Workaholism and daily energy management at work: associations with self-reported health and emotional exhaustion

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Abstract: Adequate energy management during the working day is essential for employees to remain healthy and vital. Research has investigated which energy management strategies are frequently used and which are most beneficial, but the results are inconclusive and research is still scarce. We aim to extend the current knowledge by considering individual differences in terms of working compulsively (as key feature of workaholism) with regard to energy management. Data were collected with an online survey in 1,253 employees from 12 different organizations. Employees' levels of compulsiveness were expected to relate to 1) employees' choice of which energy management strategies to use, and 2) the benefits (improved health and alleviated emotional exhaustion) of the chosen strategy. The results partly supported the hypotheses in that compulsiveness was associated with more frequent use of work-related energy management strategies. However, compulsiveness was not related to less frequent use of micro-breaks. Energy management (particularly work-related and physical micro-break strategies) improved health and alleviated emotional exhaustion regardless of compulsiveness levels, whereas private micro-break strategies were only beneficial for employees high in compulsiveness.

Key words: Energy management strategies, Compulsiveness, Internal recovery, Work breaks

Introduction

Today's workforce faces the challenge of globalization, accompanied by economic recession, organizational downsizing, and restructuring, which leads to rising levels of job insecurity, competitiveness, and overwork[1]. Research has extensively demonstrated that working under these stressful conditions is extremely demanding and can be detrimental to employees' health and well-being[2, 3]. To counteract stressful job demands, adequate management of an employee's cognitive and emotional resources at work, called "energy management" is needed during the work-day[4–7]. This study investigates which energy management strategies during the workday are most beneficial for employee well-being and health. As the existing research is still inconclusive as regards these beneficial effects, we aim to extend the current knowledge by considering individual differences in energy management. More specifically, our study investigates whether employees' level of working compulsively is related to energy management and its association with health and emotional exhaustion.

Energy management at work promotes recovery from work. Whereas recovery experiences refer to the psychological mechanisms which explain how specific leisure

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activities help restoring people's health and well-being after a stressful working day[8], energy management strategies refer to concrete activities which employees deliberately engage in to keep their energy levels high throughout the working day[5]. Numerous studies have investigated the benefits of external recovery (i.e., recovery occurring after the working day)[9–12], but research on the benefits of internal recovery (i.e., recovery occurring during the working day)[9, 10] remains scarce. Internal recovery is important. Human energy levels decline during the course of the day[6, 13], and successful recovery throughout the working day helps employees to maintain health and well-being by preventing strain to build up[14]. A cross-sectional study[14] showed that employees who frequently applied energy management strategies during the working day experienced higher levels of psychological detachment, relaxation, control and mastery after finishing work. This suggests that the relationship between internal and external recovery is complementary, meaning that energy management during work benefits recovery experiences after work. Internal and external recovery seem to reinforce each other and both processes contribute uniquely to health, work engagement, and job performance. Therefore, energy management during the working day is essential to preserve health and alleviate emotional exhaustion.

The first research on energy management during the working day has distinguished work-related strategies and micro-breaks[5]. Work-related strategies are defined as strategies in the doing of work[5]. They contain, for example, focusing on a new work-related goal or making a to-do list for the workday. Micro-breaks in contrast refer to break activities independent of the work context[5], like chatting with a coworker about non-work-related topics or going for a walk. A subsequent study further divided the rather broad category of micro-breaks into private micro-breaks (e.g., listening to music) and physical micro-breaks (e.g., engaging in some form of physical activity, including walks or stretching) based on exploratory and confirmatory factor analyses[15].

Results regarding the outcomes of these strategies for health and well-being differ[5, 14]. On the one hand, for example, work-related strategies seem to be beneficial as they have been shown to relate positively to vitality levels and negatively to fatigue when investigated cross-sectionally[5]. However, not all work-related strategies were found to correlate with energy levels on an item-specific level. One strategy (i.e., venting about a problem) was even found to contradict the positive pattern[5]. A study with a similar cross-sectional design also showed positive asso-

ciations between work-related strategies and health, but the correlations were relatively low, ranging between 0.02 and 0.14[14]. On the other hand, the results of a diary study contradicted these findings. In this diary study, employees reported baseline levels of fatigue and vitality and additionally responded to hourly surveys across one working day. Multilevel analyses showed that work-related strategies neither contributed to vitality nor alleviated fatigue during the course of the day, which means that no positive short-term effects (i.e., on the within-person level) were found for the use of work-related strategies[16]. However, on the between-person level the use of work-related strategies was positively associated with vitality[16]. Hence, the existing research is somewhat ambiguous with regard to the benefits of work-related strategies.

The research on micro-breaks is likewise inconclusive. A cross-sectional study reported negative associations with vitality and positive associations with fatigue[5]. Again, exceptions were found on the item-specific level. One strategy (meditation) was found to contradict the negative pattern by showing a positive relation with vitality[5]. A subsequent cross-sectional study challenged the findings by Fritz and colleagues[5] and identified positive associations between the use of micro-breaks and health[14]. Further, in the diary study mentioned above, positive short-term effects were found within-persons. Micro-breaks showed positive associations with vitality and negative associations with fatigue[16]. These contradictory and ambiguous findings reveal a great need for more research in this field.

