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Original Article

What makes a good work break? Off-job and on-job recovery as predictors of employee health

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Abstract: Recovery from work today seems to be crucial for health care employees' health, so it is important to uncover ways how to facilitate and improve adequate recovery from work. Focusing on the recovery concept of detachment from work, this study investigated associations between detachment after work and during work breaks and individual health among health care employees from a general hospital in the Netherlands. An online cross-sectional survey study was conducted comprising a sample of 368 health care employees of different departments. Controlling for demographics in hierarchical regression analyses, results showed that when health care employees experienced more cognitive detachment after work, they reported less concentration problems. Second, when employees experienced more emotional detachment after work, they reported less feelings of emotional exhaustion, less depressive feelings, and less sleep problems. Finally, in case employees experienced more physical detachment after work, they reported less concentration problems, less feelings of emotional exhaustion, less sleep problems and less physical health problems. No significant associations were found for detachment during work breaks. In conclusion, findings add to current recovery research showing that detachment after work is an important predictor for health care employees' health.

Key words: Fatigue, Sleep, Work hours, Psychosocial stress, Workload

Introduction

Health care employees in hospital care today are experiencing escalating demands at work[1, 2]. All kinds of new working practices have been introduced that aim at improving productivity and quality of care. For instance, the introduction of information and communication technology (ICT) allows staff to work anytime and anywhere, which makes them available for work 24 h, 7 d a week[3, 4]. As a result, work demands such as extended working days, work pressure and blurred work-private boundaries are accelerating. Work stress research has shown that this kind of work demands are becoming increasingly problematic for health care employees and organizations alike[5]. The toll employees pay for too high levels of work stress is expressed in increased health-related risks such as burnout, depression, poor performance, intention to leave, and sickness absenteeism[1, 2, 5]. There is mounting evidence on the health-related consequences of high work demands, but less attention has been paid to the role of recovery from work demands and work-related stress in health care work. Moreover, when employees suffer from high work demands, they tend to detach less from their work during off-job time, they engage less in physical activity, and their

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health problems increase[4]. So, understanding how health care employees recover from work therefore is commensurately important. While there is ample research on recovery from work such as recovery activities after work[6, 7], weekends[8, 9], vacations[10, 11] and sabbaticals[12] in relation to employees' health and performance, less research has investigated recovery during the work day[13, 14]. This is remarkable considering that people spend anywhere from a third to a half of their day at their workplace[15]. During this time they are likely to have formally scheduled breaks such as coffee or lunch breaks, as well as various types of informal (mini) breaks such as a toilet visit or a chat with a colleague to socialize. Furthermore, even less studies are conducted that investigated both off-job recovery and on-job recovery simultaneously[14]. Last but not least, the type of recovery seems to be important for effective recovery as well, such as cognitive, emotional, and physical detachment from work[16]. For this reason, the present study aims to understand how different dimensions of both off-job recovery and on-job recovery can benefit health care employees and organizations through improved individual health.

