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Proactive vitality management in the work context: development and validation of a new instrument

Emma M. Op den Kamp [a], Maria Tims[b], Arnold B. Bakker[a,d] and Evangelia Demerouti[c,d]

[a]Erasmus University Rotterdam, Center of Excellence for Positive Organizational Psychology, Rotterdam, the Netherlands; [b]VU Amsterdam, School of Business and Economics, Department of Management and Organization, Amsterdam, the Netherlands; [c]TU Eindhoven, Faculty of Industrial Engineering & Innovation Sciences, Department of Human Performance Management, the Netherlands; [d]University of Johannesburg, Department of Management, Johannesburg, South Africa

ABSTRACT

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

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Creativity; job performance; proactive vitality management; vitality; well-being

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

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

Theoretical background

Modern organizations must constantly adapt to deal with changing circumstances and competitive markets. Flexible and creative employees who are able to deal with changing environments and who come up with new and useful work-related ideas are key to organizational effectiveness (Harari, Reaves, & Viswesvaran, 2016; Unsworth & Parker, 2003).

CONTACT Emma M. Op den Kamp opdenkamp@essb.eur.nl.

However, in order to function well, people need to feel vital (i.e., full of physical and mental energy; Ryan & Deci, 2008, Ryan & Frederick, 1997). When individuals have access to abundant physical and mental energy, they are able to invest these resources in their work and function optimally. Moreover, when levels of physical and mental energy are low, not only the capacity but also the willingness to perform well may decrease. Research has supported the importance of both physical and mental energy for optimal functioning at work. For example, studies have shown that energetic and positively activated employees may perform more creatively at work (Atwater & Carmeli, 2009; Baas, De Dreu, & Nijstad, 2008; Binnewies & Wörnlein, 2011). Positive activation, which is inherent to the concept of vitality, may promote flexibility, efficiency, creativity and openness to information (Baas et al., 2008; Fredrickson, 2001). In addition, mental energy and cognitive capacity (e.g., working memory and attention) have been recognized as important contributors to effective and creative performance, as they promote a persistent, focused and systematic approach (De Dreu, Nijstad, Baas, Wolsink, & Roskes, 2012) or "the ability to focus attention, to shut out distractions, [and] to persist in search of a solution" (Lykken, 2005, p. 331).

Combining these studies with proactivity and energy management literatures, in the present research, we argue that individuals may proactively manage their physical and mental energy to promote their work. Scholars studying human energy in the work context have emphasized the importance of replenishing energy reservoirs after (periods of) work (Fritz, Lam, & Spreizer, 2011; Sonnentag, Venz, Casper, 2017; Trougakos & Hideg, 2009; Zacher, Brailsford, Parker, 2014). For example, employees may unwind after work through evening activities that help them to experience relaxation, psychological detachment, mastery or feeling in control (i.e., recovery experiences; Sonnentag & Fritz, 2007). Additionally, employees may recover during work (Trougakos & Hideg, 2009), for example, through work-related strategies (e.g., check e-mail) or micro-breaks (e.g., have a snack; Fritz et al., 2011; Zacher et al., 2014). These previous studies provide initial evidence that physical energy can be replenished and offer some examples of activities people may engage in to renew their resources. Our approach is, however, both conceptually and methodologically different from the literature on recovery during or after work. Recovery is usually regarded as a process in which empty energy reserves are replenished after (periods of) work (cf. effort-recovery model; Meijman & Mulder, 1998). In this sense, it may be described as a reaction to strain from work. In contrast, we define PVM as having a clear *proactive* component, which refers to the idea that the behaviour is self-initiated and goal-oriented (cf. Parker, Williams, & Turner, 2006). Even though recovery may promote well-being, employees may engage in activities after work (e.g., hobbies) or breaks at work (e.g., have lunch or coffee) as part of a routine or habit, for physiological reasons, to reward themselves, or simply because they are bored. In addition, few studies have linked recovery experiences to actual work performance outcomes, and the ones that have, have yielded inconsistent results (Sonnentag et al., 2017). Building on Parker, Bindl, and Strauss (2010), we argue that PVM has a clear goal (being able to function at work and achieve work-related goals) and that people strive to achieve this goal by engaging in strategies to manage both physical and mental energy.

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

The present research

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

In the first study, we develop the PVM scale and examine its factorial validity. In the second study, we examine the validity of a daily version of the PVM scale in a five-day diary sample. Moreover, we explore a range of potential strategies that people may use while at work to manage their energy (i.e., work-related

strategies and micro-breaks; Fritz et al., 2011; Zacher et al., 2014), and examine how these relate to the PVM construct. Finally, in the third study, we explore the wider nomological network of PVM. In doing so, we aim to gain more insight into the nature of PVM and to find support for convergent, discriminant and criterion validity of the PVM scale.

