Journal of Occupational Health Psychology
2014, Vol. 19, No. 3, 303–314

1076-8998/14/$12.00 http://dx.doi.org/10.1037/a0036904

Burnout and Daily Recovery: A Day Reconstruction Study

Wido G. M. Oerlemans
Erasmus University Rotterdam

Arnold B. Bakker
Erasmus University Rotterdam and Lingnan University

What can employees who are at risk of burnout do in their off-job time to recover adequately from their work? Extending the effort-recovery theory, we hypothesize that the continuation of work during off-job time results in lower daily recovery, whereas engagement in 'nonwork' activities (low-effort, social, and physical activities) results in higher daily recovery for employees who are at risk of burnout versus employees with low levels of burnout. A day reconstruction method was used to assess daily time spent on off-job activities after work, and daily recovery levels (i.e., physical vigor, cognitive liveliness, and recovery). In total, 287 employees filled in a general questionnaire to assess general levels of burnout. Thereafter, participants were asked to reconstruct their off-job time use and state recovery levels during 2 workweeks, resulting in a total of 2,122 workdays. Results of multilevel modeling supported all hypotheses, except the hypothesis regarding off-job time spent on physical activities. The findings contribute to the literature by showing that employees who are at risk of burnout should stop working and start spending time on nonwork activities to adequately recover from work on a daily basis.

Keywords: burnout, day reconstruction method, effort-recovery, recovery, vigor

Research has shown that individuals need to adequately recover from their work-related efforts on a daily basis as it prevents further exhaustion and enables them to reload for the next working day (Meijman & Mulder, 1998; Sonnentag, 2003). Adequate recovery may depend on both the types of activities employees pursue in their off-job time (Demerouti, Bakker, Geurts, & Taris, 2009; Rook & Zijlstra, 2006; Sonnentag, 2001, 2003), as well as more general well-being characteristics (e.g., Bakker, Demerouti, Oerlemans, & Sonnentag, 2013). In this study, we focus on employees who are still at work, but experience relatively high levels of burnout (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). More specifically, these employees suffer from relatively high levels of exhaustion and are disengaged in their job. We will examine what employees high or low in burnout do in their off-job time to recover from their work, and how this affects their daily recovery.

The present study aims to contribute to the literature in the following ways. First, the majority of studies on burnout have mainly examined between-person differences in burnout and its consequences, for instance in terms of health problems (e.g., Ahola, Väänänen, Koskinen, Kouvonen, & Shirom, 2010; Toppinen-Tanner, Ahola, Koskinen, & Väänänen, 2009). By combining a diary design with the Day Reconstruction Method (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004), we can more precisely examine how individuals spend their time on off-job activities, and how such activities either facilitate or hinder daily recovery from work on a within-person, day-to-day level. General questionnaires often suffer from social desirability and are dependent on people's memories that are often inaccurate, especially when examining daily behavioral and well-being measures. Collecting such measures on a daily basis is preferred, as it minimizes the filter of memory and social desirability (Kahneman et al., 2004).

Second, the majority of studies on daily recovery have investigated how daily off-job activities may either hinder or facilitate daily recovery. However, similar off-job activities may have a differential effect on how individuals recover from their work, depending on more general characteristics such as the level of burnout. By combining a general questionnaire to measure individual burnout with a Day Reconstruction Method (DRM) to measure daily time spent on off-job activities and recovery outcomes, we are able to examine which categories of daily off-job activities foster higher or lower daily levels of recovery and vigor, depending on an individual's level of burnout. Consistent with previous research on daily recovery (e.g., Bakker et al., 2013; Sonnentag, 2001), we included daily levels of physical vigor and cognitive liveliness during off-job time, and daily recovery at bedtime to assess daily recovery of employees on workdays.

Theoretical Background

Burnout is an indicator of long-term well-being—it indicates whether employees experience high levels of exhaustion and disengagement toward the job (Demerouti, Mostert, & Bakker, 2010; Maslach, Schaufeli, & Leiter, 2001). Burnout varies between persons, because individuals who have high levels of

This article was published Online First June 2, 2014.

Wido G. M. Oerlemans, Department of Work and Organizational Psychology, Erasmus University Rotterdam; Arnold B. Bakker, Department of Work and Organizational Psychology, Erasmus University Rotterdam, and Department of Applied Psychology, Lingnan University.

Correspondence concerning this article should be addressed to Wido G. M. Oerlemans, Department of Work & Organizational Psychology, Erasmus University Rotterdam, Woudestein, T13-42, PO Box 1738, 3000 DR Rotterdam, The Netherlands. E-mail: oerlemans@fsw.eur.nl

neuroticism and who are exposed to an unfavorable work environment are more likely to burn out in their work than those who are emotionally stable and who work in a favorable work environment (Maslach et al., 2001). Although levels of burnout may fluctuate *within* a person over time, we do not expect those within-person fluctuations to occur on a daily basis. It is generally understood that burnout results from an unfavorable work environment characterized by high job demands and low job resources. One of the premises of the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007; Demerouti et al., 2001) is that long-term exposure to job demands (e.g., work overload, emotional demands) will exhaust employees' cognitive and physical resources, which in the long run may lead to the depletion of energy (i.e., exhaustion) and health problems including musculoskeletal disorders (Ahola, 2007), and cardiovascular diseases (Toppinen-Tanner et al., 2009).

Despite the strong focus in occupational health models on the relationships between job demands, job resources, and burnout, relatively little attention has been paid to daily psychological and physiological processes that—over time—may explain why employee well-being gradually turns into ill-being, and eventually into burnout. One notable exception is Meijman and Mulder's (1998) effort-recovery (ER) theory. Accordingly, employees have to invest effort to achieve work-related goals. This work-related effort produces physical and physiological costs that are associated with working. These reactions are usually short-lived and reversible: they should disappear after a respite from work. However, under certain circumstances, the recovery process may be insufficient or inadequate, and short-term work-related load reactions (e.g., fatigue) as a consequence of work-related efforts may turn into long-term chronic health problems such as prolonged fatigue, chronic tension, and sleep deprivation (Åkerstedt, 2006; Härmä, 2006). For example, the continuation of work during off-job time is often described as an activity that is detrimental for daily well-being. The continued exposure to job demands results in a further depletion of physical and cognitive resources, resulting in lower daily well-being. Diary studies have indeed confirmed that work-related activities during off-job time negatively affect daily recovery, although the reported effects are small (Bakker et al., 2013; Sonnentag, 2001; Sonnentag & Natter, 2004; Sonnentag & Zijlstra, 2006).

In contrast, 'nonwork' or 'leisure' activities—comprising low-effort, social, and physical activities (Rook & Zijlstra, 2006; Sonnentag, 2001)—could contribute to adequate daily recovery by either replenishing used physical and cognitive resources, or acquiring new resources (for a detailed review, see Demerouti et al., 2009). For example, *low-effort activities* (e.g., resting, doing nothing, or watching TV) require little to no effort on behalf of the individual and therefore pose no additional demands on psychobiological systems (Sonnentag, 2001; Sonnentag & Natter, 2004). These activities may have a recovery function because they do not occupy physical or cognitive resources that are normally required to accomplish work related tasks, which allow psychobiological systems to return to their prestressor state (Meijman & Mulder, 1998). *Social activities*, for instance going out with friends, and talking to family in person or on the phone, may lead to the acquisition of social resources because these activities open up channels for social support. Also, social activities are likely to draw on different personal resources than those required to accomplish work-related tasks, and social activities offer opportunities to relax and detach from work (Sonnentag, 2001, 2012). *Physical activities*, such as sports or physical exercise, may contribute to daily recovery through physiological mechanisms. Exercise increases the level of endorphins, cause a higher body temperature, or lead to enhanced secretion of noradrenalin, serotonin, and dopamine, all of which have antidepressant effects (Cox, 2002; Grossman et al., 1984). Also, exercise leads to positive psychological reactions such as the opportunity to psychologically detach from work, an increased sense of belonging (when exercising in a group), as well as increased feelings of competence and bodily attractiveness (e.g., Feuerhahn, Sonnentag, & Woll, 2014).

