

Staying Engaged During the Week: The Effect of Off-Job Activities on Next Day Work Engagement

Lieke L. ten Brummelhuis

Erasmus University Rotterdam/University of Pennsylvania

Arnold B. Bakker

Erasmus University Rotterdam

Although studies on employee recovery accumulate at a stunning pace, the commonly used theory (Effort-Recovery model) that explains how recovery occurs has not been explicitly tested. We aimed to unravel the recovery process by examining whether off-job activities enhance next morning vigor to the extent that they enable employees to relax and detach from work. In addition, we investigated whether adequate recovery also helps employees to work with more enthusiasm and vigor on the next workday. On five consecutive days, a total of 74 employees (356 data points) reported the hours they spent on various off-job activities, their feelings of psychological detachment, and feelings of relaxation before going to sleep. Feelings of vigor were reported on the next morning, and day-levels of work engagement were reported after work. As predicted, leisure activities (social, low-effort, and physical activities) increased next morning vigor through enhanced psychological detachment and relaxation. High-duty off-job activities (work and household tasks) reduced vigor because these activities diminished psychological detachment and relaxation. Moreover, off-job activities significantly affected next day work engagement. Our results support the assumption that recovery occurs when employees engage in off-job activities that allow for relaxation and psychological detachment. The findings also underscore the significance of recovery after work: Adequate recovery not only enhances vigor in the morning, but also helps employees to stay engaged during the next workday.

Keywords: leisure time activities, psychological detachment, recovery, relaxation, work engagement

Changes on and beyond the work floor have increased the demands that are placed on employees (Halbesleben & Buckley, 2004). Nowadays, employees often need to deal with a heavy workload and a considerable number of family tasks (Weer, Greenhaus, & Linnehan, 2010). While juggling multiple demands, employees may feel overburdened and risk losing motivation and passion for their work (Peeters, Montgomery, Bakker, & Schaufeli, 2005). Therefore, it is important that employees recover after a workday (Sonnentag, 2001). Recovery from work refers to the process during which an employee replenishes used personal resources such as physical energy and attentive focus (Kaplan, 1995). The employee's functioning then returns to the prestressor level and further strain is reduced. This recovery process prevents exhaustion and enables employees to reload for the next working day (Meijman & Mulder, 1998).

Although our knowledge about recovery after work is accumulating at a stunning pace, three questions have thus far remained unanswered. First, the theoretical assumptions as to why some

off-job activities lead to recovery while others do not have not yet been explicitly tested. Most commonly, recovery studies build on the Effort-Recovery model (Meijman & Mulder, 1998), which proposes that off-job activities contribute to recovery to the extent that those activities enable employees to replenish personal resources. The relationship between off-job activities and recovery is described as a mediated process: Off-job activities lead to recovery through relaxation and psychological detachment from work during off-job time (Fritz & Sonnentag, 2006). Previous studies have confirmed parts of this recovery process. Mostly, the direct effect of off-job activities on recovery ($x \rightarrow y$) has been investigated. For instance, working during off-job time has been found to impede recovery, while exercising fosters recovery (Bakker, Demerouti, Oerlemans, & Sonnentag, in press; Rook & Zijlstra, 2006; Sonnentag, 2001). Unfortunately, those studies do not reveal why high-duty activities impede recovery while leisure activities foster recovery. Support for the second part of the process ($m \rightarrow y$) is also abundant. Several studies have for instance shown that psychological detachment and relaxation after work enhance morning recovery (e.g., Sonnentag, Binnewies, & Mojza, 2008; Sonnentag, Kuttler, & Fritz, 2010). However, those studies do not reveal which off-job activities enable psychological detachment and recovery. In other words, previous research has tested the Effort-Recovery model (Meijman & Mulder, 1998) in a piecemeal manner. The complete relationship chain of the recovery process, whereby off-job activities (the predictors) are first related to psychological detachment and relaxation (the mediators), and then to recovery (the outcome) has not been tested. Our first aim is to integrate previous studies on the recovery process by examining this full mediation process ($x \rightarrow m \rightarrow y$). In line with previous studies, we

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Lieke L. ten Brummelhuis, Department of Work and Organizational Psychology, Erasmus University Rotterdam, Rotterdam, Netherlands/Wharton School, University of Pennsylvania; Arnold B. Bakker, Department of Work and Organizational Psychology, Erasmus University Rotterdam, Rotterdam, Netherlands.

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Correspondence concerning this article should be addressed to Lieke L. ten Brummelhuis, Wharton School, University of Pennsylvania, 3620 Locust Walk, Philadelphia, PA 19104. E-mail: lieke@wharton.upenn.edu

categorize off-job activities into leisure activities, such as reading a book, exercising, and having dinner with friends, and high-duty activities, such as completing household chores, care tasks, and work-related tasks (Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag, 2001). This enables us to empirically test the common implicit assumption that leisure off-job activities lead to recovery because they allow for relaxation and psychological detachment, while high-duty tasks diminish recovery because they impede relaxation and detachment.

