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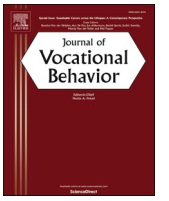

Working with a chronic health condition: The implications of proactive vitality management for occupational health and performance

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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 proactive motivation and job demands-resources (JD-R) theories to hypothesize that chronically ill individuals may optimize their own well-being and work performance by using proactive vitality management (PVM). In Study 1, we tested our hypotheses through multigroup comparative analyses among a mixed sample of both healthy and chronically ill employees who participated in a weekly, three-wave study (T1 $N = 399$, M age = 45.18 ($SD = 13.13$), 48 % female). In Study 2, employees with a chronic liver disease were followed over the course of 2,5 years and filled out surveys at three points in time (T1 $N = 192$, M age = 48.73 ($SD = 10.75$), 72 % female). Findings from both studies were in line with our hypotheses. More specifically, consistent with JD-R theory's health impairment hypothesis, results showed that exhaustion mediated the relation between PVM and (a) functional limitations and (b) absenteeism. Consistent with JD-R's motivational hypothesis, work engagement mediated the relation between PVM and (a) creative work performance and (b) absenteeism. In addition, results of moderated mediation analyses indicated that these indirect effects were stronger for chronically ill 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.

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). 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 (Beatty, 2012).

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While people with chronic illness form an understudied population (Beatty, 2012), 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 (Brzykcy et al., 2019). At the same time, chronic illness can impede the ability to fully engage in career development or even derail one's career entirely. Moreover, 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 proactive motivation theory, we propose that chronically ill employees can be proactive agents who take initiatives to shape their own work-related well-being, career development, and outcomes to some extent, in accordance with their personal needs and health restrictions (Grant & Parker, 2009; Hoekstra, 2011; Parker et al., 2010; Sullivan, 1999).

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. Proactive vitality management involves anticipatory behavior, where individuals take a forward look at their situation, their goals and wants, and proactively undertake action to manage their physical and mental energy accordingly. While individuals dealing with chronic illness may, at times, be required to display such behavior due to their health condition, it may be or seem especially challenging for them at the same time, because the additional burden of their health condition may potentially limit their 'can-do' motivation (Parker et al., 2010). Given that the value of proactive vitality management thus far has been evidenced only in studies among the healthy working population (e.g., Bakker et al., 2020; Op den Kamp et al., 2018, 2023; Op den Kamp et al., 2020; Pap et al., 2022; Tisu & Vîrgă, 2022), it is important to study whether chronically ill workers – who may deal with this additional burden on their health and physical capacity – may also benefit from adopting a proactive approach toward 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. 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 and reduced absenteeism 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). Self-insight may help individuals with chronic illness to overcome barriers and assess their personal needs, preferences, and restrictions more accurately. Therefore, self-insight may function as a higher-order personal resource that may reinforce the role of proactive vitality management in the JD-R's health impairment and motivational processes.

The current research consists of two studies in which we follow chronically ill employees over time and investigate whether they use proactive vitality management to promote their own functioning at work (see Fig. 1 for the proposed model). In Study 1, we test our hypotheses through multigroup comparative analyses among a mixed sample of both healthy and chronically ill employees who participated in a weekly, three-wave study.[1] Subsequently, in Study 2, we focus on working individuals with a chronic liver condition, whom we followed over the course of 2.5 years. Our investigation of proactive vitality management among chronically ill working individuals aims to make several contributions.

First of all, our research contributes to proactive motivation theory (Parker et al., 2010) and addresses the call for longitudinal studies on the outcomes of proactive behavior over time by exploring the hypothesized consequential processes of proactive vitality management for chronically ill employees. Our research focuses on a specific type of proactive behavior that aims to change the self – more specifically one's physical and mental state – rather than the environment, which has not received much attention so far (Op den Kamp et al., 2018; Parker et al., 2010), and has not been studied among chronically ill employees thus far either, while it seems highly relevant to them. Indeed, individuals living with a chronic disease represent a substantial part of the workforce that likely deals with lower vitality on a regular basis. Including them in our study on proactive, bottom-up behavior brings insights from a new and different perspective that complements the hitherto mainly studied top-down practices and research involving chronically ill employees.

Secondly, to uncover the potential value of proactive vitality management for individuals with a chronic health condition, we integrate proactive motivation theory with JD-R theory (Bakker & Demerouti, 2017) and study this behavior within the two core processes of the JD-R model - the health impairment and the motivational process. Previous studies have primarily examined how different forms of proactive behavior, including proactive vitality management, relate to favorable work outcomes, such as work engagement, performance, and creativity (e.g., Bakker et al., 2020; Op den Kamp et al., 2020, 2023; Pap et al., 2022; Tisu et al., 2023; Ye et al., 2021). Such findings thus primarily pertain to the motivational process in JD-R theory (Bakker & Demerouti, 2017). However, studies on how proactive behaviors may mitigate or prevent health impairment are far more scarce, while such a process may be highly relevant to study in general, and specifically in relation to proactive vitality management and among individuals with a chronic illness. Distinguishing between the two processes allows us to examine the potential protective role proactive vitality management may play with regard to health impairment, differentiating it from maladaptive or even self-destructive behaviors that may cause health

[1] The present research focuses on the value of proactive vitality management for employees with chronic illness. However, for comparison purposes, Study 1 includes a sample of both chronically ill and healthy workers. Accordingly, we mainly refer to chronically ill employees but if needed for clarity, we refer to both.

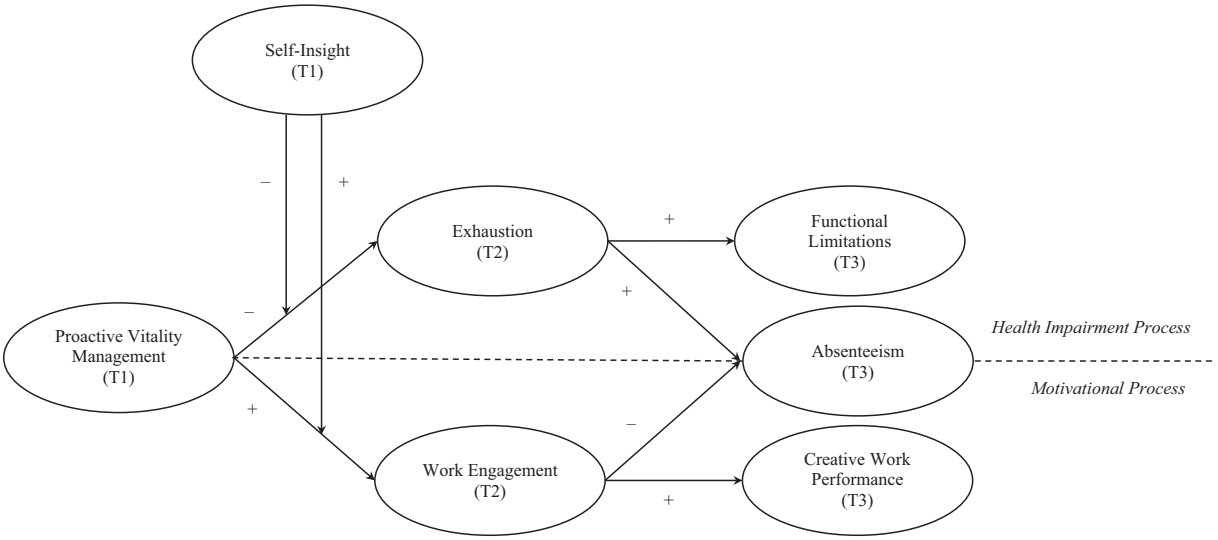

Fig. 1. The proposed theoretical model of proactive vitality management among chronically ill individuals at work.

impairment to progress (Bakker & de Vries, 2021; Bakker, Xanthopoulou, & &Demerouti, 2023). We aim to show that proactive behavior can spur the motivational process but may also help to address exhaustion, thereby reducing negative personal and work outcomes.

Finally, our research builds on the suggestion that personal factors may exert a moderating influence on the effectiveness of the proactive process (Parker et al., 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. 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.

1. Theoretical background

Self-regulation theory posits that individuals guide their goal-directed activities and performance by setting their own standards and monitoring their progress toward 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, the organizational literature suggests that people may also 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). In a similar vein, 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 this way, proactive vitality management, as goal-oriented behavior aimed at managing physical and mental energy, could be regarded as a specific type of adaptive self-regulatory strategies that may also be referred to as proactive coping. It is, however, important to emphasize that proactive vitality management refers to goal-directed behavior – aimed at changing and improving one's physical and mental state to promote optimal functioning – and thus involves self-starting and future-focused action (Parker et al., 2010). As such, it can be distinguished from reactive coping forms that involve dealing with past or current threats, challenges, or other obstacles. Indeed, 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).

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). As chronic illnesses are health conditions that are prolonged, require medical treatment, and are accompanied by some degree of functional limitation (Beatty, 2012), chronically ill employees may have 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 benefit personally and protect their value to society and the organizations they work for by trying to retain functional work capacity. Adaptive and proactive behaviors are recognized as an important activity in achieving and maintaining person-environment (P-E) fit, which is important for career development (Bayl-Smith & Griffin, 2018; Hoekstra, 2011; Kooij, 2015; Parker et al., 2010). Through proactive vitality management, those working with chronic illness may continually promote their own well-being as well as P-E fit (Bakker et al., 2020; Op den Kamp et al., 2018), thus helping them acquire and maintain work and build sustainable careers (i.e., with healthier and longer life span). 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).