However, one important limitation of ER theory is that within-person, daily processes of work and recovery are examined without considering whether general well-being characteristics on a between-person level would moderate such within-person processes. This is important, as it could explain why similar activity types that are executed in off-job time are found to hold different relationships with daily recovery (e.g., Demerouti et al., 2009) across diary studies. For example, daily time spent on low effort was sometimes found to be beneficial (Sonnentag, 2001), and sometimes not related (Sonnentag & Natter, 2004; Rook & Zijlstra, 2006) to daily recovery. Also, social activities were found to sometimes relate negatively (Sonnentag & Natter, 2004), not (Sonnentag & Bayer, 2005), or positively (Sonnentag & Zijlstra, 2006) to daily recovery outcomes. We are aware of only one study that has examined whether between-person differences in general well-being (i.e., workaholism; a general tendency to work compulsively and excessively) between employees would moderate within-person processes of time spent on activity types during off-job time and daily recovery. Bakker and colleagues (Bakker et al., 2013) showed that the continuation of work during off-job time led to a decline in daily recovery, whereas engaging in daily physical activities during off-job time led to higher daily recovery levels for employees high (vs. low) on workaholism.

Burnout and Daily Recovery

The present study extends and builds on the body of literature on burnout and recovery by examining whether specific patterns of time spent on off-job activities can help employees who are at risk of burnout to adequately recover from their work-related efforts on a daily basis. Burnout was operationalized by its two core dimensions: Exhaustion and disengagement from work (Demerouti et al., 2010). Exhaustion refers to a combination of affective, physical, and cognitive aspects of exhaustion, whereas disengagement from work refers to a general lack of interest in the job. Daily recovery on workdays was assessed by state levels of physical vigor and cognitive liveliness (Shirom, 2004) during off-job time—as these two concepts indicate whether physical and cognitive resources are being restored in off-job time. Physical vigor refers to an affective state where individuals feel full of pep and experience physical strength, whereas cognitive liveliness refers to feeling alert, being creative, and thinking rapidly. We also included self-reported daily recovery before going to sleep to directly assess the degree to which employees felt recovered at bedtime during workdays.

Burnout is likely to moderate within-person processes of time spent on off-job activities and daily recovery in some important ways. For example, work-related activities require high effort investment on behalf of employees (Robert & Hockey, 1997). However, employees who are at risk of burnout have already lost most of their physical and cognitive resources to deal with high job demands (Bakker & Demerouti, 2007). As a consequence, employees who are high in burnout have to invest additional physical and cognitive resources that were already used up at work when continuing their work during off-job time. In contrast, employees low in burnout are less exhausted and more dedicated which likely helps them to cope with demanding work-related activities in off-job time (Demerouti, 2012; Ten Brummelhuis & Bakker, 2012). For example, a survey study among almost 4,000 Swedish health care workers showed that individuals who are chronically exhausted continue to work in their off-job time, but also report higher sickness absence as compared to a nonexhausted group (Peterson, Demerouti, Bergström, Asberg, & Nygren, 2008). It therefore appears that individuals who are high in burnout continue their work during off-job time, leading to ill well-being. One possible explanation may be that employees high in burnout continue to work during off-job time to compensate for performance failures during regular work hours (e.g., Van der Linden, Keijsers, Eling, & Van Schaijk, 2005). However, such compensatory efforts may result in further losses of physical and cognitive resources which are already low (Demerouti, Le Blanc, Bakker, Schaufeli, & Hox, 2009). Based on the above reasoning, we hypothesize the following:

Hypothesis 1: Time spent on work-related activities during off-job time has a stronger negative relationship with (a) state physical strength, (b) state cognitive liveliness, and (c) the state of feeling recovered for employees high (vs. low) in burnout.

Next, ‘nonwork’ activities such as low-effort, social, and physical activities either put no further demands on the individual, or draw on resources that are different as compared with the cognitive and physical resources required at work (Sonnentag, 2001, 2003). As such, nonwork activities during off-job time allow for the restoration of personal (e.g., physical, social, and cognitive resources) that were lost during the workday. In the present study, we argue that the restoration of daily personal resources becomes more important in the face of a more enduring loss of personal resources, as is the case with individuals who score relatively high (vs. low) in burnout. For instance, employees high in burnout suffer from long-term affective, physical, and cognitive exhaustion. As such, they are in a higher need to recover from their work-related efforts as compared with individuals who are low in burnout (Kant et al., 2003; Sonnenschein, Sorbi, Van Doornen, Schaufeli, & Maas, 2007). This also reflects resources theories, which state that a restoration of resources becomes more crucial for well-being in the face of enduring resource loss (Bakker & Demerouti, 2007; Hobfoll, 2002, 2011).

For instance, individuals who are high in burnout are likely to benefit more from low-effort activities in terms of daily recovery as such activities can restore physical and cognitive resources that were lost during the work day, whereas such activities may be less beneficial in terms of recovery for individuals who are low in burnout. Also, employees who are high (vs. low) in burnout generally experience a lack of social support from supervisors and colleagues as compared with individuals who are relatively low in burnout (Schaufeli & Buunk, 2003). As a consequence, they feel a sense of cynicism, irritability, and helplessness toward their work environment, and have less meaningful social interactions with others at work. Under such conditions, social contact (social resources) outside of the work environment with friends or family may help individuals who are at risk of burnout to feel physically and cognitively more alive. In contrast, employees who are low in burnout already have more social interactions at work and may be less dependent on meaningful social interactions outside work in order to adequately recover from their workday. Finally, *physical activities* such as sports and exercise are known to have an antidepressant effect (e.g., Cox, 2002), and relate to increased positive affect as such activities provide opportunities to psychologically detach from work, and increase feelings of competence and bodily attractiveness (e.g., Feuerhahn et al., 2014). We expect employees who are at risk of burnout (vs. those who are low on burnout) to benefit more from physical activities, as they allow for a restoration of physical, cognitive, and affective resources. A 6-year follow-up study among a large sample of individuals showed that job burnout led to a much higher increase in depression when individuals did not engage in physical activity, as compared with individuals who did engage in physical activities (Toker & Biron, 2012). Based on the above reasoning, we hypothesize the following:

Hypothesis 2: Time spent on nonwork activities—that is, low-effort, social, and physical activities—during off-job time is more positively associated with (a) state physical strength, (b) state cognitive liveliness, and (c) the state of feeling recovered for employees high (vs. low) in burnout.

Method

Participants and Procedure

Employees were recruited to participate in this study via a university website in The Netherlands and via social media (e.g., Twitter, Facebook, LinkedIn). First, participants were asked to fill in a background survey which included questions on age, gender, educational level, employment details (e.g., average weekly work days and work hours), and the general level of burnout. Thereafter, participants were asked to keep a personal diary on daily off-job activities and daily recovery on workdays during two weeks. Participants could create a unique name and password which granted them access to their personal dairy. E-mails were sent every morning with a link to the personal diary for two consecutive workweeks. The diary contained two methods of self-report. First, participants were asked to ‘reconstruct’ the time they spent on their off-job activities during the previous day, by using a Day Reconstruction Method (DRM; Kahneman et al., 2004). In particular, participants indicated in chronological order their time spent on off-job activities of the previous day by filling out the time at which an activity began and ended, as well as the type of activity. Second, participants answered questions about their recovery state during the previous day (i.e., state physical vigor, state cognitive liveliness, and state recovery). Note that participants were asked to answer questions regarding yesterdays’ off-job activities and state recovery after waking up the next morning, which may be problematic in terms of recall bias. However, a DRM facilitates access to encoded momentary experiences that are stored into our memory when one episode ends and another episode starts (Kurby & Zacks, 2008). The recall cues generated by a DRM (e.g., When did you perform the activity? How much time did you spent on the activity? What type of activity?) help respondents to reexperience their previous day (Kahneman et al., 2004), as well as their states of well-being at that time. Note that a DRM methodology produces similar results as compared with experience sampling methods (Dockray et al., 2010).