Second, the recovery literature has mainly focused on the restoration process, whereby employees cope with stress by replenishing used personal resources (Meijman & Mulder, 1998). Recovery, in other words, is considered to be a coping strategy for dealing with or preventing work exhaustion. From an expansion perspective, however, one could argue that off-job time also offers the opportunity to collect resources (Hobfoll, 2002). Engaging in off-job activities then not only restores used personal resources but may also increase one's personal resource reservoir and boost motivation for work. In line with this expansion perspective, we use vigor in the morning as an indicator of state recovery. Vigor refers to high levels of energy, resilience and motivation to undertake activities (Schaufeli, Bakker, & Salanova, & 2006) and is distinct from feeling recovered in the morning because it is an active and energetic state (Russell, 2003), reflecting a surplus of personal resources, rather than the mere replenishment of personal resources (Binnewies, Sonnentag, & Mojza, 2010). Adopting an expansion perspective on the recovery process, we test whether off-job activities can be used to start a new workday in a state of abundance of energy and motivation.

Third, we address the question whether this energized state in the morning is strong enough to last at work, boosting work engagement throughout the day. Previous studies that focused on the recovery potential of weekends and vacations (e.g., Fritz & Sonnentag, 2006; Kühnel, Sonnentag, & Westman, 2009) revealed that adequate recovery during short respites benefits work engagement. We use a diary study design, testing within-person, between-day differences. This design enables us to examine whether beneficial effects for work engagement also hold for daily recovery during the workweek and, if so, which off-job activities contribute to and which ones impede next day work engagement.

Theoretical Framework

Recovery Models

The process of recovery from work is commonly explained by resource theories such as the Effort-Recovery (ER) model (Meijman & Mulder, 1998) and Conservation of Resources (COR) theory (Hobfoll, 1989). The general assumption of these theories is that employees have a certain supply of personal resources. Personal resources are personal traits and energies that are instrumental for achieving goals during the workday (Hobfoll, 2002), including cognitive resources (e.g., directed attention), physical energy (e.g., positive-activated affect, health), and emotional energy (e.g., mental resilience). At the end of the workday, those resources may be depleted (Meijman & Mulder, 1998). Recovery after work is then necessary, and can be achieved in several ways. First, recovery can occur when stressors cease and employees refrain from using the same types of personal resources as used at

work. In contrast, when job demands (e.g., a heavy workload) continue for a longer period of time, employees risk ending up in a downward spiral whereby job demands accumulate (because one is unable to effectively deal with job demands), and personal resources further deplete (ten Brummelhuis, Ter Hoeven, Bakker, & Peper, 2011). Second, off-job activities may contribute to recovery if they allow for replenishment of used personal resources. For example, employees can take the time to rest after work, allowing for the restoration of used physical and cognitive resources (Kaplan, 1995).

The ER model and the earlier version of COR theory (Hobfoll, 1989) can be labeled as stress models. Both models aim to explain human responses to stressors, and how certain coping strategies may reduce strain caused by stressors. Later on, Hobfoll (2002) extended the COR theory and used its original insights for a more general theory on human development. The novel idea was that resources appear to come in resource caravans: once obtained, resources can generate new resources (Hobfoll, 2002). Hobfoll argued that individuals who possess resources (e.g., knowledge, resilience, and self-esteem) are better equipped to handle stressful circumstances and are more likely to avoid problematic situations. This allows them to invest in further resources instead of in preventing resource loss. In addition, the influence of resources tends to hold across time and different circumstances, enabling individual to use resources multiple times. Finally, resources are valued in their own right; the mere fact of possessing resources makes people happier (Hobfoll, 2002). The idea of resource caravans is helpful for understanding how employees may use their off-job time to prepare for the next workday. Employees may not only use their leisure time for dealing with stressors (and prevent stress accumulation), but also for seeking distraction and relaxation that allows them to start the next workday with a surplus of personal resources (Kühnel et al., 2009). Using these insights, we examine whether employees use off-job activities to gain physical and emotional energy for work, as reflected in high levels of morning vigor.

Recovery Mechanisms

The ER model and COR theory (Hobfoll, 1989) provide two specific explanations of why certain off-job activities contribute to recovery while others do not. First, both models suggest that recovery is most likely when stressors stop and no further calls are made upon the personal resource supply that is used for work. This can be established by distancing oneself both physically and mentally from work (Kaplan, 1995). Previous studies have underscored the importance of psychological detachment from work, referred to as an "individual's sense of being away from the work situation" (Etzion, Eden, & Lapidot, 1998, p. 579), for employee well-being (for an overview, see Demerouti et al., 2009). For instance, employees who were better able to detach from work when they were at home experienced more positive affect and lower fatigue at bedtime (Sonnentag & Bayer, 2005). Based on the assumptions of the ER model and COR theory, we suggest that psychological detachment mediates the effect of off-job activities on vigor in the morning.

We expect that work-related tasks (e.g., working overtime, administrative tasks) and household tasks will impede detachment from work. By doing work-related tasks, work stressors are still

present and one is still occupied with work (Sonnentag & Bayer, 2005). Family responsibilities may impede detachment from work because these tasks have a certain level of obligation and keep employees in a work-modus. Kaplan (1995) explained that detachment from work is most likely when one engages in fascinating activities, referring to activities in which one easily engrossed because the activity is interesting in itself. Although employees may rate some family responsibilities as more enjoyable than others, various family tasks (e.g., cleaning, picking children up from school) may be perceived as routine tasks that are not highly enjoyable (Hochschild, 1997; Poortman & Van der Lippe, 2009). Employees then may still have intruding thoughts about work while performing family tasks.