Background

Recovery can generally be defined as a dynamic process of unwinding and restoration during which an employee's functioning and stressful experiences return to their pre-stress levels[14, 17]. Thus, recovery can be considered as a process opposite to the stress process, in which detrimental effects of demanding and stressful situations are at least alleviated or eliminated. As said before, recovery may occur at work during work breaks or after work during off-job time. To understand how and when recovery occurs as well as what makes a complete recovery, we will look through the lenses of two theoretical frameworks; that is, the Effort-Recovery (E-R) Model[18] and the Conservation of Resources (COR) Theory[19, 20]. These frameworks generally assume that an employee's reservoir of resources may be depleted during and after a work day, which makes recovery necessary. According to Hobfoll[19, 20], resources generally refer to external entities such as objects (e.g., housing situation) or conditions (e.g., job autonomy or job security), to personal characteristics (e.g., self-esteem and optimism), and to energies (e.g., vigor). Hunter and Wu[13] mentioned *human energy* as the cornerstone resource for recovery (see also[21]). Human energy entails physical energy (i.e., the physical capacity to do the job) and energetic activation (i.e., the degree to which people feel energized to do the job). In addition to energy, Quinn *et al.*[21] have also identified motivation and concentration as key to the process of resource production and depletion. Unfortunately, energy, motivation, and concentration resources are not unlimited but rather behave like rechargeable batteries that periodically need recharging[13]. The E-R Model proposes that these resources are expended and recharged by the opposing stress processes of reactivity and recovery. Reactivity refers to the immediate physiological and psychological reactions to work demands[13]. In case physiological and psychological systems are sustained activated, mental and physical effort drains resources and may lead to negative health outcomes such as concentration problems, depressive feelings and fatigue. For that very reason, energy management during and after a working day is a constant challenge for employees[22]. If recovery through effective energy management is successful, employee health and performance improve. If not, health and performance will be affected and the employee starts the next working day in a suboptimal state. Both the E-R Model and COR Theory further propose that successful recovery can be reached in the following ways. First, according to the E-R Model, recovery usually occurs when work demands end. Employees are then able to replenish their resources and successfully recover from work. Second, according to COR Theory, recovery can be obtained by investing in new resources during leisure time such as learning new skills or engaging in leisure activities that positively contribute to an employee's self-esteem. Consequently, employees are better able to deal with future work demands. Finally, the effectiveness of recovery during or after work is also dependent on the type of recovery activities people perform during this time, and how they perceive these activities[7, 15].

In the present study, I will focus on the recovery concept of *detachment from work*. Detachment can be seen as the most central diversionary strategy as far as job-related recovery is concerned[23]. Etzion *et al.*[24] defined detachment from work as an 'individual's sense of being away from the work situation' (p. 579). It is an experience of leaving one's work behind during work breaks or after work has been done (i.e., 'switching off'). Low detachment from work implies that the functional bodily systems remain in a state of prolonged activation. To recover from high work demands, Geurts and Sonnentag[17] suggested that it is important that employees engage in recovery activities that appeal to other bodily systems than used at work, or do not engage at all in effort-related activities. For instance, a health care employee whose job requires high emotional effort would be better off avoiding engage-

ment in recovery activities that put high demands on the same (i.e., emotional) systems. Similarly, a nurse's aide with a highly demanding physical job would be better off avoiding engagement in recovery activities that put high demands on the same (i.e., physical) systems. In this context, several authors assume that detachment from work should encompass cognitive, emotional and physical absence from work[16, 25]. Further, they propose that a full degree of off-job and on-job recovery is attained when the employee feels that both cognitive and emotional as well as physical systems called upon during work have returned to their baseline levels during work breaks and after work. This implies that a completely detached employee is able to stop thinking about work-related issues, is no longer bothered by work-related negative emotions, and is able to shake off physical exertion from work.

Empirical evidence for the beneficial effects of detachment from work on individual health have been reported in the literature (for overviews, see[14, 15, 26, 27]). Generally, a meta-analytical study of 86 publications by Wendsche and Lohmann-Haislah[27] indicated average positive associations between detachment from work and individual health. More specifically, empirical research studies on detachment after work showed that employees who fully detach after work report less psychological and physical health problems[28], less emotional exhaustion[29, 30], and better subjective health[31]. A few research studies on detachment during work breaks demonstrated that relaxing lunch breaks were related to less somatic health symptoms[13], less fatigue[32], and less emotional exhaustion[33, 34]. Last but not least, several studies on detachment from work have included the role of sleep[14, 26, 27]. Sleep seems to be essential to complete the recovery process to a large extent. For example, Clinton *et al.*[35] found a positive relation between detachment from work and sleep quality. Another study by Cropley *et al.*[36] showed that the inability to stop thinking about work issues during off-job time was associated with more sleep problems. To conclude, sleep problems can also be considered key outcomes of insufficient recovery[27, 37].