For instance, to date very few studies have considered individual differences that may play a role in managing one's energy levels during the day. Research on external recovery suggests that various individual differences play a role in the recovery process[17–19]. A recently published study on internal recovery during the working day suggests that demographic variables (gender and age) as well as certain work characteristics (autonomy and social support) distinguish between people using different types of energy management strategies[15]. In this paper, the authors used latent profile analysis to identify four typical patterns of employees' use of three different energy management strategies (i.e., work-related, private micro-break, and physical micro-break strategies) which they labeled "Actives", "Passives", "Averages", and "Casuals". "Actives" typically use a wide variety of energy management strategies frequently (especially work-related strategies and physical micro-breaks), whereas "Passives" use few strategies and take particularly few physical micro-breaks. "Averages" and "Casuals" fell between these two more extreme

groups in terms of energy management strategies. Further analyses revealed that women were overrepresented in the "Casual" pattern, and employees' in the "Passive" pattern were older than employees in any of the other patterns. Moreover, each pattern related to either promotion or prevention of energizing during the workday with most beneficial results for the "Actives" and "Casuals". Autonomy and social support at work contributed to the opportunity to engage in beneficial energy management strategies during the working day.

However, the overall scientific evidence of links between personality characteristics and recovery remains scarce. An exception to this is workaholism, or "an irresistible inner drive to work excessively hard"[20], which has been investigated in relation to external recovery in several studies[18, 21, 22]. A key feature of workaholics is the obsessive inner drive to work extremely hard, in the following referred to as "compulsiveness". Compulsiveness causes people's energy levels to diminish quickly, thereby increasing their need for recovery[18, 23]. Our study fills the research gap on internal recovery and takes into account employees' levels of compulsiveness, which may provide a means to understand some of the ambiguities in past findings. More specifically, we investigate whether differences in employees' compulsiveness relate to employees' tendency to apply a specific energy management strategy during the working day, and play a role in the relationship between specific energy management strategies and employee's health and emotional exhaustion.

The tendency to work compulsively has frequently been investigated in the recovery literature due to its close relationship to the inability to detach psychologically (i.e., inability to not think of work or to "switch off" mentally)[24, 25], which makes it difficult to take time off for recovery from work demands. People who score high on compulsiveness tend to work long hours, frequently think about work – even when not working – and work beyond what is reasonably expected of them to meet organizational requirements[26]. Moreover, people with a compulsive tendency to work seem to ignore their need for recovery[27]. Hence, it seems likely that people scoring higher on compulsiveness also have difficulties in engaging in active energy management during working hours, which can be detrimental to the individual.

Concentration levels diminish during the course of the day, and the constant focus on work demands some form of energy management[6, 13]. As using work-related strategies (compared to micro-breaks) does not require complete psychological detachment from work, this form of energy management may be seen as a compromise (i.e., a default option) for employees higher in compulsiveness, to replenish energy levels during the working day. Therefore, it is expected that differences in compulsiveness are reflected in the use of energy management strategies at work. More specifically, it is hypothesized that compulsiveness is positively related to frequent use of work-related energy management strategies (*Hypothesis 1a*) and negatively related to the frequent use of micro-breaks (*Hypothesis 1b*).

Moreover, beneficial effects of energy management (work-related vs. micro-breaks) may differ in proportion to employees' compulsiveness levels. In the external recovery literature, it was argued that work-related activities during the evening may be differently experienced by individuals scoring high (vs. low) on compulsive tendencies[18]. Whereas highly compulsive individuals may engage in work-related activities due to their inner drive to fulfill stringent standards, low compulsive individuals, if doing so, may simply enjoy working on specific work tasks in the evenings. Bakker and colleagues[18] found that work-related activities during the evening are particularly detrimental to well-being at bedtime for individuals with high compulsive tendencies (as compared to individuals with low compulsive tendencies), as they do not have enough time for recovery.

Accordingly, we expect similar effects for employees' well-being during the day, namely that work-related strategies are differently associated with health and emotional exhaustion depending on employees' compulsiveness levels. More specifically, we hypothesize that for employees with higher levels of compulsiveness, the use of work-related strategies is negatively associated with health and positively associated with emotional exhaustion (Hypothesis 2a) whereas we expect the opposite patterns for employees with lower levels of compulsiveness (Hypothesis 2b). Thus we assume that because of their obsessive inner drive to work hard, work-related strategies do not help them to maintain their energy level. On the contrary, these strategies may worsen their well-being level due to the increased effort put to work. In line with the most recent research on energy management strategies[14, 16], it is also assumed that micro-breaks generally benefit employees' health and alleviate emotional exhaustion. It is hypothesized that taking micro-breaks is positively associated with health and negatively with emotional exhaustion, regardless of peoples' compulsiveness level (Hypothesis 2c).