Leisure activities (social, low-effort, physical activities) can be seen as meaningful and fascinating activities that give employees the experience of being away from work (Kaplan, 1995). For example, while watching TV one can feel being part of another world, forgetting about work (Press, 1991). Exercising (e.g., outdoor running) and meeting with friends also provides the opportunity to stop intrusive thoughts and switch off one's attention from work-related matters (Cropley & Millward, 2009; Kaplan, 1995). Leisure activities, then, are expected to enable employees to detach from work, contributing vigor in the morning.

Hypothesis 1a: Daily work-related, household, and childcare off-job activities will be negatively related to next morning vigor through diminished psychological detachment.

Hypothesis 1b: Daily social, low-effort, and physical off-job activities will be positively related to next morning vigor through increased psychological detachment.

The ER model and COR theory further assume that recovery occurs when employees can reload their depleted personal resources after work. Reloading is particularly established by relaxation, referring to a state in which a minimum of personal resources are used (Fritz & Sonnentag, 2006). There is ample empirical support for the positive relationship between relaxation after work and employee well-being (for an overview, see Demerouti et al., 2009). For instance, using cross-sectional data, Sonnentag and Fritz (2007) found that relaxation was negatively correlated to health complaints, exhaustion, sleeping problems, and need for recovery. Thus, we assume that relaxation is the second mediating mechanism explaining why off-job activities contribute to recovery.

Because high-duty tasks require effort and deplete personal resources such as emotional and physical energy, we expect them to be negatively related to relaxation. Various studies have shown that working after work hours (Sonnentag, 2001; Sonnentag & Natter, 2004), doing household chores (ten Brummelhuis, Van der Lippe, & Kluwer, 2010b), and also care for children (ten Brummelhuis, Haar, & Van der Lippe, 2010a) increases fatigue, stress, and feelings of time pressure. Leisure activities, such as having dinner with friends, watching TV, and meditation are expected to increase feelings of relaxation (Sonnentag, 2001). Leisure activities require low self-regulation, enabling employees to replenish and gain personal resources instead of further depleting them (Baumeister, Muraven, & Tice, 2000). Even physical activities, which may induce an active psychological state of mind immedi-

ately afterward (Reed & Ones, 2006), have been found to contribute to feelings of tranquility and calmness during the night (Bodin & Hartig, 2003; Sonnentag, 2001). Moreover, leisure activities are more voluntary and less compelling than some other off-job activities (e.g., childcare). While one can choose not to exercise, this is less true for taking care of children, such as feeding a baby or taking a child to a soccer game (ten Brummelhuis et al., 2010b). Assuming that leisure activities are perceived as less obligatory, those activities are more likely to induce feelings of relaxation (Vallerand, 2007).

Hypothesis 2a: Daily work-related, household, and childcare off-job activities will be negatively related to next morning vigor through diminished relaxation.

Hypothesis 2b: Daily social, low-effort, and physical off-job activities will be positively related to next morning vigor through increased relaxation.

Recovery and Engagement at Work

Work engagement is an active and positive work-related state that is characterized by vigor, dedication, and absorption (Schaufeli et al., 2006). Dedication is characterized by being strongly involved in one's work and experiencing a sense of significance and enthusiasm. Absorption is the state of being fully concentrated and happily engrossed in one's work (Bakker, 2011). Engaged employees have high levels of energy and are enthusiastically involved in their work. Moreover, they are often fully immersed in their work so that time flies (May, Gilson, & Harter, 2004). Work engagement is beneficial for both the individual and the organization and has been related to several positive work outcomes, including task performance, organizational citizenship behavior, and customer satisfaction (Bakker, Demerouti, & Verbeke, 2004; Salanova, Agut, & Peiro, 2005).

Several theoretical arguments can be given for the hypothesis that feeling vigorous in the morning fosters engagement at work. According to COR theory (Hobfoll, 2002), individuals who possess personal resources (e.g., physical energy, directed attention, and resilience) are better equipped to handle stressful circumstances, more likely to avoid problematic situations, and less negatively affected when they need to expend effort because they are able to draw on substitute resources (Hobfoll, 2002). This implies that employees who feel optimistic and full of energy in the morning are better able to cope with stressors at work, maintain a vigorous work style, and have resilience to stay absorbed in work tasks even when facing difficulties (Hobfoll, Johnson, Ennis, & Jackson, 2003; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Vigor is also a positive emotion that, according to Broaden-and-Build theory (Fredrickson, 2001), helps individuals be more sensitive to opportunities at work and fosters a more proactive work style. Finally, mood-spillover theory suggests that positive emotions have the tendency to persist across domains because information is evaluated more positively and optimistically when individuals are in a positive mood (Rusting & DeHart, 2003). Thus, we expect that employees who feel vigorous in the morning because of the activities they have undertaken in their leisure time have more personal resources. They bring these personal resources to work, which results in a happy, vigorous, and dedicated work style during the workday.

Hypothesis 3a: Daily work-related, household, and childcare off-job activities will be negatively related to next day work engagement through reduced vigor in the morning.

Hypothesis 3b: Daily social, low-effort, and physical off-job activities will be positively related to next day work engagement through increased vigor in the morning.