Aim, hypothesis and research question

The present study investigates associations between detachment from work and individual health among health care employees in a general hospital setting. More specifically, this study tries to disentangle the particular role of different detachment dimensions (i.e., cognitive, emotional, physical) both after work and during work breaks on employee's health. Based on previous findings, I hypothesize in general that detachment after work as well as detachment during work breaks are positively associated with individual health. Furthermore, I am not aware of any research study that *simultaneously* investigated detachment after work and detachment during work breaks, in relation to the three detachment dimensions mentioned above. For that very reason, I explore the following research question: What kind of detachment (i.e., after work or during work breaks) and which detachment dimensions (i.e., cognitive, emotional, physical) are associated with individual health of health care employees?

Methods

Procedure and participants

An online cross-sectional survey study was conducted in a general hospital in the Netherlands. Health care employees of different departments (n=541) received a questionnaire, and 368 people returned it (68% response rate). Most of them were nurses or nurses' aides (37.4%), laboratory staff (28.6%), and operating room assistants (22.8%). The remaining people were administration staff (3.8%), managers (3.6%), 'else' (2.7%), and doctors (1.1%). All employees received an email with a personal link to an online survey. They were able to fill out the survey by using either a desktop, laptop, tablet or smartphone. Participants gave their informed consent for inclusion before they participated in the study. They received written information on the aim of the study, and knew that their data were handled confidentially. The study was conducted in accordance with ethical principles of the Declaration of Helsinki and the American Psychological Association. Ethics approval was obtained from the Medical Ethics Committee of the Radboud University Nijmegen Medical Centre in the Netherlands.

Demographic characteristics showed that 81.9% of the participants were female. The mean age of the group was 44.5 yr (SD=11.4; range 20–63 yr). The majority of the employees had finished higher vocational education (55.1%). Most of the respondents were married or lived together (83.0%), and 51.2% had children at home. Finally, 54.5% of the health care employees worked at least 32 h (i.e., four days) per week. Mean working time was 29.7 h per week (SD=7.5), and the majority of the employees worked irregular shifts (69.6%).

Measures

Off-job recovery

Off-job recovery was measured using the DISQ-R, a

well-validated scale developed by De Jonge *et al.*[16]. The DISQ-R consists of three detachment dimensions; that is, cognitive, emotional, and physical detachment after work. Cognitive and emotional detachment after work were measured with three items, and physical detachment after work with four items. All items were rated on a 5-point frequency scale ranging from 1 (never) to 5 (always). Examples of items are "After work, I put all thoughts of work aside" (cognitive; Cronbach's α=0.79), "After work, I put all emotions from work aside" (emotional; Cronbach's α=0.77), and "After work, I shake off the physical exertion from work" (physical; Cronbach's α=0.75). To test the construct validity of the DISQ-R scales in the present study, I estimated a confirmatory factor analytical model using LISREL 10[38]. A three-factor model was estimated positing three factors representing cognitive, emotional and physical detachment after work. Model test was based upon a covariance matrix and used maximum likelihood estimation. Because non-significant χ^2 test values are rarely obtained in this kind of analysis, I also used other fit indices such as the root mean squared error of approximation (RMSEA), the non-normed fit index (NNFI), and the comparative fit index (CFI) as recommended by Hair and colleagues[39]. Though the χ^2 was significant ($\chi^2(30)=92.39$, $p=0.000$), the remaining fit indices revealed that a three-factor model provided a relatively good fit to the data (RMSEA=0.08, NNFI=0.94, CFI=0.96). Factor loadings were all significant and ranged from 0.40 to 0.58 (completely standardized). These figures are in line with earlier findings of De Jonge *et al*[16].

On-job recovery

On-job recovery was measured with three separate items that were particularly developed for this study. The items reflect three detachment dimensions during a work break (i.e., cognitive, emotional, and physical), and were rated on a 5-point frequency scale ranging from 1 (never) to 5 (always). The items are "During a work break, I focus my thoughts on other aspects than work" (cognitive), "During a work break, I emotionally distance myself from work" (emotional), "During a work break, I physically distance myself from work" (physical). Several studies have provided support for the validity of single item measures[33, 40]. In addition, it has been shown that recovery from work measured with one item was highly correlated with longer recovery scales[41].