Study 1: scale development and factorial validity

Method

Scale development

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

To develop the items for the PVM scale, we conducted an extensive literature search, in which we focused on studies including physical and mental energy at work. During this developmental phase, a wide variety of studies and literatures have inspired us throughout the process. Research that has influenced our work includes, but is not limited to, the work of Atwater and Carmeli (2009), Baas et al. (2008), De Dreu et al. (2012), Fredrickson (2001) and Shirom (2004). Combining this literature with the proactive, goal-oriented behavioural aspect of PVM, we formulated an initial pool of items with the help of two experts (work and organizational psychologists). The items all referred to managing both the physical and mental energy aspect of vitality (e.g., cognitive capacity, positivity and physical energy) (cf. Ryan & Deci, 2008; Ryan & Frederick, 1997). Additionally, all items were formulated in a way that represents the proactive, goal-oriented nature of PVM (i.e., self-initiated behaviour aimed at work). After a thorough examination and discussion of all items, this time with help from various social and professional contacts of the authors, 18 items were selected to be included in the next phase of this research. To illustrate, we developed items such as "I make sure that I feel energetic during my work" and "I make sure that I can focus well on my work". The response options to the items range from 1 (*totally disagree)* to 7 (*totally agree*). In the instructions, participants were asked to respond to statements about their behaviour towards their work, to further emphasize the proactive and goal-oriented nature of PVM.

Procedure and participants

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

Results and discussion

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

Exploratory factor analysis

Using Sample 1, we performed a principal components analysis (varimax rotation) on the pool of 18 items to examine whether a meaningful factor representing "proactive vitality management" could be obtained. We aimed to develop a reliable instrument while avoiding an overly exhaustive scale containing too many items for it to be used conveniently. So, while we deliberately started out with a relatively large pool of items to empirically answer the question which items functioned best together in terms of their loadings, one of our goals was to significantly reduce the number of items. In the first analysis, SPSS extracted three factors based on their Eigenvalues (>1). However, we noted that the first factor had an Eigenvalue (7.9) that was considerably higher than the other two factors (1.7 and 1.2, respectively). Only one item had a considerable loading on factor three, so we excluded this item/factor. In addition, the second factor did not make theoretical sense, i.e., it overlapped with the first factor regarding content. In the subsequent analysis, two items had high cross loadings on the second factor in the factor solution, so we excluded these items as well. In a further iterative process, two subsequent analyses were performed in which three more items were excluded, using the same criteria. The remaining 12 items loaded on one single factor. However, in order to achieve our goal and facilitate efficient use of the scale, we performed a content analysis and finally decided to exclude four more items that did not add unique, meaningful information to the scale. We were able to exclude these redundant items without compromising construct coverage and face validity (i.e., representation of all facets of the PVM construct). For example, one item was "I make sure that I can concentrate well on my work", which is highly similar to "I make sure that I can focus well on my work". In this case, we excluded the former item because it had a lower loading on the latent

factor. The eight remaining items together formed one overall factor that is representative of the PVM construct. The factor had an Eigenvalue of 4.12 and explained 51.5% of the variance. The factor loadings of the items ranged from .67 to .78, and Cronbach's alpha of the 8-item scale was α = .86. The total general-level sample (*N = 813)* was used to calculate means and standard deviations of the items. The eight PVM items and their descriptive statistics can be found in Table 1.

Confirmatory factor analysis

Using Sample 2, we performed CFA on the eight PVM items using AMOS software (Arbuckle, 2013). To assess model fit, four different fit indices were used. For absolute model fit, the goodness of fit index (GFI) and the standardized root mean square residual (SRMR) were examined. In addition, for relative model fit, we examined the Tucker-Lewis index (TLI) and the comparative fit index (CFI). Values of .08 and under (for SRMR) or .90 and over (for CFI, TLI and GFI) indicate acceptable fit, although some scholars have argued that .95 is a better cut-off point (Byrne, 2001; Hu & Bentler, 1999). The results generally indicated acceptable fit for the one-factor model (CFI = .94, TLI = .92, GFI = .95, SRMR = .044) with standardized factor loadings ranging from .58 to .76 (all *p*'s < .001). Taken together, our results show that PVM can be adequately and reliably measured with the proposed 8-item instrument.