Method

Sample and Procedure

This study was conducted among nurses from several health institutions in the Netherlands. One-hundred randomly selected employees were informed about the study via their managers. Managers only approached nurses working during regular daytime hours (excluding the night shift). Of these employees, 74 agreed to participate (response rate 74%). In the week before the study, employees were informed in person by the research coordinator about the aim and the procedure of the upcoming survey. We consulted the managers about the research design that would be most practical and effective in this particular work setting. Accordingly, we chose for a paper version because the nurse occupation does not entail frequent Internet use, and nurses are much more familiar with keeping records on paper. On Monday morning, the respondents completed a general questionnaire that included questions about demographic characteristics (e.g., age, gender) and the trait variable of work engagement. In the afternoon, after work (T0), employees completed the first diary questionnaire, reporting work engagement experienced during the workday. On Monday night, before going to sleep (T1), respondents completed the second diary questionnaire, including daily measures of time spent on off-job activities, feelings of psychological detachment, and relaxation. All questions referred to the day that had just finished. The third diary questionnaire was completed on Tuesday morning (T2), reporting current feelings of recovery. T3 of the model refers to the work engagement measurement of the workday after the morning recovery measurement, in this example on Tuesday after work. All three questionnaires (morning, afternoon, and night) were repeated Tuesday through Friday (5 days). Respondents reported the time at the start of each questionnaire, allowing us to check whether they used the correct time slot for each measurement. A research assistant on location reminded the respondents twice a day (when arriving at work and while leaving work) to fill in the diary. Fourteen employees worked on only four of the weekdays, resulting in a total of 356 cases.

Eighty-two percent of the respondents were female and the mean age of our sample was 32.36 years ($SD = 5.38$; range 22 to 48 years). The average amount of job experience was 10.85 years ($SD = 5.93$). Most employees (82.4%) had a full-time contract (>36 hr). The mean contractual weekly working hours were 37.57 ($SD = 3.43$). The majority (79.7%) of the respondents had lower vocational education, while 20.3% of the respondents had a college degree. About half of the employees had a partner (56.7%), and 60.8% of the respondents had children living at home.

Diary Measures

Work engagement. *Daily work engagement* was assessed immediately after work with the daily 9-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006), which has been previously validated (Breevaart, Bakker, Demerouti, & Hetland, 2012). Example items are: "Today at my job I felt strong and vigorous," "Today, I was enthusiastic about my job," and "Today, I was immersed in my work." All items were scored on a 7-point rating scale ranging from 0 (*never*) to 6 (*always*). Cronbach's alpha varied over the 5 days between .87 and .90 ($M = .89$).

Morning vigor. We measured daily vigor in the morning with a subdimension of the state, context-free version of the work engagement scale (Schaufeli et al., 2006). Example items are: "Right now, I feel strong and vigorous," "Right now, I am enthusiastic," and "Right now, I am inspired by the activities I am going to undertake" (0 = *totally disagree*, 6 = *totally agree*). Cronbach's alpha varied between .87 and .95 ($M = .91$), indicating good reliabilities.

Off-job activities. Off-job activities were measured as the daily time spent on various activities. We offered short descriptions of six activity categories and a list of prototypical activities within each category, which is common in recovery research (e.g., Sonnentag, 2001; Sonnentag & Natter, 2004). The six activities within each category were: (a) *work-related tasks*, (b) *household tasks*, (c) *childcare tasks*, (d) *social activities*, (e) *low-effort activities*, and (f) *physical activities*. Each day before going to sleep, participants reported how much time in hours and minutes they spent on activities within each category. Table 1 provides an overview of the off-job activities, including several examples of each activity.

Recovery mechanisms. The recovery mechanisms were measured using the recovery experiences measures from Sonnentag and Fritz (2007). The scale contains the subscales for psychological detachment and relaxation, each of which contains four items. The scales were adjusted for daily measurement by

Table 1
Overview of Off-Job Activities

Category	Activity	Examples
High-duty	Work related tasks	Administrative tasks, preparing for work, making the department's time-table
	Household tasks	Cleaning, cooking, buying groceries
	Childcare tasks	Dressing children, bringing/picking up children
Leisure activities	Social activities	Visiting family, having dinner with friends, phone calls to catch up with family/friends
	Low effort activities	Reading a book, watching TV, sitting on the couch
	Physical activities	Sports, dancing, cycling, going for a hike/stroll

adding “Today in my free time after work . . .” Example items for *psychological detachment* were: “I was able to distance myself from my work” and “I could detach from my responsibilities” (Cronbach’s $\alpha = .82$; range .80 to .83). *Relaxation* included items such as “I sat back and relaxed” (Cronbach’s $\alpha = .91$; range .83 to .94). All items were rated on a 5-point Likert scale, ranging from 1 (*totally disagree*) to 5 (*totally agree*). An Exploratory Factor Analyses showed the two factor structure in our data (Eigenvalue >1).

General Measures

Controls. *Trait work engagement* was asked in the general questionnaire, preceding the diary study to control for the fact that some individuals may be more engaged at work than others in general (Breevaart et al., 2012). We used the 9-item version of the UWES (Schaufeli et al., 2006). Example items are: “At my job I feel strong and vigorous,” “I am enthusiastic about my job,” and “I find my work inspiring.” All items were scored on a 7-point rating scale ranging from 0 (*never*) to 6 (*always*). Cronbach’s alpha was .79. We included sex (coded as 0 = male, 1 = female), age (in years), weekly work hours, and number of children living at home as demographic control variables in the analyses. We took into account T0 work exhaustion and work engagement of the same day as the off-job activities, because daily work attitudes may influence which off-job activities employees engage in (Sonnentag, 2001). *Daily work related exhaustion* was measured with a shortened subscale of Maslach Burnout Inventory–General Survey (Schaufeli, Maslach, Leiter, & Jackson, 1996). The scale consisted of three items, such as “Today, I felt emotionally drained because of my work.” Cronbach’s alpha varied between days from .81 to .92 ($M = .89$). The control measure of daily work engagement (as described above) concerns engagement experienced at work before engaging in off-job activities.