Health outcomes

In line with earlier recovery research, five (adverse) health outcomes were used in this study; that is, concentration problems, emotional exhaustion, depressive feelings, sleep problems, and physical health problems[14, 26, 27].

Concentration problems were measured with four items derived from a well-validated semantic differential scale[42], and its psychometrics in terms of construct validity and reliability are profoundly reported elsewhere[42]. All items were rated on a 5-point response scale with two extremes, for example 1 (no concentration difficulties) vs. 5 (concentration difficulties). Cronbach's alpha was 0.95.

The burnout-dimension emotional exhaustion was measured with the Dutch version of the Maslach Burnout Inventory[43]. Construct validity, convergent validity and internal consistency are extensively tested and reported[43]. The scale consisted of five items (e.g., "I feel emotionally drained from my work"), which were rated on a 7-point frequency scale ranging from 1 (never) to 7 (always). Cronbach's α of this scale was 0.87.

Depressive feelings were assessed with two items from the Patient Health Questionnaire (PHQ-9[44]). Research have shown that the combination of these two items appeared to be a useful measure to diagnose depressive feelings in primary care[45, 46]. The items were "During the past month, how often have you been bothered by feeling down, depressed, or hopeless?" and "During the past month, how often have you been bothered by little interest or pleasure in doing things?" The possible responses were 1 (no), 2 (sometimes), and 3 (yes). The intercorrelation of these items was $r=0.63$ ($p=0.000$).

Sleep problems were measured by three items derived from the well-validated Maastricht Questionnaire. This scale was psychometrically tested on construct validity and reliability by Appels *et al*[47]. For instance, "Do you often have problems falling asleep?" The possible responses are 1 (no), 2 (sometimes), and 3 (yes). Cronbach's α was 0.61.

Physical health problems refer to neck, back, shoulder and limb problems in the last six months, and were measured by four items of a well-validated scale developed by Hildebrandt and Douwes[48] and widely used in work stress research[49]. The scale showed good psychometrics in terms of construct validity and reliability in former research[48, 49]. The possible responses were 1 (no), 2 (sometimes), and 3 (yes). Cronbach's α was 0.73.

Demographics

Demographics used in this study were age (yr), gender (0=male; 1=female), educational level (1=low to 7=high), weekly hours worked (actual hours), and irregular shifts (0=no, 1=yes). They were used as potential confounders as

they appeared to be important as well as significantly associated with the outcome measures[14, 17, 27].

Sample size calculation and effect sizes

Sample size calculation was based on our outcome measures. Given the meta-analytical study of Wendsche and Lohmann-Haislah[27], I could use average effect sizes of detachment as predictor for emotional exhaustion (r=−0.36), sleep problems (r=−0.30), and physical health complaints (r=−0.23). Using G*Power3.1[50], a power analysis for linear regression was conducted based upon the outcome with the smallest average effect size; that is, physical health complaints. Using a statistical power (1-β) of 0.80 and a Type 1 error probability (α) of 0.05 resulted in a required sample size of 196 respondents.

Statistical analysis

First, Pearson zero-order correlational analyses were conducted to obtain an initial overview of the survey data. Next, hierarchical multiple regression analyses (HMRAs) were used to examine the associations between detachment and health. No significant violations of linear regression assumptions were detected. All analyses were performed in IBM SPSS Statistics 25, and consisted of two hierarchical modeling steps accordingly. First, all demographics were simultaneously entered as potential confounders. Second, the six detachment variables were stepwise entered in the regression model to come up with the ones that predict the most on the respective health outcome (criteria: Probability-of-F-to-enter ≤0.05; Probability-of-F-to-remove ≥0.10). This procedure continued until adding predictors did not add anything to the regression model anymore. In addition, variance inflation factors were computed to test for a potential degree of multicollinearity among the predictors. Standardized beta-weights (β) and their significance for individual predictor variables were presented, as well as the explained variance (R^2) of the final regression model.

