In correspondence with JD-R theory, proactive vitality management may relate to more favorable work-related outcomes via such increases in well-being (Bakker & Demerouti, 2017). More specifically, the physical, affective, and cognitive components inherent in proactive vitality management may trigger multiple, intertwined processes that may subsequently promote optimal functioning (cf. Lavrusheva, 2020; Ryan & Deci, 2008; Ryan & Frederick, 1997). I have maintained this integrative perspective throughout the various chapters in this dissertation. However, each of the vitality components has also been the subject of a more focused view while I explored the various underlying mechanisms through which proactive vitality management may promote favorable outcomes.

Physical Mechanism

In Chapter 6, I focused on a mechanism that corresponds to the physical aspect of proactive vitality management by exploring the mediating role of exhaustion in the link with work outcomes. More specifically, findings from the longitudinal study described in Chapter 6 show that employees who used proactive vitality management experienced less exhaustion three months later, which subsequently related to reduced absenteeism

and fewer functional limitations two years later. Accordingly, in line with JD-R theory, using proactive vitality management may help to avoid or reduce fatigue, and reduce corresponding deficits in work performance (i.e., mitigating health impairment; Bakker & Demerouti, 2017). These findings suggest that proactive vitality management may play an important protective role with regards to occupational health and performance. Individuals may maintain adequate levels of psychological and physical resources that prevent future resource losses by initiating actions on a regularly basis, helping them to stay ahead of physical and mental health issues (cf. Hobfoll, 1989). Through proactive vitality management, individuals may intervene in a proactive and timely manner, undertaking action before they might become depleted and their functioning impaired (Hockey, 1997; Op den Kamp et al., 2018). In contrast, acting in a reactive manner and failing to undertake such anticipatory action may, over time, result in maladaptive or even self-destructive behaviors that cause health impairment to progress (Bakker & Costa, 2014; Bakker & De Vries, 2021).

Affective Mechanism

In addition to a physical mechanism, the studies in this dissertation suggest that proactive vitality management may also relate to favorable outcomes through an underlying affective mechanism. For example, findings from a weekly diary study detailed in Chapter 4 showed that employees were more engaged in their work and performed more creatively at work during weeks in which they had proactively managed their vitality. In Chapter 6, I also focused on the affective mechanism by exploring the mediating role of work engagement in the link between proactive vitality management and creative work performance. More specifically, findings from the longitudinal study described in Chapter 6 show that employees who used proactive vitality management were more engaged in their work three months later, which subsequently related to increased creative performance at work two years later. Recently published studies that corroborate these findings show, for example, that proactive vitality management relates positively to work engagement, which, in turn, relates positively to mental health (Ye et al., 2021). Moreover, Tisu et al. (2021) showed that the use of proactive vitality management was related to higher job performance, mediated by work engagement. Accordingly, in addition to mitigating health impairment, proactive vitality management may instigate an affective process that corresponds to JD-R's motivational process.

Cognitive Mechanism

JD-R theory is based on two processes that are primarily physical (i.e., health impairment process) and affective (i.e., motivational process) in nature. However, based on the vitality literature, proactive vitality management has been conceptualized as an overarching construct that may spur physical, affective, as well as *cognitive* processes. I focused on the cognitive mechanism through which proactive vitality management may relate to favorable outcomes in Chapter 5. More specifically, replicated findings from two daily diary studies showed that, on days employees used proactive vitality management they performed better on a daily creative brainstorm task and they were evaluated as performing more creatively at work by their supervisors. These relationships were mediated by daily states of mindfulness, i.e., cognitive states characterized by attention to and awareness of present events and experiences (Brown et al., 2007).

Even though studies often focus on vitality's either physical, affective, or cognitive components and effects, these components are intertwined (Lavrusheva, 2020). Similarly, even though I distinguished between the physical, affective, and cognitive processes spurred by proactive vitality management in some of the studies in this dissertation, I have argued that these processes are intertwined, and may thus partly overlap and occur simultaneously. For example, physical energy may play a role in the process of activated positive affect and may also enable a fresh pair of eyes and headspace. At the same time, some aspects of the different processes may be rather unique. For example, undertaking action to feel more physically energetic is not necessarily accompanied by an increase in happiness, and making sure one is able to focus well need not require one to experience positive affect. The relative importance of a primarily physical, affective, or cognitive mechanism in the link between proactive vitality management and favorable work outcomes process may depend on characteristics of the person, the situation, and the outcome.

Top-Down versus Bottom-Up

The studies included in this dissertation together show that individuals who proactively manage their vitality for work – e.g., by purposefully listening to relaxing music during work or shutting of their phone and e-mail to be able to focus – feel better in terms of physical and mental energy, and perform better and more creatively. These findings

provide valuable insights because they create awareness of the important role the individual plays in their own occupational health and performance. Indeed, when it comes to promoting employee well-being and performance, studies often point towards contextual variables, such as elements of the job or work environment. For example, JD-R theory postulates that job demands influence fatigue, and may have a negative indirect impact on functional capacity ('health impairment process'). In contrast, job resources influence employee work engagement, and have an indirect impact on job performance ('motivational process'; Bakker & Demerouti, 2017; Demerouti et al., 2001). Previous research has shown that organizations and their managers may thus valuably impact employee health and motivation through top-down processes that involve job redesign (e.g., Holman et al., 2010; Holman & Axtell, 2016).

Similar to top-down approaches aimed at employee well-being, research has shown that organizations can deploy tactics to foster employee creativity, for example by providing a resourceful environment in which creativity is valued, encouraged, and facilitated (Hunter et al., 2007; Shalley & Gilson, 2004). Moreover, characteristics of the person, such as having expertise in a certain domain or being open to new experiences, may offer a fruitful basis for creativity to arise (e.g., Anderson et al., 2014; Amabile, 1983). However, top-down approaches cannot take all individual differences in needs and preferences into account. Moreover, individuals do not perform equally creative or effective at all times, and top-down approaches and distal factors may be less likely to explain intraindividual variation in occupational health and (creative) performance. To illustrate, even an experienced, open-minded individual who works in a resourceful environment may encounter days where they need to manage their physical and mental energy to deal with work, or to increase their chance of coming up with new ideas or useful solutions to problems.

Proactive vitality management is a behavioral strategy individuals may use themselves and on their own initiative to perform more effectively and creatively in the short term. Earlier studies have already provided specific examples of strategies individuals may use to manage their physical and mental energy to promote creativity in their work. For example, they may go for a walk to clear their mind and energize, increasing their subsequent levels of creativity (Oppezzo & Schwartz, 2014; Sianoja et al., 2018) or they may work on creative projects during the time of day that is aligned with their

chronotype (Kühnel et al., 2022). In turn, proactive vitality management may help individuals to make use of their personal potential and any favorable work conditions available to them to reach higher levels (creative) performance. The findings from each of the studies presented in this dissertation thus contribute to the literature by highlighting the importance of individuals' self-regulatory and proactive behaviors in the creative process (cf. De Stobbeleir et al., 2011).

Research Question 3: Who may benefit from using proactive vitality management?
The third goal of this dissertation was to explore when and for whom proactive vitality management may especially be beneficial or effective. First of all, I argued that – theoretically – everyone may use and benefit from proactive vitality management. Especially in the short term, small efforts and actions may already be sufficient to manage physical and mental energy and may considerably impact work-related outcomes. Moreover, the studies included in this dissertation support the value of proactive vitality management for employees from a wide range of organizations and occupations, with one study focusing explicitly on the creative industry (Chapter 5). In addition, I explored the role of proactive vitality management for employees with a chronic medical condition, i.e., a highly relevant yet understudied population in the context of occupational health and performance. While most people will have experienced times when they could not perform well because of low energy, focus, or drive, for chronically ill individuals, dealing with an energetic disadvantage is part of everyday reality. The findings from Chapter 6 showed that employees with a chronic liver condition who used proactive vitality management experienced more favorable outcomes over time with regards to their well-being and work performance.