Study 2: daily PVM

Study 1 showed that PVM can be reliably measured with a short 8-item scale that represents one overall factor. To test whether these psychometric properties also hold at the day level, we conducted a second study using a heterogeneous sample. In this diary study, we test the reliability and validity of the daily PVM scale. In addition, we aim to gain insights into example strategies individuals may use to manage their vitality. Therefore, we examine how the PVM construct relates to the daily use of work-related strategies and micro-breaks at work (Fritz et al., 2011; Zacher et al., 2014).

Method

Procedure and participants

To examine PVM on a daily level, we conducted a five-day diary study using the same items, yet adapted to the day level (e.g., "Today I made sure that I felt energetic during my work" – see Table 1 for all the items). Participants for this study were recruited via Amazon Mechanical Turk (MTurk) and were paid for their participation through this platform. While some people accentuate the potential pitfalls of this particular data collection method, studies have shown that it is an adequate way to gather data (e.g., Buhrmester, Kwang, & Gosling, 2011). Another advantage is that this method allows us to validate the PVM scale in an English-speaking (American) sample as well, which adds to the generalizability of the scale. Individuals were required to work full time to be able to participate in the diary study. To ensure high-quality data, another criterion was that participants had to have a good "reputation" on MTurk (i.e., above 95% approval ratings), which represents the quality of their past responses and data entries in the system (cf. Peer, Vosgerau, & Acquisti, 2014). Participants were instructed to fill out each daily questionnaire at the end of their working day, over the course of five consecutive workdays. We asked participants to fill in their MTurk ID at the beginning of each daily survey to be able to match their responses across the five days. In total, 133 participants filled out 521 daily questionnaires. The mean age of the participants was 36.26 (*SD* = 10.57), and 52% of the sample were male. Of all participants, 65% had a college or university degree. Participants worked on average 41.64 hr per week (*SD* = 6.82) in a wide range of professions and sectors, including computer and electronics (18.6%), retail (14.7%), finance and insurance (10.9%), education (6.2%), entertainment and recreation (6.2%), healthcare (5.0%), government and public administration (4.7%), hotel and food services (4.7%) or other sectors such as transportation, real estate, agriculture and

Table 1. Items, means and standard deviations of the proactive vitality management scale on general level (*N* = 813 individuals) and daily level (*N* = 521 days).

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

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

construction. A majority of the participants (74%) had a permanent employment contract (versus being a business owner or having a temporary contract), and 47% held a supervisory position.

Measures

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

Results and discussion

Multilevel confirmatory factor analysis

Using Mplus (Muthén & Muthén, 1998-2012), we performed a multilevel confirmatory factor analysis (MLCFA) on the eight day-level items. We modelled both the within- and between-person covariance matrices simultaneously (see Figure 1). The results of the MLCFA indicated a good fit (CFI = .96, TLI = .95, SRMR within = .029, SRMR between = .033). Moreover, all items on the within level had substantial standardized loadings on the latent construct, with coefficients ranging from .70 to .85 (all p values < .001). The loadings on between level are even higher, with coefficients ranging from .99 to 1.35 (all p values < .001), which implies that there may be a high degree of multicollinearity among the items on the between level (Jöreskog, 1999). Item-level intraclass correlation coefficients (i.e., the amount of variance that can be attributed to the person level) ranged from .52 to .67, indicating that a considerable amount of variance remained to be explained on the within-person level. Cronbach's alpha coefficient of the daily PVM scale ranged from α = .95 to α = .97 over the five days. These results show that PVM can be adequately and reliably measured with the proposed 8-item instrument on a daily level.

Work-related strategies and micro-breaks at work

To examine how the use of work-related strategies and micro-breaks (Fritz et al., 2011; Zacher et al., 2014) relates to PVM, we measured these constructs over the course of five working days. Following the methodological strategy of Zacher et al. (2014), for each day, we created a mean score for all work-related strategies, as well as a mean score for all the micro-breaks. Overall, the results show that PVM related moderately but positively to both work-related strategies and micro-breaks. On the between-person level (i.e., aggregated mean scores), PVM correlated r = .51, p < .001 with work-related strategies and r = .27, p < .01 with micro-breaks. On the daily level, PVM correlated r = .49, p < .001 with work-related strategies and r = .29, p < .001