1.1. 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 may exhaust the individuals' mental and physical resources, leading to strain and health problems. In contrast, the motivational process is traditionally 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).

While the presence of job demands and the availability of job resources may substantially impact occupational health and performance, more recently, scholars have expanded their perspective by also looking at individual-level behaviors that may play an influential role. Bakker and Demerouti (2017; see also Bakker, Demerouti, & Sanz-Vergel, 2023) integrated such individual behaviors into the JD-R model and argued that employees may use various behavioral strategies to influence their own health and motivation. The inclusion of such behaviors in JD-R theory is in line with conservation of resources theory, which states that individuals are naturally wired to protect and mobilize different kinds of resources to deal with their current and future situation (Hobfoll et al., 2018). For example, 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 (Scharp et al., 2022). Other examples of individual behaviors that have been linked to the JD-R processes include strength use (Van Woerkom et al., 2016), self-management (Houghton & Neck, 2002), and recovery (Sonnentag & Fritz, 2007). 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 of health impairment and motivation.

1.2. The health impairment process

1.2.1. Proactive vitality management and exhaustion

Central to the health impairment process is the premise that, as a consequence of physical, affective, and cognitive strain, people may develop higher levels of exhaustion, limiting their functional capacity at work. 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 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., 2022; 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.

Notwithstanding the importance of the health impairment process among healthy employees (e.g., Bakker, Demerouti, De Boer, & Schaufeli, 2003; Bakker, Demerouti, & Schaufeli, 2003; De Beer et al., 2016; Schaufeli & Bakker, 2004), we expect that this process may certainly also affect 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 difficulty dealing with demanding situations at times (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 decrements in functional work capacity over time.

1.2.2. Exhaustion, functional limitations, and absenteeism

In JD-R's health impairment process, individual levels of exhaustion may, in turn, result in reduced functional capacity at work – indicated by, for example, performance decrements and absenteeism (e.g., Bakker, Demerouti, De Boer, & Schaufeli, 2003; Bakker et al., 2004; Cropanzano et al., 2003; Demerouti et al., 2001; Schaufeli et al., 2009; Taris, 2006). Based on earlier health impairment studies and taking into account the context of working with chronic illness, in the current research 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 missed work hours or days (i.e., absenteeism). Indeed, chronic illnesses are not only widespread in the workforce but often lead to relevant impairment of work activities and work participation among affected workers. For example, chronic illness is one of the most common causes of work incapacity, resulting in twice as many absences as other (i.e., non-chronic) illnesses or causes (Nazarov et al., 2019).

Through the hypothesized reduction in exhaustion, chronically ill employees who proactively manage their vitality may experience less difficulty in performing their everyday work tasks. Moreover, the need to call in sick may diminish, or, the capacity to reintegrate into work quicker after an illness flare-up may be higher, resulting in lower levels of absenteeism over time. In contrast, when they experience higher levels of exhaustion, this may function as a central mechanism in the health impairment process, resulting in diminished day-to-day functioning. In line with this reasoning, previous research studies have repeatedly identified absenteeism as an outcome of exhaustion (e.g., Ahola et al., 2008; Lawson & O'Brien, 1994; Peterson et al., 2011) and a meta-analysis by Swider and Zimmerman (2010) also found that exhaustion was the most proximal predictor of absenteeism.

Summing up, by proactively managing their physical and mental energy, chronically ill employees may become better equipped with essential resources to deal with challenges or job demands at work. Doing so may, therefore, mitigate health impairment effects, including exhaustion and corresponding drops in functional work capacity over time (see also Fig. 1).

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

1.3. The motivational process

1.3.1. Proactive vitality management and work engagement

Parallel to the health impairment process, which centers around health deterioration and lowered functional capacity, 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 outcomes 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., 2022; Op den Kamp et al., 2018; Pap et al., 2022; Tisu et al., 2023; 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.

1.3.2. Work engagement, creative work performance, and absenteeism

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). In JD-R's motivational process, individual levels of work engagement may thus, in turn, result in favorable work outcomes – such as lowered turnover intentions and improved job performance (Salanova et al., 2005; Schaufeli & Bakker, 2004). Chronically ill individuals may not only boost their own engagement through their own behavior but also, in doing so, reach a higher level of performance at work that reflects the capacity but also the willingness (i.e., motivation) to 'go above and beyond'. Accordingly, 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). 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., Amabile, 1997; 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., 2023), thereby creating the optimal circumstances to perform creatively in their work over time.

In addition to an increased ability to perform more creatively, we hypothesize that highly engaged chronically ill individuals may display lower levels of absenteeism. Indeed, while 'calling in sick' has often been linked to health impairment, with higher levels of exhaustion causing a higher degree of absenteeism, motivation may also play an important role in the prevalence of absenteeism. More specifically, when chronically ill employees feel positive and fulfilled in their work (i.e., highly engaged), they have been shown to be less inclined to call in sick in the first place (Schaufeli et al., 2009). Similarly, when chronically ill individuals experience low levels of motivation in their work, these feelings might produce and sustain absenteeism spells because they may lack the drive to reintegrate into their work. Summing up, we propose that chronically ill employees who proactively manage their vitality feel more engaged in their work. In this motivational process, they may subsequently perform more creatively and report lower absenteeism over time (see also Fig. 1).

Hypothesis 2. T1 proactive vitality management is positively related to (a) T3 creative work performance and (b) T3 absenteeism, through T2 work engagement.

1.4. The role of self-insight

In order to protect and boost 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 a full workday feeling as physically and mentally prepared as possible. Alternatively, others may aim to mindfully derive positive energy for afternoon work tasks through a work break filled with social interaction or by listening to their favorite music while working. In a similar vein, someone may try to start busy 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 is 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, because self-insight may help them to assess their needs and preferences, and to recognize their strengths and weaknesses in the process.

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, making their efforts more impactful. 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 toward 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-do 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 relations 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 relations between T1 proactive vitality management and (a) T3 creative work performance and (b) T3 absenteeism through T2 work engagement is stronger for individuals with high (vs. low) self-insight.

2. Study 1

The aim of Study 1 is to explore the role of proactive vitality management in the two JD-R processes among both healthy and chronically ill employees. To this end, we follow employees with and without a chronic medical condition over the course of three weeks to test the hypothesized processes. Such a comparative investigation allows us to gain initial insights into the potential value of proactive vitality management and self-insight regarding health (impairment) and motivation and may uncover any potential differences between the two subpopulations at the same time.

3. Method

3.1. Procedure and participants

Participants for Study 1 were recruited via Prolific and were paid for their participation through this platform. Several studies have shown that data collected through online platforms, and in specific the Prolific platform, are reliable and valid (e.g., Douglas et al., 2023; Palan & Schitter, 2018; Peer et al., 2022). Individuals were eligible to participate in the research if they were currently working/employed. In addition, we aimed for approximately 50 % participants with and 50 % participants without a chronic medical condition. Our recruitment approach was achieved through the use of inclusion criteria in Prolific. In the introductory message, participants read that the study aimed to gain insights on their work experiences and well-being through three weekly surveys. After clicking on the link to Part 1 of the research (i.e., the first weekly survey), participants received more information and were asked to indicate their consent for participation in the entire, time-lagged study. Participants were instructed to fill out each questionnaire at the end of each working week, over the course of three consecutive workweeks. The three-wave, weekly design was chosen because such a 'shortitudinal' study (cf. Dormann & Griffin, 2015) allows for an initial examination of proactive vitality management in the two JD-R processes over time, while still capturing the relative short-term influence of proactive vitality management, in line with earlier studies showing that proactive vitality management may fluctuate and affect outcomes within short time periods such as days or weeks (e.g., Bakker et al., 2020; Op den Kamp et al., 2020, 2023). We asked participants to fill in their unique Prolific ID at the beginning of each survey to be able to match their responses across the three weeks.

In total, 399 participants participated in Part I of our research. The week after that, 356 participants (89 %) also filled out Part II of the research. Finally, the week after that, 315 participants (79 %) also filled out Part III, the third and final weekly survey of the study. We matched Time 1 (T1), Time 2 (T2), and Time 3 (T3) data based on their Prolific IDs. At T1, the mean age of the participants was 45.18 ($SD = 13.13$), and 48 % of the sample was female. Of all participants, 42 % had a bachelor's degree, and 21 % held a university degree. On average, participants worked 38.17 h per week ($SD = 9.38$) in a wide range of professions and industries, including health care (15 %), education (10 %), retail (10 %), ICT (9 %), finances (8 %), manufacturing (7 %), professional services (7 %), building and construction (5 %), marketing and sales (5 %), and, to a lesser extent, in sectors such as government, hotel and catering, culture and media, and agriculture.

Finally, to validate our comparative approach regarding employees with and without a chronic medical condition, we performed some additional checks. Of the participants, 42 % indeed indicated they had a chronic illness, including a wide range of medical conditions, such as heart and lung diseases, chronic pain, diabetes, mental health disorders, multiple sclerosis (MS), and arthritis, among other conditions. Moreover, participants working with a chronic medical condition on average dealt with more severe health issues compared to those without a chronic illness – as represented by the variable health complaints (see measures): $M = 1.33$, $SD = 2.23$ for healthy individuals and $M = 4.63$, $SD = 2.53$ for chronically ill individuals, $t(397) = -13.78$, $p < .001$. In addition, they spent more time on their personal circumstances and health (i.e., disease management), causing interference with their work – as represented by the variable 'self-work conflict' (see measures): $M = 1.63$, $SD = 0.83$ for healthy individuals and $M = 2.24$, $SD = 0.89$ for chronically ill individuals, $t(397) = -5.99$, $p < .001$.