Results

A first inspection of the Pearson zero-order correlations in Table 1 shows that the three dimensions of detachment after work ('off-job') were negatively associated with nearly all (adverse) health outcomes (significant r's ranged from −0.14 to −0.33). The same is true for detachment during work breaks ('on-job'), albeit to a lesser extent (significant r's ranged from −0.11 to −0.23). Furthermore, detachment after work was positively associated with detachment during work breaks (r's ranged from 0.18 to 0.39). Finally, all health outcomes were positively related to each other, too (r's ranged from 0.14 to 0.47).

Hierarchical multiple regression was conducted by entering two sets of predictor variables to the five health outcomes (Table 2). As far as concentration problems are concerned, forced entry of the demographic variables as confounders in step 1 explained 4.0% of the variance in concentration problems. Stepwise entering detachment in step 2 revealed that both physical and cognitive detachment after work contributed to the explanation of concentration problems, which explained 8.9% of the variance in total. More specifically, more physical detachment after work (β=−0.15, p=0.009) and more cognitive detachment after work (β=−0.12, p=0.042) were both related to less concentration problems.

With respect to emotional exhaustion, entering the demographic variables as confounders in step 1 explained 3.0% of the variance. Stepwise entering detachment in step 2 indicated that both physical and emotional detachment after work contributed to the explanation of emotional exhaustion. The final regression model explained 18.0% of the variance in emotional exhaustion. Specifically, more physical detachment after work (β=−0.25, p=0.000) and more emotional detachment after work (β=−0.22, p=0.000) were both associated with less feelings of emotional exhaustion.

Regarding depressive feelings, entering the demographic variables as confounders in step 1 explained 4.7% of the variance. Stepwise entering detachment in step 2 revealed that emotional detachment after work contributed to the explanation of depressive feelings, which explained 7.1% of the variance in total. The beta-coefficient showed that more emotional detachment after work (β=−0.16, p=0.005) was related to less depressive feelings.

As far as sleep problems are concerned, forced entry of the demographic variables as confounders explained 7.8% of the variance (step 1). Stepwise entering detachment in the next step showed that both physical and emotional detachment after work contributed to the explanation of sleep problems. The final regression model explained 13.8% of the variance in sleep problems. More specifically, more emotional detachment after work (β=−0.16, p=0.006) and more physical detachment after work (β=−0.14, p=0.015) were both related to less sleep problems.

The last column of Table 2 shows the findings of physical health problems as an outcome measure. Entering the demographic variables as confounders in step 1 explained 2.8% of the variance in physical health problems (actually

Table 1. Descriptive statistics and Pearson zero-order correlations among study variables (n=368)