Analysis

Our repeated measures data can be viewed as multilevel data, with daily measurements nested within individuals. This leads to a two-level model with days at the first-level ($n = 356$ study occasions) and the individual persons at the second-level ($n = 74$ participants). Multilevel analysis with the MLwiN program (Rashbash, Browne, Healy, Cameron, & Charlton, 2000) was applied. Predictor variables at the day-level (Level 1, e.g., relaxation) were centered to the individual mean, while person-level (Level 2) predictor variables (e.g., age) were centered to the grand mean.

To test mediated relationship in multilevel models, we followed the Monte Carlo Method for assessing mediation as described by Bauer, Preacher, and Gil (2006). For each mediated effect we calculated the distribution of the specific mediation effect using the estimate and the standard error of the effect of the predictor (x) on the mediator (m), as well as the estimate and the standard error of m on the outcome variable (y). The 0 hypothesis that m does not significantly mediate the relationship between x and y is rejected when the distribution of possible estimates for m lies above or below zero.

Results

Descriptive Statistics

Table 2 presents the means, *SDs*, and correlations among the study variables. To examine the proportion of variance that is attributed to the different levels of analysis, we calculated the intraclass correlation for each day-level variable. Results showed that most of the variance (89%) in morning vigor could be attributed to within-person variance, whereas only 11% of the variance in recovery was attributable to between-person variations. Similarly, 26% of the variance in work engagement was because of between-person variance, while 74% was attributable to variations within persons, between days. Thus, there were significant amounts of variance to be explained by within-person fluctuations, justifying our multilevel approach.

Mediation Models

Table 3 shows the multilevel analysis of the main effects of off-job activities on next morning vigor. Work-related tasks were significantly negatively related to vigor on the next morning, while all three leisure activities (social, low-effort, and physical activities) were significantly positively related to next morning vigor. Household tasks and childcare tasks did not have a significant relationship with vigor. Table 3 also shows the effects of the off-job activities on the two expected mediating variables (psychological detachment and relaxation). While social, low-effort, and physical activities were significantly positively related to the mechanisms, work-related tasks and household tasks were significantly negatively related to psychological detachment and relaxation. Childcare tasks had no significant relationship with either psychological detachment or relaxation. In the subsequent step, we examined the effects of off-job activities on vigor in the morning, while adding both mediators.

Psychological detachment. The bootstrap mediation test indicated that five of the mediated pathways, relating the six off-job activities to vigor through psychological detachment, were significant (see Table 3). In line with Hypothesis 1a, we found that work related tasks and household tasks were negatively related to next day vigor through diminished psychological detachment. No such effect was found for childcare tasks. Social, low-effort, and physical activities enhanced next day vigor via increased psychological detachment, confirming Hypothesis 1b.

Relaxation. The bootstrap results (see Table 4) confirmed that relaxation significantly mediated the effects of work-related tasks, household tasks, social activities, and low-effort activities on next day vigor. Our results thus partially confirm Hypothesis 2a: Work-related tasks and household tasks, but not childcare tasks, diminished next day vigor through reduced relaxation. Hypothesis 2b was also partially supported: Unlike physical activities, social activities and low-effort activities contributed to next day vigor through enhanced relaxation. Note that the pathway from physical activities to vigor via relaxation was marginally significant (significance level of $p < .10$).

Remarkably, the relation between household tasks and morning vigor became significant, and positive, when adding the mediators. Although household tasks have a negative relation with next morning vigor through decreased psychological detachment and

Table 2
Means, SDs, and Correlations of All Model Variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Work engagement (T3)	3.90	0.63																
2. Vigor morning (T2)	4.11	0.71	.74**															
3. Gender (female)	0.82	0.38	.06	.02														
4. Age	32.36	5.37	.14**	.11*	.31**													
5. Number of children	2.02	1.03	.04	.08	.01	.21**												
6. Weekly work hours	37.57	3.41	.17**	.04	-.15**	-.14**	-.25**											
7. Trait work engagement	4.81	0.40	.06	-.03	.05	-.12*	-.08	.14**										
8. Work exhaustion (T0)	2.17	1.11	-.06	-.10	.02	-.05	-.02	-.09	-.05									
9. Work engagement (T0)	3.87	0.64	.33**	.18**	.02	.14*	.04	.16**	.07	-.49**								
10. Work-related tasks (T1)	0.48	0.50	-.32**	-.37**	-.03	.02	-.06	-.03	-.14*	-.09	.05							
11. Household tasks (T1)	1.13	0.62	-.06	-.10	.28**	.13*	.04	-.04	-.02	-.07	.19**	.05						
12. Childcare tasks (T1)	0.58	0.67	.12*	.16**	.27**	.36**	.38**	-.40**	-.07	-.06	.08	-.07	.09					
13. Social activities (T1)	1.50	0.79	.13*	.27**	-.02	-.12*	.01	-.19**	-.09	.13*	.25**	-.29**	-.20**	.05				
14. Low-effort activities (T1)	1.91	0.81	.30*	.48**	.05	-.11	.04	-.13*	-.11	.05	-.11	-.30**	-.27**	.06	.50**			
15. Physical activities (T1)	0.41	0.44	.16*	.24**	-.46**	-.18**	-.16**	.11*	-.08	.06	-.06	-.16**	-.30**	-.14*	.15**	.11		
16. Psychological detachment (T1)	3.47	0.67	.43**	.47**	-.01	.05	.07	-.11	-.03	-.07	.08	-.40**	-.25**	.21**	.28**	.41**	.25**	
17. Relaxation (T1)	3.76	0.76	.46**	.55**	-.06	-.04	-.11	-.03	.02	.02	-.05	-.45**	-.33**	.06	.46**	.62**	.29**	.56**