To gain further insights on who may benefit from proactive vitality management, I built on the model of proactive motivation (Parker et al., 2010) to examine whether certain personal characteristics and contextual factors may make it more likely for an individual to – effectively – use proactive vitality management.

Personality and Proactive Vitality Management
Although proactive vitality management may be important for all individuals, some persons may be more likely or better equipped to proactively and timely manage their vitality than others. This idea suggests that there may be an interplay between

certain personality characteristics and proactive vitality management. First of all, as discussed earlier, the findings from Chapter 2 suggest that individuals with a proactive personality are more likely to engage in proactive vitality management. In addition, personal attributes may influence the extent to which the proactive, goal-driven process may result in change and a different future. For example, Parker et al., (2010) suggest that proactive goals that are learning-focused rather than performance-oriented (Dweck, 1986) will be more likely to result in effective goal achievement. In line with this, the findings from Chapter 4 show that the relationship between proactive vitality management and creative work performance (i.e., a different future) was stronger for individuals driven by a learning goal orientation compared to individuals driven by a performance goal orientation. So, even though the goal of proactive vitality management is optimal functioning at work – regardless of one's personality or goal orientation – these findings corroborate the idea that certain personal attributes may impact the proactive goal process and influence its effectiveness.

Other personal attributes that may impact the proactive process and influence the extent to which a different future is achieved may center around how individuals may more effectively strive towards their goal. Indeed, Parker et al. (2010) proposed that the more proactive goal striving involves effective self-regulation, the more likely it is that those "proactive goals will continue to be pursued rather than abandoned" (Parker et al., 2010, p. 833). In a similar vein, in this dissertation I have argued that, in order to succeed in a goal-driven process such as proactive vitality management, people need to use their self-regulation skills to develop and implement behavioral strategies, and to continuously monitor and evaluate what works best for them to achieve the desired results (Balkis & Duru, 2016; Wang et al., 2021; Zimmerman, 2000). As suggested by the findings from the studies described in Chapter 2, 3 and 6 of this dissertation, individuals with higher levels of self-insight seem better equipped to go through this self-regulatory process, enhancing the effect of their proactive vitality management behaviors. Similar to other key personal resources, such as emotional intelligence and optimism, self-insight may thus function as a higher-order and structural personal resource that facilitates the mobilization of other, more volatile personal resources, such as physical and mental energy (Bakker & De Vries, 2021; Ten Brummelhuis & Bakker, 2012). For example, Chapter 6 detailed how higher levels of self-insight strengthened the effectiveness of proactive vitality management in mitigating JD-R's health impairment

process and instigating JD-R's motivational process for chronically ill employees. While the role of personality in the context of JD-R theory has not been researched extensively before, some other studies have suggested that certain personal characteristics, such as neuroticism and extraversion (Bakker et al., 2010) and proactive personality (Li & Mao, 2014) may play a role in the JD-R processes. However, in contrast to many personality traits, an advantageous feature characterizing self-insight – referring to an understanding about the self, i.e., one's needs, goals, attributes – is that it can be developed and trained (Carver & Scheier, 1998; Grant et al., 2002; Klimoski & Hu, 2011).

Context and Proactive Vitality Management

In addition to personal characteristics that may be involved in (the effectiveness of) proactive behavior, the model of proactive motivation emphasizes the role that contextual factors may play in the proactive process. Although studies that consider how the context shapes proactive behaviors aimed at achieving a better fit between the individual and the organization are somewhat scarce, they suggest that the social context may be influential (Parker et al., 2010). Corresponding to this notion, the findings from a study described in Chapter 3 showed that social support strengthened the relationship between proactive vitality management and creative work performance on a weekly basis. Furthermore, even though Parker et al. (2010) suggested that job design may play an especially large role for other type of proactive work and strategic behaviors, I included job autonomy as a control variable in several studies presented in this dissertation. Indeed, while low levels of autonomy may not necessarily impede proactive vitality management efforts, it may be more challenging to employ effective strategies according to situational needs and personal preferences when there is little freedom to decide how, when, and where one executes their work. Tisu et al. (2021) corroborated this idea by showing that job autonomy preceded proactive vitality management, which was followed by work engagement and performance.

The way a job is designed may thus impact the likelihood and effectiveness of proactive vitality management. The findings correspond with Daniel's (2006) notion of 'enacted' job characteristics, which entails that employees must enact job characteristics, such as autonomy, in order for such stable job characteristics to have an impact on work and organizational outcomes. Proactive vitality management may allow employees to capitalize on available job resources – i.e., make better use of them – and translate

them into more favorable work outcomes, such as work engagement and performance (cf. Bakker & Demerouti, 2017; Tisu et al., 2021).

LIMITATIONS

In this section, I will discuss several limitations of the presented research on proactive vitality management, accompanied by some ideas on how to tackle these limitations in future studies. First, the relationships explored in the studies in this dissertation have not been tested causally. I controlled for earlier levels of the mediator and/or outcome variables in the studies presented in Chapter 4, 5, and 6 to capture 'change' in these variables, with findings indicating that proactive vitality management coincided with changes in, for example, work engagement, creativity, and job performance. Moreover, I used a longitudinal design to capture how proactive vitality management relates to changes in occupational health and well-being over a longer time period in Chapter 6. However, actual causality can only be established with experimental manipulations, such as interventions. Such interventions would address the call by Parker et al. (2010) for insights on how to intervene in order to boost proactivity. For example, an intervention focused on awareness and instruction may involve a workshop in which participants in the experimental group learn about their well-being in relation to work, and about how they can proactively improve this from day to day. During the training, participants may set personal goals and come up with various initiatives they can take to be physically active and get involved in interesting activities with the aim to feel energized and motivated. The majority of the studies included in this dissertation involve within-person designs that capture intraindividual fluctuations in proactive vitality management. Accordingly, an intervention in which individuals are provided with instruction and encouragement on a regularly basis – e.g., every day or even multiple times during the day – may be highly effective because it corresponds to the nature of proactive vitality management. For example, a workshop like the one described above may be followed up with a smartphone application that sends questions and alerts on a regular basis to stimulate self-reflection and nudge people into managing their physical and mental energy for work.

A second limitation is that I relied on self-reports in many of the studies included in this dissertation. Even though I used the Remote Associates Test to measure creative performance in Chapter 2, a brainstorm task and supervisor ratings to measure creative performance in Chapter 5, and days missed at work due to illness (i.e., absenteeism) in Chapter 6, this was not feasible in all studies. However, self-reports have important advantages too. For example, they allow for the measurement of psychological or internal experiences that are not feasible to measure more objectively, as individuals are sometimes the only ones able to observe their own thoughts and behaviors. Moreover, other-ratings are often based on general impressions of the focal employee, and may sometimes lack accuracy, especially on a daily basis. Furthermore, one of the main disadvantages of self-reports is the risk of socially desirable responses, which is diminished when examining within-person variation in longitudinal designs. With regards to proactive vitality management, it may almost be inevitable to use a self-reported measurement, as many of the behaviors that fall under proactive vitality management may be too small or out of sight from others to be noticed and reported on by others. However, adding to the self-report limitation, the question remains whether people are actually accurate in assessing their own (effective) proactive vitality management behaviors. Future research may aim to find ways to more objectively measure proactive vitality management. For example, by asking people for specific, textual diary entries in which they elaborate on their proactive vitality management strategizing and behaviors, and subsequently analyzing and coding these textual entries. Moreover, future studies may aim to incorporate objective measures of other surrounding factors or potential outcome variables, such as absenteeism, turnover, profit, client satisfaction, promotions, patents, or products sold.