3.2. Measures

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. An example item is: "This past week, I made sure that I felt energetic during my work" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was 0.93.

Exhaustion was measured at T2 with four items from the Oldenburg Burnout Inventory (Demerouti et al., 2010). An example item is "This past week, I felt worn out and weary after work" (1 = *totally disagree*, 4 = *totally agree*). Cronbach's alpha was 0.93.

Work engagement was measured at T2 with the nine-item Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). Example items are: "This past week, at my job, I felt strong and vigorous," and "This past week, I was enthusiastic about my job" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was 0.93.

Functional limitations were measured at 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. The items were translated into English and back-translated by two of the authors who are proficient in Dutch and English. Participants were asked to what extent they experienced functional limitations within different aspects of their work. Example items are: "This past week, I was able to concentrate on my work tasks during the workday," and "This past week, I was able to maintain a normal working pace at work" (1 = *not limited at all*, 5 = *strongly limited*). Cronbach's alpha was 0.96. Because this measurement instrument is mostly used in practice, we examined its validity by conducting a confirmatory factor analysis (CFA) with the eight items. The results of the CFA indicated a good fit to the data (CFI = 0.99, IFI = 0.99, TLI = 0.99, RMSEA = 0.06, SRMR = 0.01). Moreover, all items had substantial standardized loadings on the latent construct, with coefficients ranging from 0.84 to 0.90 (all p-values $< .001$).

Absenteeism was measured at T3 with the number of reported missed work hours due to the way participants were feeling (i.e., health issues) during the past working week (cf. Darr & Johns, 2008).

Creative work performance was measured at T3 using five items developed by Zhou and George (2001). Participants indicated to what extent they agreed with statements such as "This past week, I came up with creative solutions to problems" (1 = *totally disagree*, 5

= *totally agree*). Cronbach's alpha was 0.96.

Self-insight was measured at T1 using the eight-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" (reversed scored; 1 = *totally disagree*, 6 = *totally agree*). Cronbach's alpha was 0.88.

Health complaints were measured at T1 with one item to explore the potential differences between participants with and without a chronic medical condition in their experience of (severe) health issues. 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).

Self-work conflict was measured at T1 with four items developed by Demerouti (2009) and slightly adapted to explore the potential differences between participants with and without a chronic medical condition in the extent to which their personal circumstances and health interfere with work. An example item is: [In general, how often does it happen that…] "the time that you spend on personal things and your health makes it difficult to do your job well" (1 = *never*, 5 = *all the time*). Cronbach's alpha was 0.92.

3.3. Analytical strategy

The Study 1 analyses were conducted using Mplus 8.10 software (Muthén & Muthén, 1998–2017), with full information maximum likelihood with robust standard errors (MLR) as the estimation method. Before testing our hypotheses, we examined the factor structure of our measurement model through confirmatory factor analysis (CFA). Moreover, we performed measurement invariance tests between the two subsamples using Satorra-Bentler scaled chi-square difference tests. After that, our theoretical model was tested through structural equation modeling (SEM). We created latent factors for each of the variables in our theoretical model based on the items used to measure each of the variables. Subsequently, we tested our hypotheses by estimating predictions between the latent factors. Because Study 1 involves a mixed sample of healthy and chronically ill employees, we performed multigroup comparative analyses to check for potential differences between these two subsamples, investigating the predictive equivalence across groups. Indirect effects were tested using bootstrapping (1000 iterations). The moderated mediation hypotheses were examined using the latent moderated structural equation modeling (LMS) approach (Klein & Moosbrugger, 2000) to test the interaction between self-insight and proactive vitality management in their potential effect on exhaustion and work engagement and, indirectly, on the outcome variables (i.e., to examine first-stage moderated mediation).

4. Results

4.1. Descriptive statistics

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 Fig. 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 respective latent factors fit the data well (see Table 1).

Furthermore, to check whether the measurement instruments were interpreted in the same way between the two subsamples, we

Table 1
Model fit indices of all CFA and SEM models in Study 1 and Study 2.

Model	χ^2	*df*	CFI	TLI	RMSEA
Study 1					
Measurement model all	1393.50	797	0.942	0.937	0.043
Measurement model healthy	1398.83	797	0.916	0.904	0.057
Measurement model illness	1249.62	797	0.917	0.901	0.058
Measurement invariance tests					
Model 1 Configural invariance	2655.16	1594	0.909	0.902	0.058
Model 2 Weak invariance	2699.81	1630	0.908	0.903	0.057
Model 3 Strong invariance	2749.89	1666	0.907	0.904	0.057
Model 4 Strict invariance	2854.80	1708	0.902	0.901	0.058
Model 5 Partial strict invariance	2798.24	1706	0.906	0.906	0.057
Conceptual model (all)	1111.10	552	0.936	0.931	0.050
Predictive equivalence tests					
Model 1 Baseline	2109.90	1162	0.907	0.902	0.064
Model 2 Equal slopes	2120.94	1168	0.904	0.902	0.063
Model 3a Free slopes, equal intercepts	2137.89	1168	0.902	0.90	0.065
Model 3b Equal slopes, equal intercepts	2143.41	1174	0.902	0.901	0.064
Model 4 Equal residuals	2162.43	1179	0.900	0.900	0.065
Study 2					
Measurement model	1215.35	797	0.917	0.907	0.055
Health impairment process	273.79	214	0.953	0.945	0.039
Motivational process	408.98	260	0.907	0.901	0.056

Table 2
Descriptive statistics and correlations among the variables in Study 1, per subsample: correlations for healthy individuals below the diagonal, for chronically ill individuals above the diagonal.

Variables	*M*(*SD*)(healthy)	*M*(*SD*)(illness)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 PVM	5.20 (1.06)	5.02 (1.09)	–	−0.06	−0.39**	0.19*	−0.47**	−0.38**	0.73**	0.64**	−0.07	−0.18*	−0.16*	−0.09	0.52**	0.57**
2. T1 Health complaints	1.33 (2.23)	4.63 (2.53)	−0.09	–	0.44**	−0.26**	0.23**	0.22**	−0.02	0.00	0.25**	0.32**	0.12	0.11	−0.06	−0.09
3. T1 Self-work conflict	1.63 (0.83)	2.24 (0.89)	−0.25**	0.42**	–	−0.44**	0.53**	0.52**	−0.36**	−0.41**	0.20*	0.46**	0.29**	0.20*	−0.21*	−0.23**
4. T1 Self-insight	4.65 (0.95)	4.63 (0.90)	0.32**	−0.34**	−0.55**	–	−0.35**	−0.26**	0.17*	0.22**	−0.28**	−0.46**	−0.28**	−0.28**	0.12	0.08
5. T1 Exhaustion	3.59 (1.75)	3.84 (1.70)	−0.41**	0.24**	0.47**	−0.41**	–	0.78**	−0.48**	−0.42**	0.25**	0.47**	0.24**	0.20*	−0.32**	−0.33**
6. T2 Exhaustion	3.56 (1.72)	3.71 (1.77)	−0.34**	0.22**	0.41**	−0.38**	0.73**	–	−0.43**	−0.51**	0.30**	0.42**	0.22**	0.15*	−0.34**	−0.28**
7. T1 Work engagement	4.76 (1.35)	4.67 (1.33)	0.72**	−0.06	−0.20**	0.21**	−0.51**	−0.44**	–	0.79**	−0.07	−0.14	−0.11	−0.01	0.61**	0.55**
8. T2 Work engagement	4.73 (1.36)	4.63 (1.29)	0.65**	−0.02	−0.09	0.18*	−0.42**	−0.49**	0.80**	–	−0.14	−0.16	−0.17*	−0.09	0.69**	0.58**
9. T2 Functional limitations	3.24 (1.59)	3.18 (1.51)	−0.01	0.16*	0.24**	−0.35**	0.21**	0.24**	0.02	0.01	–	0.55**	0.22**	0.14	−0.09	−0.06
10. T3 Functional limitations	3.14 (1.63)	2.99 (1.43)	−0.11	0.30**	0.25**	−0.46**	0.16*	0.19*	−0.01	0.02	0.53**	–	0.13	0.29**	−0.09	−0.22**
11. T2 Absenteeism	1.82 (6.47)	1.79 (5.93)	0.02	0.26**	0.21**	−0.18**	0.22**	0.20**	0.01	0.03	0.20**	0.21**	–	0.54**	−0.14	−0.09
12. T3 Absenteeism	2.24 (7.40)	1.26 (4.05)	−0.06	0.07	0.13	0.13	0.09	0.01	0.02	0.03	0.15*	0.07	0.28**	–	−0.08	−0.14
13. T2 Creative work performance	3.29 (1.06)	3.20 (1.11)	0.39**	0.03	−0.01	−0.04	−0.01	−0.12	0.50**	0.59**	0.17*	0.19*	0.11	0.07	–	0.73**
14. T3 Creative work performance	3.32 (1.12)	3.14 (1.07)	0.48**	0.01	−0.10	−0.03	−0.12	−0.14	0.57**	0.54**	0.21**	0.16*	0.04	0.11	0.72**	–

PVM = Proactive vitality management.
* $p < .05$.
** $p < .01$.