The online quantitative diary was programmed such that participants could fill out the diary only once per day. Upon completion, the date was automatically stored in the database.

A total of 287 participants filled in the DRM diary with an average of seven workdays ($M = 7.39$; $SD = 3.79$), reporting a total of 2,122 workdays. The mean age of the participants in the study sample was 44 years ($SD = 12.35$), and 82% was female. The Dutch educational system has secondary and tertiary education levels. As for the tertiary education level, 39.4% of the participants in the sample held a higher professional degree (HBO), 24% held a university degree (WO), and 13.2% held a lower professional degree (MBO). As for the secondary educational level, 15% finished higher secondary education (HAVO/VWO), 7.7% finished lower secondary education (MAVO/VMBO), and 0.7% stated to have no educational degree whatsoever. The participants worked in a wide range of occupational sectors: 24.0% of the participants worked in the health industry; 13.2% in the government; 12.5% in the educational sector; 11.5% in the financial sector; 4.5% in the cultural sector; 4.2% in retail; 1.7% in transportation; 1.7% in the hospitality or catering industry, and 16.7% reported to work in other types of sectors (10.1% did not respond to the question). The participants reported to work on average for 29.98 hours ($SD = 10.64$), and 4.22 workdays ($SD = 1.16$) per week.

As compared with the Dutch working population (CBS, 2012), the average weekly hours worked in the study sample was somewhat lower (30 hours vs. 34 hours). Also, participants were higher educated in the study sample as compared to the Dutch population (e.g., 24% vs. 11%), and the percentage of females was higher (82% vs. 47%).

Measures

Burnout. We measured *burnout* with the OLdenburg Burnout Inventory (OLBI; Demerouti et al., 2010). The OLBI includes two dimensions: *exhaustion* and *disengagement from work*. Item examples of exhaustion are: *After my work, I regularly feel worn out and weary*, and *After my work, I regularly feel totally fit for my leisure activities* (reversed). Items for disengagement include: *I frequently talk about my work in a negative way*, and *I get more and more engaged in my work* (reversed). Response categories ranged from 1 (*totally disagree*) to 4 (*totally agree*). Cronbach's alpha was .86 for exhaustion, .89 for disengagement, and .91 when combining both scales into one burnout measure. The overall burnout measure was used in the analyses as an indicator of burnout.

Daily activities during off-job time. Participants reconstructed in chronological order their time spent on various types of off-job activities from the time they returned home from work until going to sleep that day by using a DRM (Kahneman et al., 2004). In particular, respondents were asked to reflect on their off-job time of the previous day by indicating the time they spent on specific off-job activities during that day. A drop-down menu offered many off-job activities to choose from. Following earlier diary studies on recovery (e.g., Sonnentag, 2001), we distinguished between work-related, low-effort, physical, and social activities in the analyses. Work-related activities after work included working at home, and/or preparing for the next working day; physical activities after work included playing soccer, tennis, hockey, running, bicycling, dancing, fitness, swimming, golf; social afterwork activities included spending time with friends or family, going out with friends or family, and social interactions with others away from home (e.g., at another person's home, or at a club); and low-effort activities after work included relaxing on the couch, watching TV, doing nothing, and resting. On average, participants spent 35 minutes of their off-job time on work-related activities, 21 minutes on low-effort activities, 22 minutes on physical activities, and 2 hours and 31 minutes on social activities.

State physical vigor. We measured *state physical vigor* with three items from the Shirom–Melamed vigor measure (Shirom, 2004). The items were adapted to refer to *yesterday during my off-job time*, and included the following items: *I felt vigorous*, *I felt I had physical strength*, and *I felt energetic*. Items were answered on a 7-point Likert scale ranging from 1 (*don't agree at all*), to 7 (*totally agree*). Cronbach's alpha for physical vigor varied between .95 and .97 depending on the day, indicating good reliabilities.

State cognitive liveliness. We measured state cognitive liveliness with three items from the Shirom–Melamed vigor measure (Shirom, 2004). Items were adapted to refer to *yesterday during my off-job time* and included the following: *I felt I could think rapidly*, *I felt I was able to be creative*, and *I felt I was able to contribute to new ideas*. Items were answered on a 7-point Likert scale ranging from 1 (*don't agree at all*), to 7 (*totally agree*). Cronbach's alpha for cognitive liveliness varied between .85 and .91 depending on the day.

State recovery. This was assessed with three items from a recovery measure of Sonnentag (2003). The items were slightly adapted to refer to *yesterday before going to sleep* and included the following: *I felt recovered*, *I felt rested*, and *I felt I had enough time to recover from my workday*. Items were answered on a 7-point Likert scale ranging from 1 (*don't agree at all*), to 7 (*totally agree*). Cronbach's alpha varied between .89 and .92.

Control variables. In our analyses we controlled for a number of additional variables (gender, age, educational level, average weekly work hours, and day of the week). For instance, demographics such as gender, age, socioeconomic indicators, and variations in work hours have been found to relate to fatigue and disturbed sleep (Åkerstedt, Fredlund, Gillberg, & Jansson, 2002). Moreover, we controlled for day of the week as behavioral patterns as well as its consequences for daily well-being may fluctuate substantially between workdays (Beckers et al., 2008).

Strategy of Analysis

Because our data has a hierarchical structure with days nested in persons, we used hierarchical linear modeling for analyzing the data. As the substantive focus of interest is on cross-level moderation effects of general burnout levels (a between person variable) on time spent on off-job activities (within person variables) and daily recovery (i.e., state vigor, state cognitive liveliness, and state recovery), burnout was centered on the grand mean, and the variables for time spent on all of the activity types were centered on the person mean (also called Centering Within Cluster). Centering Within Cluster (CWC) of level 1 variables is preferred instead of grand mean centering when examining cross-level interactions that involve a pair of Level 1 variables (Enders & Tofighi, 2007). Moreover, as state levels of recovery may also depend on other variables than time spent on off-job activities and general levels of burnout, we controlled for a number of additional variables (age, gender, educational level, average weekly work hours, and day of the week). Also, we corrected for lagged effects of daily recovery in order to analyze variations in the daily recovery beyond the baseline recovery levels of the day before. Note that 1,538 workdays (out of a total of 2,122 workdays) with lagged state recovery levels of the day before were included in our multilevel analyses.

In a first model, we included main effects of both between-person and within-person variables. In a second, nested model, we tested the hypotheses by calculating each of the interaction effects for time spent on off-job activities and burnout on the three state recovery outcomes. Additionally, we analyzed the nature of significant interaction effects by performing simple slopes analyses as proposed by Preacher, Curran, and Bauer (2006) where participants with one standard deviation above the mean on burnout were considered ‘high’ in burnout and those who scored one standard deviation below the mean were considered to be ‘low’ in burnout. The improvement of each multilevel model over the previous one was computed by the differences of the respective log-likelihood statistic -2^{*}log and submitting this difference to a chi squared (χ^2) test.