Subjects and Methods

Sample and procedure

The participants of the study were 1,253 (58% female; age: $M = 46.93$, $SD = 10.52$) employees working in 12 Finnish organizations representing different sectors, the largest of which were education, information technology, and media. The majority of the sample (58%) comprised higher white-collar employees (e.g., teachers, IT engineers, managers), and 66% held a bachelor's or higher university degree. Weekly working hours ranged from 12 to 60 with an average of 39. Sampling different organizations made it possible to include employees from a variety of different jobs. The organizations were mainly recruited among the client organizations of a company supplying occupational health services.

The questionnaire data for the current study were collected in spring 2013. An electronic questionnaire was sent either directly to the employees' work e-mail addresses (in eight organizations) or the link to the questionnaire was delivered by the contact persons to the employees (in four organizations). Of the 2,824 employees approached in spring 2013, 1,253 provided answers on the constructs measured in this study, resulting in a response rate of 44%. All participants of this study gave their informed consent after receiving information about the goals of the study and assurance that responses would be treated confidentially and that participation was voluntary. Approval by the institutional ethics committee was not necessary, because (according to the Finnish national advisory board on research ethics) this is only necessary if a study would contain any of the following six features: 1) it intervenes in the physical integrity of subjects, 2) it deviates from the principle of informed consent, 3) it involves children, 4) it poses security risks, 5) it exposes participants to physical or 6) mental harm. None of these criteria applied to our survey study, which was conducted in adults who signed informed consent and who were not exposed to any physical, mental or security risks.

Measures

Energy management. Energy management strategies during the working day were assessed with an adapted version of the questionnaire developed by Fritz and colleagues[5]. We chose the items most frequently reported by the employees from the list of strategies provided by Fritz et al.[5]. Participants were asked to report to what extent they used each of the listed 13 behaviors to sustain their energy during the work day, with response options on a 5-point scale ranging from 1 (very seldom or never) to 5 (very often or always). Participants also had the option to respond "not possible in my job", recoded into 0. Example items were "How often do you go outside for fresh air (not smoking)", "How often do you set a new goal?", and "How often do you listen to music".

We followed the recent work of Kinnunen and colleagues[15] who used exploratory and confirmatory factor analyses to cluster energy management strategies into three meaningful categories: work-related strategies (three items: make a to-do list, focus on what gives me joy at work, set a new work-related goal), private micro-break strategies (three items: interact with someone about non-work-related things, listen to music, surf the web for non-work-related information) and physical micro-break strategies (two items: engage in some form of physical activity, including walks or stretching, go outside for fresh air). Internal reliabilities of the subscales were similar as in earlier studies and factor loadings of the items on the respective dimensions were all above 0.45. Confirmatory factor analysis further showed that the three-factor solution ($\chi^2(17) = 94.13$, $p < 0.001$, RMSEA $= 0.06$) fitted the data better than a two- ($\chi^2(19) = 387.03$, $p < 0.001$, RMSEA $= 0.12$) or a one-factor solution ($\chi^2(20) = 649.60$, $p < 0.001$, RMSEA $= 0.16$). The difference between the models was significant (three versus two factor solution: $\Delta\chi^2(2) = 292.90$, $p < 0.001$; three versus one-factor solution: $\Delta\chi^2(3) = 555.47$, $p < 0.001$).

Compulsiveness. Level of compulsiveness was assessed with items from the DUWAS questionnaire by Del Libano, Llorens, Salanova, and Schaufeli[28], which has been validated in Finland[29]. The questionnaire consisted of three items with an acceptable Cronbach's α of 0.70. Participants were asked to make their responses on a 5-point scale from 1 (very seldom or never) to 5 (very often to always). Items were "I feel guilty when I take time off work", "I feel that there's something inside me that drives me to work hard", and "I feel obliged to work hard even if it's not enjoyable".

Self-reported health. Participants' health status was elicited with one item (i.e., "How would you rate your general health status?"). Answers could range from 1 (very unhealthy) to 10 (very healthy). Single-item health measures have been shown to be valid indicators for investigating general health levels and predicting morbidity and mortality[30–32].

Emotional exhaustion. Emotional exhaustion was assessed with a subscale of the Maslach Burnout Inventory–General Survey[33] which has been validated in

Table 1.   Bivariate correlations between the study variables

	M	*SD*	Range	1	2	3	4	5	6	7	8
1. Age	46.72	10.32	20–68	(—)							
2. Gender	0.37	0.48	0,1	0.06*	(—)						
3. Work-related strategies	2.70	0.96	1–5	0.03	−0.18**	(0.64)					
4. Private micro-break strategies	2.59	1.03	1–5	−0.18**	0.07*	0.15**	(0.61)				
5. Physical micro-break strategies	2.18	1.09	1–5	0.10**	0.12**	0.35**	0.26**	(0.65)			
6. Compulsiveness	2.97	0.89	1–5	−0.06*	−0.08**	0.17**	−0.03	<0.01	(0.70)		
7. Self-reported health	7.54	1.47	1–10	−0.13**	−0.01	0.13**	0.04	0.14**	−0.14**	(—)	
8. Emotional Exhaustion	1.94	1.47	0–6	0.04	−0.09**	−0.11**	−0.07*	−0.11**	0.35**	−0.38**	(0.93)

Gender: 0: Female, 1: Male. M: Mean. SD: Standard deviation. Cronbach's alpha coefficients are displayed on the diagonal in parentheses. *$p<0.05$. **$p<0.01$. $N=1{,}193$ to $1{,}578$.