tested for measurement invariance using multigroup analysis. We contrasted four nested, increasingly restrictive models in terms of equality constraints: Model 1) configural invariance (equal factor structure); Model 2) weak invariance (equal factor loadings); Model 3) strong invariance (equal item intercepts); and Model 4) strict invariance (equal item residual variances). First of all, the findings indicated configural invariance across the two subsamples, as there was adequate model fit both in the overall sample as well as for both subsamples (see Table 1 for model fit of all CFA models). Secondly, weak invariance was also obtained, as Model 2 showed a similar fit to the configural Model 1, $\Delta\chi^2 = 44.27$, $\Delta df = 36$, $p = .162$. Third, the chi-square difference between Model 3 and Model 2 was insignificant, $\Delta\chi^2 = 49.18$, $\Delta df = 36$, $p = .070$, indicating strong invariance across the two subsamples. Finally, strict invariance could not be obtained as Model 4, involving equal item residuals across groups, differed significantly from Model 3, $\Delta\chi^2 = 88.14$, $\Delta df = 42$, $p < .001$. However, scholars have argued that strict measurement invariance rarely holds in applied contexts and that groups can still be compared on latent constructs under strict non-invariance, especially when the main aim is to compare regression coefficients across groups (Van de Schoot et al., 2012, 2015). Having said that, we proceeded with testing for partial strict invariance. The model modification indices from the Model 4 results and the (unconstrained) residual variances from Model 3 suggested that the residual variances for item 2 of the self-insight scale may be freed to obtain partial strict invariance. Doing so did not alter the findings, such that the model still differed significantly from Model 3; $\Delta\chi^2 = 68.45$, $\Delta df = 41$, $p < .05$. Accordingly, in an iterative process based on examining aforementioned parameters again, item 5 of the self-insight scale was freed as well. Doing so resulted in an insignificant difference compared to Model 3; $\Delta\chi^2 = 48.35$, $\Delta df = 40$, $p = .171$, which means that partial strict invariance was supported. Means, standard deviations, and correlations of the measured variables in Study 1 are presented in Table 2.

4.2. Hypotheses testing

In support of the hypothesized model, fit indices of the structural equation model comprising the hypothesized associations in the health impairment and the motivational process showed an adequate fit to the data (see Table 1). We proceeded with performing the multigroup tests to investigate predictive equivalence across the two subsamples. To this end, we again contrasted four nested, increasingly restrictive models in terms of equality constraints, this time focusing on potential differences between groups on the latent factor level. Starting from an invariant model, we first added our predictive paths (Model 1: baseline), after which we placed equality constraints on the regression paths (Model 2: Equal slopes), then on the regression intercepts (Model 3: Equal intercepts), and finally on the regression disturbances (Model 4: Equal residuals); see Table 1. The findings showed that the constrained Model 2 (equal slopes) resulted in an insignificant decrease in model fit compared to the unconstrained baseline model; $\Delta\chi^2 = 11.03$, $\Delta df = 6$, $p = .087$, although the *p*-value did near the 0.05 cut-off point of significance. Accordingly, we first conducted a closer inspection of the modification indices and the unconstrained slope parameters in Model 1, which indicated that the coefficients for the paths between T2 exhaustion and T3 functional limitations, T2 exhaustion and T3 absenteeism, and T2 work engagement and T3 absenteeism showed the largest differences between the two subsamples (see also Table 3). In order to examine partial predictive equivalence regarding the regression paths, we freed these particular parameters, which resulted in an even smaller difference and insignificant decrease in model fit compared to the fully unconstrained baseline model; $\Delta\chi^2 = 6.60$, $\Delta df = 4$, $p = .159$. These findings support partial predictive equivalence of the regression paths while suggesting that any differences between the two groups regarding the slopes of the direct paths may primarily emerge in the aforementioned paths. After that, we constructed an intermediate Model 3a (see Table 1) with unconstrained slopes but equal intercepts and compared it to Model 1 (baseline model), which resulted in a decrease in model fit; $\Delta\chi^2 = 27.99$, $\Delta df = 6$, $p < .001$. After that, we proceeded with comparing Model 3b (equal slopes and equal intercepts) to the unconstrained baseline model, which also resulted in a decrease in fit; $\Delta\chi^2 = 33.41$, $\Delta df = 12$, $p = .001$. Furthermore, comparing Model 3b (equal slopes and equal intercepts) to Model 2 (equal slopes) resulted in a decrease in model fit as well; $\Delta\chi^2 = 22.68$, $\Delta df = 6$, $p < .001$. Finally, Model 4 (equal residuals) fit the data significantly worse compared to Model 3b (equal slopes and equal intercepts); $\Delta\chi^2 = 11.23$, $\Delta df = 5$, $p < .05$. These findings, although they need to be interpreted with caution, imply that the role of PVM in the two JD-R

Table 3
Statistics of the structural equation model (SEM) analyses in Study 1.

Path	Healthy sample				Chronically ill sample			
Health impairment process	Beta	*S.E.*	β	R^2	Beta	*S.E.*	ß	R^2
T1 PVM to T2 exhaustion	−0.53**	0.10	−0.38**		−0.55**	0.15	−0.40**	
T2 exhaustion to T3 functional limitations	0.16	0.08	0.17*		0.34**	0.07	0.44**	
T2 exhaustion to T3 absenteeism	0.08	0.39	0.02		0.31**	0.17	0.13**	
Outcome = exhaustion				0.14				0.16
Outcome = functional limitations				0.03				0.19
Outcome = absenteeism				0.00				0.03
Motivational process								
T1 PVM – T2 work engagement	0.41**	0.06	0.71**		0.36**	0.08	0.70**	
T2 work engagement – T3 creative work performance	0.83**	0.18	0.56**		0.95**	0.17	0.62**	
T2 work engagement – T3 absenteeism	0.49	0.78	0.05		−0.20	0.37	−0.03	
Outcome = work engagement				0.50				0.49
Outcome = creative work performance				0.32				0.38
Outcome = absenteeism				0.00				0.02

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

processes may manifest itself somewhat differently for chronically ill vs. healthy individuals. Accordingly, we report the findings of our hypothesis tests separately for the two subsamples, i.e., chronically ill vs. healthy individuals. A summary of all direct path coefficients can be found in Table 3.

According to Hypothesis 1, pertaining to JD-R's health impairment process, T1 PVM is negatively related to T3 functional limitations (Hypothesis 1a) and T3 absenteeism (Hypothesis 1b) through T2 exhaustion. Findings of the multigroup analyses showed that the indirect relation between T1 PVM to T3 functional limitations through T2 exhaustion was negative and significant in both subsamples, but somewhat stronger for chronically ill individuals; −0.18 [CI: −0.33 to −0.09], than for healthy individuals; −0.08 [CI: −0.19 to −0.01]. With regard to the outcome absenteeism, the indirect relation between T1 PVM and T3 absenteeism through T2 exhaustion was negative and significant for chronically ill individuals, −0.17 [CI: −0.48 to −0.03], but for healthy individuals, the indirect effect was not significant, −0.04 [CI: −0.45 to 0.36]. Overall, these findings provide support for hypotheses 1a and 1b, in the sense that they support the protective role of PVM with regard to health impairment, which seems to be especially salient for chronically ill employees.

Hypothesis 2, pertaining to JD-R's motivational process, states that T1 PVM is positively related to T3 creative work performance (Hypothesis 2a) and T3 absenteeism (Hypothesis 2b) through T2 work engagement. Inspection of the multigroup analysis showed that the indirect relation between T1 PVM and T3 creative work performance through T2 work engagement was positive and significant in both subsamples: 0.34 [CI: 0.21 to 0.48] for chronically ill employees and 0.34 [CI: 0.25 to 0.45] for healthy employees. With regard to the outcome absenteeism, the indirect relation between T1 PVM and T3 absenteeism through T2 work engagement was significant for chronically ill individuals; −0.22 [CI: −0.49 to −0.04], but for healthy individuals, the indirect effect was not significant; 0.16 [CI: −0.43 to 0.96]. Overall, these findings provide support for Hypotheses 2a and b, in the sense that they support the predictive value of PVM with regard to the motivational process, albeit slightly more so for individuals with a chronic medical condition.

4.2.1. The role of self-insight

According to moderated mediation Hypothesis 3, higher levels of self-insight strengthen the indirect relations between T1 PVM and T3 functional limitations (Hypothesis 3a) and between T1 PVM and T3 absenteeism (Hypothesis 3b), both mediated by T2 exhaustion. Inspection of the multigroup comparisons showed that the interaction effect between PVM and self-insight on exhaustion was significant for chronically ill individuals (estimate = −0.29, $p < .05$; see Fig. 2) and marginally significant for healthy individuals (estimate = −0.16, $p = .057$; see Fig. 3). A first examination of these interactions showed that, for chronically ill individuals, the negative relation between T1 PVM and T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; = −0.67 [CI = −1.07 to −0.26], than at self-insight levels −1 *SD* below the mean; −0.10 [CI = −0.57 to 0.37]. For healthy individuals, the findings showed that the negative relation between T1 PVM and T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.51 [CI = −0.80 to −0.23], than at self-insight levels −1 *SD* below the mean; −0.20 [CI = −0.40 to −0.00].

To test Hypothesis 3a, further examination of the conditional indirect effect for chronically ill individuals showed that the negative relation between T1 PVM and T3 functional limitations through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.22 [CI = −0.37 to −0.08], than at self-insight levels −1 *SD* below the mean; −0.03 [CI = −0.19 to 0.12]. For healthy individuals, the conditional indirect effect was also stronger at self-insight levels +1 *SD* above the mean; −0.10 [CI = −0.19 to −0.01], than at self-insight levels −1 *SD* below the mean; −0.04 [CI = −0.08 to 0.02]. In line with Hypothesis 3b, the conditional indirect effect for chronically ill individuals showed that the negative relation between T1 PVM and T3 absenteeism through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.27 [CI = −0.49 to −0.05], than at self-insight levels −1 *SD* below the mean; −0.04 [CI = −0.22 to 0.14]. For healthy individuals, the conditional indirect effect was not significant for any of the levels of self-insight. Overall, these results provide support for Hypotheses 3a and b, in the sense that they support the boosting influence of self-insight on the role of PVM in the health impairment process, which is especially salient for chronically ill employees.