Results

Preliminary Analyses

Table 1 reports means, standard deviations, and correlations of the study variables. Before testing the hypotheses, we first performed a multilevel confirmatory factor analysis (MLCFA) using the Mplus 6.12 program (Muthén & Muthén, 1998–2006) to evaluate whether a three-factor structure for the three recovery outcomes—state physical vigor, state cognitive liveliness, and state recovery—would fit the data. The proposed 3-factor solution yielded excellent fit indices (χ^2 = 351.23, $p < .001$; CFI = .98; TLI = .97; RMSEA = .06; RMR within-person level = .03; RMR between-person level = .04). Moreover, fit indices for the proposed three-factor solution fitted significantly better to the data as compared with a one-factor (χ^2-difference = 4659.25, $p < .001$; CFI = .72, TLI = .63, RMSEA = .21, RMR-within = .14, RMR-between = .17), or the best fitting two factor solution where items for physical vigor and cognitive liveliness were loaded on a “vigor” factor, and recovery items loading on a “recovery” factor (χ^2-difference = 1778.58, $p < .001$; CFI = .88, TLI = .84, RMSEA = .14, RMR-within = .06, RMR-between = .05). Thus, state physical vigor, state cognitive liveliness, and state recovery were treated as separate outcomes of daily recovery in the subsequent analyses. In addition, we calculated the intercept-only multilevel (null) models to assess whether a relevant amount of variation for the three state well-being outcomes is on the within person (day) level. This turned out to be the case. The analyses showed that 69% of the variance for state physical vigor, 67% of the variance for state cognitive liveliness, and 64% of the variance for state recovery was on the within person level, showing the need to perform multilevel analyses.

Main Effects of the Study Variables on Daily Recovery Outcomes

Table 2 shows the results of multilevel analyses predicting state physical vigor and state cognitive liveliness during off-job time. Table 3 shows results of multilevel analyses predicting state recovery at bedtime. At the *between person* level, Model 1 showed that burnout related negatively to state physical vigor, $t = -6.29$, $p < .001$, state cognitive liveliness, $t = -6.98$, $p < .001$, and state recovery, $t = -6.54$, $p < .001$. The between person control variables (i.e., age, gender, educational level, and average weekly work hours) did not relate to any of the three daily recovery outcomes.

Table 1
Means, Standard Deviations, and Correlations Between Study Variables

Variable	Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	44.04	12.35	—											
2. Gender (0 = male, 1 = female)	81.5%		−0.05	—										
3. Educational level	5.27	1.64	−0.06	−0.05	—									
4. Work hours (week)	30.45	10.03	−0.09	−0.22	0.15	—								
5. Burnout	2.38	0.55	−0.15	−0.01	−0.04	−0.01	—							
6. Work-related activities	0:35	3:34	−0.04	−0.18	0.07	0.29	−0.01	—	−0.09	−0.09	0.14	0.03	0.05	−0.03
7. Social activities	2:31	5:03	−0.13	0.07	−0.04	0.01	−0.05	0.01	—	0.12	0.07	0.27	0.14	0.08
8. Physical activities	0:22	0:57	−0.02	0.03	0.10	−0.03	−0.07	−0.16	0.10	—	0.04	0.20	0.13	0.03
9. Low-effort activities	0:21	1:00	−0.11	0.01	0.14	0.16	−0.17	0.15	0.13	0.05	—	0.08	0.07	0.04
10. Physical vigor	4.82	1.18	0.19	−0.04	0.07	0.05	−0.40	−0.06	0.16	0.17	0.25	—	0.79	0.56
11. Cognitive liveliness	4.73	1.14	0.20	−0.01	0.11	0.03	−0.43	−0.06	0.14	0.15	0.25	0.82	—	0.55
12. Recovery from work	4.47	1.08	0.17	−0.02	0.11	0.02	−0.43	−0.02	0.09	0.08	0.20	0.64	0.56	—

Note. Correlations below the diagonal are person-level correlations (n = 287) with correlations r ≥ |.13| being significant at $p < .05$ and r ≥ |.16| being significant at $p < .01$. Correlations above the diagonal are within-person correlations (n = 2,122) with correlations r ≥ |.05| being significant at $p < .05$ and r ≥ |.07| being significant at $p < .01$. All activities reported refer to activities pursued after office hours. We display means and standard deviations (*SD*) concerning time spent on off-job activities in an hour:minute format.

Table 2
Multi-Level Models Predicting State Vigor and State Cognitive Liveliness

Variable	State Physical Vigor Model 1			State Physical Vigor Model 2			State Cogn. Liveliness Model 1			State Cogn. Liveliness Model 2		
	Est	*SE*	Sig.	Est	*SE*	Sig.	Est	*SE*	Sig.	Est	*SE*	Sig.
Estimate	4.80	0.29	16.83***	4.80	0.29	16.83***	4.54	0.27	16.93***	4.54	0.27	16.93***
Level 2 variables												
Age	0.01	0.01	1.50	0.01	0.01	1.50	0.10	0.01	16.67	0.01	0.01	1.67
Gender	0.17	0.18	0.92	0.17	0.18	0.93	0.19	0.17	1.12	0.19	0.17	1.12
Educational level	−0.05	0.04	−1.07	−0.05	0.04	−1.09	−0.01	0.04	−0.27	−0.01	0.04	−0.27
Average weekly workhours	0.01	0.01	0.86	0.01	0.01	0.86	0.00	0.01	0.67	0.00	0.01	0.67
Burnout (BO)	−0.84	0.13	−6.29***	−0.84	0.13	−6.31***	−0.88	0.13	−6.98	−0.88	0.13	−6.98***
Level 1 variables												
Lagged effect	0.08	0.03	2.81**	0.08	0.03	3.04**	0.12	0.03	4.44***	0.12	0.03	4.44***
Weekday	0.02	0.02	1.00	0.02	0.02	1.06	0.02	0.02	1.19	0.02	0.02	1.19
Time spent on work-related activities	−0.02	0.01	−1.42	−0.02	0.01	−1.58	−0.01	0.01	−1.27	−0.01	0.01	−1.27
Time spent low-effort activities	0.17	0.04	4.45***	0.17	0.04	4.39***	0.14	0.04	3.89***	0.14	0.04	3.89***
Time spent on social activities	0.04	0.01	4.00***	0.04	0.01	4.00***	0.04	0.01	4.63***	0.04	0.01	4.63***
Time spent on physical activities	0.16	0.04	4.08***	0.17	0.04	4.18***	0.15	0.04	4.11***	0.15	0.04	4.11***
Interaction terms												
BO × Work-related activities				−0.04	0.02	−2.00*				−0.05	0.02	−2.79**
BO × Low-effort activities				0.25	0.07	3.63***				0.23	0.06	3.63***
BO × Social activities				0.04	0.02	2.18*				0.04	0.02	2.67**
BO × Physical activities				0.15	0.09	1.79				0.11	0.08	1.31
−2*log (lh)		5208.47			5170.96			4996.09			4947.77	
Diff-2*log		638.99***			37.51***			227.50***			48.32***	
df		11			4			11			4	
Level 2 variance (person)	0.54	0.09		0.55	0.09		0.48	0.08		0.50	0.08	
Level 1 variance (day)	1.52	0.06		1.48	0.06		1.32	0.05		1.27	0.05	

Note. Est = estimate; *SE* = standard error; Sig = significance; BO = burnout; State Cogn. Liveliness = State Cognitive Liveliness. The difference in −2*log in Model 1 for State Physical Vigor and State Cognitive Liveliness are compared with the intercept-only model. n = 287 persons, 1,538 days.
* $p < .05$. ** $p < .01$. *** $p < .001$.

At the *within person* level, results in Tables 2 and 3, Model 1, indicated that lagged effects of state recovery had a positive effect on (next day's) state recovery levels (lagged effect state physical vigor, $t = 2.81$, $p < .01$; lagged effect state cognitive liveliness; $t = 4.44$, $p < .001$; lagged effect state recovery, $t = 3.85$, $p < .001$). Day of the week was not significantly related to any of the state recovery outcomes. Also, off-job time spent on work-related activities held no significant relationship with the three state recovery outcomes. However, off-job time spent on social activities (state physical vigor, $t = 4.00$, $p < .001$; state cognitive liveliness; $t = 4.63$, $p < .001$; state recovery, $t = 2.88$, $p < .01$), off-job time spent on physical activities (state physical vigor, $t = 4.08$, $p < .001$; state cognitive liveliness, $t = 4.11$, $p < .001$; state recovery, $t = 1.97$, $p < .05$), and off-job time spent on low-effort activities (state physical vigor, $t = 4.45$, $p < .001$; state cognitive liveliness, $t = 3.89$, $p < .001$; state recovery, $t = 4.81$, $p < .01$) related positively to the three state recovery outcomes.