Finland[34]. The subscale consisted of five items ($\alpha=0.93$) with response options on a 7-point scale from "never" to "always, every day". An example item is "I feel emotionally drained from my work".

Control variables. *Chronological age* and *gender* were assessed as previous research found both to correlate with the use of energy management strategies[15].

Statistical analysis

To test the first hypotheses (1a and 1b), regarding the potential relation between compulsiveness and the use of particular energy management strategies, independent variables were mean-centered and predicted by compulsiveness in three separate hierarchical regression analyses (i.e., for work-related, private micro-break and physical micro-break strategies). In these regressions, we controlled for the remaining two energy management strategies, as well as for age and gender.

To test the second group of hypotheses (2a–2c) concerning the moderating effect of compulsiveness on the association between the different types of energy management strategies and health or emotional exhaustion, independent variables were mean-centered and two hierarchical regression analyses were performed (i.e., one for self-reported health and one for emotional exhaustion). In these analyses, health and emotional exhaustion were separately regressed on the predictors in four steps: 1) age and gender (control variables), 2) type of energy management, 3) compulsiveness, and 4) three interaction terms between compulsiveness and the type of energy management. Due to missing values in some questions, the subject number in the analyses slightly differs from the overall number of participants who filled in the survey. Analysis of missing data (comparing participants who completed the full survey with those who had missing data on at least one of the questionnaires of interest) showed that the two

groups were similar on the dependent variables (i.e., health status and emotional exhaustion). That is, there were no significant differences between both groups' health status ($t(8.12)=0.20$, $p=0.85$), or emotional exhaustion ($t(156.33)=−0.04$, $p=0.97$).

Results

Descriptive results

For means, standard deviations, and bivariate correlations between the study variables see Table 1. On average, participants most frequently used work-related strategies, followed by private micro-break strategies and physical micro-break strategies. Work-related strategies correlated positively with both types of micro-break strategies (private and physical). The use of all energy management strategies was positively correlated with self-reported health (except for private micro-break strategies), and negatively correlated with emotionally exhaustion. Participants' level of compulsiveness was positively associated with work-related strategies but not with either type of micro-break strategies. Moreover, compulsiveness was negatively associated with self-reported health and positively correlated with emotional exhaustion.

Compulsiveness and energy management strategies

Compulsiveness significantly predicted the use of work-related strategies ($\beta=0.15$, $p<0.01$), when controlling for age and gender, as well as private and physical micro-break strategies, supporting Hypothesis 1a. No relation was found between compulsiveness and micro-breaks (private micro break strategies or physical micro break strategies; see Table 2), which was contrary to the expected negative association in Hypothesis 1b.

Table 2. The results of hierarchical regression analyses in predicting each energy management strategy by compulsiveness (controlling for age, gender and the other two energy management strategies)

		Work-related strategies (N=1,199)			Private micro-break strategies (N=1,199)			Physical micro-break strategies (N=1,199)		
		Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β
Step 1	Age	0.04	0.02	0.03	−0.19**	−0.21**	−0.22**	0.09**	0.12**	0.12**
	Gender	−0.19**	−0.23**	−0.23**	0.08**	0.07*	0.07*	0.12**	0.16**	0.16**
Step 2	Work-related strategies		—	—		0.08*	0.09**		0.33**	0.34**
	Private micro-break strategies		0.07*	0.08**		—	—		0.22**	0.21**
	Physical micro-break strategies		0.34**	0.34**		0.24**	0.24**		—	—
Step 3	Compulsiveness			0.15**			−0.05			−0.03
	ΔR²	0.04**	0.13**	0.02**	0.04**	0.07**	<0.01	0.02**	0.17**	<0.01
	R²	0.04**	0.17**	0.19**	0.04**	0.11**	0.12**	0.02**	0.20**	0.20**

0: Female, 1: Male. β: standardized beta-coefficient. ΔR^2: change in explanation rate in each step. R^2: explanation rate for the total model. *$p<0.05$. **$p<0.01$.

Table 3. The results of hierarchical regression analyses in predicting self-reported health and emotional exhaustion

		Self-reported health (N=1,184)				Emotional exhaustion (N=1,199)			
		Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 1 β	Step 2 β	Step 3 β	Step 4 β
Step 1	Age	−0.13**	−0.15**	−0.16**	−0.16**	0.04	0.05	0.08**	0.08*
	Gender	−0.01	<0.01	−0.01	−0.01	−0.09**	−0.10**	−0.08**	−0.08**
Step 2	Work-related strategies		0.09**	0.12**	0.13**		−0.10**	−0.17**	−0.17**
	Private micro-break strategies		−0.04	−0.05	−0.04		−0.02	<0.01	0.01
	Physical micro-break strategies		0.13**	0.12**	0.12**		−0.07*	−0.05	−0.05
Step 3	Compulsiveness			−0.17**	−0.17**			0.38**	0.38**
	Work-related strategies x Compulsiveness				0.01				0.04
	Private micro-break strategies x Compulsiveness				0.06*				−0.06*
Step 4	Physical micro-break strategies x Compulsiveness				−0.42				−0.03
	ΔR²	0.02**	0.03**	0.03**	<0.01	0.01**	0.02**	0.14**	0.01
	R²	0.02**	0.05**	0.08**	0.08**	0.01**	0.03**	0.17**	0.17**

0: Female, 1: Male. β: standardized beta-coefficient. ΔR^2: change in explanation rate in each step. R^2: explanation rate for the total model. *$p<0.05$. **$p<0.01$.