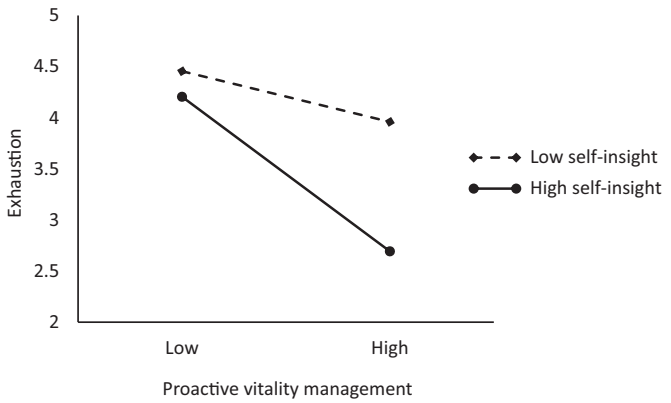

Fig. 2. Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work exhaustion in Study 1 for chronically ill individuals. Low levels of proactive vitality management and self-insight are represented by values of −1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means.

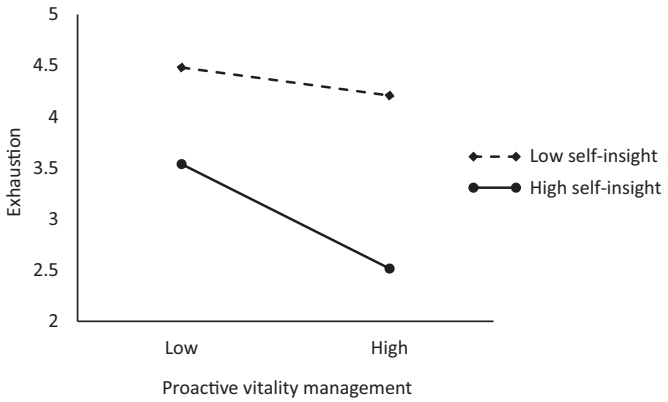

Fig. 3. Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work exhaustion in Study 1 for healthy individuals. Low levels of proactive vitality management and self-insight are represented by values of −1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means.

Finally, we tested moderated mediation Hypothesis 4, which stated that higher levels of self-insight strengthen the indirect relations between T1 PVM and T3 creativity (Hypothesis 4a) and between T1 PVM and T3 absenteeism (Hypothesis 4b), both mediated by T2 work engagement. Inspection of the multigroup comparisons showed that the interaction effect between PVM and self-insight on work engagement was significant for chronically ill individuals (estimate = 0.13, $p < .05$; see Fig. 4), but not for healthy individuals (estimate = 0.04, $p = .190$). A first examination of the interaction showed that, for chronically ill individuals, the positive relation between T1 PVM and T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; 0.54 [CI = 0.32 to 0.77], than at self-insight levels −1 *SD* below the mean; 0.28 [CI = 0.04 to 0.51]. To test Hypothesis 4a, further examination of the conditional indirect effect for chronically ill individuals showed that the positive relation between T1 PVM and T3 creativity through T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; 0.39 [CI = 0.23 to 0.55], than at self-insight levels −1 *SD* below the mean; 0.20 [CI = 0.02 to 0.37]. The conditional indirect effect for chronically ill individuals pertaining to Hypothesis 4b showed that the negative relation between T1 PVM and T3 absenteeism through T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; −0.27 [CI = −0.53 to −0.02], than at self-insight levels −1 *SD* below the mean; −0.14 [CI = −0.29 to 0.01]. Overall, these results provide support for Hypotheses 4a and b, in the sense that they support the boosting influence of self-insight on the role of PVM in the motivational process, although only for individuals with a chronic medical condition.

5. Discussion of Study 1

The findings from Study 1 show that proactive vitality management may mitigate a health impairment process and instigate a motivational process. These patterns were visible for both healthy and chronically ill individuals, but more salient for the latter group, especially when it comes to reducing health impairment. While the value of proactive vitality management was apparent in both subpopulations, they do seem to differ from each other in some aspects. First of all, one group has to deal with a chronic medical condition while the other group does not. This distinction is also reflected in higher scores on health complaints and self-work conflict for chronically ill employees. Moreover, the multigroup analyses to examine predictive equivalence across the two subsamples

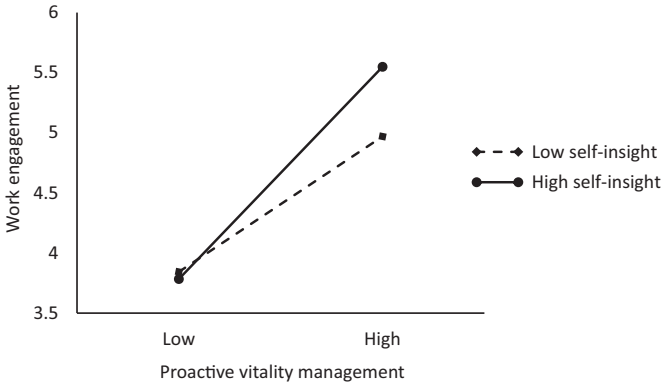

Fig. 4. Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work engagement in Study 1 for chronically ill individuals. Low levels of proactive vitality management and self-insight are represented by values of −1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means.

indicated that the increasingly constrained models resulted in decreases in model fit, indicating that there may be some differences between the two subpopulations in the processes under current investigation, which was also supported by the results from the hypotheses tests. Summing up, the findings indicate that individuals with a chronic illness may deal with different things compared to healthy individuals, and that proactive vitality management is a valuable strategy to protect their occupational health and performance. However, both the current findings as well as findings from earlier studies clearly support the value of proactive vitality management for healthy working individuals as well.

6. Study 2

In Study 2, we shift our focus solely on chronically ill employees and aim to replicate the findings from Study 1 supporting the value of proactive vitality management for chronically ill employees while investigating whether they also transpire and hold over a prolonged time span. To this end, we follow working individuals with a chronic liver condition in a three-wave longitudinal study over the course of 2.5 years. Chronic liver conditions are typically characterized by a deterioration of general health (e.g., fatigue, physical limitations). Furthermore, individuals with chronic liver disease may suffer from (chronic) pain, sleep disturbance, autonomic nervous system dysfunction, and cognitive impairment. Unfortunately, such symptoms often limit the day-to-day functional capacity of chronic liver patients, even under optimal disease management (Newton & Jones, 2012). We thus test the same processes and hypotheses as in Study 1 in a specific group of chronically ill patients that may potentially benefit from proactive vitality management, this time over a considerably long time span. This approach provides additional insights on the importance of proactive vitality management over time that may complement the shorter-term insights from Study 1.

7. Method

7.1. Procedure and participants

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 email, 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 email 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 capture changes in how the participants were doing in terms of well-being over time (i.e., measured through the focal mediators: exhaustion and work engagement). Moreover, since proactive vitality management may also involve establishing (new) habits or routines rather than simply enacting singular or incidental changes, the three-month lag suitably provides time to capture the development of such habits or routines, and their potential influence on well-being.

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 for considerable change in the level of functioning at work (i.e., operationalized as functional limitations, absenteeism, and creative work performance), which allowed us to examine how the processes may develop and look like over a prolonged period of time. Thus, the entire research period comprised 2.5 years. We obtained approval for our research 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 emails 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 – on average, participants worked 25.65 h per week ($SD = 14.05$) 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 email addresses, which were deleted from our records afterward. Of the 192 working participants on T1, 99 participants (52 %) also filled out the survey on T2, and 97 participants (51 %) also filled out the survey on T3. At T1, the mean age of the participants was 48.73 ($SD = 10.75$), and 72 % of the sample was female. Of all participants, 37 % had completed higher vocational training, and 16 % held a university degree. Participants worked in a wide range of professions and industries, including health care (28 %), education (11 %), government (10 %), finances (8 %), 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.

7.2. Measures

The variables in Study 2 were measured using the same instruments as in Study 1. We measured the study variables with reference to the past month, except for 'self-insight,' which we measured at the trait level. Retrospective bias is reduced when adopting a specific, relatively concise time period, yielding more robust measurements of the variables and increasing the accuracy of the self-reported experiences and behaviors (Althubaiti, 2016; Ohly et al., 2010). To be able to control for earlier levels of the model variables in

Table 4
Descriptive statistics and correlations among the variables in Study 2.