Note. N = 74 respondents, 5 days (lagged effects, 4 days).
* p < .05. ** p < .01.

relaxation, after having controlled for this, household tasks appeared to have a direct positive relation to next morning vigor. We will elaborate on this finding in the discussion.

Engagement During the Next Workday

Table 3 also provides the multilevel estimates for the relations between the off-job activities and next day work engagement. While controlling for the recovery experiences (psychological detachment and relaxation), we found that work task had a negative relation with engagement on the next workday. Household tasks, as well as the three leisure activities, had positive relationships with next day work engagement. Childcare tasks were not significantly related to engagement on the next workday. As expected, morning vigor was positively related to work engagement during the day (see Table 3). When adding morning vigor as a mediator, the relationships between work-related tasks, low-effort activities, and physical activities on the one hand and work engagement on the other, turned nonsignificant. Two direct relationships were still significant. Household tasks and social activities both had a positive relation with next day work engagement, even after controlling for morning vigor. The bootstrap analyses confirmed that, except for childcare tasks, all indirect pathways (activity → morning vigor → work engagement) were significant (see Table 4). In addition, we ran a bootstrap for the mediated relations of the two recovery mechanisms (psychological detachment and relaxation) on work engagement through morning vigor. As can be seen in Table 4, both mediated pathways were significant.

Our findings partially support Hypothesis 3a: Work-related tasks were negatively related to next day work engagement through decreased feelings of vigor in the morning. In contrast to what we had expected, doing household chores in off-job time was positively related to next day work engagement, through enhanced feelings of vigor. Hypothesis 3b was supported, because social, low-effort, and physical activities were positively related to next day work engagement through enhanced feelings of vigor in the morning.

Discussion

We aimed to contribute to our understanding of the daily recovery process after work in several ways. To begin, we sought to provide empirical evidence for the theoretical framework used in recovery research (Meijman & Mulder, 1998), which suggests that recovery occurs when employees stop calling upon the resource reservoir used during the workday (psychological detachment) and replenish used personal resources (relaxation). Our results confirmed that psychological detachment plays a key role in the recovery process. Off-job activities that enable employees to psychologically detach from work, including social activities, low-effort activities, and exercising, enhanced vigor on the following morning. By contrast, performing work-related and household tasks diminished morning vigor because these high-duty tasks hindered the opportunities for employees to distance themselves from work. These findings suggest that persons who perform high-duty tasks after work stay psychologically occupied with the tasks even after finishing them, whereby personal resource depletion continues (Cropley & Millward, 2009).

Table 3
Multi-Level Analyses of Off-Job Activities on Recovery Experiences, Next Morning Recovery, and Work Engagement Next Workday

<i>x, m</i> → <i>y</i>	Detachment T1		Relaxation T1		Vigor T2		Vigor T2		Engagement T3		Engagement T3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	3.600***	0.104	3.988***	0.099	4.138***	0.115	4.136***	0.155	3.890***	0.101	3.878***	0.106
Gender (female)	-0.084	0.116	-0.158	0.110	-0.051	0.128	-0.052	0.128	0.003	0.113	0.026	0.118
Age	0.001	0.008	0.001	0.008	0.014	0.009	0.014	0.009	0.020	0.008	0.021**	0.008
Number of children	0.006	0.043	-0.077*	0.041	0.047	0.047	0.049	0.047	0.036	0.042	0.024	0.043
Weekly work hours	-0.029	0.013	-0.018	0.013	0.022	0.015	0.024	0.015	0.026*	0.014	0.027*	0.014
Engagement (trait)	0.009	0.106	0.003	0.100	-0.064	0.117	-0.066	0.117	0.063	0.103	0.071	0.107
Work exhaustion (T0)	-0.076*	0.036	-0.045	0.036	-0.011	0.049	0.001	0.046	0.061	0.040	0.057*	0.030
Work engagement (T0)	0.081	0.067	-0.035	0.067	0.032	0.091	0.007	0.086	0.006	0.074	-0.003	0.056
Work-related tasks (T1)	-0.255***	0.076	-0.366***	0.076	-0.354***	0.093	-0.212**	0.090	-0.163*	0.080	-0.025	0.062
Household tasks (T1)	-0.176***	0.056	-0.149**	0.056	0.085	0.076	0.145*	0.072	0.164**	0.062	0.085*	0.047
Childcare tasks (T1)	0.026	0.085	0.026	0.084	-0.045	0.118	-0.056	0.110	-0.046	0.097	0.003	0.074
Social activities (T1)	0.129**	0.047	0.204***	0.046	0.111*	0.066	0.020	0.064	0.095*	0.056	0.083*	0.043
Low-effort activities (T1)	0.229***	0.049	0.431***	0.048	0.367***	0.061	0.188**	0.066	0.137**	0.057	0.041	0.044
Physical activities (T1)	0.420***	0.091	0.164*	0.090	0.384***	0.116	0.241*	0.112	0.218*	0.098	0.071	0.075
Psychological detachment (T1)							0.223**	0.074	0.180**	0.065	0.075	0.050
Relaxation (T1)							0.262***	0.070	0.176**	0.061	0.036	0.048
Recovery morning (T2)											0.544***	0.045
-2xLOG	0.081***	0.021	0.069***	0.019	0.088***	0.027	0.097***	0.027	0.077***	0.021	0.106***	0.022
Level 2 variance (persons)	0.225***	0.019	0.223***	0.019	0.265***	0.026	0.230***	0.022	0.168***	0.017	0.096***	0.010
Level 1 variance (days)	553.497		543.366		487.917		458.021		361.475		254.891	

