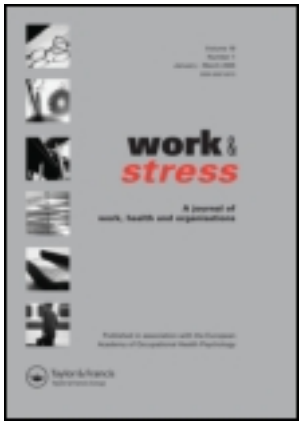

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How feeling happy during off-job activities helps successful recovery from work: A day reconstruction study

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How feeling happy during off-job activities helps successful recovery from work: A day reconstruction study

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This diary study builds on the effort-recovery and broaden-and-build theories to examine whether the subjective experience of off-job activities (work-related, household, social, physical, low-effort) matters for an individual's daily recovery from work. It was hypothesized that momentary happiness experienced during off-job activities stops the prolongation of load reactions from work-related effort, and builds personal resources that benefit daily recovery from work. Using a day reconstruction method, 384 participants recruited via a Dutch website reconstructed their time spent on, and happiness during, off-job activities, and their daily recovery on workdays over a two-week period. Results of hierarchical linear modelling showed that work-related and household activities during off-job time were negatively associated with recovery at bedtime when happiness during such activities was low, but not when happiness was high. Social and physical activities were associated positively with recovery when happiness during such activities was high, but negatively when happiness was low, indicating that such activities only aid recovery when they are enjoyed. The findings expand knowledge on recovery by showing that it is not just the time spent on off-work activities but the subjective experience of such activities that plays a pivotal role in the way they are linked to recovery.

Keywords: broaden-and-build theory; day reconstruction method; happiness; recovery from work; diary study

Introduction

Daily recovery from work appears to be crucial to maintain a high level of well-being (Demerouti, Bakker, Geurts, & Taris, 2009) and performance (Binnewies, Sonnentag, & Mojza, 2009). Based on the Effort Recovery (E-R; Meijman & Mulder, 1998) and the Conservation of Resources theories (COR; Hobfoll, 1998, 2002), authors suggested that specific types of off-job activities may be harmful (e.g. work during off-job time, household activities), whereas other activities may enhance employee recovery (e.g. social, physical and low-effort activities; Demerouti et al., 2009; Sonnentag, 2001). However, other

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research has found that similar types of recovery activities (e.g. social activities) after work sometimes have a beneficial effect, no effect or even a detrimental effect on daily recovery (Demerouti et al., 2009). We therefore suggest that the subjective experience of the extent to which off-job activities are enjoyable can increase our understanding in how such activities may or may not contribute to daily recovery (see also, Beckers et al., 2008; Demerouti et al., 2009).

The central aim of this study was to extend knowledge by examining the qualifying role of momentary happiness – defined as a positive momentary state during off-job activities – in the relationship between the time employees spent on specific off-job activities after work and daily recovery from work. A within-person design – the Day Reconstruction Method (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004) – was used as an ecologically valid method to capture daily recovery from work and intrapersonal fluctuations in time spent on, and happiness experienced during, off-job activities on working days over a two-week period.

Off-job activities and daily recovery

Recovery from work is defined as the process during which an individual's functioning returns to its pre-stressor level and work-related strain is reduced (e.g. Sonnentag & Natter, 2004). According to Effort-Recovery theory (E-R; Meijman & Mulder, 1998) a key element for optimally recovering from work is the avoidance of acute load reactions (e.g. accelerated heart rate, elevated blood pressure levels, stress) that employees already experienced during the workday. Moreover, according to the Conservation of Resources theory (COR; Hobfoll, 1998, 2002), another important element that facilitates optimal recovery is the restoration of personal resources such as vigour and self-esteem that are lost when engaging in work-related effort (Demerouti et al., 2009).

Off-job time (e.g. free evenings, weekends or holidays) temporarily relieves employees from their work-related efforts (Meijman & Mulder, 1998) and offers the opportunity to engage in different types of activities. However, empirical evidence is mixed on what kind of off-job activities lead to a better recovery (for an overview, read Demerouti et al., 2009). For example, *social activities* (e.g. spending time with friends and family) would enhance recovery because they provide opportunities for social support. Social support is an important resource that has been found to reduce the negative influence of job demands on psychological well-being (Bakker, Demerouti, & Euwema, 2005). Moreover, social activities draw on resources other than those that are used up during the workday, allowing for a restoration of work-related resources. However, empirical findings have shown that time spent on social activities can have positive (Sonnentag & Zijlstra, 2006), but also negative, consequences for daily recovery (Sonnentag & Natter, 2004). Demerouti et al. (2009) therefore suggested that future research on daily recovery should take into account the affective experiences that individuals derive from their off-job activities in addition to time spent on such activities. Also, Sonnentag and Fritz (2007) used the term recovery experiences to characterize attributes associated with off-job activities contributing to recovery. These recovery experiences comprise experiences such as psychological detachment from work, relaxation and the experience of mastery. For example, Sonnentag, Binnewies, and Mojza (2008) demonstrated in a daily survey among 166 public administration employees that mastery experiences in the