Variables	*M* (*SD*)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 PVM	5.24 (0.95)	–													
2. T1 Self-insight	4.66 (0.83)	0.16	–												
3. T1 Exhaustion	2.80 (0.69)	−0.40**	−0.33**	–											
4. T2 Exhaustion	2.57 (0.73)	−0.39**	−0.34**	0.62**	–										
5. T1 Work engagement	4.45 (1.14)	0.58**	0.28**	−0.57**	−0.34**	–									
6. T2 Work engagement	4.52 (1.23)	0.33**	0.30**	−0.29**	−0.59**	0.47**	–								
7. T2 Health complaints	4.27 (2.57)	−0.10	−0.19	0.30**	0.55**	−0.26**	−0.45**	–							
8. T3 Health complaints	3.87 (2.37)	−0.16	−0.22*	0.51**	0.50**	−0.36**	−0.37**	0.67**	–						
9. T2 Functional limitations	2.00 (0.76)	−0.22*	−0.29*	0.60**	0.51**	−0.39**	−0.35**	0.37**	0.32**	–					
10. T3 Functional limitations	1.91 (0.76)	−0.21*	−0.33**	0.53**	0.57**	−0.38**	−0.46**	0.46**	0.61**	0.65**	–				
11. T2 Absenteeism	0.86 (3.00)	0.01	−0.09	0.04	0.20	−0.10	−0.31**	0.16	−0.03	0.15	0.02	–			
12. T3 Absenteeism	1.44 (4.65)	−0.12	−0.17	0.23*	0.34**	−0.28**	−0.29*	0.21	0.18	0.41**	0.49**	0.01	–		
13. T2 Creative work performance	3.12 (0.83)	0.24*	0.19	−0.04	−0.17	0.30**	0.56**	−0.16	−0.26*	−0.20	−0.26*	−0.28**	−0.06	–	
14. T3 Creative work performance	3.02 (0.81)	0.30**	0.16	−0.20	−0.20	0.35**	0.35**	−0.15	−0.22	−0.26*	−0.45**	0.01	−0.34**	0.34**	–

PVM = Proactive vitality management.
* $p < .05$.
** $p < .01$.

our analyses, we measured the mediators, work engagement and exhaustion, both at T1 and T2, and the outcome variables, functional limitations, absenteeism, and creative work performance, both at T2 and T3.

Validated Dutch measurement instruments were obtained from the developers of the measurements for proactive vitality management (Op den Kamp et al., 2018), work engagement (Schaufeli et al., 2006), and exhaustion (Demerouti et al., 2010). Moreover, the instrument used to measure functional limitations was originally developed in Dutch by the Social Medical Affairs division of the Dutch Employee Insurance Agency (UWV). Finally, two of the authors acted as translators in the translation-back translation procedure for the measurement of self-insight (Grant et al., 2002) and creative work performance (Zhou & George, 2001). Agreement between the translators was high, resulting in only minor adaptations; none of the items were deleted or meaningfully modified. An example item for proactive vitality management is "Last month, I made sure that I felt energetic during my work" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was 0.90. For exhaustion, an example item is "Last month, there were days when I felt tired before I arrived at work" (1 = *totally disagree*, 4 = *totally agree*). Cronbach's alpha was 0.85 at T1 and 0.87 at T2. For work engagement, an example item is "Last month, I was enthusiastic about my job" (1 = *totally disagree*, 7 = *totally agree*). Cronbach's alpha was 0.91 both at T1 and T2. For functional limitations, an example item is "Last month, I was able to maintain a normal working pace at work" (1 = *not limited at all*, 5 = *strongly limited*). Cronbach's alpha was 0.87 at T2 and 0.86 at T3. Absenteeism was measured with the number of reported missed workdays (i.e., absence) due to illness during the last month (cf. Darr & Johns, 2008). For creative work performance, an example item is "Last month, I came up with creative solutions to problems" (1 = *totally disagree*, 5 = *totally agree*). Cronbach's alpha was 0.89 both at T2 and T3. An example item for self-insight is "I usually know why I feel the way I do" (reversed-scored; 1 = *totally disagree*, 6 = *totally agree*). Cronbach's alpha was 0.86. Finally, health complaints were measured as a control variable at T2 and T3, as Study 1 showed that chronically ill employees, on average, experience more severe health complaints, which may play a significant role regarding the particular variables and processes examined in the study. 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).

7.3. Analytical strategy

The Study 2 analyses were conducted using Mplus 8.10 software (Muthén & Muthén, 1998–2017), with full information maximum likelihood with robust standard errors (MLR) as the estimation method. Before testing our hypotheses, we examined the factor structure of our measurement model through confirmatory factor analysis (CFA). After that, our theoretical model was tested through structural equation modeling (SEM). We created latent factors for each of the variables in our theoretical model based on the items used to measure each of the variables. Subsequently, we tested our hypotheses by estimating predictions between the latent factors. Due to the relatively complex theoretical model and the relatively small sample size, in Study 2, 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 Fig. 1, respectively). The indirect effects were tested using bootstrapping (1000 iterations). The moderated mediation hypotheses were examined using the latent moderated structural equation modeling (LMS) approach (Klein & Moosbrugger, 2000) to test the interaction latent interactions between self-insight and proactive vitality management in their potential effect on exhaustion and work engagement and, indirectly, on the outcome variables (i.e., to examine first-stage moderated mediation). 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, in line with the study aim of this study to capture process changes over a prolonged period of time, 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.

8. Results

8.1. Descriptive statistics

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 Fig. 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) and the control variable health complaints (T2 and T3) were omitted from the CFA because they are not latent variables. The measurement model in which all items loaded on their respective latent factors fit the data reasonably well (see Table 1). Means, standard deviations, and correlations of the measured variables in Study 2 are presented in Table 4.

8.2. Hypotheses testing

8.2.1. 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. The model involving the health impairment process fit reasonably well to the data (see Table 1). A summary of all direct path coefficients can be found in Table 5. In line with our predictions, the indirect relation between T1 PVM and T3 functional limitations through T2 exhaustion was negative and significant; −0.15 [CI: −0.28 to −0.07]. In addition, the indirect

relation between T1 PVM and T3 absenteeism through T2 exhaustion was negative and significant as well; −0.53 [CI: −1.29 to −0.03]. Overall, these results provide initial support for Hypotheses 1a and b.

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; −0.05 [CI: −0.16 to −0.01]. Moreover, T1 PVM was still negatively and significantly related to T3 absenteeism through T2 exhaustion; −0.31 [CI: −1.08 to −0.01]. These findings provide further support for Hypotheses 1a and b.

8.2.2. *The motivational process*

We proceeded with testing Hypothesis 2, which states that T1 PVM is positively related to T3 creativity (Hypothesis 2a) and T3 absenteeism (Hypothesis 2b) through T2 work engagement. The fit of the structural equation model involving the motivational process was reasonable (see Table 1). A summary of all the direct path coefficients is reported in Table 5. In line with Hypothesis 2a, T1 PVM was indirectly related to T3 creativity through T2 work engagement; 0.09 [CI: 0.02 to 0.24]. Furthermore, in line with Hypothesis 2b, T1 PVM was indirectly related to T3 absenteeism through T2 work engagement; −0.36 [CI: −1.17 to −0.01]. These results provide initial support for Hypotheses 2a and b.

After controlling for earlier levels of work engagement (i.e., T1 work engagement), creativity (i.e., T2 creativity), and absenteeism (i.e., T2 absenteeism), the path between T1 PVM and T2 work engagement became nonsignificant (see Table 5). Accordingly, the indirect relation between T1 PVM and T3 creativity via T2 work engagement was no longer significant; 0.01 [CI: −0.03 to 0.08]. Similarly, the indirect relation between T1 PVM and T3 absenteeism via T2 work engagement was no longer significant; −0.03 [CI: −0.65 to 0.26]. Because the effects diminished in statistical significance after controlling for earlier levels of the mediator and outcome variables, we performed post-hoc power tests which showed that power was not an issue. Furthermore, when solely controlling for earlier levels of the outcome variables (i.e., T2 creativity and T2 absenteeism), the indirect effects did remain standing. That is, T1 PVM was still indirectly related to T3 creativity through T2 work engagement; 0.07 [CI: 0.01 to 0.22]. Moreover, T1 PVM was still indirectly related to T3 absenteeism through T2 work engagement; −0.49 [CI: −1.54 to −0.06]. Overall, these results thus provide some additional support for Hypotheses 2a and b.

8.2.3. *Moderated mediation hypotheses*

According to moderated mediation Hypothesis 3, higher levels of self-insight strengthen the indirect relations between T1 PVM and T3 functional limitations (Hypothesis 3a) and between T1 PVM and T3 absenteeism (Hypothesis 3b), both mediated by T2 exhaustion. The interaction effect between PVM and self-insight on exhaustion was significant; estimate = −0.14, $p < .01$, see Fig. 5. A first examination of the interaction showed that the negative relation between T1 PVM and T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.37 [CI = −0.50 to −0.24], than at self-insight levels −1 *SD* below the mean; −0.09 [CI = −0.26 to 0.06]. Unpacking the conditional indirect effect to test Hypothesis 3a showed that the negative relation between T1 PVM and T3 functional limitations through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.22 [CI = −0.33 to −0.10], than at self-insight levels −1 *SD* below the mean; −0.06 [CI = −0.16 to 0.04]. In addition, in line with Hypothesis 3b, the negative relation between T1 PVM and T3 absenteeism through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.83 [CI =

Table 5
Statistics of the structural equation model (SEM) analyses in Study 2.