Note. *N* = 356 for detachment/relaxation models; *N* = 282 (4 lagged days) for vigor and engagement models.
* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 4
Bootstrap Intervals of Mediation Tests

$x \rightarrow m \rightarrow y$	95% confidence interval		$p < .05$
	Lower level	Upper level	
Work-related tasks \rightarrow psychological detachment \rightarrow vigor	-.115	-.014	*
Household tasks \rightarrow psychological detachment \rightarrow vigor	-.080	-.009	*
Childcare tasks \rightarrow psychological detachment \rightarrow vigor	-.034	.048	Ns
Social activities \rightarrow psychological detachment \rightarrow vigor	.005	.062	*
Low-effort activities \rightarrow psychological detachment \rightarrow vigor	.015	.095	*
Physical activities \rightarrow psychological detachment \rightarrow vigor	.029	.176	*
Work-related tasks \rightarrow relaxation \rightarrow vigor	-.166	-.038	*
Household tasks \rightarrow relaxation \rightarrow vigor	-.080	-.009	*
Childcare tasks \rightarrow relaxation \rightarrow vigor	-.034	.054	Ns
Social activities \rightarrow relaxation \rightarrow vigor	.021	.095	*
Low-effort activities \rightarrow relaxation \rightarrow vigor	.052	.180	*
Physical activities \rightarrow relaxation \rightarrow vigor	-.002	.103	†
Work-related tasks \rightarrow vigor \rightarrow work engagement	-.163	-.017	*
Household tasks \rightarrow vigor \rightarrow work engagement	.033	.147	*
Childcare tasks \rightarrow vigor \rightarrow work engagement	-.113	.062	Ns
Social activities \rightarrow vigor \rightarrow work engagement	.001	.103	*
Low-effort activities \rightarrow vigor \rightarrow work engagement	.022	.128	*
Physical activities \rightarrow vigor \rightarrow work engagement	.030	.209	*
Psychological detachment \rightarrow vigor \rightarrow work engagement	.053	.191	*
Relaxation \rightarrow vigor \rightarrow work engagement	.079	.210	*

Note. Ns = nonsignificant.

† $p < .10$. * $p < .05$.

Relaxation appeared to be another important mechanism in the recovery process. Spending off-job time on social and low-effort activities was positively related to relaxation in the evening, and enhanced vigor on the following morning. The opposite was true for spending off-job time on work-related tasks and household tasks. On those days, employees felt less relaxed in the evening, and felt less recovered on the following morning. Note that exercising contributed to recovery in the morning, but only marginally through feeling more relaxed. It is conceivable that several forms of physical exercise, such as doing intensive sports, do not offer an opportunity to relax physically. Nevertheless, those activities contributed to recovery as they allow employees to forget about work. Overall, our findings provide support for the ER model (Meijman & Mulder, 1998) and COR theory (Hobfoll, 2002), specifying that recovery occurs when employees engage in off-job activities that allow them to detach from work or to relax.

Furthermore, our study showed that the recovery process not only helps employees to recuperate from stress (Sonnentag & Zijlstra, 2006), but can even lead to additional personal resources. Employees who engaged in social, low-effort, and physical activities after work felt more vigorous in the morning. Thus, optimal recovery seems to occur when employees use their leisure time for replenishing *and* collecting personal resources, whereby they can start the next day full of physical energy, enthusiasm, and resilience. Our findings support the idea from COR theory (Hobfoll, 2002) that contextual resources (e.g., rewarding nonwork life) generate an upward spiral that can lead to acquiring additional personal resources. COR theory sheds a new light on the recovery process, whereby recovery is not only seen as recuperating from the past day, but also as anticipating the new workday.

We also examined whether recovery during off-job time had consequences for one's work attitude during the next day. Using a

lagged effect study design, our results showed that this was indeed the case. Employees who had engaged in work-related off-job activities on the previous day not only felt less vigorous in morning, but also reported less engagement at work. By contrast, employees who had spent their off-job time on leisure activities felt more vigorous, enthusiastic and absorbed at work on the next day. Our findings extend the recovery literature, indicating that the benefits of adequate recovery during off-job time are strong enough to last throughout the next workday: Employees expend more effort on the next workday once they have replenished personal resources during off-job time.