Energy management and health and emotional exhaustion

Hypotheses 2a and 2b were not supported as only the main effects were significant while the interaction effects were not (Table 3). Higher compulsiveness and more frequent use of work-related strategies significantly predicted better health (compulsiveness: $\beta=-0.17$, $p<0.01$; work-related strategies: $\beta=0.12$, $p<0.01$) and lower emotional exhaustion (compulsiveness: $\beta=0.38$, $p<0.01$; work-related strategies: $\beta=-0.17$, $p<0.01$). However, the interaction effect of work-related strategies and compulsiveness was not significant. Hence, compulsiveness had no role in the association of work-related strategies and health or in the association of work-related strategies and emotional exhaustion (consequently not supporting Hypotheses 2a and 2b).

When controlling for compulsiveness, physical micro-break strategies significantly predicted health ($\beta=0.12$, $p<0.01$). However, contrary to expectations, physical micro-break strategies did not predict emotional exhaustion. Private micro-break strategies did neither predict health nor emotional exhaustion (see Table 3). Hence, more frequent use of physical micro-break strategies (but not private micro-break strategies) was positively associated with health, but neither type of micro-break strategies (physical or private) was directly associated with emotional exhaustion. Accordingly, Hypothesis 2c was only partly supported.

We found no significant interaction effects between compulsiveness and physical micro-break strategies on health and emotional exhaustion (see Table 3). However,
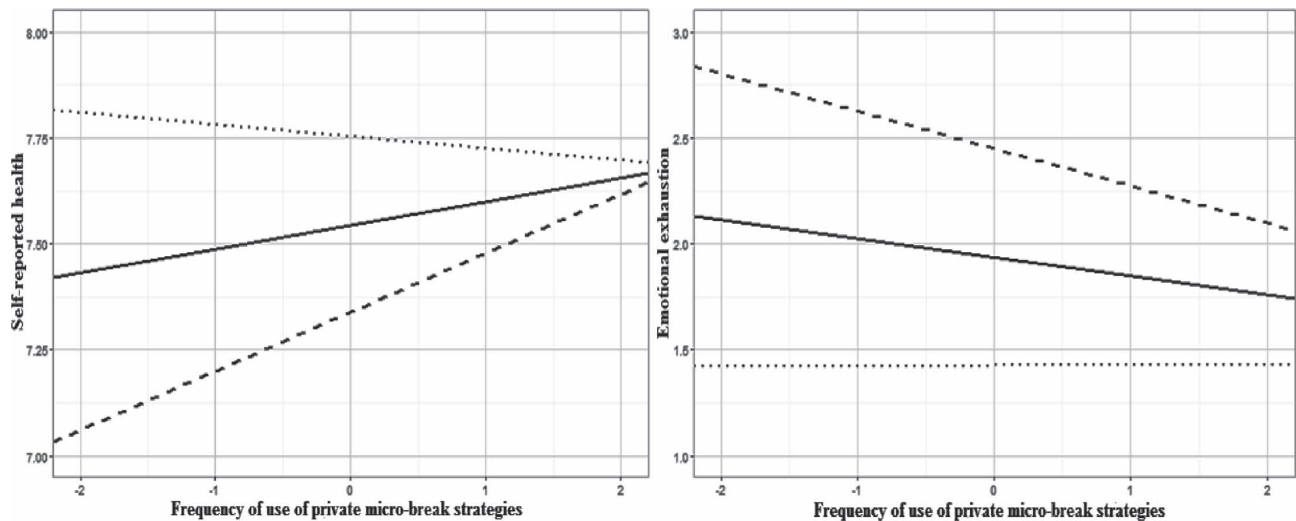
Fig. 1. Interaction effects between private micro-break strategies and compulsiveness on self-reported health (left) and emotional exhaustion (right). Simple slopes are shown for different levels of compulsiveness (—: mean, ----: +1 SD, ·····: −1 SD).

we detected a significant positive interaction effect of private micro-break strategies and compulsiveness on health ($\beta=0.06$, $p<0.05$), and a significant negative interaction effect of private micro-break strategies and compulsiveness on emotional exhaustion ($\beta=-0.06$, $p<0.05$). A graphical presentation (see Fig. 1) of the regression lines (i.e., simple slope analysis) for employees with high (1 SD above the mean), average (the mean) and low (1 SD below the mean) scores on compulsiveness showed that the effect of private micro-break strategies on self-reported health was positive for employees who scored high on compulsiveness ($\beta=0.10$, $p<0.05$). For employees who scored relatively low on compulsiveness, private micro-break strategies had no significant influence ($\beta=-0.02$, $p=0.63$). Private micro-break strategies were only beneficial for the health of employees with high levels of compulsiveness (Fig. 1).