evening predicted positive activation in the next morning, whereas relaxation during the evening predicted next morning's serenity.

Building on the notion that subjective experiences may play an important role in subsequent recovery states, the current study examined happiness as a momentary positive emotional experience during off-job activities, and its link to daily recovery. We acknowledge that happiness can be defined in a broader sense, as a form of psychological well-being that relates to how persons evaluate their lives as a whole (Diener, Sandvik, & Pavot, 1991). This appraisal may take the form of cognitions (i.e. when a person performs a conscious evaluative judgement about his or her satisfaction with life) or the form of affect (i.e. when people experience unpleasant or pleasant emotions in response to everyday life). In the present study, we concentrate on the latter definition of happiness, as a pleasurable and mildly activated momentary state (Russell, 1980, 2003) that people may experience during specific off-job activities after work.

Happiness during off-job activities

The experience of momentary happiness during off-job activities may be important for daily recovery in two ways. First, the Broaden-and-Build (B&B) theory of positive emotions states that positive emotions can loosen the hold of a negative emotion on a persons' mind and body by undoing the preparation for a specific action (B&B; Fredrickson, 1998, 2001). B&B theory holds that negative and positive emotions are fundamentally incompatible because they are built upon the same "thought-action repertoire". The experience of positive emotions, then, should speed recovery because positive emotions should "undo" the lingering after-effects of negative emotions such as the acute load reactions experienced from work-related effort. For example, Fredrickson et al. (Fredrickson, Mancuso, Branigan, & Tugade, 2000) showed that individuals who had first watched a video clip inducing high arousal negative emotions showed a faster cardiovascular recovery after watching a second video clip that induced joy, as compared to clips that induced neutrality or sadness. Similar effects were reported in other studies (Block & Kremen, 1996; Tugade & Fredrickson, 2004).

Second, positive emotions share the capacity to build more enduring personal resources (e.g. psychological, physical and social resources), through a broadened thought-action repertoire, leading to enhanced well-being (Fredrickson, 2001). For example, "joy" creates the urge to play, be creative and push limits; these are urges that are evident in social, physical, intellectual and artistic behaviour. The "build" hypothesis is relevant from a COR perspective, which suggests that personal resources that are lost during the workday (e.g. vigour, self-esteem) need to be restored in order to optimally recover from work. In addition to a positive emotional state, the type of activity pursued also appears to matter for the acquisition of different types of resources. For instance, Waterman (2005) showed that when activities are highly enjoyed, high-effort activities (e.g. athletic activities) were more strongly associated with greater levels of interest, flow experiences, personal expressiveness, self-realization values and self-ascribed importance as compared to low-effort activities (e.g. watching TV).

Happiness during off-job activities as a moderator

In the current study, five different types of off-job activities are examined that have been identified as either hampering or facilitating recovery on a daily basis (Sonnentag, 2001,

2003; Sonnentag & Zijlstra, 2006), namely work-related activities, household activities, social activities, physical activities and low-effort activities. Specifically, the continuation of *work-related activities* in off-job time would draw on resources that are already used up during the workday. Moreover, the continuation of work in off-job time would prolong load reactions from work-related effort, resulting in a poorer recovery. Yet, empirical evidence has provided only limited support for the notion that engaging in work-related activities in off-job time results in a poorer recovery (Beckers et al., 2008; Sonnentag, 2001).

We suggest that the subjective experience of work-related activities as enjoyable may buffer the negative consequences of time spent on such activities for daily recovery in two ways. First, it is unlikely that individuals experience prolonged load reactions when they are happily engrossed in their work (van Hooff, Geurts, Beckers, & Kompier, 2011). Second, the subjective experience of happiness results in a broader thought-action repertoire that allows employees, for instance, to be more creative or better cope with work-related challenges (e.g. Fredrickson, 2001), leading to enhanced recovery levels as compared to employees who feel neutral or sad. Thus, we hypothesize that:

> *Hypothesis 1:* Time spent on work-related activities in off-job time on working days will be negatively associated with daily recovery before sleep when happiness during work-related activities is low, but not when happiness is high.