Three additional findings are noteworthy. First, our results shed more light on the effect of family responsibilities on recovery. Previous studies generally failed to find significant relations between family responsibilities and recovery (Rook & Zijlstra, 2006; Sonnentag, 2001; Sonnentag & Natter, 2004; Sonnentag & Bayer, 2005; Sonnentag & Zijlstra, 2006). As suggested by others, it is possible that different types of family responsibilities have opposite effects on recovery, weighing out a net effect. Indeed, we found that childcare tasks did not influence relaxation and psychological detachment, while employees reported lower levels of relaxation and psychological detachment when they performed household chores. The work-family literature also underscores the different nature of both family activities (Poortman & Van der Lippe, 2009). Household chores mainly seem to drain emotional and physical energy, while care tasks also provide worthwhile resources such as fulfillment and skills (Ruderman et al., 2002; ten Brummelhuis et al., 2010b). Our findings indicate that childcare tasks at least do not impede recovery after work. Therefore, it seems important to differentiate between household and childcare tasks when examining their role in the recovery process.

Second, we found that carrying out household chores after work partially impeded and partially improved the recovery process. While household chores impeded relaxation and psychological detachment, indirectly diminishing vigor in the morning, we also found a direct positive relation with morning vigor and engagement during the workday. Apparently, performing household chores has some beneficial side effects that contribute to recovery and work engagement. It is possible that such tasks result in feelings of self-efficacy, self-esteem, or skills that are useful for work such as planning (Ruderman et al., 2002). An increase in such personal resources (Xanthopoulou et al., 2009) may explain why employees who engage in household tasks feel more vigorous in the morning and more engaged at work. Our findings also indicate that the term 'high-duty' tasks may not be very suitable for family responsibilities. Childcare tasks did not impede the recovery process, and household tasks even partially contributed to work engagement on the following day.

A final noteworthy finding was the direct positive relation between social off-job activities and next day work engagement. Again, this direct relationship may be explained by the fact that certain activities produce other personal resources beyond feeling vigorous, such as enhanced self-esteem, advice, and positive affect (Bakker, 2011). For instance, spending time with one's family may bring about positive affect, and receiving advice from friends may increase one's positive self-evaluation. People who experience such positive emotions have been found to be more sensitive to opportunities at work, more confident, and better able to become absorbed in the work role (Bakker, 2011; Fredrickson, 2001).

Limitations, Future Directions, and Practical Implications

A merit of our study was the use of a diary design with three measurements per day, which enabled us to study the daily process of recovery from work in detail. Such a design diminishes causality issues that are common in cross-sectional studies. However, some limitations need to be mentioned. The use of self-reports may have led to bias because of common method variance. Momentary circumstances (e.g., mood) may have affected how respondents perceived feelings of detachment, relaxation, vigor, and work engagement. We note, however, that this type of bias is less likely in our study design because we used different points in time for the measurement of our predictor and outcome variables. Moreover, we controlled for the trait variable of work engagement *and* the state levels of exhaustion and engagement reported before employees engaged in off-job activities.

Our study was also limited to a specific sample of employees from a single occupation, working on a fixed day schedule. It is possible that employees in other occupations actually benefit from working in evening hours, because this enables them to combine work and care tasks (Glass & Finley, 2002). More research is needed to examine the generalizability of our findings to other occupational groups and employees working on more flexible hours. Furthermore, while experienced quality of off-job activities has been reported to foster recovery (Sonnentag & Zijlstra, 2006), we had no information on the enjoyment that employees derived from their off-job activities. Future studies could examine whether recovery particularly occurs when employees engage in activities that they enjoy.

Our study provides several other leads for future studies. A first suggestion is to investigate long-term consequences of the recovery process. For instance, the types of activities that individuals engage in during leisure time (e.g., watching TV vs. doing exercise) may affect health, work, and family differently in the long run (Frey, Benesch, & Stutzer, 2007; Hancox, Milne, & Poulton, 2004). More research is needed to reveal other reasons why certain off-job activities lead to recovery, such as increased self-esteem and learning skills at home. Others have pointed at the importance of sleep for recovery (e.g., Rook & Zijlstra, 2006). Future studies could examine whether sleep quality mediates the effects of off-job activities on morning vigor. Another suggestion is to examine whether personality, motivation for off-job activities, and control over activities moderate the effects of off-job activities on the recovery process. For instance, recovery may particularly occur when people feel in control over their leisure time (Sonntag & Fritz, 2007). In addition, a more finely grained measurement of types of activities within each category is necessary because activities may vary in their recovery potential (e.g., a formal work reception vs. having drinks with friends; cooking vs. cleaning). Finally, we encourage researchers to use a diary design with three different measurement points in time, testing lagged mediation effects of off-job activities at T1, on recovery at T3 through psychological detachment, and relaxation at T2. Such a design depicts the longitudinal process of recovery even more precisely.

Our results have practical relevance as they shed more light on the factors that facilitate or undermine the recovery process. Employees seem to recover most from their work when they pursue *leisure* activities during off-job time, in contrast to *work-related* activities. It does not seem to particularly matter which leisure activities are done: social, low-effort, and physical activities all enhance next day recovery. In addition, employees may strive to limit work-related tasks as much as possible as these activities impede relaxation and psychological detachment from work. Given the detrimental consequence of working after regular work hours for work engagement during the next workday, reducing the time allocated to work during off-job time seems a rational choice. Supervisors may have an important role here by discouraging employees from working after regular hours. In addition, organizations could support employee recovery and facilitate work engagement by creating a work climate in which working overtime is not the standard.

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