Third, even though this dissertation includes eight empirical studies that together show a robust pattern of results, more research is needed to more thoroughly support external validity. For example, most studies included in this dissertation involved heterogeneous working samples. With the exception of the creative industry (Chapter 5), the studies did not focus on other specific sectors or occupations. For example, it may be interesting to explore the role of proactive vitality management in physically demanding occupations. Physical activity at work has been shown to impair physical health and relate to burnout, while 'off-job' physical activity, in contrast, promotes physical and mental health (i.e., 'the physical activity paradox'; Coenen et al., 2020;

de Vries & Bakker, 2021). Accordingly, proactive vitality management may be even more important in physically demanding jobs, while it may at the same time be more difficult to obtain positive results. Moreover, with the exception of a German (Chapter 5) and American (Chapter 2 and 5) sample, the studies involved participants of Dutch nationality. It is possible that proactive vitality management may manifest itself differently in other – currently unexplored – cultures, such as Asian cultures. Finally, the current studies have not taken into account demographic variables such as gender or age, which may also play a role. For example, it is possible that proactive vitality management may be more important for the aging workforce, who may deal with losses in personal resources, providing them with reason-to motivation to be proactive (Bakker & Hakanen, 2019). At the same time, physical and mental health issues seem to be highest among the younger workforce (TNO, 2020).

FUTURE RESEARCH

Thus far, as described above, I have made suggestions for future research that may tackle the methodological limitations of the studies included in this dissertation. In the following section, I will elaborate on several future research directions that may tackle theoretical questions that have thus far remained unanswered.

First of all, future research may further explore how proactive vitality management may not only complement top-down factors, such as job design, but may also interact with elements of the job or the work environment in its effect on occupational health and performance. The studies included in this dissertation are partly based – and build further – on JD-R theory (Bakker & Demerouti, 2017). More specifically, I consider proactive vitality management as a behavioral strategy that individuals can deploy to directly their occupational health and performance processes. With regards to the actual interplay between (elements of) job design and proactive vitality management, the discussion so far focused mostly on job resources, such as social support and job autonomy. However, the role of job *demands* in the proactive vitality management process has so far remained largely unexplored.

The model of proactive motivation (Parker et al., 2010) identifies job stressors as a contextual variable that may influence the proactive process. While one may argue that job stressors take a toll on an individual that may inhibit proactive behavior, researchers have argued that stressors indicate a mismatch between a desired and an actual situation. Employees may then engage in proactive behavior to decrease this discrepancy (Carver & Scheier, 1998; Parker et al., 2010). For example, individuals may show different behavioral responses to high versus low levels of workload. Some individuals may adopt an adaptive and approach-oriented coping style to deal with their job demands, for instance by seeking support, planning ahead, and by proactively managing their physical and mental energy (see also, Bakker & De Vries, 2021). However, high workload may also trigger a more maladaptive or avoidance coping style, in which people act passively or even disengage (Bakker & De Vries, 2021; Roth & Cohen, 1986).

While job demands may thus predict the use of proactive vitality management, the two may also interact in their impact on occupational health and performance. According to JD-R theory, job resources may counteract the negative impact of job demands in their influence on occupational health and performance (Bakker & Demerouti, 2017). However, later expansions of the theory have suggested that individual *behaviors* may similarly buffer the impact of job demands on health outcomes. For example, strength use refers to the application of more stable, personal qualities that may energize individuals, and Van Woerkom et al., (2016) showed that using one's personal strengths diminishes the impact of high workload on absenteeism. Following a somewhat similar reasoning, Sonnentag and Fritz (2015) theorized that psychological detachment – i.e., disengaging oneself psychologically from work when being away from the workplace – may act as a buffer in the link between job demands and health impairment. In this dissertation, proactive vitality management is mainly regarded as an instigator of occupational health and performance processes. Future research may build further on our findings and examine the potential buffering role of proactive vitality management in the link between job demands and poor health and performance outcomes.

Based on the high number of individuals that suffer from burnout complaints, it may be valuable to further examine the role of proactive vitality management in the process of work strain and the development of physical and mental health issues, such as burnout.

I have argued that proactive vitality management may be a valuable behavioral strategy that can help reduce physical and mental health issues in the long term. The findings from Chapter 6 provide some indication for this, by showing that proactive vitality management relates to lower exhaustion and functional limitations and absenteeism over time. Perhaps that individuals who use proactive vitality management on a regularly or even daily basis may also have a lower risk of developing burn-out because they act in a timely manner, maintaining adequate levels of physical and mental resources that help to prevent future resource losses (cf. Bakker & Costa, 2014; Hobfoll, 1989). In contrast, failing to undertake such anticipatory action may relate to poorer well-being and performance at work in the short term. Moreover, over time, this may result in a resource 'loss spiral' where individuals, over time, may act more and more in a passive and reactive manner. In turn, maladaptive and destructive behaviors, such as self-undermining, may cause health impairment to progress (Bakker & De Vries, 2021; Bakker & Wang, 2020). Future studies may examine more closely the development of physical and mental strain at work – potentially resulting in higher risk of burn-out – and how the proactive use of vitality management strategies may protect against such a development.

In contrast to the aforementioned 'loss spiral', proactive vitality management may also activate a 'gain spiral' or 'upward spiral' (Hobfoll, 1989; Strauss & Parker, 2014) where proactive vitality management may relate to more physical, affective, and cognitive resources, in turn stimulating more proactive vitality management, eventually structurally resulting in higher levels of performance at work over time (Tisu & Vîrgă, 2022). On the other hand, while I postulate that the regular use of proactive vitality management strategies should relate positively to optimal functioning at work, sometimes there can be too much of a good thing. Based on the idea of "no such thing as an unmitigated good," Grant and Schwartz (2011, p. 62) suggested that future research needs to identify the inflection points at which the effects of positive phenomena may turn negative. Building on this, Lam et al. (2014) showed that there is a curvilinear relationship between positive affect and proactive behavior, emphasizing the importance of aiming for intermediate levels of positive phenomena. In a similar vein, with regards to proactive vitality management, at some point there may be costs that outweigh the benefits (Grant & Schwarz, 2011). For example, while proactive vitality management may involve small efforts and actions, it may still be time-consuming.

When individuals are constantly working on their physical and mental energy – through outside walks, work breaks, and social interactions – this may ironically go at the expense of job performance at a certain point. Future research may focus on how and when proactive vitality management may activate resource gain spirals, and may aim to identify the inflection point at which the costs of proactive vitality management may outweigh the benefits.

In addition, the occasional distancing from work may be beneficial too. For example, creative performance may benefit from periods of incubation (Wallas, 1926) and intermediate levels of psychological detachment from work may benefit mental health (Shimazu et al., 2016). Accordingly, a potentially interesting avenue for future research lies in the interplay between reactive behaviors, such as distancing oneself from work, and proactive strategies, such as proactive vitality management. While there is a clear distinction between the two, they do not have to be mutually exclusive, and individuals may benefit from alternating the two strategies over time. Future research may aim to gain a more comprehensive understanding of the potentially non-linear or curvilinear effects of proactive vitality management as well as the relevant boundary conditions that may influence this process.

Finally, future research may bring more detailed insights with regards to the specific actions people proactively undertake to manage their vitality. The proactive vitality management scale itself is a relatively generic measure that I developed to be able to investigate the behavioral phenomenon and map its occurrence, and to gain insights into surrounding factors and consequential processes. However, throughout the chapters included in this dissertation, I provided numerous examples of proactive vitality management strategies, of which most – if not all of them – came from qualitative research I conducted during the development of my proactive vitality management research project. The examples that individuals mentioned when asked about their proactive vitality management behaviors ranged from sports activities before work to become energized, and listening to preferential music genres during work to become relaxed or focused – to more specific, idiosyncratic actions they had discovered worked for them, such as playing pool or other games in between work sessions to clear their mind, taking a different route to work for inspiration, or having lunch outside the office for a change of scenery. While there are thus numerous actions individuals may

proactively undertake to manage their physical and mental energy for work, future research may aim to develop a system, such as a quadrant or specified categories, to classify these proactive actions. Such a classification may not only provide valuable practical insights, but may also be used to take a closer look at the different types of strategies, and for whom or when they may especially be effective.