Testing the Hypotheses

In a second, nested model, we tested all of the hypotheses by including cross-level interaction terms for burnout and daily off-job time spent on activities (See Tables 2 and 3, Model 2). Hypothesis 1 predicted that time spent on work-related activities during off-job time would have a stronger negative relationship with (a) state physical strength, (b) state cognitive liveliness, and (c) the state of feeling recovered for employees high (vs. low) in burnout. Results indeed showed significant and negative cross-level interaction effects of burnout and daily off-job time spent on work-related activities on state physical vigor, $t = -2.00$, $p < .05$, state cognitive liveliness, $t = -2.79$, $p < .01$, and state recovery, $t = -2.44$, $p < .01$, after controlling for lagged effects. We used simple slope tests as proposed by Preacher et al. (2006) to interpret the nature of these cross-level interaction effects. These tests indicated that for employees who were low in burnout (one standard deviation below the mean), off-job time spent working had no significant effect on state physical vigor ($z = -0.85$, $p = .40$), state cognitive liveliness ($z = -0.72$, $p = .47$), and state recovery ($z = -0.85$, $p = .39$). However, for employees who were high in burnout (one standard deviation above the mean), off-job time spent working related negatively to state physical vigor ($z = -2.09$, $p < .05$), state cognitive liveliness ($z = -2.44$, $p < .05$), and state recovery ($z = -2.23$, $p < .05$), which confirmed hypothesis 1. As an example, Figure 1 shows the interaction effect between burnout and off-job time spent working for state recovery at bedtime. Very similar figures were found for state physical vigor and state cognitive liveliness and are available on request from the first author.

Hypothesis 2 predicted that off-job time spent on nonwork activities—that is, low-effort, social, and physical activities—would be more positively associated with (a) state physical strength, (b) state cognitive liveliness, and (c) the state of feeling recovered for employees high (vs. low) in burnout. As for *low-effort activities*, burnout moderated the relationships between off-

Table 3
Multi-Level Models Predicting State Recovery From Work

Variable	State Recovery From Work Model 1 Est	*SE*	Sig.	State Recovery From Work Model 2 Est	*SE*	Sig.
Estimate	4.38	0.27	16.03***	4.39	0.30	14.63***
Level 2 variables						
Age	0.01	0.01	1.00	0.01	0.01	1.00
Gender	0.10	0.17	0.55	0.10	0.17	0.55
Educational level	0.00	0.04	−0.10	0.00	0.04	−0.10
Average weekly workhours	0.00	0.01	0.67	0.00	0.01	0.67
Burnout (BO)	−0.84	0.13	−6.54***	−0.84	0.13	−6.54***
Level 1 variables						
Lagged effect	0.10	0.03	3.85***	0.10	0.03	3.85***
Weekday	0.03	0.02	1.81	0.03	0.02	1.81
Time spent on work-related activities	−0.02	0.01	1.58	−0.02	0.01	−1.55
Time spent low-effort activities	0.13	0.03	4.81***	0.13	0.03	3.82***
Time spent on social activities	0.02	0.01	2.88***	0.02	0.01	2.88**
Time spent on physical activities	0.07	0.04	1.97*	0.07	0.04	1.97*
Interaction terms						
BO × Work-related activities				−0.04	0.02	−2.44**
BO × Low-effort activities				0.10	0.06	1.72
BO × Social activities				0.06	0.02	3.80***
BO × Physical activities				0.13	0.08	1.74
−2*log (lh)		4867.79			4827.55	
Diff-2*log		602.43***			40.24***	
df		11			4	
Level 2 variance (person)	0.54	0.08		0.55	0.08	
Level 1 variance (day)	1.19	0.05		1.16	0.05	

Note. Est = estimate; *SE* = standard error; Sig = significance; BO = burnout. The difference in −2*log in Model 1 for State Recovery From Work is compared with the intercept-only model. $n = 287$ persons, 1,538 days.
* $p < .05$. ** $p < .01$. *** $p < .001$.

job time spent on low-effort activities and state physical vigor, $t = 3.63$, $p < .001$ and state cognitive liveliness, $t = 3.63$, $p < .001$, but not state recovery, $t = 1.72$, $p = .09$. Specifically, simple slope analyses (for an example, see Figure 2) revealed that for employees low in burnout, off-job time spent on low-effort activities was not significantly related to state physical vigor ($z = 1.62$, $p = .11$) and state cognitive liveliness ($z = 1.45$, $p = .14$). However, for employees high in burnout, off-job time spent on low-effort activities related positively to state physical vigor ($z = 3.39$, $p < .001$), and state cognitive liveliness ($z = 3.23$, $p < .001$). Thus, for low-effort activities, hypothesis 2 was confirmed for two out of three state recovery outcomes.

For *social activities*, burnout significantly moderated the relationship between off-job time spent on social activities and state vigor, $t = 2.18$, $p < .05$, state cognitive liveliness, $t = 2.67$, $p < .01$, and state recovery, $t = 3.80$, $p < .001$. Simple slope analyses revealed that for both employees low *and* high in burnout, daily socializing during off-job time related positively to state physical vigor (low: $z = 2.09$, $p < .05$; high: $z = 4.65$, $p < .001$), state cognitive liveliness (low: $z = 3.30$, $p < .001$; high: $z = 3.65$, $p <$

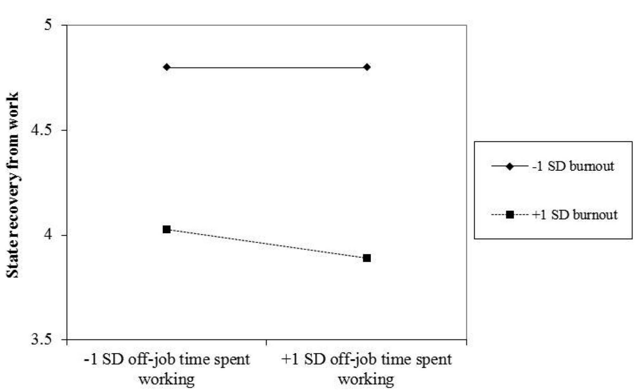

Figure 1. Interaction effect of burnout and off-job time spent on work-related activities for state recovery at bedtime.

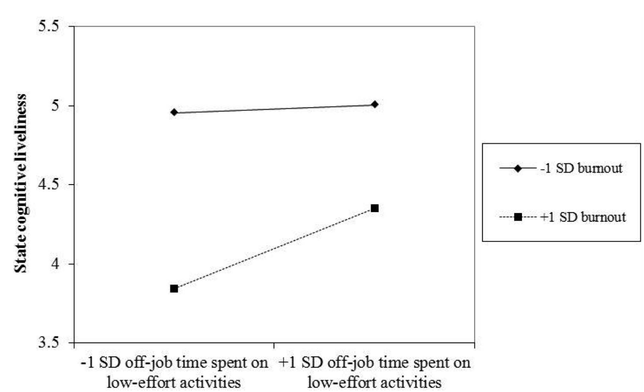

Figure 2. Interaction effect of burnout and time spent on low-effort activities for state cognitive liveliness during off-job time.

.001), and state recovery (low: $z = 2.00$, $p < .05$; high: $z = 3.85$, $p < .001$). However, consistent with hypothesis 2, slope difference tests revealed that effects of off-job time spent on socializing and the three state recovery outcomes were stronger for employees who were high (vs. low) in burnout (state physical vigor, $z = 4.64$, $p < .01$; state cognitive liveliness, $z = 2.00$, $p < .05$; state recovery, $z = 2.18$, $p < .05$). Thus, for social activities, hypothesis 2 was fully confirmed. Figure 3 shows an example of the pattern of the interaction effect for time spent on social activities and state physical vigor.