For emotional exhaustion, a simple slope analysis showed that the positive effect of private micro-break strategies on emotional exhaustion was relatively high for employees who scored high (1 SD above the mean) on compulsiveness; ($\beta=-0.12$, $p<0.01$). For employees who scored relatively low (1 SD below the mean) on compulsiveness (i.e.,), private micro-break strategies had no significant influence ($\beta=0.01$, $p=0.98$). This means that private micro-break strategies were only beneficial for lowering exhaustion for employees with high levels of compulsiveness (Fig. 1). These findings show that employees with high levels of compulsiveness benefitted more from the use of private micro-break strategies than employees with low levels of compulsiveness.

In sum, compulsiveness was positively related to the frequent use of work-related strategies, but no significant relationsships were found between compulsiveness and the frequent use of micro-breaks (i.e., private micro-break and physical micro-break strategies). Contrary to our expectations, compulsiveness did not moderate the relationship between work-related energy management strategies, and health or emotional exhaustion. However, private micro-break strategies seemed to improve health and lower emotional exhaustion in persons with high levels of compulsiveness. Regardless of peoples' compulsiveness levels, work-related strategies were connected to improved health and lowered exhaustion and physical micro-break strategies were associated with higher levels of self-reported health, as expected. Private micro-breaks were not directly linked to the outcomes.

Discussion

Energy management strategies and compulsiveness

The first aim of the present study was to investigate the relationship between different energy management strategies during the working day (work-related strategies and micro-break strategies) and employees' levels of compulsiveness. Specifically, we hypothesized that employees scoring high on compulsiveness would use work-related strategies more frequently and micro-break strategies, representing non-work-related breaks, less frequently. We divided the broad category of micro-break strategies into private strategies and physical strategies based on the prior used categorization of Kinnunen and colleagues[15].

In an online survey completed by 1,253 employees from

12 organizations, we found partial support for our first hypothesis. In line with Hypothesis 1a, an inner drive to work hard was associated with more frequent use of work-related strategies during the working day. This finding suggests that people who are working compulsively frequently chose work-related strategies to manage their energy levels during the course of the day. With regard to Hypothesis 1b, no direct relationship was found between compulsiveness and the use of either type of micro-break strategies (private or physical). This means that micro-break strategies were used by employees regardless of their individual tendency to work compulsively.

One possible explanation for not finding the hypothesized negative relationship between compulsiveness and the use of micro-break strategies may be that people make independent use of work-related strategies and micro-break strategies (as also suggested by the low correlation coefficients between the two types of strategies). People apply different kinds of strategies during the day but the number of breaks varies and the use of a work-related strategy does not necessarily replace the use of other micro-break strategies. We predicted that compulsiveness would be related to increased use of work-related strategies and decreased use of micro-break strategies. Hence, we indirectly assumed a dependency by assuming that people only use a certain number of strategies during the day and that increased use of one type of strategies would consequently lead to decreased use of the other type. However, with regard to our results, this assumption of dependency is questionable. It seems that people use micro-break strategies regardless of their compulsive tendencies. But people scoring high on compulsiveness use work-related strategies more frequently (compared to people scoring low on compulsiveness). This result implies that in addition to regular use of micro-break strategies, people scoring high on compulsiveness frequently use work-related strategies, which results in more frequent use of energy management strategies in general. This alternative explanation calls for more specific research on the number of strategies people generally adopt in the course of the day.

Energy management, health, and exhaustion

Generally, we found that work-related strategies and physical micro-break strategies were positively associated with health. In addition, work-related strategies were negatively associated with emotional exhaustion. Frequent use of private micro-break strategies was not associated with either health or emotional exhaustion. Hence, our findings partly support our hypotheses and imply that employees who frequently use work-related or physical micro-break strategies feel healthier and employees who frequently use work-related strategies feel less emotionally exhausted.

As private micro-break strategies do not seem to be associated with either health or emotional exhaustion (contrary to predictions), it seems that those strategies are of lesser importance for well-being. Employees who, for example, surf the web or listen to music seem to benefit less from the break activity than do employees who go outside for fresh air or do physical activities. Intuitively, this finding is not surprising, given the assumed underlying mechanism for recovery (e.g., psychological detachment)[25]. With regard to the study results, it seems that physical micro-break strategies offer more opportunities to detach from work than simply doing non-work-related tasks inside the work place.

Our findings from the Finnish sample largely corroborate research results on American employees[5], in that the use of work-related strategies benefits health and well-being. This result was especially important, because we replicated Fritz and colleagues'[5] findings by using a shorter version of the energy management strategy questionnaire. Shortening the extensive questionnaire has already been suggested by Zacher and colleagues[16]. Questionnaire batteries in survey studies are usually long and simplifying them without failing to elicit important information is valuable as it is less cognitively demanding for participants, thereby avoiding careless answers. Hence, we contributed to the existing research by shortening and testing the energy management questionnaire, which can be implemented in future studies.