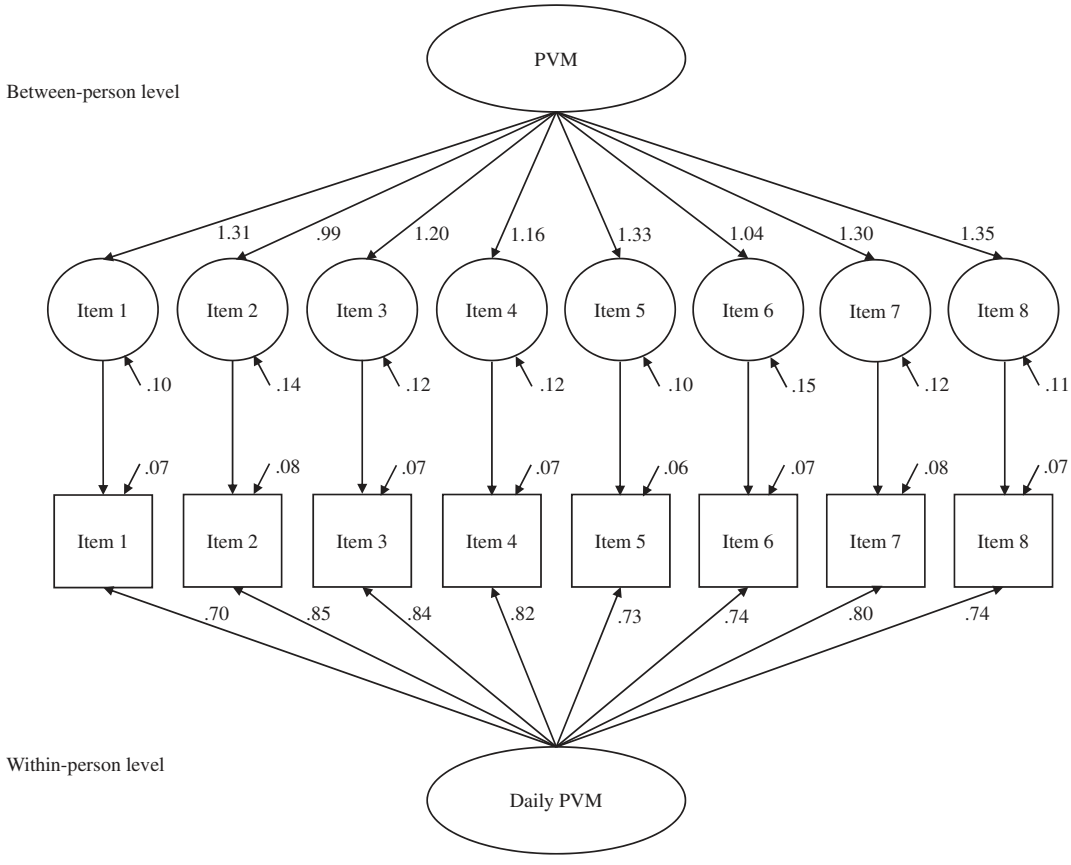

Figure 1. Results of the multilevel confirmatory factor analysis (MLCFA) on the eight daily PVM items. All reported values are standardized.

with micro-breaks. Finally, when we group-mean centred the variables to represent actual within-person fluctuations, the correlation between PVM and work-related strategies was $r = .26$, $p < .001$. However, the relationship between PVM and micro-breaks became non-significant ($r = .06$, $p = .157$).

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

Study 3: nomological network of PVM

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

Convergent validity

First of all, we examine whether proactive personality and self-insight are related to PVM because these personal characteristics may increase the tendency to engage in such behaviour. Proactive individuals are predisposed to engage in behaviour that alters their environment (Bateman & Crant, 1993). Taking control to exert influence and make changes may be accompanied by proactively managing helpful resources (i.e., physical and mental energy) to achieve such goals. In addition, proactively managing physical and mental energy to promote work goals may require some level of awareness of one's own (fluctuating) need for such resources. Therefore, self-insight i.e., the understanding of one's own feelings, thoughts and behaviour (Grant, Franklin, & Langford, 2002) may increase the likelihood of (effective) PVM.

Hypothesis 1: PVM is positively related to (a) proactive personality and (b) self-insight.

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

Hypothesis 2: PVM is positively related to (a) job crafting (increasing job resources and challenges) and (b) relaxation.