Burnout did *not* moderate the within-person relationships of off-job time spent on physical activities and the three state recovery (see Tables 2 and 3, Model 2). In sum, hypothesis 2 was fully confirmed for off-job time spent on social activities, partly confirmed for off-job time spent on low-effort activities (for state physical vigor and state cognitive liveliness), but rejected for off-job time spent on physical activities.

Discussion

This study is, to the best of our knowledge, the first to examine whether employees who are at risk of burnout react differently to time spent on activities during off-job time in terms of their daily recovery (i.e., state physical vigor, state cognitive liveliness, and state recovery) as compared with individuals with low burnout levels. The findings suggest that it is important for employees who are at risk of burnout to stop spending time on work-related activities during off-job time, and start spending more time on low-effort and social activities in order to adequately recover from work on a daily basis. For employees with low burnout levels, the pattern of findings suggest that social, but not low effort activities, are beneficial for their daily recovery. Moreover, it appears that employees with low burnout levels are not in immediate danger when continuing their work during off-job time, as it does not (yet) have a negative impact on their daily recovery. Physical activities contributed to daily recovery for all employees.

These findings are theoretically and practically important, as they show that within-person effects of daily time spent on off-job activities and subsequent recovery may change substantially, depending on more general well-being characteristics such as job burnout. In addition, this study reveals practical strategies of what employees who are at risk of burnout can do in order to adequately recover from work on a daily basis. Below, we discuss the theoretical and practical implications of our findings in more detail.

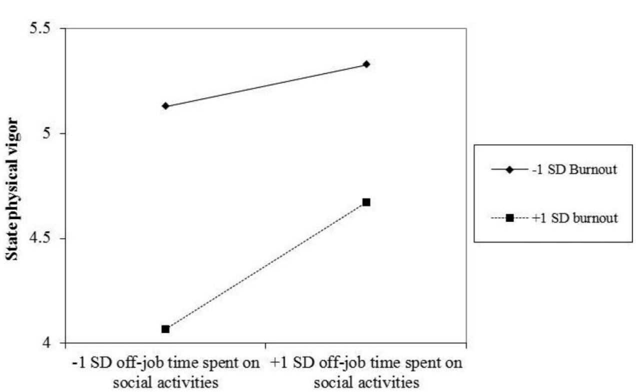

Figure 3. Interaction effect of burnout and off-job time spent on social activities for state physical vigor during off-job time.

Burnout and Work-Related Activities

Our findings confirm that employees who are at risk of burnout experience a decline in their daily recovery (i.e., in terms of physical vigor, cognitive liveliness, and recovery) on days when they spend more off-job time on work-related activities, whereas employees with a low burnout level do not. To understand this interaction effect, it is important to consider the enduring characteristics of burned-out employees. Employees who are high (vs. low) in burnout have suffered a loss in enduring physical and cognitive resources: they feel chronically exhausted and disengaged from their work (Demerouti et al., 2010). On workdays where employees continue their work during off-job time, they presumably have to invest additional physical and cognitive resources to deal with demanding work-related tasks. However, individuals who are high in burnout have mostly depleted their affective, physical, and cognitive resources and are not well equipped to deal with additional work-related efforts, resulting in poor daily recovery.

In contrast, employees who are low in burnout have a higher level of vigor (Demerouti et al., 2010), and are therefore better equipped to deal with demanding work-related activities in their off-job time, so that their daily recovery level is not adversely affected when they continue to work in their off-job time. These findings are more in line with assumptions from resources theories (e.g., Hobfoll, 2002, 2011; Ten Brummelhuis & Bakker, 2012). For example, those low in burnout are in the possession of more personal energetic resources (e.g., physical and cognitive resources), which makes them better equipped to deal with demanding situations (e.g., work-related tasks) as compared with individuals who are high in burnout and do not have such personal resources at their disposal. Moreover, employees who are high in burnout are generally disengaged from their work, whereas employees who are low in burnout are more dedicated. As a consequence, for the burnout group, work-related efforts during off-job time are likely to be experienced as something that has to be done rather than something that might be interesting or challenging. Consistent with this idea, Beckers et al. (2008) showed that the effect of overwork on fatigue is only significant when overwork is performed involuntarily.

The above findings stress that the continuation of work-related activities in off-job time is only harmful for daily recovery for employees with a high (vs. low) level of burnout. Although this may seem obvious, it is important to note that highly exhausted employees appear to perform more overtime work as compared with non–burned-out employees (Peterson et al., 2008), which emphasizes the importance to convey this message.

Burnout and Low-Effort Activities

Results confirmed that for employees who are at risk (vs. not at risk) of burnout, spending time on low-effort activities relates to higher daily recovery (i.e., higher levels of physical vigor and cognitive liveliness, but not recovery). These interaction effects are in accordance with ER theory (Meijman & Mulder, 1998), and may be explained as follows. Low-effort activities (e.g., relaxing on the couch, resting, doing nothing) require little to no effort on behalf of the individual, and provide an opportunity to momentarily restore physical and cognitive resources. For employees who are high in burnout, then, low-effort activities pursued during off-job time provide a much-needed opportunity to restore physical and cognitive resources that are almost drained, resulting in higher physical vigor and cognitive liveliness.

In contrast, employees who are low in burnout have a higher general level of physical and cognitive vigor. For them, the restoration of physical and cognitive resources may not be required, which is in line with the finding that time spent on low-effort activities are not significantly related to daily recovery among individuals who are low in burnout. It might be that for individuals who are low in burnout, low-effort activities such as relaxing on the couch or doing nothing may reflect boredom or apathy in leisure time (Iso-Ahola, 1997; Demerouti et al., 2009). The findings on low-effort activities are also in line with assumptions from resources theories, which suggest that the restoration of resources becomes more crucial for well-being in the face of enduring resource loss (Bakker & Demerouti, 2007; Hobfoll, 2002, 2011).

It is important to note that general levels of burnout did not moderate the relationship between time spent on low-effort activities and daily recovery at bedtime. Thus, the findings indicate that individuals who are at risk of burnout benefit primarily from low-effort activities in terms of the restoration of momentary physical and cognitive resources in off-job time, but not recovery at bedtime. It may be the case that recovery at bedtime is better predicted by other indicators, such as the degree to which low-effort activities are enjoyed (e.g., Van Hooff, Geurts, Beckers, & Kompier, 2011; Oerlemans, Bakker, & Demerouti, 2014).

Burnout and Social Activities

As hypothesized, results show that individuals who are at risk of burnout (vs. those who score low in burnout) recover better on days when they spend more off-job time on social activities. One explanation for this finding is that those who are at risk of burnout have developed a rather cynical attitude toward their work, and have distanced themselves from clients, colleagues, or superiors at work. As a consequence, individuals who are high (vs. low) in burnout may be less likely to have meaningful social interactions with others in the workplace. Indeed, between-person studies confirm that burnout relates negatively to social support at work (e.g., Schaufeli & Buunk, 2003). Under such circumstances, social activities pursued outside work provide welcome opportunities for highly burned-out individuals to engage in meaningful conversations with others (friends or family). Social activities during off-job time such as a night out with friends, visiting family, or talking on the phone with meaningful others fulfill important psychological needs and can be invigorating (e.g., Ryan & Deci, 2008). Also, social activities can provide individuals who are high in burnout and suffer from chronic job stress with a much-needed opportunity to detach from their stressful work environment and relax (Ten Brummelhuis & Bakker, 2012).

In contrast, employees who are low in burnout are more engaged in their work, and experience more meaningful social interactions in the workplace (e.g., Bakker, Schaufeli, Leiter, & Taris, 2008). Then, social interactions outside work may be less crucial for their daily well-being. Note that individuals who are low in burnout also experience higher recovery levels on days when they spend more time on social activities, but the effect is less strong as compared with individuals who are at risk of burnout.