With regard to the use of micro-break strategies, our results support the findings of Zacher and colleagues on Australian employees[16]. In their multi-level diary study, they found positive, within-person relations between the use of micro-breaks and employees' vitality and negative within-person relations between the use of micro-break strategies and employees' fatigue. Our study design allows a between-person comparison and the results imply that employees who using physical micro-break strategies more frequently feel healthier and less emotionally exhausted. As causality cannot be discerned from our analyses, our results are open to two different interpretations. On the one hand, the use of energy management strategies may improve health and reduce emotional exhaustion. On the other hand, our results may simply mean that people who are healthy or who score low on emotional exhaustion more frequently implement specific energy management strategies during their working day. Hence, future longitudinal or experimental research is needed.

Compulsiveness as a moderator of the relationship between energy management, health and exhaustion

The second aim of the study was to explore the association between different energy management strategies and employees' level of health and emotional exhaustion by considering individual differences in compulsiveness. We predicted that an employee's level of compulsiveness plays a decreasing role in the relation between work-related strategies, health and emotional exhaustion. Moreover, we predicted that compulsiveness does not influence the association between taking micro-break strategies and employees' health and emotional exhaustion.

In line with Hypothesis 2c, we found that the use of physical micro-break strategies is beneficial for employees' health regardless of their compulsiveness levels. According to our prediction, this result suggests that employees scoring high, as well as low, on compulsiveness recover from work with the help of physical micro-break strategies. Physical micro-break strategies may help them to replenish their energy levels and promote well-being by fostering mental detachment from work. However, in our study we did not directly measure psychological detachment (only perceived health and emotional exhaustion as outcome variables). Therefore, we can only assume from related research[35] that psychological detachment may be the underlying mechanism leading to better health and less emotional exhaustion. Follow up research is needed. Regardless of the underlying mechanism(s), our findings clearly suggest that physical micro-break strategies benefit employee's health during the course of the day and therefore employees should be able to engage in such break activities. This finding is in line with research on worksite interventions and external recovery supporting the positive relationship between physical activities and employees' well-being[36−38]. We, thus, recommend that organizations support employees' engagement in activities like walking, stretching or spending time outside the office during the working day.

Further, our results deviate from Hypotheses 2a and 2b, in that compulsiveness did not seem to play a role in the relation between work-related strategies and health and emotional exhaustion. This finding implies that people with higher levels of compulsiveness, and people with lower levels of compulsiveness, benefit equally from the use of work-related strategies. One possible explanation for this unexpected finding may be related to our choice of study design. The analyses of the cross-sectional data allow us to make inferences about differences between individuals but does not provide us with information about changes in energy levels within one individual. Hence, short-term changes over the course of the day, within an individual, may occur but we were not able to detect them in our data. However, energy levels vary over the course of the day and lower levels may cause short-term problems. This idea is in line with the research by Zacher and colleagues[16], who found within-person changes in vitality and fatigue during the course of the day that were not detectable on a between-person level[16]. Hence, our findings call for more detailed exploration of the effects of energy management within individuals.

Additionally, and somewhat contrary to Hypothesis 2c (assuming positive relationships between both micro-break strategies and the outcomes, regardless of compulsiveness), we found an interaction effect for private micro-break strategies and compulsiveness on health and emotional exhaustion. Originally, we expected that compulsiveness levels should not affect the benefit of any type of micro-break strategy with regard to health and emotional exhaustion. This seems to be true for physical micro-break strategies but not for private micro-break strategies. It seems that employees who score relatively high on compulsiveness seem to benefit more from the use of private micro-break strategies than employees who score relatively low on compulsiveness. This finding adds to prior research in demonstrating between-person differences in the benefit of private micro-break strategies. An explanation for this finding, derives from assumption that detachment from work may be the underlying mechanism behind micro-break strategies and well-being. Prior research suggests that increasing levels of compulsiveness make it harder to detach from work because people may ruminate about work during their breaks[39]. Hence, highly compulsive employees may have difficulties to detach and therefore do not strongly benefit from breaks, unless they find a way to detach during these breaks. Private micro-break strategies seem to offer highly compulsive employees the opportunity to benefit from breaks because private micro-breaks may distract them from rumination about work, for example, by the increased input (i.e., investment of mental effort) required when interacting with a friend or surfing the web. Thus, we assume that during private micro-breaks compulsive workers simply do not have time to ruminate about work. Private micro-break strategies seem to offer highly compulsive employees the opportunity to replenish energy during break time.

Limitations and recommendations for future research

Our study showed that energy management is a chal-

lenging topic to investigate and is subject to several limitations, resulting in recommendations for future studies. Firstly, one should bear in mind that employees may not have a shared understanding of energy management. Some people may for example have skipped reading the introduction of the questionnaire and may simply have reported whether they engaged in certain behaviors during the working day (and not whether they used these behaviors to actively manage their energy levels at work). Some people may also engage in energy management strategies during the working day to conserve energy for the time after work (rather than for work-related purposes). They may for instance save their mental and/or physical energy to engage in effortful activities after work (e.g., household chores, child care, renovations). Thus it may not be entirely clear to them how they should reply to the questionnaire. Many behaviors for managing energy at work may also occur unconsciously and/or simultaneously and may be difficult to assess with self-report questionnaires. Consequently, future research could benefit from observational studies tracking employees' typing speed, clicking behavior or recordings of websites visited.