Discriminant validity

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

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

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

Criterion validity

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

Well-being

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

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

Work outcomes

We expect that PVM will help to complete regular work tasks because proactively boosting physical and mental energy may promote efficiency and productivity when one needs it. Indeed, cognitive resources (attention and working memory) are important predictors of multitasking performance, which is a day-to-day requirement in many jobs (Konig, Buhner, & Murling, 2005), and having such resources may reduce the likelihood of mistakes. Moreover, the tendency to procrastinate at work may be reduced by motivating oneself and shutting out distractions (Steel, 2007), setting goals or deadlines (Ariely & Wertenbroch, 2002), and sleeping well (Kühnel, Bledow, & Feuerhahn, 2016). All such behaviours may be categorized under PVM when undertaken proactively. Additionally, we propose that PVM may promote work performance because people need physical and mental energy to go the extra mile and engage in creative thinking. When individuals proactively ensure that they feel fresh, energized and positive, and with enough cognitive capacity to think, creative ideas regarding work methods, products or procedures may come to live (cf. Baas et al., 2008; De Dreu et al., 2012). Additionally, PVM may help to engage in creative work behaviour and innovative strategies that improve work performance (cf. Atwater & Carmeli, 2009; Kark & Carmeli, 2009). In the one-day diary study, we also examine the relationship between PVM and cognitive performance using a context-free, objective measure (i.e., the Remote Associates Test; RAT; Mednick, 1968). This test is not directly applicable to one specific work setting, as it more generally measures one's cognitive capacity to think associatively and to create new combinations that are useful.

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

Method

Participants and procedure

To test our hypotheses and explore the nomological network of PVM, we used the total general-level sample from Study 1 (N = 813). In addition, we wanted to measure the variables in the nomological network on a day level. For this day-level study, approximately one-third of all participants from the general-level sample (N = 293) were asked and found willing to also participate in a cross-sectional study measuring daily PVM. This subsample of participants was asked to fill out the day-level questionnaire at or near the end of one working day. We excluded participants who did not follow these instructions, leaving 246 participants (84%) for analysis of the day-level measure. Using a subsample of the general-level participants in our day-level study allowed us to more accurately compare general-level PVM and day-level PVM (i.e., regarding associations with relevant constructs). However, to increase the independency of the general- and day-level samples, we asked people who participated in both studies to keep at least one but preferably multiple days between filling out the general- and the day-level questionnaires. The average number of days between the two surveys was 3.97 days (SD = 4.94). The mean age of the participants was 36.43 (SD = 12.96), and 51.6% of the sample were male. Of all participants, 71.0% had completed higher vocational education or held a university degree. Participants worked on average 38.63 hr per week (SD = 8.63) in a wide range of professions and sectors, including finances (15.7%), business (13.3%), health care (6.5%), trade (6.9%), hotel and catering (6.0%) or other sectors such as education, government and the creative industry. They worked on average 8.07 years for their current employer (SD = 9.12). More than half of the participants (57.7%) had a permanent employment contract, and 36.1% held a supervisory position.

Measures

PVM was measured both on general and day level using the 8-item scale that was developed and validated in this research (see Table 1). Cronbach's alphas of all the measures can be found in Table 2 (general level) and Table 3 (day level).

Table 2. Means, SDs, AVEs, correlations and Cronbach's alphas (between brackets on the diagonal) of the general-level variables in Study 3 (N = 813).

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

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

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

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

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

General level

Proactive personality

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

Self-insight

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

Job crafting

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

Relaxation

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

Psychological detachment

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

Work engagement

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

Cognitive liveliness

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

Exhaustion

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

In-role work performance

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

Creative work performance

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

Day-level measures

Job crafting

We measured "increasing social job resources" (using four items) and "decreasing hindering job demands" (using four items) from the JCS (Tims et al., 2012), because we deemed these strategies most relevant on daily level. We converted the items for daily use (e.g., "Today I asked colleagues for advice"; 1 = *totally disagree*, 5 = *totally agree*).

Relaxation

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

Psychological detachment

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

Vigour

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

Fatigue

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

In-role work performance

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

Creative work performance

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

Cognitive performance

An objective test, the RAT (Mednick, 1968; Dutch version by Chermahini, Hickendorff, & Hommel, 2012), was used to measure cognitive performance. In this test, participants are provided with word triplets and asked to come up with a fourth word that is associatively related to all three stimulus words. An example: participants were provided with the words "cup", "bean" and "break" (answer: "coffee"). The six items varied in difficulty level, and participants were given 2 min to (try to) complete the test. We randomly assigned participants to "conditions" that determined whether they received the RAT items at the beginning, halfway or at the end of the day-level questionnaire.

Results and discussion

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

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

In hypothesis 3, we tested the null-hypothesis that PVM would be unrelated to (a) decreasing hindering job demands

and (b) psychological detachment. PVM did not significantly correlate with decreasing hindering job demands, both on general and day level (r = −.06, p = .114 and r = −.02, p = .816, respectively), supporting hypothesis 3a (Tables 2 and 3). Furthermore, PVM was not significantly related to psychological detachment, both on general and day level (r = .03, p = .473 and r = .10, p = .111, respectively), indicating support for hypothesis 3b (Tables 2 and 3).