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	44.47	11.36															
2. Gender	0.82	0.38	−0.02														
3. Education	5.15	1.10	−0.04	−0.15**													
4. Weekly working hours	29.65	7.47	−0.21**	−0.36**	0.10												
5. Irregular shifts	0.70	0.46	−0.31**	−0.16**	0.04	0.19**											
6. Cognitive detachment (off-job)	3.90	0.55	0.09	0.04	−0.16**	−0.15**	−0.01										
7. Emotional detachment (off-job)	3.69	0.57	−0.07	0.02	−0.15**	−0.08	−0.09	0.73**									
8. Physical detachment (off-job)	3.67	0.62	0.08	−0.02	−0.08	−0.09	0.05	0.35**	0.39**								
9. Cognitive detachment (on-job)	3.28	0.85	0.03	−0.03	−0.14*	−0.10	0.03	0.23*	0.30**	0.28**							
10. Emot. detachment (on-job)	3.16	0.91	0.00	−0.01	−0.15**	−0.11*	0.03	0.30**	0.39**	0.31**	0.79**						
11. Physical detachment (on-job)	3.11	0.98	−0.01	−0.03	−0.11*	−0.11*	0.00	0.18**	0.24**	0.36**	0.61**	0.66**					
12. Concentration problems	2.00	0.84	−0.04	−0.07	0.02	0.00	0.12*	−0.17**	−0.14*	−0.18**	−0.08	−0.12*	−0.12*				
13. Emotional exhaustion	2.55	0.85	−0.01	−0.07	−0.03	0.14*	0.03	−0.30**	−0.31**	−0.33**	−0.20**	−0.23**	−0.21**	0.40**			
14. Depressive feelings	1.35	0.52	0.12*	−0.01	−0.01	0.09	0.17**	−0.10	−0.18**	−0.08	−0.06	−0.13*	−0.08	0.27**	0.47**		
15. Sleep problems	1.81	0.51	0.16**	0.08	−0.06	0.12*	0.13*	−0.15**	−0.22**	−0.20**	−0.09	−0.11*	−0.14*	0.14*	0.42**	0.35**	
16. Physical health problems	1.81	0.62	−0.03	0.06	0.12*	−0.00	0.09	−0.04	−0.08	−0.31**	−0.10	−0.09	−0.12*	0.14*	0.25**	0.28**	0.31**

*p<0.05; **p<0.01 (two-tailed).

Table 2. Hierarchical regression models of health outcomes with off-job and on-job detachment as predictor variables (n=368)

	Concentration problems	Emotional exhaustion	Depressive feelings	Sleep problems	Physical health problems
	β	β	β	β	β
Control variables (forced entry)					
Age	−0.09	−0.02	0.09	0.17**	−0.04
Gender	−0.12*	−0.06	0.01	0.14*	0.06
Education	−0.03	−0.10*	−0.04	−0.08	0.10
Weekly working hours	−0.06	0.10	0.14*	0.21***	−0.00
Irregular shifts	−0.19***	−0.09	−0.13*	−0.06	−0.11
Predictor variables (stepwise selection)					
Cognitive detachment (off-job)	−0.12*				
Emotional detachment (off-job)		−0.22***	−0.16**	−0.16**	
Physical detachment (off-job)	−0.15**	−0.25***		−0.14*	−0.30***
Cognitive detachment (on-job)					
Emotional detachment (on-job)					
Physical detachment (on-job)					
Model test	R^2=0.089	R^2=0.180	R^2=0.071	R^2=0.138	R^2=0.115
	F(7,360)=4.33***	F(7,360)=9.79***	F(6,361)=3.93***	F(7,360)=7.31***	F(6,361)=6.72***

*p<0.05; **p<0.01; ***p<0.001 (two-tailed).

none of them was significant). In the second step, stepwise entering detachment revealed that physical detachment after work contributed to the explanation of physical health problems, which explained 11.5% of the variance in total. In more detail, more physical detachment after work (β=−0.30, p=0.000) was associated with less physical health problems.

Discussion

This study examined associations between off-job and on-job recovery and individual health among health care employees in a general hospital setting. The study focused on the central recovery concept of *detachment from work*. The goal was to understand how different dimensions of both detachment after work and detachment during work breaks (i.e., cognitive, emotional, and physical) can benefit

health care employees and organizations through improved individual health. In general, it was hypothesized that detachment after work as well as detachment during work breaks are positively associated with individual health. In addition, the following research question was explored: What kind of detachment (i.e., after work or during work breaks) and which detachment dimensions (i.e., cognitive, emotional, physical) are associated with individual health of health care employees?

First, controlling for demographics, results demonstrate that when health care employees experienced more cognitive detachment after work, they reported less concentration problems. Second, when employees experienced more emotional detachment after work, they reported less feelings of emotional exhaustion, less depressive feelings, and less sleep problems. Finally, in case health care employees experienced more physical detachment after work, they reported less concentration problems, less feelings of emotional exhaustion, less sleep problems and less physical health problems. So, empirical support was found for the hypothesis as far as the relation between detachment after work and individual health is concerned. However, no support was found for additional significant associations between detachment during work breaks and employee health.