Path	Model 1				Model 2			
Health impairment process	Beta	*S.E.*	β	R^2	Beta	*S.E.*	ß	R^2
T1 PVM to T2 exhaustion	−0.26**	0.06	−0.37**		−0.16**	0.05	−0.21**	
T1 exhaustion – T2 exhaustion					0.52**	0.10	0.47**	
T2 exhaustion to T3 functional limitations	0.56**	0.14	0.50**		0.31*	0.18	0.30*	
T2 functional limitations – T3 functional limitations					0.38*	0.23	0.39*	
T2 exhaustion to T3 absenteeism	2.05*	1.20	0.32**		1.96*	1.11	0.32**	
T2 absenteeism – T3 absenteeism					0.03	0.09	0.02	
Outcome = exhaustion				0.50				0.66
Outcome = functional limitations				0.55				0.68
Outcome = absenteeism				0.12				0.09
Motivational process								
T1 PVM – T2 work engagement	0.36*	0.15	0.31*		0.06†	0.17	0.05†	
T1 work engagement – T2 work engagement					0.51**	0.19	0.45**	
T2 work engagement – T3 creative work performance	0.24*	0.10	0.34*		0.17*	0.09	0.27*	
T2 creative work performance – T3 creative work performance					0.30*	0.17	0.26*	
T2 work engagement – T3 absenteeism	−1.00	0.71	−0.25*		−0.96	0.70	−0.26*	
T2 absenteeism – T3 absenteeism								
Outcome = work engagement				0.27				0.44
Outcome = creative work performance				0.20				0.25
Outcome = absenteeism				0.11				0.11

Model 1 = main analyses; Model 2 = analyses including earlier levels of the mediator and outcome variables.
* $p < .05$.
** $p < .01$.

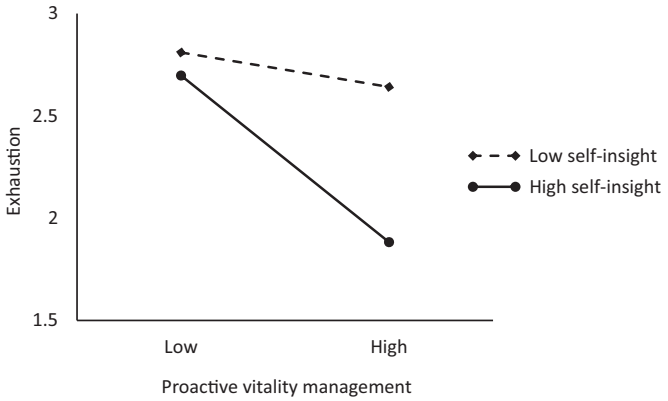

Fig. 5. Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work exhaustion in Study 2. Low levels of proactive vitality management and self-insight are represented by values of −1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means.

−1.56 to −0.09], than at self-insight levels −1 *SD* below the mean; −0.22 [CI = −0.66 to 0.23]. Overall, these results provide initial support for Hypotheses 3a and b.

We proceeded by testing Hypotheses 3a and b 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 interaction effect between PVM and self-insight on exhaustion became marginally significant; estimate = −0.12, $p = .050$. Although the negative relation between T1 PVM and T3 functional limitations through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.10 [CI = −0.20 to 0.01], than at self-insight levels −1 *SD* below the mean; −0.01 [CI = −0.08 to 0.05], the confidence interval on both levels contained zero, indicating insignificance. Because the effects diminished in statistical significance after controlling for earlier levels of the mediator and outcome variables, we performed post-hoc power tests which showed that power was not an issue. Moreover, the direction and significance of the conditional indirect effect pertaining to Hypothesis 3b were unaffected. The negative relation between T1 PVM and T3 absenteeism through T2 exhaustion was stronger at self-insight levels +1 *SD* above the mean; −0.55 [CI = −1.13 to −0.07], than at self-insight levels −1 *SD* below the mean; −0.07 [CI = −0.46 to 0.32]. These findings provide additional support for Hypothesis 3b.

Finally, we tested moderated mediation Hypothesis 4, which stated that higher levels of self-insight strengthen the indirect relations between T1 PVM and T3 creativity (Hypothesis 4a) and between T1 PVM and T3 absenteeism (Hypothesis 4b), both mediated by T2 work engagement. The interaction effect between PVM and self-insight on work engagement was significant; estimate = 0.31, $p < .01$, see Fig. 6. A first examination of the interaction showed that the positive relation between T1 PVM and T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; 0.67 [CI = 0.25 to 0.1.09] than at self-insight levels −1 *SD* below the mean; 05 [CI = −0.34 to 0.44]. To test Hypothesis 4a, further examination of the conditional indirect effect showed that the positive relation between T1 PVM and T3 creativity through T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; 0.15 [CI = 0.01 to 0.29], than at self-insight levels −1 *SD* below the mean; 0.01 [CI = −0.08 to 0.10]. Moreover, in line with Hypothesis 4b, the negative relation between T1 PVM and T3 absenteeism through T2 work engagement was stronger at self-insight levels +1 *SD* above the mean; −0.76 [CI = −1.43 to −0.10], than at self-insight levels −1 *SD* below the mean; −0.06 [CI = −0.44 to 0.32].

After controlling for earlier levels of work engagement (i.e., T1 work engagement), creativity (i.e., T2 creativity), and absenteeism

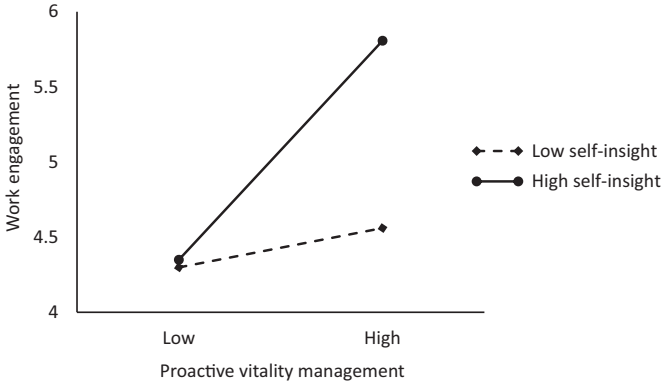

Fig. 6. Visual representation of the interaction between self-insight and T1 proactive vitality management in their effect on T2 work engagement in Study 2. Low levels of proactive vitality management and self-insight are represented by values of −1SD below their respective means, whereas high levels are represented by values of +1SD above their respective means.

(i.e., T2 absenteeism), the direction and significance of the findings for Hypotheses 4a and b were unaffected. The interaction effect between PVM and self-insight on work engagement was still significant; estimate = 0.30, $p < .01$. The positive relation between T1 PVM and T3 creativity through T2 work engagement was again stronger at self-insight levels +1*SD* above the mean; 0.13 [CI = 01 to 0.24] than at self-insight levels −1 *SD* below the mean; 0.02 [CI = −0.05 to 0.09]. Moreover, the negative relation between T1 PVM and T3 absenteeism through T2 work engagement was also stronger at self-insight levels +1*SD* above the mean; −0.82 [CI = −1.56 to −0.09], than at self-insight levels −1 *SD* below the mean; −0.13 [CI = −0.56 to 0.29]. These additional findings provide further support for Hypotheses 4a and b.

9. General discussion

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. 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, especially when combined with self-insight, may mitigate a health impairment process and instigate a motivational process, with important implications for functional limitations, absenteeism, and creative work performance over time.

9.1. Theoretical contributions

9.1.1. 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) 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 (Scharp et al., 2022). 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 one week (Study 1) and three months (Study 2) later, which subsequently related to fewer functional limitations and reduced absenteeism another week later (Study 1) and two years later (Study 2) (i.e., a different future). In parallel, proactive vitality management was positively related to work engagement and, subsequently, to creative work performance and reduced absenteeism across the same time spans in both studies. 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.

Previous research has shown that organizations can play an important role in employee well-being 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. Moreover, Cook and Zill (2023) showed that chronic illness predicted lower engagement and higher burnout over and above job characteristics. Based on proactive motivation theory, and as noted by Bakker and Demerouti (2017), individuals may also use bottom-up, proactive behavioral strategies to directly impact their own occupational health and performance. Our findings suggest that employees with a chronic illness may do so 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 personal and work outcomes themselves. These findings correspond with the notion of personal agency (Bandura, 2006; Montano & Kasprzyk, 2015) and show that the bottom-up, proactive behavior of chronically ill individuals themselves may complement job redesign and other top-down efforts from relevant parties that play a role in their occupational health, such as medical care, the government, and employers. Indeed, while those parties carry a responsibility to provide support and a healthy work environment, chronically ill employees also carry responsibility for managing their own occupational health and careers (cf. Beatty & Joffe, 2006; Grant & Parker, 2009; Sullivan, 1999). Employees with chronic illness form an understudied population in general (Beatty, 2012), as well as in the proactivity literature specifically, while taking charge of their situation may be highly important yet also challenging for this subpopulation within the broader workforce. Especially when it comes to physical and mental energy, a proactive approach seems vital, given the apparent link between chronic illness and poorer work experiences, functional limitations, and absenteeism (e.g., Boot et al., 2011; Cook & Zill, 2023; Darr & Johns, 2008; Fouad et al., 2017; Newton & Jones, 2012). Despite their potentially demanding health conditions, these employees are still willing to invest effort into their work to remain functional (Hockey, 1997; Parker et al., 2010). 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).

Building further on this, while substantial literature shows that various proactive behaviors at work have favorable consequences, such studies do not commonly focus on (reducing) negative health outcomes, such as functional limitations and absenteeism. Similarly, 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 work engagement - and for favorable work outcomes, such as job performance and creativity (e.g., Bakker et al., 2020; Op den Kamp et al., 2020, 2023; Pap et al., 2022; Ren et al., 2023; Tisu et al., 2023; Ye et al., 2021). These findings primarily pertain to a positive, motivational process in which individuals may be(come) more engaged and perform better at work. A contribution of the current research was to refine and broaden our understanding of proactive vitality management by also exploring its role in a process characterized by health impairment.