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

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

General discussion

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

Theoretical contributions

Our research on PVM as a specific type of self-regulatory behaviour may make an important contribution to the literature. Combining literatures on proactivity and energy at work allowed us to introduce PVM as a bottom-up, goal-oriented behaviour that may complement top-down approaches to promote employee vitality. Moreover, other proactive approaches, such as job crafting (Tims et al., 2012; Wrzesniewski & Dutton, 2001) or voice (LePine & Van Dyne, 1998), focus mainly on changing aspects of the job or the work environment. In contrast, PVM involves a focus on the self or, more specifically, a focus on (managing) physical and mental energy in order to promote optimal functioning at work. Furthermore, the goal-oriented behavioural aspect of PVM distinguishes the construct from concepts concerning (the recovery of) human energy in the work context. Previous research has provided valuable insights on the importance of physical and mental energy for various work outcomes (cf. Atwater & Carmeli, 2009; Baas et al., 2008; De Dreu et al., 2012; Fredrickson, 2001; Kark & Carmeli, 2009; Lykken, 2005). Moreover, scholars have argued and shown that such valuable resources may be replenished after (periods of) work (cf. Fritz et al., 2011; Sonnentag et al., 2017; Trougakos & Hideg, 2009). However, studies that examine the effects of such reactive processes on performance outcomes are scarce, and their results are inconsistent (Sonnentag et al., 2017). The present research contributes to the literature, as we have developed a proactive construct and corresponding measurement instrument that incorporates a goal-oriented behavioural component. This approach aims to bridge energy management on the one hand and performance outcomes on the other hand.

Strengths and limitations

We have developed a reliable 8-item PVM scale, which facilitates efficient and convenient use of the scale in future research

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

However, the present research is not without limitations. First, we cannot infer causal relationships from the correlations that we have calculated. That is, the current findings do not specify whether proactively managing physical and mental energy actually *results* in higher performance or creativity. However, we deem it reasonable to assume that proactively managing physical and mental energy to promote work may predict work-related outcomes. The goal-oriented nature of PVM (i.e., aimed to promote work) is also implied in the instructions we gave participants prior to answering the items and in the formulation of the items. Nevertheless, while we believe that proactively working on one's levels of vitality should result in, for example, higher levels of work engagement, the reverse, or, a reciprocal relationship, is conceivable as well (i.e., where highly engaged individuals are willing and inclined to invest more in their work by proactively managing their vitality). The interrelatedness of PVM and work engagement/vigour is also represented in the relatively high correlations between these constructs, as compared to correlations with other variables that we used to establish convergent validity. Another limitation is that, with the exception of cognitive performance – which we measured using the RAT (Mednick, 1968) – most of the variables were measured using self-reports. Work-related, objective measures of (creative) performance are difficult to realize in practice and are a recurring subject of discussion (e.g., Zhou & Shalley, 2003). However, being able to predict quantifiable changes in work performance in field research would add to the significance of PVM. Finally, even though the samples that were used were quite heterogeneous regarding the range of industries and professions participants worked in, some of the sample characteristics may have been less representative of the entire workforce. That is, the participants were relatively highly educated and a considerable proportion of the samples held supervisory positions. Workers with relatively high levels of autonomy or skill variety may have more opportunities to engage in PVM, and/or to engage in specific strategies that are not practical or possible in all occupations. However, we argue that all workers in all industries and occupations may use PVM, as there are numerous possible strategies, small or more elaborate, that people may use.

Future research

Future research may help to gain more insights into the specific mechanisms underlying PVM in relation to work performance and other relevant outcomes. The general tendency to use PVM may possibly be relatively stable. However, as suggested by the results of the diary study, the need and opportunity to do so may fluctuate considerably due to individual and momentary needs and preferences, and due to the nature of one's work. The fluctuating nature of PVM opens up further possibilities for multilevel research. So far, studies have barely incorporated individual or contextual factors that may influence the effectiveness of energy management and recovery (Sonnentag et al., 2017; Zacher et al., 2014). To address this gap, future studies could test cross-level interaction effects between PVM and potentially relevant boundary or facilitating conditions (e.g., degree of job autonomy or type of work tasks). Perhaps individuals who have more autonomy in their work have more opportunities to engage in preferential strategies to manage their physical and mental energy for work. Or, people may be more motivated to use PVM for workdays with challenging tasks, or on days during which they have sufficient time to think about new projects.