PRACTICAL IMPLICATIONS

The studies presented in this dissertation have several practical implications for working individuals and organizations. Overall, the findings from the studies together suggest that proactive vitality management is a valuable behavioral strategy for employees from various industries and occupations, for people working in the creative industry, and for employees with a chronic medical condition. The conceptualization and exploration of proactive vitality management included in this dissertation may facilitate communication about and encouragement of proactive vitality management within organizations. For instance, it is important to ask questions about where one stands with regards to their physical and mental energy for work, and to think about proactive strategies that may help manage these valuable resources, i.e., to cultivate self-insight in the proactive vitality management process.

Organizations may promote and facilitate proactive vitality management in several ways. First of all, the work environment and jobs may be (re)designed in a way that makes the use of proactive vitality management easier and more effective. For example, social support seems to increase the effectiveness of proactive vitality management. Individuals may thus aim to seek social support themselves (cf. De Stobbeleir et al., 2011; Tims et al., 2012), but organizations may also aim to establish a climate where social interaction is encouraged and facilitated. Moreover, it may be important to provide employees with some level of freedom in their work that allows them to employ strategies according to their own situational needs and personal preferences. Higher levels of job autonomy may, for example, provide people with the opportunity to adjust their working hours according to their own biorhythm or to do their work on different locations (e.g., outside or from home). However, many examples of proactive vitality management strategies provided throughout this dissertation may be employed under

lower levels of autonomy as well. For example, people may purposefully shut off their phone and e-mail for a while, decorate their own workplace, or listen to preferential music while working to become more relaxed or focused.

In addition, it may be important for organizations as well as supervisors or managers to lead by example and to explicitly encourage employees to engage in proactive vitality management. Moreover, top-down initiatives from the organization may complement but also encourage and facilitate proactive vitality management. For example, organizations may implement physical and mental health programs and initiatives, such as having a gym at work, providing healthy lunch options, or creating 'quiet zones' where employees may meditate or take a short nap during working hours. Employees may proactively manage their physical and mental energy through the intentional use of such available initiatives to promote their own work.

However, providing favorable circumstances for proactive vitality management may not be sufficient. Proactive behavior is inherently self-starting, and proactive vitality management involves proactive, individual behavior with the goal of optimal functioning at work. Individuals may be more likely to take such control themselves when they have the knowledge and tools to do so (i.e., 'can-do motivation'; Parker et al., 2010). Organizations may thus aim to stimulate proactive vitality management through training. In the Netherlands, practitioners have already started providing workshops on proactive vitality management. As described earlier, such trainings or workshops may involve instruction and encouragement, and provide helpful tools to navigate the proactive vitality management process. For example, individuals may be activated to think about their own goals, and why they are important to them, to cultivate a proactive, goal-oriented mindset. Moreover, the trainings may encourage individuals to set personal goals and come up with various initiatives they may take to manage the physical, cognitive, and affective resources that can help them to function optimally at work. In other words, trainings may function to promote awareness and activate a proactive approach in employees with regards to their physical and mental energy for work.

Finally, examples of proactive vitality management strategies are abundant and oftentimes idiosyncratic. What is important is that the actions are goal-directed and purposefully initiated; which specific behaviors or activities are most effective and

preferred may vary between individuals and be different over time (see also, Sonnentag & Fritz, 2007; Thayer et al., 1994). However, it is suggested that proactive vitality management strategies may have the best result when they suit the individual's needs and preferences. For example, research has shown that feeling happy or intrinsically motivated during any type of activity requires less effort, and that engaging in 'preferred activities' may be most beneficial in terms of physical and mental energy (e.g., Ten Brummelhuis & Trougakos, 2014; van Hooff et al., 2011; Hunter & Wu, 2016). Moreover, findings from multiple studies included in this dissertation suggest that higher levels of self-insight increase the effectiveness of proactive vitality management. Therefore, it is important that people develop and use their self-regulation skills by continuously thinking about their situational needs and personal preferences, and using a trial-and-error strategy to find out what works best for them.

CONCLUSION

The goal of this dissertation was to explore the role of the individual in promoting their own well-being and work outcomes. This approach is consistent with the idea of personal agency; that is, people can exert control over their own life. The conceptualization of proactive vitality management and the development of the proactive vitality management scale may facilitate theoretical advancement and systematic research on this topic. The studies presented in this dissertation build on core principles of proactive motivation and JD-R theories, and together explore the idea that individuals may proactively manage their own physical and mental energy for work to promote optimal functioning. Accordingly, besides valuable organizational policies or programs to promote employee vitality, organizations may benefit from creating a climate in which employees are stimulated and encouraged to take control themselves. The studies in this dissertation present a theoretical framework of proactive vitality management and its surrounding and consequential processes. Moreover, several relevant yet so far unexplored research avenues have been discussed that may help advance the literature and yield valuable new insights. Taken together, the presented work on proactive vitality management may hopefully inspire future research as well as practical interventions on proactive vitality management.

APPENDICES

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NEDERLANDSE SAMENVATTING
SUMMARY IN DUTCH

INTRODUCTIE

Hoewel de afgelopen jaren voortdurend innovatieve technologische ontwikkelingen hebben gebracht die de aard van werk hebben veranderd, blijft menselijk kapitaal cruciaal bij het bepalen van het succes van een organisatie. Mensen zijn echter geen robots: werk van hoge kwaliteit leveren kost inspanning en vereist fysieke en mentale energie. Veel mensen lijken te maken te hebben met een ondermaatse kwaliteit van hun werkleven, wat gepaard gaat met lichamelijke en mentale gezondheidsproblemen met hoge persoonlijke en maatschappelijke kosten. Zo blijkt uit recente statistieken dat ongeveer 1 op de 6 tot 7 werknemers in Nederland last heeft van burn-out gerelateerde klachten (CBS, 2021). Terwijl mensen dus fysieke en mentale energie nodig hebben om hun werk uit te voeren, zijn dergelijke bronnen vluchtig en raken ze gemakkelijk uitgeput. De meeste organisaties en mensen erkennen dan ook de noodzaak om te herstellen van inspanning, om met (over)belasting om te gaan, en om vermoeidheid en andere fysieke en psychologische problemen te voorkomen of verhelpen.

Organisaties kunnen via verschillende wegen proberen de gezondheid en prestaties van werknemers te beïnvloeden, bijvoorbeeld door veranderingen in formeel beleid of HR-strategieën, effectief leiderschap, job (re)design, of door het organisatieklimaat te verbeteren. Hoewel dergelijke 'top-down'-benaderingen waardevol kunnen zijn, kunnen ze niet aan elke situationele behoefte en persoonlijke voorkeur voldoen. Bovendien zijn mensen geen passieve 'ontvangers' van hun omgeving; ze kunnen controle nemen en invloed uitoefenen op hun eigen ervaringen en uitkomsten. Technologische ontwikkelingen en daarmee samenhangende veranderingen in de aard van het werk (bijvoorbeeld virtuele teams, flexwerk) brengen extra uitdagingen met zich mee om gezondheid en functioneren op het werk te reguleren. Bovendien hebben organisaties steeds vaker te maken met medewerkers die op afstand werken, waardoor het voor managers moeilijker wordt om hen te bereiken en te ondersteunen. In deze nieuwe manier van werken zijn mensen afhankelijker van zichzelf en is het belangrijk om ook zelf de verantwoordelijkheid te nemen voor om hun eigen werk, werk-privébalans, en

welzijn. Het is daarom belangrijk om de rol van het individu in dit proces centraal te stellen, dat wil zeggen, een 'bottom-up' benadering te hanteren. Vooral als het gaat om het reguleren van persoonlijke en vluchtige bronnen zoals fysieke en mentale energie, betoog ik dat een individuele en proactieve benadering essentieel is. Het hoofddoel van dit proefschrift is dan ook het introduceren en onderzoeken van een gedragsfenomeen dat ik 'proactive vitality management' noem – gedefinieerd als 'individueel, doelbewust gedrag dat gericht is op het reguleren van fysieke en mentale energie om optimaal functioneren op het werk te bevorderen'.