Secondly, another point for discussion may be the seemingly low response rate of the present study (i.e., 44%) concerning to the representativeness of the target population. Problems in this regard have often been discussed in organizational research[40]. However, a review by Baruch and Holtum[40] on survey response rates and trends in organizational research points out that the response rate represents only one aspect of the quality of the sample and its representativeness of the target population. It should also be noted that the average response rate of organizational research is 37.2 percent according to this study[40] and therefore the response rate of the present research can be considered satisfactory. Accordingly, we believe that the present sample is fairly representative for the target population. However, it is possible that the sample is selective in regard to some study variables. For example, it is possible that those suffering from severe exhaustion did not take part in the study.

Thirdly, the present study was based on web based questionnaires. Some researchers have raised concerns about the use of internet questionnaires, because they may yield selective, homogenous samples and findings which may be inconsistent with findings from studies using other methods[41, 42]. However, research showed that internet samples are actually diverse and results usually match findings from studies using other methods such as paper-pencil questionnaires[43–45]. Especially in populations of high internet penetration (such as in Finnish working people), electronic questionnaires may be a good choice, because they are reliable tools which eliminate the need for costly and error-prone data entry[46].

Fourthly, the cross-sectional design of our study does not allow us to specify a causal link between compulsiveness, the types of energy management strategies and well-being. This drawback implies that either compulsiveness or type of strategy may be responsible for the change in the other variable. Earlier research has already called for clarification with longitudinal study designs or experimental settings[5]. With regard to the present results, we can at least assume a causal direction as compulsiveness is considered a stable trait[47]. Therefore, it is more likely that individuals scoring high on compulsiveness more frequently choose work-related strategies, rather than that people who more frequently use work-related strategies became more compulsive.

Fifthly, it should be noted that the subscales of the energy management strategies showed relatively low internal reliabilities. Earlier research indicates that it is fairly common that shorter scales (as compared to longer scales) have lower internal consistencies[48]. This seems especially true for scales intend to capture broad, multidimensional constructs[49], which is the case for the construct of energy management strategies. The difficulty of a scale which measures specific actual break behaviors (rather than the underlying feelings or experiences) is that it easily becomes an extensive list with many items that are applicable to small groups of employees only. Therefore, an alternative approach might be to use continuous sequential logs of activities across one working day such as the extensive time use diaries applied in the Harmonised European Time-use Study[50]. Researchers could then analyze the type of break activities employees engage in during the working day, categorize these into meaningful categories and try to link them to the outcome variables. However, categorizing the activities may be less straightforward than it may seem and this approach also only provides a "snapshot" on break activities during one particular day and is also time-consuming for both participants and researchers.

Sixthly, more research is needed on recovery during the working day and its relationship to well-being and work performance. Personal differences (e.g., work characteristics, home characteristics, personality) should also be taken into account in these studies. Data triangulation, combining self-reports with physiological data (e.g., blood pressure, stress hormones) and direct observations (e.g., cameras in the office to observe actual behaviors) would be

a very useful addition in order to understand the phenomenon of recovery activities better.

Lastly, our research showed interesting connections between compulsiveness and private micro-break strategies. As the reliability of the compulsiveness scale was not optimal, our results should be approached with certain caution. More research is needed to better understand why compulsive employees seem to benefit from private micro-breaks. As stated earlier, mental detachment may act as a moderator or mediator between breaks and positive work outcomes (see also Sianoja *et al.*[51]). The role of job demands (e.g., workload) and job resources (e.g., autonomy) as facilitators of energy management could be explored in more detail in the future as well.

Conclusions and practical recommendations

Our study revealed that individual differences matter when choosing energy management strategies during the day to stay well during the working day. The more compulsively employees work, the more frequently they use work-related strategies. Hence, compulsive people seem to have a preference for certain strategies. Also, we found that work-related strategies as well as physical micro-break strategies were positively related to health and work-related strategies were negatively related to emotional exhaustion, regardless of individual differences in compulsiveness. Furthermore, private micro-break strategies seemed to be especially beneficial for employees who scored high in compulsiveness. Taken together, our findings suggest that the use of energy management strategies itself is beneficial, but highly compulsive employees should consider using private micro-break strategies more frequently as they seem to be particularly beneficial for them.

Our results also suggest that organizations could benefit from encouraging their employees to use several energy management strategies and to create a work setting in which employees can freely choose between energy management strategies in order to foster a healthy working life. Earlier studies have demonstrated that job autonomy and social support at work promote efficient use of energy management strategies[15]. So, in addition to an overwhelming body of research demonstrating the importance of these factors for occupational well-being and mental health in general[52], these job resources can also assist in enabling favorable management of energetic resources during the working day. Employers could for example organize trainings for managers to learn how to facilitate autonomy and a supportive atmosphere at work[53, 54]. These trainings could also include practical guidance on useful energy management strategies during the day and for successful recovery after work[55]. Research has also shown that beneficial recovery habits spill over from supervisors to employees and between partners[56–58].

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