Practical implications

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

Conclusion

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

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Emma M. Op den Kamp http://orcid.org/0000-0001-8377-0251

References

Arbuckle, J. L. (2013). *IBM SPSS Amos 22 user's guide*. Mount Pleasant, SC: Amos Development Corporation.

Ariely, D., & Wertenbroch, K. (2002). Procrastination, deadlines, and performance: Self-control by precommitment. *Psychological Science*, *13*, 219–224.

Atwater, L., & Carmeli, A. (2009). Leader–Member exchange, feelings of energy, and involvement in creative work. *The Leadership Quarterly*, *20*, 264–275.

Baas, M., De Dreu, C. K., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood creativity research: Hedonic tone, activation, or regulatory focus? *Psychological Bulletin*, *134*, 779–806.

Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. (2008). Work engagement: An emerging concept in occupational health psychology. *Work & Stress*, *22*, 187–200.

Bateman, T. S., & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, *14*, 103–118.

Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology*, *90*, 1054.

Binnewies, C., & Wörnlein, S. C. (2011). What makes a creative day? A diary study on the interplay between affect, job stressors, and job control. *Journal of Organizational Behavior*, *32*, 589–607.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, *6*, 3–5.

Byrne, B. M. (2001). Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International Journal of Testing*, *1*, 55–86.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*, 81.

Chermahini, S. A., Hickendorff, M., & Hommel, B. (2012). Development and validity of a Dutch version of the remote associates task: An item-response theory approach. *Thinking Skills and Creativity*, *7*, 177–186.

Claes, R., Beheydt, C., & Lemmens, B. (2005). Unidimensionality of abbreviated proactive personality scales across cultures. *Applied Psychology*, *54*, 476–489.

de Bloom, J., Kinnunen, U., & Korpela, K. (2015). Recovery processes during and after work: Associations with health, work engagement, and job performance. *Journal of Occupational and Environmental Medicine*, *57*, 732–742.

De Dreu, C. K., Nijstad, B. A., Baas, M., Wolsink, I., & Roskes, M. (2012). Working memory benefits creative insight, musical improvisation, and original ideation through maintained task-focused attention. *Personality and Social Psychology Bulletin*, *38*, 656–669.

de Jonge, J., Spoor, E., Sonnentag, S., Dormann, C., & van den Tooren, M. (2012). "Take a break?!" Off-job recovery, job demands, and job resources as predictors of health, active learning, and creativity. *European Journal of Work and Organizational Psychology*, *21*, 321–348.

Demerouti, E., Bakker, A. B., Vardakou, I., & Kantas, A. (2003). The convergent validity of two burnout instruments: A multitrait-multimethod analysis. *European Journal of Psychological Assessment*, *18*, 296–307.

Demerouti, E., & Rispens, S. (2014). Improving the image of student-recruited samples: A commentary. *Journal of Occupational and Organizational Psychology*, *87*, 34–41.

Farrell, A. M. (2010). Insufficient discriminant validity: A comment on Bove, Pervan, Beatty, and Shiu (2009). *Journal of Business Research*, *63*, 324–327.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, *18*, 39–50.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*, 218–226.

Fritz, C., Lam, C. F., & Spreitzer, G. M. (2011). It's the little things that matter: An examination of knowledge workers' energy management. *The Academy of Management Perspectives*, *25*, 28–39.

Grant, A. M., & Ashford, S. J. (2008). The dynamics of proactivity at work. In B. M. Staw & A. Brief (Eds.), *Research in organizational behavior* (Vol. 28, pp. 3–34). Greenwich, CT: JAI.

Grant, A. M., Franklin, J., & Langford, P. (2002). The self-reflection and insight scale: A new measure of private self-consciousness. *Social Behavior and Personality: an International Journal*, *30*, 821–835.

Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *The Academy of Management Annals*, *3*, 317–375.

Harari, M. B., Reaves, A. C., & Viswesvaran, C. (2016). Creative and innovative performance: A meta-analysis of relationships with task, citizenship, and counterproductive job performance dimensions. *European Journal of Work and Organizational Psychology*, *25*, 495–511.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*, 1–55.

Hunter, E. M, & Wu, C. (2016). Give me a better break: choosing workday break activities to maximize resource recovery. *Journal Of Applied Psychology*, *101*, 302. doi:10.1037/apl0000045

Jöreskog, K. G. (1999, June 22). How large can a standardized coefficient be. Retrieved from http://sicentral.com

Kark, R., & Carmeli, A. (2009). Alive and creating: The mediating role of vitality and aliveness in the relationship between psychological safety and creative work involvement. *Journal of Organizational Behavior*, *30*, 785–804.