De verschillende onderzoeken die worden beschreven in dit proefschrift dragen bij aan een beter begrip van een proactive vitality management, vanaf hier afgekort tot 'PVM'. De doelstellingen van dit proefschrift kunnen worden samengevat in drie onderzoeksvragen die op elkaar voortbouwen. Deze onderzoeksvragen worden beantwoord met behulp van acht empirische studies die in de verschillende hoofdstukken van dit proefschrift zijn beschreven. Kortweg leveren de studies uit dit proefschrift kennis op over de conceptualisatie van PVM, hoe PVM gemeten kan worden, welke processen PVM in gang zet, hoe effectief PVM is, en voor wie en wanneer dat (met name) het geval is. Hieronder volgt een korte samenvatting van de belangrijkste bevindingen aan de hand van de drie onderzoeksvragen.

Onderzoeksvraag 1: Hoe kunnen we PVM conceptualiseren en dit gedrag op een betrouwbare manier meten?

Om PVM te conceptualiseren, heb ik verschillende literatuurstromen geïntegreerd en verder ontwikkeld om het te introduceren als 'individueel, doelbewust gedrag gericht op het reguleren van fysieke en mentale energie om optimaal functioneren op het werk te bevorderen'. In lijn met de belangrijkste kenmerken van proactief gedrag zoals vastgesteld door Parker et al. (2010) gaat het bij PVM om zelfstartend gedrag dat inherent veranderingsgericht en toekomstgericht is. Mensen kunnen dus doelbewust acties initiëren die gericht zijn op het beheren van hun vitaliteit voor het werk op basis van hun eigen situationele behoeften en persoonlijke voorkeuren. Volgens het theoretische kader van proactieve motivatie ontwikkeld door Parker et al. (2010), kunnen mensen ofwel zichzelf ofwel de situatie veranderen om hun doelen te bereiken. Echter, bestudeerde voorbeelden van proactief gedrag in een organisatorische context, zoals job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001), voice (LePine & Van

Dyne, 1998), of playful work design (Bakker et al., 2020; Scharp et al., 2019), betreffen vooral gedrag gericht op het veranderen van de situatie, zoals de taak, de baan, of de (sociale) werkomgeving. PVM onderscheidt zich van deze vormen van proactief gedrag doordat het gericht is op hoe mensen aspecten van zichzelf veranderen – of meer specifiek, hun fysieke, affectieve en cognitieve staat – om optimaal te kunnen functioneren. Vitaliteit heeft zowel een fysieke als een mentale – d.w.z. affectieve en cognitieve – component (Lavrusheva, 2020; Ryan & Frederick, 1997). Het gaat dus niet alleen om een fysiek fit gevoel, maar ook mentaal een gevoel van positiviteit en alertheid. In lijn hiermee is PVM in dit proefschrift neergezet als een overkoepelend gedragsconstruct dat het proactief reguleren van de fysieke, affectieve en cognitieve componenten van vitaliteit omvat.

Ten slotte omvat proactiviteit doelgerichte processen, en dit opzettelijke, doelbewuste aspect is ook inherent aan PVM. Mensen kunnen strategisch gebruik maken van PVM om hun persoonlijke behoefte aan energiebescherming te bevredigen om optimaal te kunnen functioneren op het werk (De Bloom et al., 2020). Door dit te doen, kunnen ze een betere persoonlijke fit met hun werk en werkomgeving bereiken (Parker et al., 2010). Als zodanig kan PVM door mensen worden gebruikt om hun eigen gezondheid en prestaties op het werk te beïnvloeden. Deze 'bottom-up'-benadering kan worden gecontrasteerd met – maar is ook complementair aan – top-down-benaderingen waarin organisaties ernaar streven het welzijn en de prestaties van werknemers te beïnvloeden, bijvoorbeeld door job redesign (vgl. JD-R-theorie; Bakker & Demerouti, 2017; Holman et al., 2010; Holman & Axtell, 2016).

Meetinstrument

Om PVM grondig te kunnen onderzoeken is een instrument nodig om het fenomeen vast te leggen en systematisch onderzoek ernaar te faciliteren. Met een dergelijk instrument kan gekeken worden naar mogelijke verschillen tussen personen in PVM, als ook fluctuaties binnen de persoon. Bovendien kan het instrument worden gebruikt in toetsend onderzoek om inzicht te krijgen in de onderliggende mechanismen, gevolgen en andere relevante factoren en voorwaarden rondom het PVM-proces (zie ook onderzoeksvraag 2 en 3). In **Hoofdstuk 2** wordt de ontwikkeling en validatie van de PVM schaal gepresenteerd. De items voor de schaal zijn geformuleerd om het doelgerichte karakter van het construct weer te geven, verwijzend naar gedrag dat gericht is op

het bevorderen van het functioneren tijdens het werk. Bovendien worden op basis van de vitaliteitsliteratuur de fysieke, affectieve en cognitieve aspecten die inherent zijn aan vitaliteit meegenomen in de schaal. De psychometrische kwaliteit van het instrument wordt getoetst door de betrouwbaarheid en factorstructuur te onderzoeken. De studies in dit proefschrift laten tezamen zien dat PVM betrouwbaar kan worden gemeten met een schaal bestaande uit acht items onder één overkoepelende factor. De nieuw ontwikkelde schaal voor PVM functioneerde consistent in alle verschillende onderzoeken die in dit proefschrift zijn beschreven, wat aangeeft dat de schaal toepasbaar is op en betrouwbaar kan worden gebruikt in verschillende omgevingen, landen, organisaties, en meetniveaus. Bovendien geven de resultaten van de studies aan dat de schaal inderdaad kan worden gebruikt om zowel verschillen tussen personen als intra-individuele fluctuaties in het gebruik van PVM te onderzoeken.

Intra-individuele benadering

Sommige mensen gebruiken regelmatig PVM, waardoor het mogelijk een gewoonte wordt om te anticiperen op de komende werkdagen en hun fysieke en mentale energie dienovereenkomstig te reguleren. Op deze manier kan PVM onderdeel worden van iemands persoonlijke manier van leven, waarschijnlijk gerelateerd aan algemene werkmotivatie en persoonlijkheidskenmerken. De meeste mensen zijn echter niet altijd even standvastig, en niet elke dag of week is hetzelfde. PVM is daarmee een veranderlijk, fluctuerend fenomeen. Het verwijst naar proactief gedrag dat mensen in meer of mindere mate dag in dag uit kunnen vertonen. Ter ondersteuning van deze benadering varieerde de mate van variantie in PVM die kon worden verklaard op intra-individueel niveau van 33% tot 69% in de onderzoeken die in dit proefschrift zijn opgenomen. Deze percentages geven aan dat het gebruik van PVM sterk fluctueert van week tot week (**Hoofdstukken 3 en 4**) en van dag tot dag (**Hoofdstukken 2 en 5**). Het beschouwen van een bepaald fenomeen als fluctuerend – het tonen van intra-individuele variatie – is conceptueel verschillend van het benaderen van het fenomeen op persoonsniveau (d.w.z. als een eigenschap, algemeen fenomeen of ander stabiel construct; Brose et al., 2015; Molenaar, 2004). Hoewel variatie op persoonsniveau kan worden toegeschreven aan stabiele factoren die verband houden met de persoon en zijn omgeving, zoals hierboven besproken, worden intra-individuele fluctuaties waarschijnlijk bepaald door situaties en persoon x situatie-interacties (Brose et al., 2015). Met betrekking tot PVM kunnen dergelijke factoren bijvoorbeeld de verschillen

tussen werkdagen en taken zijn, de hoeveelheid fysieke en mentale energie die het werk vereist, en fluctuerende persoonlijke behoeften.