Burnout and Physical Activities

Results indicate that time spent on physical activities has a positive effect on all daily recovery outcomes (i.e., physical vigor, cognitive liveliness, and recovery) for all employees, regardless of differences in the level of burnout. We hypothesized that for employees high (vs. low) on burnout, physical activities would be more positively associated with state well-being. One explanation for the nonsignificant interaction effects may be that physical activities are related to physiological mechanisms that have equal positive effects for all individuals, independent from their enduring level of burnout (e.g., increased level of endorphins, higher body temperature, and enhanced secretion of noradrenalin, serotonin, and dopamine; Cox, 2002; Grossman et al., 1984). Another explanation may be that positive and negative elements cancel each other out, and produce a similar gain in physical vigor, cognitive liveliness, and recovery at bedtime for individuals who are high (vs. low) in burnout. For example, individuals who are at risk of burnout are highly exhausted. Physical activities are able to enhance vigor and mood, but may also produce physical fatigue (e.g., Sonnentag, 2001; Sonnentag & Natter, 2004). Then, engaging in physical activities may lead to higher physical fatigue for individuals who are high (vs. low) in burnout, which may cancel out positive effects of other aspects of physical activities on physical vigor, cognitive liveliness, and recovery at bedtime. Unfortunately, physical fatigue was not included in the present study. Future studies could examine whether physical fatigue indeed masks the otherwise beneficial effects of physical activities on state well-being for employees who are high in burnout.

Strengths and Weaknesses

This study has some particular strengths and weaknesses. A strength of the study is the use of a general questionnaire to measure job burnout, and daily methods (the DRM, and daily questionnaires) to measure time spent on off-job activities and daily recovery. The DRM and daily questionnaires have the advantage of minimizing recall bias. Results obtained from the DRM are highly similar to results obtained with experience sampling methods, which uses real-time reports of people's actions and emotions (Dockray et al., 2010; Kahneman et al., 2004). Still, participants were asked to reflect on their off-job activities and state recovery of the day before (yesterday), and therefore we cannot exclude the possibility that some recall bias is involved.

Using different research methods also limits concerns about common-method variance, as is the case when using only one questionnaire (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). To further limit problems associated with common-method bias, we used person-centered scores in the analyses and corrected for lagged effects of state recovery outcomes. This way of analyzing allowed us to study intraindividual changes in daily recovery, beyond the individual's baseline and beyond the effects of previous day recovery.

The study sample did not match the Dutch working population well in terms of gender and educational level. The percentage of females was higher (82% vs. 47%) and employees were higher educated (24% vs. 11%) in the sample as compared with the Dutch population. We therefore included control variables for age, gender, educational level, and average weekly work hours on the between-person level in all the analyses. Please note that these control variables held no significant associations with the daily recovery outcomes studied. Moreover, this study, as well as diary studies in general, are mostly concerned with studying within-person changes in state well-being over time as compared to studying differences on a between-person level. Still, future research may want to include a sample of participants that is representative of the labor force in a particular region or country.

Another limitation is that we focused specifically on activities pursued during off-job time and general levels of burnout as predictors of daily recovery. However, changes in recovery may also occur during work time (Trougakos, Beal, Green, & Weiss, 2008). For example, Fritz, Lam, and Spreitzer (2011) examined how employees replenish and sustain their energy during working time. They found that particularly strategies related to learning, to the meaning of one's work, and to positive workplace relationships were positively related to employees' energy. It would be interesting to examine the recovery potential of recovery activities during the working day in future DRM studies—in addition to the recovery potential of off-job activities.

Implications for Practice

Organizations could take a person-centered approach, where burnout levels of individual workers are periodically monitored. Organizations may then take actions for those employees who are relatively high in burnout to discontinue their work outside regular work hours. In fact, large organizations such as BMW, Volkswagen, and Goldman-Sachs have recently communicated to their employees to discontinue their work outside regular work hours.

Also, employers may support opportunities for nonwork activities that fit the employees' interests (sport-facilities, sociocultural events, etc.). Furthermore, organizations could start a vitality program aimed at keeping all employees fit and healthy. For example, a vitality program may include opportunities for employees to receive feedback on indicators of their general well-being (e.g., levels of burnout, engagement, workaholism, or happiness at work). Depending on differences in general well-being, vitality programs could be aimed at informing employees about the kind of off-job activities that contribute to their personal recovery. Moreover, employees themselves can be taught to keep a daily diary, based on the Day Reconstruction Methodology, where they become more aware of the kind of activities that contribute most to their personal daily recovery. For example, online tools have been recently developed that are helpful in reconstructing one's day in terms of activities and social interactions from waking up until bedtime. Moreover, online apps are now available where employees can answer questions and receive personalized feedback on their smartphone regarding their momentary levels of work-engagement, as well as important job demands and resources (Oerlemans & Bakker, 2013). Finally, as argued by Noblet and LaMontagne (2006), organizations could also change policies and implicit norms concerning unlimited availability and help employees to find a healthy work–life balance.

References

Ahola, K. (2007). *Occupational burnout and health*. Helsinki, Finland: Finnish Institute Occupational Health.

Ahola, K., Väänänen, A., Koskinen, A., Kouvonen, A., & Shirom, A. (2010). Burnout as a predictor of all-cause mortality among industrial employees: A 10-year prospective register-linkage study. *Journal of Psychosomatic Research, 69,* 51–57. doi:10.1016/j.jpsychores.2010.01.002

Åkerstedt, T., Fredlund, P., Gillberg, M., & Jansson, B. (2002). Work load and work hours in relation to disturbed sleep and fatigue in a large representative sample. *Journal of Psychosomatic Research, 53,* 585–588. doi:10.1016/S0022-3999(02)00447-6

Åkerstedt, T. (2006). Psychological stress and impaired sleep. *Scandinavian Journal of Work and Environmental Health, 32,* 493–501. doi:10.5271/sjweh.1054

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22,* 309–328. doi:10.1108/02683940710733115

Bakker, A. B., Demerouti, E., Oerlemans, W. G. M., & Sonnentag, S. (2013). Workaholism and daily recovery: A day reconstruction study of leisure activities. *Journal of Organizational Behavior, 34,* 87–107. doi:10.1002/job.1796

Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. (2008). Work engagement: An emerging concept in occupational health psychology. *Work & Stress, 22,* 187–200. doi:10.1080/02678370802393649

Beckers, D. J., Van der Linden, D., Smulders, P. G. W., Kompier, M. A. J., Taris, T. W., & Geurts, S. A. E. (2008). Voluntary or involuntary? Control over overtime and rewards for overtime in relation to fatigue and work-satisfaction. *Work & Stress, 22,* 33–50. doi:10.1080/02678370801984927

Beckers, D. G. J., Van Hooff, M. L. M., Van der Linden, D., Kompier, M. A. J., Taris, T. W., & Geurts, S. A. E. (2008). A diary study to open up the black box of overtime work among university faculty members. *Scandinavian Journal of Work and Environmental Health, 34,* 213–223. doi:10.5271/sjweh.1226

Cox, R. C. (2002). Exercise psychology. In R. C. Cox (Ed.), *Sports psychology, concepts and applications* (5th ed., pp. 366–389). Boston, MA: McGraw-Hill.

Demerouti, E. (2012). The spillover and crossover of resources among partners: The role of work–self and family–self facilitation. *Journal of Occupational Health Psychology, 17,* 184–195. doi:10.1037/a0026877

Demerouti, E., Bakker, A. B., Geurts, S. A. E., & Taris, T. W. (2009). Daily recovery from work-related effort during non-work time. In S. Sonnentag, P. Perrewe, & D. Ganster (Eds.), *Research in occupational stress and well being: Current perspectives on job-stress recovery* (Vol. 7, pp. 85–123). Bingley, UK: JAI Press. doi:10.1108/S1479-3555(2009)0000007006

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job-demands resources model of burnout. *Journal of Applied Psychology, 86,* 499–512. doi:10.1037/0021-9010.86.3.499

Demerouti, E., Le Blanc, P. M., Bakker, A. B., Schaufeli, W. B., & Hox, J. (2009). Present but sick: A three-wave study on job demands, presenteeism and burnout. *Career Development International, 14,* 50–68.

Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology, 15,* 209–222. doi:10.1037/a0019408

Dockray, S., Grant, N., Stone, A. A., Kahneman, D., Wardle, J., & Steptoe, A. (2010). A comparison of affect ratings obtained with ecological momentary assessment and the day reconstruction method. *Social Indicators Research, 99,* 269–283. doi:10.1007/s11205-010-9578-7

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods, 12,* 121–138. doi:10.1037/1082-989X.12.2.121

Feuerhahn, N., Sonnentag, S., & Woll, A. (2014). Exercise after work, psychological mediators, and affect: A day-level study. *European Journal of Work and Organizational Psychology, 23,* 62–79. doi:10.1080/1359432X.2012.709965.

Fritz, C., Lam, C. F., & Spreitzer, G. M. (2011). It's the little things that matter: An examination of knowledge workers' energy management. *The Academy of Management Perspectives, 25,* 28–39. doi:10.5465/AMP.2011.63886528

Grossman, A., Bouloux, P., Price, P., Drury, P. L., Lam, K. S., Turner, T., & Sutton, J. (1984). The role of opioid peptides in the hormonal responses to acute exercise in man. *Clinical Science, 67,* 483–491.

Härmä, M. (2006). Workhours in relation to work stress, recovery and health. *Scandinavian Journal of Work and Environmental Health, 32,* 502–514. doi:10.5271/sjweh.1055

Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology, 6,* 307–324. doi:10.1037/1089-2680.6.4.307

Hobfoll, S. E. (2011). Conservation of resource caravans and engaged settings. *Journal of Occupational and Organizational Psychology, 84,* 116–122. doi:10.1111/j.2044-8325.2010.02016.x

Iso-Ahola, S. (1997). A psychological analysis of leisure and health. In J. Haworth (Ed.), *Work, leisure and well-being* (pp. 131–144). London, UK: Routledge.

Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science, 306,* 1776–1780. doi:10.1126/science.1103572

Kant, I. J., Bültmann, U., Schröer, K. A. P., Beurskens, A. J. H. M., Van Amelsvoort, L. G. P. M., & Swaen, G. M. H. (2003). An epidemiological approach to study fatigue in the working population: The Maastricht Cohort Study. *Occupational and Environmental Medicine, 60,* 32–39. doi:10.1136/oem.60.suppl_1.i32

Kurby, C. A., & Zacks, J. M. (2008). Segmentation in the perception and memory of events. *Trends in Cognitive Sciences, 12,* 72–79. doi:10.1016/j.tics.2007.11.004

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology, 52,* 397–422. doi:10.1146/annurev.psych.52.1.397

Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. Drenth, H. Thierry, & C. J. de Wolff (Eds.), *Handbook of work and organizational psychology* (2nd ed., pp. 5–33). Hove, UK: Psychology Press.

Muthén, L. K., & Muthén, B. O. (1998–2006). Mplus [Computer software]. Los Angeles, CA.

Noblet, A., & LaMontagne, A. D. (2006). The role of workplace health promotion in addressing job stress. *Health Promotion International, 21,* 346–353. doi:10.1093/heapro/dal029

Oerlemans, W. G. M., & Bakker, A. B. (2013). Capturing the moment in the workplace: Two methods to study momentary subjective well-being. In A. B. Bakker (Ed.), *Advances in positive organizational psychology* (Vol. 1; pp. 329–346). Bingley, UK: Emerald.

Oerlemans, W. G. M., Bakker, A. B., & Demerouti, E. (2014). How feeling happy during off-job activities helps successful recovery from work: A day reconstruction study. *Work & Stress*. Advance online publication. doi:10.1080/02678373.2014.901993

Peterson, U., Demerouti, E., Bergström, G., Asberg, M., & Nygren, A. (2008). Work characteristics and sickness absence in burnout and non-burnout groups: A study of Swedish health care workers. *International Journal of Stress Management, 15,* 153–172. doi:10.1037/1072-5245.15.2.153

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88,* 879–903. doi:10.1037/0021-9010.88.5.879

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31,* 437–448. doi:10.3102/10769986031004437

Robert, J., & Hockey, G. (1997). Compensatory control in the regulation of human performance under stress and high workload: A cognitive–energetical framework. *Biological Psychology, 45,* 73–93. doi:10.1016/S0301-0511(96)05223-4

Rook, J., & Zijlstra, F. (2006). The contribution of various types of activities to recovery. *European Journal of Work and Organizational Psychology, 15,* 218–240. doi:10.1080/13594320500513962

Ryan, R. M., & Deci, E. L. (2008). From ego depletion to vitality: Theory of findings concerning the facilitation of energy available to the self. *Social and Personality Psychology Compass, 2,* 702–717. doi:10.1111/j.1751-9004.2008.00098.x

Schaufeli, W., & Buunk, B. P. (2003). Burnout: An overview of 25 years of research and theorizing. In M. J. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), *Handbook of work and health psychology* (pp. 383–425). Chichester, UK: Wiley.

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

Sonnenschein, M., Sorbi, M. J., Van Doornen, L. P., Schaufeli, W. B., & Maas, C. J. M. (2007). Evidence that impaired sleep recovery may complicate burnout improvement independently of depressive mood. *Journal of Psychosomatic Research, 62,* 487–494. doi:10.1016/j.jpsychores.2006.11.011

Sonnentag, S. (2001). Work, recovery activities, and individual well-being: A diary study. *Journal of Occupational Health Psychology, 6,* 196–210. doi:10.1037/1076-8998.6.3.196

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between nonwork and work. *Journal of Applied Psychology, 88,* 518–528.

Sonnentag, S. (2012). Psychological detachment from work during leisure time: The benefits of mentally disengaging from work. *Current Directions in Psychological Science, 21,* 114–118. doi:10.1177/0963721411434979

Sonnentag, S., & Bayer, U. V. (2005). Switching off mentally: Predictors and consequences of psychological detachment from work during off-job time. *Journal of Occupational Health Psychology, 10,* 393–414. doi:10.1037/1076-8998.10.4.393

Sonnentag, S., & Natter, E. (2004). Flight attendants' daily recovery from work: Is there no place like home? *International Journal of Stress Management, 11,* 366–391. doi:10.1037/1072-5245.11.4.366

Sonnentag, S., & Zijlstra, F. R. H. (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology, 91,* 330–350. doi:10.1037/0021-9010.91.2.330

Ten Brummelhuis, L. L., & Bakker, A. B. (2012). A resource perspective on the work-home interface: The work-home resources model. *American Psychologist, 67,* 545–556. doi:10.1037/a0027974

Toker, S., & Biron, M. (2012). Job burnout and depression: Unraveling their temporal relationships and considering the role of physical activity. *Journal of Applied Psychology, 97,* 699–710. doi:10.1037/a0026914

Toppinen-Tanner, S., Ahola, K., Koskinen, A., & Väänänen, A. (2009). Burnout predicts hospitalization for mental and cardiovascular disorders:

10-year prospective results from industrial sector. *Stress and Health, 25,* 287–296. doi:10.1002/smi.1282

Trougakos, J. P., Beal, D. J., Green, S. G., & Weiss, H. M. (2008). Making the break count: An episodic examination of recovery activities, emotional experiences, and positive affective displays. *Academy of Management Journal, 51,* 131–146. doi:10.5465/AMJ.2008.30764063

Van der Linden, D., Keijsers, G., Eling, P., & Van Schaijk, R. (2005). Work stress and attentional deficits: An initial study on burnout and cognitive failures. *Work & Stress, 19,* 23–36.

Van Hooff, M., Geurts, S. A. E., Beckers, D. G. J., & Kompier, M. A. J. (2011). Daily recovery from work: The role of activities, effort and pleasure. *Work & Stress, 25,* 55–74. doi:10.1080/02678373.2011.570941

Received October 22, 2013
Revision received April 7, 2014
Accepted April 8, 2014 ■