Theoretical implications

These findings advance recovery research in several ways. First, this study shows that the E-R Model[18] and COR Theory[19, 20] are helpful and beneficial for understanding detachment after work and detachment during work breaks. Moreover, this study extends these frameworks by focusing on three different detachment dimensions: cognitive, emotional, and physical detachment from work. Introducing and exploring these three dimensions demonstrated a promising avenue for examining off-job and on-job recovery. Current findings show an interesting pattern: cognitive detachment after work was associated with cognitive health (i.e., concentration problems), emotional detachment after work with emotional health (i.e., emotional exhaustion), and physical detachment after work with physical health (i.e., physical health problems). Several researchers have argued that the associations between detachment and outcomes largely depend on the respective types of detachment and corresponding outcomes[16, 51]. So, it might be that specific detachment dimensions correspond to, or match, specific health outcomes to show a particular health effect. This line of thinking is referred to as the matching hypothesis[52, 53]. Cognitive types of detachment from work are proposed to cause particularly cognitive types of health, whereas other areas of health (e.g., emotional health symptoms) are not a likely consequence. In other words, using the same bodily systems during work and non-work could lead to system overload and may affect an identical health outcome. Furthermore, study findings also show that physical detachment after work acted as some sort of panacea for nearly all health outcomes. Appearingly, shaking off the physical exertion from work and/or physically distancing oneself from work is in general important for employee health[16].

The current study contributes to a better understanding of the simultaneous health effects of off-job and on-job recovery. Although health care employees reported detaching from their work during work breaks, it was not a significant predictor for individual health at all. This is contrary to previous research demonstrating how important detachment during work breaks is for employee health[13, 32]. So, it seems that fully detaching from work after work has been done is more effective than detachment during work breaks. Bosch *et al.*[34] argued that complete detachment might be very difficult in work break settings. Formal work breaks are embedded in the work context, and are mostly taken at the workplace or within the company area, and quite often still encompass contact with colleagues. In addition, formal and informal work breaks provide significantly less time for complete detachment than off-job recovery activities. They are also directly followed by new work activities, thus closer to new work demands and work stress.

As far as effect sizes of the regression models are concerned, current findings are in line with those found in the meta-analysis by Wendsche and Lohmann-Haislah[27]. Only sleep problems show substantial lower effect sizes compared to meta-analytical findings, which could be due to its lower internal consistency.

To summarize, all these findings add to recovery research[14, 27], and suggests that cognitive, emotional and physical detachment from work after regular working hours are powerful off-job recovery experiences (i.e., rebuilding energy resources) in case of employee health.

Limitations and future directions

Besides its valuable insights, this study has some limitations. A first limitation concerns its cross-sectional study design. Although a particular causal order of the study variables is suggested, other causal directions or even reciprocal relations are also possible[14]. Longitudinal studies should investigate these kinds of associations in more depth. On the other hand, Spector[54] recently argued

that cross-sectional research designs are still necessary to explore new ideas and to test corresponding associations. Furthermore, the recovery process takes place on a daily basis, and usually has immediate consequences for the employee[55]. One could argue that momentary recovery can be best assessed by either cross-sectional or daily diary research. A second limitation is that common method variance due to using self-report data may have played a role, although recent research studies have shown that this influence is not as high as commonly believed[56, 57]. This risk was tried to minimize by assessing the outcomes with different response formats and anchors compared to the predictor variables[56, 58]. Nevertheless, multi-source and/or multi-method studies are recommended to deal with this kind of bias. A third and closely related limitation is the risk of the triviality trap[14, 59]. Put differently, there is potential for content overlap between off-job and on-job recovery experiences. Our data showed that the different dimensions of detachment after work were positively related to the dimensions of detachment during work breaks. However, the Pearson intercorrelations ranged from 0.18 to 0.39, which implies that content overlap is not a serious problem. Nevertheless, more items per dimension for detachment during work breaks are highly recommended. A fourth limitation is that the Cronbach's α for the sleep problems scale was not very high, which may also be partly due to the sample size and number of items used. It is recommended to increase its number of items and to reassess the psychometric properties of this scale in further research. Fifth, this study examined only part of the recovery process (i.e., detachment only): it could also have examined other aspects of it, such as relaxation, control and mastery[60]. This would have provided a more complete examination of the role of the recovery process, next to the different detachment dimensions used here. A final limitation is that the current findings could be generalized only to health care employees.