Nomologisch netwerk

Als onderdeel van het validatieproces heb ik het nomologische netwerk van PVM verkend om te onderzoeken hoe het zich verhoudt tot theoretisch verwante constructen. De bevindingen, besproken in **Hoofdstuk 2,** laten een patroon zien dat consistent is met de conceptualisering van PVM. Ten eerste gaven de bevindingen aan dat PVM matig tot sterk geassocieerd was met meer energie, bevlogenheid en cognitieve levendigheid, en met minder vermoeidheid. Deze bevindingen komen overeen met het idee dat PVM een overkoepelend gedragsconstruct is dat het proactief reguleren van de fysieke, affectieve en cognitieve componenten inherent aan vitaliteit omvat. Om de conceptualisering van PVM verder te ondersteunen is het van belang dat PVM enige conceptuele overlap heeft, maar ook zinvol kan worden onderscheiden van theoretisch verwante constructen. Bevindingen uit **Hoofdstuk 2** lieten zien dat mensen met een proactieve persoonlijkheid vaker PVM gebruiken, en dat PVM geassocieerd was met het gebruik van job crafting. De gemene deler van alle proactieve constructen ligt in het 'forward time perspective', dat ook onderliggend is aan proactieve persoonlijkheid, job crafting en PVM. Proactieve persoonlijkheid verwijst naar een individuele eigenschap die iemand predisponeert om de controle te nemen en zich in te laten met gedrag dat verandering teweegbrengt (Bateman & Crant, 1993), en het is vaak geassocieerd met vele vormen van proactief gedrag (Fuller & Marler, 2009; Parker & Collins, 2010). Dienovereenkomstig, hoewel proactieve persoonlijkheid een eigenschap is in tegenstelling tot gedrag, is de kans groter dat proactieve mensen zich inlaten met verschillende proactieve gedragingen, waaronder PVM. Bovendien zijn job crafting en PVM conceptueel verwant omdat ze de proactieve strategie om de ervaringen van werknemers te optimaliseren delen. Job crafting verwijst echter naar het proactief veranderen van aspecten van iemands werkomgeving, terwijl PVM opzettelijk gedrag omvat dat gericht is op het veranderen van aspecten van zichzelf – of meer specifiek, iemands fysieke, affectieve, en cognitieve toestand. Beide gedragingen kunnen vervolgens de fit van de persoon met de baan of werkomgeving verbeteren (vgl. Parker et al., 2010; Tims et al., 2014; Wrzesniewski & Dutton, 2001).

Ten slotte, om divergente validiteit vast te stellen, heb ik onderzocht of PVM kan worden gecontrasteerd met gedrag dat reactiever en minder doelgericht van aard is. De bevindingen van het nomologische netwerk in **Hoofdstuk 2** toonden inderdaad aan dat er zwakke of niet-bestaande relaties waren tussen PVM en het verlagen van belemmerende taakeisen, evenals gedrag dat vooral gericht is op herstel na inspanning, of zelfs het onttrekken aan werk, zoals psychologische onthechting van het werk. Mensen kunnen zich bezighouden met herstel-achtige activiteiten – bijvoorbeeld hobby's na het werk of koffiepauzes op het werk – als onderdeel van een routine of gewoonte, als reactie op fysiologische triggers, omdat ze weinig te doen hebben, omdat ze niet zich goed voelen, omdat ze het werk niet leuk vinden, of om zichzelf te belonen (Bosch & Sonnentag, 2019). Hoewel het verminderen van belemmerende taakeisen en het herstellen na (periodes van) werk de belasting kan tegengaan en daarmee het welzijn kan beschermen, toont onderzoek aan dat het niet of nauwelijks gerelateerd is aan beter functioneren. Daarbij kan het met name op de lange termijn soms 'too little too late' zijn. Het is van cruciaal belang om spanning of lege energiereserves voor te blijven, en PVM houdt in dat men zich voorbereidt op wat komen gaat in plaats van te herstellen van – of te reageren op – wat was. Zoals aangetoond in dit proefschrift kunnen mensen, door middel van PVM, dus tijdiger en effectiever handelen om het risico op mogelijke fysieke en mentale gezondheidsproblemen te verminderen.

Onderzoeksvraag 2: Welke processen worden door PVM in gang gezet en wat zijn de uitkomsten hiervan?

De onderzoeksbevindingen die in dit proefschrift worden gepresenteerd geven over het algemeen aan dat personen die hun vitaliteit voor het werk op proactieve wijze reguleren zich fysiek beter voelen, enthousiaster zijn, en cognitief flexibeler kunnen nadenken. Bovendien hebben ze vaak creatievere ideeën en functioneren ze beter tijdens het werk. Zo laten de bevindingen in **Hoofdstuk 2** bijvoorbeeld zien dat PVM verband houdt met betere werkprestaties en creatievere werkprestaties, zowel op persoon- als op dagniveau. Hiernaast presteerden mensen op dagen dat ze PVM gebruikt hadden beter op de Remote Associates Test, die iemands cognitieve vermogen meet om associatief te denken en om nieuwe nuttige combinaties te creëren. Deze bevindingen werden bekrachtigd in een wekelijkse dagboekstudie die wordt beschreven in **Hoofdstuk 3**, waaruit bleek dat werknemers creatiever presteerden op het werk gedurende weken waarin ze proactief met hun fysieke en mentale energie voor werk aan de slag waren

gegaan. Deze resultaten bieden een eerste onderbouwing voor de waarde van PVM, en brengen waardevolle inzichten omdat ze bewustzijn creëren van de belangrijke rol die het individu speelt in diens eigen gezondheid en presteren op het werk. In de onderzoeken die in **Hoofdstuk 4, 5, en 6** worden beschreven, heb ik me verdiept in de onderliggende mechanismen die PVM verbinden met positieve uitkomsten.

PVM processen

PVM is een bepaalde vorm van proactief gedrag waarbij mensen aspecten van zichzelf veranderen om een doel te bereiken. Specifieker kunnen mensen in het PVM-proces hun fysieke, affectieve en cognitieve staat veranderen om optimaal functioneren op het werk te bevorderen. Dus hoewel het *doel* met name kan worden gerepresenteerd door werk gerelateerde uitkomsten, kan de *'veranderde zelf'* zich manifesteren in procesvariabelen die de fysieke, affectieve en cognitieve componenten van vitaliteit weerspiegelen (Lavrusheva, 2020; Ryan & Frederick, 1997). In andere woorden, deze procesvariabelen kunnen in theorie de vraag beantwoorden *hoe* PVM zich verhoudt tot werk gerelateerde uitkomsten.

Fysiek mechanisme

In **Hoofdstuk 6** heb ik me gericht op een mechanisme dat correspondeert met het fysieke aspect van PVM door de tussenliggende rol van vermoeidheid in de relatie tussen PVM en werkuitkomsten te onderzoeken. Meer specifiek laten de bevindingen van de longitudinale studie onder chronisch zieke werknemers zien dat werknemers die PVM gebruikten drie maanden later minder vermoeidheid ervaarden, wat vervolgens samenhing met verminderd ziekteverzuim en minder functionele beperkingen twee jaar later. In lijn met de JD-R-theorie kan het gebruik van PVM dus helpen om uitputting en daaruit voortvloeiende functioneringsproblemen te voorkomen of verminderen (Bakker & Demerouti, 2017). Deze bevindingen suggereren dat PVM een belangrijke beschermende rol kan spelen met betrekking tot gezondheid en prestaties op het werk. Mensen kunnen een adequaat niveau van psychologische en fysieke hulpbronnen behouden om toekomstig verlies van hulpbronnen te voorkomen door regelmatig acties te ondernemen, waardoor ze fysieke en mentale gezondheidsproblemen voorblijven (Hobfoll, 1989). Door PVM kunnen mensen proactief en tijdig ingrijpen en actie ondernemen voordat ze uitgeput raken en hun functioneren verslechtert (Hockey, 1997). Daarentegen kan reactief handelen en het niet ondernemen van dergelijke anticiperende

maatregelen na verloop van tijd resulteren in onaangepast of zelfs zelfdestructief gedrag dat de gezondheid verslechtert (Bakker & Costa, 2014; Bakker & De Vries, 2021).