Konig, C. J., Buhner, M., & Murling, G. (2005). Working memory, fluid intelligence, and attention are predictors of multitasking performance, but polychronicity and extraversion are not. *Human Performance*, *18*, 243–266.

Kühnel, J., Bledow, R., & Feuerhahn, N. (2016). When do you procrastinate? Sleep quality and social sleep lag jointly predict self-regulatory failure at work. *Journal of Organizational Behavior*, *37*, 983–1002.

LePine, J. A., & Van Dyne, L. (1998). Predicting voice behavior in work groups. *Journal of Applied Psychology*, *83*, 853–868.

Lykken, D. T. (2005). Mental energy. *Intelligence*, *33*, 331–335.

McNair, D. M., Lorr, M., & Droppleman, L. F. (1971). *Profile of mood states manual*. San Diego (CA): Educational and Industrial Testing Service.

Mednick, S. A. (1968). The remote associates test. *The Journal of Creative Behavior*, *2*, 213–214.

Meijman, T. F, & Mulder, G. (1998). Psychological aspects of workload. In (Eds.), *Handbook of work and organizational psychology* (Vol. *2*, pp. 5–33). Hove, UK: Psychology Press.

Mitchell, M. L., & Jolley, J. M. (2012). *Research design explained*. Wadsworth Cengage Learning, Belmont, CA.

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide*. (7th ed.). Los Angeles, CA: Muthén & Muthén.

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research. An introduction and some practical recommendations. *Journal of Personnel Psychology*, *9*, 79–93.

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. *Journal of Management*, *36*, 827–856.

Parker, S. K., Williams, H. M., & Turner, N. (2006). Modeling the antecedents of proactive behavior at work. *Journal of Applied Psychology*, *91*, 636–652.

Peer, E., Vosgerau, J., & Acquisti, A. (2014). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior Research Methods*, *46*, 1023–1031.

Ryan, R. M., & Deci, E. L. (2008). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass*, *2*, 702–717.

Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, *65*, 529–565.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire a cross-national study. *Educational and Psychological Measurement*, *66*, 701–716.

Shirom, A. (2004). Feeling vigorous at work? The construct of vigor and the study of positive affect in organizations. In D. Ganster & P. L. Perrewe (Eds.), *Research in organizational stress and well-being* (Vol. 3, pp. 135–165). Greenwich, CT: JAI.

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, *12*, 204–221.

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*, 72–103.

Sonnentag, S., Venz, L., & Casper, A. (2017). Advances in recovery research: What have we learned? What should be done next? *Journal of Occupational Health Psychology*, *22*, 365–380.

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*, 65.

Tims, M., Bakker, A., & Derks, D. (2013). The impact of job crafting on job demands, job resources, and well-being. *Journal of Occupational Health Psychology*, *18*, 230–240.

Tims, M., Bakker, A., & Derks, D. (2014). Daily job crafting and the self-efficacy–Performance relationship. *Journal of Managerial Psychology*, *29*, 490–507.

Tims, M., Bakker, A. B., & Derks, D. (2012). Development and validation of the job crafting scale. *Journal of Vocational Behavior*, *80*, 173–186.

Tims, M., Derks, D., & Bakker, A. B. (2016). Job crafting and its relationships with Person–Job fit and meaningfulness: A three-wave study. *Journal of Vocational Behavior*, *92*, 44–53.

Trougakos, J. P., & Hideg, I. (2009). Momentary work recovery: The role of within-day work breaks. *Current Perspectives on Job–Stress Recovery: Research in Occupational Stress and Wellbeing*, *7*, 37–84.

Unsworth, K. L., & Parker, S. K. (2003). Promoting a proactive and innovative workforce for the new workplace. In D. Holman, T. D. Wall, C. W. Clegg, P. Sparrow, & A. Howard (Eds.), *The new workplace: A guide to the human impact of modern working practices*. Chichester: John Wiley & Sons.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, *17*, 601–617.

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, *26*, 179–201.

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Work engagement and financial returns: A diary study on the role of job and personal resources. *Journal of Occupational and Organizational Psychology*, *82*, 183–200.

Zacher, H., Brailsford, H. A., & Parker, S. L. (2014). Micro-breaks matter: A diary study on the effects of energy management strategies on occupational well-being. *Journal of Vocational Behavior*, *85*, 287–297.

Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, *44*, 682–696.

Zhou, J., & Shalley, C. E. (2003). Research on employee creativity: A critical review and directions for future research. *Research in Personnel and Human Resources Management*, *22*, 165–218.