9.1.2. Motivational and health-impairment processes

We used JD-R theory to investigate the role of proactive vitality management regarding two distinct processes, one focused on instigating motivation and favorable work outcomes and another focused on mitigating exhaustion and impaired functional capacity. While JD-R theory is based on the idea that two different sets of working conditions (i.e., job demands and resources) evoke the two different processes, the current findings suggest that proactive vitality management may play a role in both JD-R processes 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 affective, cognitive, and physical facets. These behaviors may therefore trigger various processes that may subsequently promote optimal functioning (cf. Op den Kamp et al., 2018, 2023; 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 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 and playful work design, with findings indicating that individuals may optimize their job and work conditions to become more engaged and perform better in their work (e.g., Scharp et al., 2022; Tims et al., 2013). 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 resources that promote work engagement and, subsequently, favorable work outcomes.

While the two processes are driven by distinct mechanisms, we examined absenteeism as an outcome of both health impairment and motivation. Previous research has indicated that absenteeism as an outcome of the health impairment process (i.e., predicted by exhaustion) may be referred to as "involuntary absenteeism", thus far measured primarily as a prolonged duration of any absence spell (s) (Schaufeli et al., 2009). In contrast, absenteeism investigated as an outcome of the motivational process (i.e., predicted by work engagement) may be referred to as "voluntary absenteeism", thus far measured as a higher frequency of absence spells (Schaufeli et al., 2009). We have not been able to test this distinction operationally in the current research, because absenteeism was represented by the reported total number of hours per week (Study 1) and days per month (Study 2) missed work due to feeling ill. However, future research could look into this to see whether, for chronically ill employees, similar findings may emerge. Even though theoretically it makes sense that health impairment would result in prolonged (involuntary) absenteeism while reduced motivation could result in a higher frequency of (voluntarily) calling in sick, one could argue for the reverse in this population as well. Namely, frequent absenteeism spells may be caused by frequent flare-ups of one's illness (i.e., regardless of work engagement), while a prolonged absenteeism spell may also be produced or sustained by a lack of motivation to reintegrate (i.e., under low levels of work engagement).

While the findings evidenced the value of proactive vitality management regarding both health and motivational outcomes, controlling for earlier levels of the mediators and outcome variables in the analyses for the two processes showed somewhat differential findings. When controlling for earlier levels of exhaustion, functional limitations, and absenteeism in the analyses pertaining to the health impairment process, the significance and direction of the findings were unaffected. In contrast, the indirect effects from T1 proactive vitality management to T3 creative work performance and T3 absenteeism via T2 work engagement (i.e., pertaining to the motivational process) did not persist after controlling for earlier levels of the mediator and outcome variables. It seems like these findings may primarily be explained by the fact that the path from T1 proactive vitality management to T2 work engagement did not hold when we controlled for earlier levels of work engagement, a finding that emerged in previous research involving work engagement as well (e.g., Nielsen & Abildgaard, 2012). Apparently, how one feels about their work may not easily be predicted over and above the influence of how one felt about it earlier. However, in the moderated mediation analyses addressing the role of self-insight, the predictive value of proactive vitality management in the motivational process did remain standing even after controlling for earlier levels of the mediator and outcome variables. These findings suggest that the predictive value of work engagement from one timewave to another was too strong for proactive vitality management to add significant predictive value on its own. However, combined with self-insight, the effect of proactive vitality management becomes more effective, and thus strong enough to add significant predictive value over and above the influence of previous levels of work engagement (and of the outcome variables).

9.1.3. Self-insight

For individuals dealing with a chronic illness, it is 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). Self-insight refers to an understanding of one's own thoughts, feelings, and behaviors, and our findings suggest that higher levels of self-insight strengthen the effectiveness of proactive vitality management. These findings are in line with proactive motivation theory, which explains how certain factors, such as emotion regulation ability, can have a moderating influence on the proactive process (Parker et al., 2010). Moreover, they contribute to the JD-R literature, where studies investigating person-level

factors that moderate the two processes are relatively scarce. Specifically, our results showed that proactive vitality management was particularly related to work and personal outcomes through exhaustion and 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 function as a relatively more structural personal resource (Ten Brummelhuis & Bakker, 2012) that may help employees to effectively manage their vitality.

9.2. Practical implications

Our findings may have important implications for chronically ill individuals who wish to take some control over their own occupational health, performance, and career development. Practical recommendations would primarily center around awareness, education, and encouragement regarding proactive vitality management. For example, training or workshops may involve instruction and inspiration, and provide helpful tools to navigate the proactive vitality management process (e.g., Bălăceanu & Vîrgă, 2022). Among other aims, workshops may target the motivational drivers that spur proactive behavior, i.e., feelings of capability, feasibility, and the "why" behind taking action. 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 workshops may help individuals set personal goals and come up with various initiatives they can take to manage physical and mental energy in order to function optimally at work. Such workshops may further be adjusted to specifically suit individuals with a chronic health condition (cf. McGonagle et al., 2014; Varekamp et al., 2006), coaching them in a manner that is tailored to their illness-specific challenges and obstacles. Also, 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 action, but actually feel in control of 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 of 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. Individuals, preferably supported by their organizations or other relevant parties, may aim to develop self-insight by engaging in self-reflection- and analysis (Klimoski & Hu, 2011). Also, and more specifically, chronically ill employees may aim to cultivate their self-insight while 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.

9.3. Limitations

The current research combines both a 'shortitudinal' time-lagged study spanning three weeks (cf. Dormann & Griffin, 2015) and a longitudinal study spanning 2.5 years. This approach addresses the call for longitudinal studies on proactive behavior (Parker et al., 2010) and provides valuable insights into how processes unfold over different periods of time. Moreover, the fact that we replicated our findings across two distinct time lags contributes to the generalizability of our research. Another strength is that our research involves a constructive replication of the patterns among two ecologically valid samples of 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, hence it does not allow for causal attributions. Although we could control for previous levels of the variables in our model, future studies may explore the effectiveness of interventions that provide education, coaching, and inspiration to chronically ill individuals on proactive vitality management. Moreover, our design did not lend itself to conducting tests of directionality, which could be a valuable avenue for future studies. Second, due to the focus on chronically ill workers and the long time span, the Study 2 sample size is relatively small, possibly limiting statistical power and averting us from testing the full model at once in Study 2. Study 1 involved a shorter time period, which usually means higher retention, and participants knew beforehand that they were participating in a three-wave, weekly study. Also, they did not need to provide any personal information, as the sampling was done via the Prolific platform. Third, although there are known limitations of chi-square tests of exact fit and chi-square difference tests (such as their sample size dependency), we elected to rely on chi-square difference tests as the primary source of information to guide model comparison, given that the subsamples are relatively small and that our goal was to detect potential sample differences – to which these tests are particularly sensitive – rather than to establish generalizability.

Finally, the samples used in the two studies largely complement each other, strengthening the validity and generalizability of our research, but also come with limitations. Study 1 employs a mixed sample of both healthy and chronically ill employees, the latter group being heterogeneous in nature, i.e., involving a wide range of chronic illnesses. In Study 2, we focused specifically on chronically ill employees, with a sample involving chronic liver patients. In some ways, there is considerable overlap between many, if not all, chronic illnesses. This overlap is reflected in, for example, the relative experience of more (severe) health issues, and symptoms such as fatigue, pain, or other physical and mental limitations. Moreover, most illnesses require some form of disease management, which

costs time and energy taken away from work or social life (cf. Greenhaus & Beutell, 1985). Having said that, all chronic illnesses cannot simply be lumped together, as they still differ in severity, type of symptoms and challenges they bring, and the effects they have on, for example, social and work life. Moreover, both of the current samples consisted of chronically ill individuals who were still, or again, working to some extent. Our findings may thus not generalize to individuals with a chronic health condition who are – at present – more severely ill and are not currently working. Future research may take other relevant factors into account besides health complaints, such as the stage of the illness, but also the type of job or family situation that may impact one's level of functioning. Although our approach is based on the idea that it is valuable to examine processes within specific subpopulations to gain more specific and helpful insights, the value of proactive vitality management, as well as potential obstacles such as health issues and self-work conflict, are not exclusive to individuals with a chronic medical condition. Accordingly, we emphasize that the broader workforce may generally benefit from proactive vitality management, as has also been supported by earlier research studies.

9.4. Future Research

The current research suggests 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, which would add to our knowledge concerning proactive motivation theory (Parker et al., 2010). Theoretically, we have assumed that individuals with a chronic health condition have ample reason to proactively manage their vitality in order to remain functional. However, we have not operationalized the underlying motivations for their proactive vitality management behaviors. Moreover, 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 or manage their vitality (cf. Beatty, 2012). Future research may focus on identifying which personal factors enable or inhibit proactive vitality management among chronically ill workers.

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 (cf. JD-R theory). 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, the effective management of physical and mental energy may enable individuals to enact and make optimal use of 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., 2023). Future studies could examine how various contextual factors, such as stigmatization or policies that support chronically ill employees, 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 subpopulations 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).

10. Conclusion

Being able to work contributes greatly to the 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 vulnerable because of the challenges their medical condition may bring them (Beatty & Joffe, 2006; De Jong et al., 2015). The current research studies among working individuals with chronic illness suggest that proactive vitality management may help them protect and promote their occupational health and performance over time.

CRediT authorship contribution statement

Emma M. Op den Kamp: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Arnold B. Bakker:** Writing – review & editing, Conceptualization. **Maria Tims:** Writing – review & editing, Conceptualization. **Evangelia Demerouti:** Writing – review & editing, Conceptualization. **Jimmy J. de Wijs:** Writing – review & editing, Resources, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jvb.2024.103987.

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