Affectief mechanisme

Naast een fysiek mechanisme suggereren de studies in dit proefschrift dat PVM ook gerelateerd kan zijn aan positieve uitkomsten via een onderliggend affectief mechanisme. Bevindingen uit een wekelijkse dagboekstudie die in **Hoofdstuk 4** wordt beschreven lieten bijvoorbeeld zien dat werknemers meer bevlogen waren in hun werk, en vervolgens ook creatiever presteerden op het werk gedurende weken waarin ze PVM hadden gebruikt. In **Hoofdstuk 6** heb ik me ook gericht op het affectieve mechanisme door de tussenliggende rol van bevlogenheid in het verband tussen PVM en creatieve werkprestaties te onderzoeken. In deze longitudinale studie onder chronisch zieke werknemers zag ik dat werknemers die PVM gebruikten drie maanden later meer betrokken en gemotiveerd waren op werk, wat vervolgens twee jaar later verband hield met verhoogde creatieve werkprestaties.

Cognitief mechanisme

De JD-R-theorie is gebaseerd op twee processen die voornamelijk fysiek (d.w.z. uitputtingsproces) en affectief (d.w.z. motivationeel proces) van aard zijn. Op basis van de literatuur over vitaliteit is PVM echter geconceptualiseerd als een overkoepelend construct dat fysieke, affectieve én cognitieve processen kan stimuleren. In **Hoofdstuk 5** heb ik me gericht op het cognitieve mechanisme waardoor PVM gerelateerd kan zijn aan positieve uitkomsten. Met een dagboekstudie toonde ik aan dat op dagen dat werknemers PVM gebruikten, ze beter presteerden op een dagelijkse creatieve brainstormtaak. In een tweede dagboekstudie onder werkende mensen uit de creatieve industrie werden deze bevindingen gerepliceerd – deze werknemers werden door hun leidinggevenden als creatiever beoordeeld op dagen dat ze PVM gebruikt hadden. In beide onderzoeken kon het verband tussen PVM en creativiteit verklaard worden doordat werknemers zich meer 'mindful' voelden op werk, gedefinieerd als een cognitieve staat die wordt gekenmerkt door verhoogde aandacht voor en bewustzijn van huidige gebeurtenissen en ervaringen (Brown et al., 2007).

Onderzoeksvraag 3: Wie kan baat hebben bij het gebruik van PVM?

Het derde doel van dit proefschrift was om te onderzoeken wanneer en voor wie PVM vooral gunstig of effectief kan zijn. Allereerst heb ik betoogd dat – in theorie – iedereen PVM kan gebruiken en er baat bij kan hebben. Vooral op de korte termijn kunnen kleine inspanningen en acties al voldoende zijn om fysieke en mentale energie te reguleren en kunnen ze een aanzienlijke impact hebben op werk gerelateerde uitkomsten. Bovendien ondersteunen de onderzoeken in dit proefschrift de waarde van PVM voor werknemers uit een breed scala van organisaties en beroepen, waarbij één onderzoek zich expliciet richt op de creatieve industrie (**Hoofdstuk 5**). Daarnaast onderzocht ik de rol van PVM voor werknemers met een chronische medische aandoening, een zeer relevante maar onderbelichte populatie in de context van gezondheid en prestaties op het werk. Waar de meeste mensen momenten zullen kennen waarop het niet lukt om goed te presteren vanwege een gebrek aan energie, focus of drive, is voor chronisch zieken het omgaan met verminderde vitaliteit vaak onderdeel van de dagelijkse realiteit. De onderzoeksbevindingen beschreven in **Hoofdstuk 6** lieten zien dat werkende mensen met een chronische ziekte in de loop van tijd positievere uitkomsten ervaarden met betrekking tot hun welzijn en functioneren op werk wanneer zij meer aan PVM deden. Om aanvullend inzicht te krijgen in wie baat kan hebben bij PVM, heb ik voortgebouwd op het model van proactieve motivatie (Parker et al., 2010) en onderzocht of bepaalde persoonlijke kenmerken en contextuele factoren het voor een individu waarschijnlijker maken om – effectief – aan PVM te doen.

Persoonlijkheid en PVM

Hoewel PVM voor alle mensen belangrijk kan zijn, zijn sommige personen meer of beter toegerust om hun vitaliteit proactief en tijdig te reguleren dan anderen. Dit idee impliceert dat er een wisselwerking kan zijn tussen bepaalde persoonlijkheidskenmerken en PVM. Allereerst laten de bevindingen uit **Hoofdstuk 2**, zoals eerder besproken, zien dat mensen met een proactieve persoonlijkheid meer geneigd zijn tot PVM. Daarnaast kunnen persoonlijke eigenschappen van invloed zijn op de mate waarin het proactieve, doelgerichte proces kan leiden tot verandering en een andere toekomst. In lijn hiermee laten de onderzoeksbevindingen beschreven in **Hoofdstuk 4** zien dat de relatie tussen PVM en creatieve werkprestaties (d.w.z. een andere toekomst) sterker was voor mensen die gedreven werden door een leerdoel-oriëntatie in vergelijking met mensen die gedreven werden door een prestatiedoel-oriëntatie.

Andere persoonlijke kenmerken die van invloed kunnen zijn op het proactieve proces en de mate waarin verandering wordt bereikt kunnen te maken hebben met hoe mensen effectiever naar hun doel kunnen streven. Parker et al. (2010) stelden al dat effectieve zelfregulatie in het nastreven van proactieve doelen het waarschijnlijker maakt dat die proactieve doelen ook nagestreefd blijven worden, en niet opgegeven worden (Parker et al., 2010). In dezelfde geest heb ik in dit proefschrift betoogd dat, om goed te slagen in een doelgericht proces zoals PVM, mensen hun zelfregulatie vaardigheden zullen moeten gebruiken. Immers, mensen kunnen proactief een breed scala aan strategieën gebruiken om hun vitaliteit voor het werk te reguleren, waarvan de effectiviteit en aantrekkelijkheid van persoon tot moment kan verschillen (vgl. Sonnentag & Fritz, 2007; Thayer et al., 1994). Sommige mensen proberen bijvoorbeeld misschien vroeg wakker te worden en elke ochtend te sporten om energie te krijgen voor de aankomende werkdag, terwijl anderen zich mogelijk juist concentreren op voldoende slaap om de werkdag fysiek en mentaal uitgerust te beginnen. Naast dergelijke individuele verschillen, kan het aantal en het type PVM-strategieën die mensen gebruiken van dag tot dag verschillen. Wanneer deadlines bijvoorbeeld vragen om ononderbroken tijd om aan projecten te werken kunnen mensen misschien een rustige plek opzoeken om te werken en hun e-mail en push berichten een tijdje uitschakelen (bijvoorbeeld een 'stilte uur' inbouwen; König et al. , 2013). Op andere momenten kunnen mensen ervoor kiezen om te gaan wandelen om hun hoofd leeg te maken en nieuwe ideeën op te doen (Oppezzo & Schwartz, 2014) of om naar hun favoriete muziek te luisteren terwijl ze aan het werk zijn om een energieke en gedreven mindset te bevorderen (Lesiuk, 2005). Belangrijk hierbij is dat de PVM-strategieën *bewust* en *doelgericht* worden ingezet. In dit zelfregulerende proces moeten mensen dus gedragsstrategieën bedenken en implementeren, en voortdurend monitoren en evalueren wat voor hen het beste werkt om de gewenste uitkomsten te bereiken (Balkis & Duru, 2016; Wang et al., 2021; Zimmerman, 2000). Dit idee ondersteunend laten de bevindingen van de studies beschreven in **Hoofdstuk 2, 3 en 6** van dit proefschrift zien dat mensen met meer zelfinzicht beter in staat zijn om dit zelfregulerende proces te doorlopen, waardoor het effect van hun PVM-strategieën wordt versterkt. Zelfinzicht kan dus functioneren als een structurele persoonlijke hulpbron die de mobilisatie van meer vluchtige persoonlijke hulpbronnen, zoals fysieke en mentale energie, makkelijker maakt (Ten Brummelhuis & Bakker, 2012). **Hoofdstuk 6** beschrijft bijvoorbeeld hoe een hoger niveau van zelfinzicht de effectiviteit van PVM versterkte bij het verminderen van JD-R's uitputtingsproces en het op gang