For future research, it is recommended to examine the particular, moderating, role of individual characteristics such as affect, motivation, and personal control in the relation between detachment from work and employee health[59]. It is highly likely that personal preferences for specific recovery activities are particularly beneficial for efficient detachment from work[15]. Another avenue for future research is trying to replicate the current findings in other research areas such as remaining human services, industry, or retail trade. It would be interesting to see whether or not findings of the present study will hold for their employees, too.

Practical implications

The current findings have implications for practice as well. Modern technologies such as smartphones and tablets as well as social media imply that health care employees stay tuned to their work while having leisure time. This could create a 24/7 availability for work demands, could make boundaries between work and home obscure, and may hamper detachment from work. Given the findings that recovery from work seems to be crucial for individual health, we should uncover ways how to facilitate and improve adequate recovery from work. First, the results suggest that physical detachment after work is important for all kinds of individual health. So, physically distancing oneself from work and/or being able to shake off physical exertion from work seem to be beneficial for health care employees' health. Next, as regards cognitive and emotional health, findings suggest not a 'one-size-fits-all' approach, but a more nuanced view. Health care employees who are able to stop thinking about work-related issues may report less concentration problems. In addition, employees who are no longer bothered by work-related negative emotions may report less emotional exhaustion, less depressive feelings, and less sleep problems. The practical question is how to facilitate and improve detachment from work after work has been done? Health care managers play an important role here. Managers should create a work climate in which working beyond regular work hours is not 'business as usual', as this kind of activity impedes necessary recovery processes. They should also act as role models by not being available during non-work time and should not contact their employees during this time as well[61]. Further, it is important to identify not only the work-related risk factors that accompany an employee's poor recovery, but also to explore recovery opportunities during and after working hours[3]. Hahn and her team[62] developed a recovery training with information about how important off-job and on-job recovery is for individual health. They also provided employees with skills and techniques to optimize recovery opportunities during and after work. At the end of the training, people had to formulate specific goals to improve their recovery. Empirical research supported the effectiveness of this training[62]. Health care employees are then able to replenish their energy resources and fully detach from work. Finally, health care employees should spend recovery time on activities that they like most[13]. For instance, Ten Brummelhuis and Trougakos[63] showed that the recovery potential is highest in case recovery activities are intrinsically motivated, and people have fun doing them.

Conclusions

Taken together, this cross-sectional survey study shows that detachment from work after work has been done is an important predictor for health care employees' health. This study expands the E-R Model and COR Theory by (1) investigating both detachment after work and detachment during work breaks simultaneously, and (2) exploring three different detachment dimensions: cognitive, emotional, and physical detachment from work. An interesting result is that cognitive detachment after work was associated with cognitive health, emotional detachment after work with emotional health, and physical detachment after work with physical health. So, a particular type of detachment after work can restore an identical bodily system, and can help to replenish existing energy resources. However, in case work demands are too high, employees tend to detach less from their work during off-job time and engage less in physical recovery activities[4]. Health care managers should be aware that allocating too many work demands to their employees may be negative for their recovery and health. This may also have a destructive effect on their work performance and the quality of care[64]. Both health care managers and health care employees should find creative ways to accomplish decent work demands within regular work hours, and to be aware of adequate recovery from work.

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