brengen van JD-R's motivatieproces voor chronisch zieke werknemers. Hiernaast laten de wekelijkse onderzoeksbevindingen beschreven in **Hoofdstuk 3** zien dat mensen met hoger zelfinzicht extra creatief waren op werk na het gebruik van PVM. In tegenstelling tot veel andere persoonlijkheidskenmerken is een belangrijk en waardevol kenmerk van zelfinzicht dat men het kan trainen en ontwikkelen (Carver & Scheier, 1998; Grant et al., 2002; Klimoski & Hu, 2011).

Context en PVM

Naast persoonskenmerken die mogelijk een rol spelen bij (de effectiviteit van) proactief gedrag, benadrukt het model van proactieve motivatie de rol die contextuele factoren kunnen spelen in het proactieve proces (Parker et al., 2010). Zo kan de manier waarop een baan is ontworpen van invloed zijn op de effectiviteit van PVM. Hiernaast kan PVM werknemers in staat stellen om te kapitaliseren op beschikbare werkbronnen - d.w.z. er beter gebruik van te maken - en deze te vertalen in positieve werkuitkomsten, zoals werkbetrokkenheid en prestaties. In overeenstemming met dit idee lieten de bevindingen van een onderzoek beschreven in **Hoofdstuk 3** zien dat sociale steun op de werkvloer het verband tussen PVM en wekelijkse creatieve werkprestaties versterkte. Hiernaast heb ik in verschillende studies die in dit proefschrift worden gepresenteerd rekening gehouden met de mate van autonomie in het werk die de deelnemers hadden. Hoewel een lage mate van autonomie PVM-gedrag niet noodzakelijkerwijs hoeft te belemmeren, kan het een grotere uitdaging zijn om effectieve strategieën te gebruiken op basis van situationele behoeften en persoonlijke voorkeuren wanneer er weinig vrijheid is om te beslissen hoe, wanneer en waar men zijn werk uitvoert.

Naast waardevolle werkbronnen zoals sociale steun en werkautonomie, hebben veel mensen te maken met taakeisen die hinderend kunnen werken, zoals een (te) hoge werkdruk. Hoewel men zou kunnen beweren dat stressoren op het werk een tol eisen van een persoon en proactief gedrag kunnen remmen, wijzen stressoren ook op een 'mismatch' tussen een gewenste en een werkelijke situatie. Mensen zouden in zo'n situatie ook proactief gedrag kunnen vertonen om deze discrepantie te verkleinen (Carver & Scheier, 1998; Parker et al., 2010). Zo kunnen mensen bijvoorbeeld verschillende gedragsreacties vertonen op hoge versus lage werkdruk. Waar een hoge werkdruk kan leiden tot een onaangepaste of vermijdende coping-stijl, waarbij mensen passief handelen of zichzelf terugtrekken (Bakker & De Vries, 2021; Roth & Cohen, 1986),

kunnen mensen ook een adaptieve en toenaderingsgerichte coping-stijl aannemen om met hun werkeisen om te gaan – bijvoorbeeld door ondersteuning te zoeken, vooruit te plannen en door proactief hun fysieke en mentale energie te reguleren. Toekomstig onderzoek zal verder moeten uitwijzen hoe verschillende persoonlijke en contextuele factoren een rol kunnen spelen in het PVM-proces.

CONCLUSIE

De onderzoeken die in dit proefschrift zijn opgenomen laten samen zien dat mensen die hun vitaliteit voor het werk proactief reguleren – bijvoorbeeld door doelbewust naar ontspannende muziek te luisteren tijdens het werk of hun telefoon en e-mail af te sluiten om zich te kunnen concentreren – zich beter voelen en ook beter en creatiever presteren. De studies in dit proefschrift presenteren een theoretisch kader van PVM en de omringende en daaruit voortvloeiende processen, en dragen bij aan de literatuur door het belang van zelfregulerend en proactief gedrag van mensen in hun eigen werkproces te benadrukken. Hiernaast heb ik in dit proefschrift uiteenlopende suggesties voor toekomstig onderzoek gedaan, dat zich bijvoorbeeld zou kunnen richten op de precieze rol van de (sociale) werkomgeving in het PVM-proces, de rol van PVM ten aanzien van burnout, en de mogelijke keerzijden van PVM. Iedereen die zijn of haar werkgerelateerde bevlogenheid, gezondheid of functioneren wil verbeteren kan door middel van een proactieve mindset en bewuste, doelgerichte acties ervoor zorgen dat zij meer fysieke en mentale energie hebben voor hun werk. Zij kunnen vervolgens gezonder, prettiger, en effectiever werken, wat PVM zowel voor organisaties als voor het individu een belangrijk thema maakt. Derhalve kunnen organisaties, naast waardevol organisatiebeleid of programma's om de vitaliteit van medewerkers te bevorderen, profiteren van het creëren van een klimaat waarin medewerkers worden gestimuleerd en aangemoedigd om zelf de regie te nemen. Ik hoop dan ook dat mijn proefschrift als bouwsteen kan dienen om bewustzijn en aandacht voor PVM in de praktijk te genereren en om toekomstig onderzoek naar PVM te inspireren, zodat er een beter begrip ontstaat van de belangrijke rol die mensen zelf kunnen spelen om optimaal functioneren te bevorderen.

CURRICULUM VITAE

Emma M. Op den Kamp was born on the 13th of November, 1989, in Amsterdam, the Netherlands. After graduating from the Stedelijk Gymnasium Haarlem, she spent a year working at a publishing company, studying Italian in Florence, and traveling. After that, she started her Psychology studies at the University of Amsterdam. She specialized in Social Psychology during her bachelor's, followed by obtaining her master's degree in Sports and Performance Psychology. During her studies, Emma participated in the psychology honor program and worked as a student assistant and research assistant. Moreover, she worked as a performance psychologist at the Barlaeus Gymnasium Amsterdam during her master's internship. She eventually ended up in Rotterdam, where she started a 2-in-1 year research master, Master of Philosophy in Business Research, at the Erasmus Research Institute of Management. During her time there, she worked as a research assistant for a large research project on goal-setting and writing interventions, a project that had brought her to Rotterdam in the first place. She left the program early because she was provided the opportunity to work at the Center of Excellence for Positive Organizational Psychology at the Erasmus University Rotterdam, where she started her PhD research that has resulted in this dissertation. Over the years, Emma has presented her work at several (inter)national scientific conferences, including several European Association of Work and Organizational Psychology (EAWOP) conferences and the Proactive Behavior Conference in Hongkong. Additionally, she co-organized the 'Werkgemeenschap van onderzoekers in de Arbeids- & Organisatiepsychologie' (WAOP) conference in Rotterdam, and later also provided workshops on her research to practitioners. Currently, she is working as an assistant professor at the Leadership & Management department of the Amsterdam Business School (University of Amsterdam), where she combines doing research with her other passion, teaching.

Papers

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