Next, *household activities* (household finances, grocery shopping, cooking) are generally described as harmful for one's recovery. One reason is that household activities require physical and physiological effort to perform them when individuals are already fatigued after a workday, resulting in a prolongation of load reactions. Another aspect is that household activities would be non self-concordant (Ryan & Deci, 2006), meaning that people engage in them because they "have to" rather than because they "want to". However, the suggested detrimental effect of household activities on recovery has not been confirmed empirically (e.g. Sonnentag, 2001; Sonnentag & Bayer, 2005). One explanation may be that the assumption of household activities as "have to" activities is wrong. Thus, individuals may like to engage in household activities (e.g. cooking, cleaning). For instance, cooking can also be a hobby for people, or provide a distraction from worrying about daily hassles in the workplace. When household activities are experienced as enjoyable, load reactions should diminish, resulting in a faster recovery. Therefore, we hypothesize that:

> *Hypothesis 2:* Time spent on household activities in off-job time on a working day will be negatively associated with daily recovery before sleep when happiness during household activities is low, but not when happiness is high.

Social activities (e.g. spending time with friends and family) would enhance recovery because they provide opportunities for social support. Social support is an important resource that has been found to reduce the negative influence of job demands on psychological well-being (Bakker et al., 2005). Moreover, social activities draw on other resources than those that are used up during the workday, allowing for a restoration of work-related resources. Empirical findings indicated that time spent on social activities may have positive (Sonnentag & Zijlstra, 2006), but also negative consequences for daily recovery (Sonnentag & Natter, 2004). One explanation is that the subjective experience of social activities as enjoyable matters for the acquisition of personal resources. For

example, individuals who feel happy during social events receive more social support from others (Lyubomirsky, King, & Diener, 2005). We therefore hypothesize that:

Hypothesis 3: Time spent on social activities in off-job time on working days will be positively associated with recovery before sleep when happiness during social activities is high, but not when happiness is low.

Physical activities (such as exercise and sports) would enhance recovery from work because they bring about a sense of mastery that would enhance well-being (Sonnentag, 2001; Waterman, 2005). Also, physical activities may provide a "time out" from worrisome thoughts and daily stressors (e.g. Yeung, 1996). Research has indeed consistently shown a positive relationship between physical activities in off-job time and recovery at bedtime (Sonnentag, 2001; Sonnentag & Bayer, 2005; Sonnentag & Natter, 2004). Still, the subjective experience of such activities as enjoyable may moderate the association between time spent on physical activities and daily recovery. For instance, physical activity is associated with the production of hormones (e.g. dopamine, serotonin) in the pleasure centre of the brain that may regulate feelings of stress (Esh & Stefano, 2004), which would promote recovery. Therefore, the degree to which time spent on exercise or sport during off-job time is enjoyed can be associated with the degree to which employees recover from work. Therefore, we hypothesize that:

Hypothesis 4: Time spent on physical activities in off-job time on working days will be positively associated with daily recovery before sleep when happiness during physical activities is high, but not when happiness is low.

Low-effort activities represent passive activities (such as watching TV or taking a bath) that by definition put almost no demands on the individual and will therefore pose no demands on psychobiological systems (Sonnentag, 2001; Sonnentag & Zijlstra, 2006). Moreover, low-effort activities have a recovery potential because they do not occupy resources that are required to accomplish work tasks (Sonnentag, 2001). Yet, empirical evidence has shown mixed findings. Sonnentag (2001) found a positive relationship between low-effort activities and well-being at bedtime. However, other studies have shown no significant associations between low-effort activities and recovery at bedtime (Sonnentag & Natter, 2004; Rook & Zijlstra, 2006). As low-effort activities are unlikely to create additional resources beyond pleasure (Waterman, 2005), the extent to which low-effort activities are enjoyed may determine the degree to which such activities lead to enhanced recovery. We therefore hypothesize that:

Hypothesis 5: Time spent on low-effort activities in off-job time will be positively associated with daily recovery before sleep when happiness during low-effort activities is high, but not when happiness is low.

Method

Procedure

Over a period of six months, participants were recruited via a general informational website for a university in the Netherlands that provided information on occupational health and well-being. On this website, which was independent of the present study,

individuals had already filled out background questions to set up a personal profile. This profile consisted of socio-demographic variables, including age, gender, educational level, trait happiness and employment details (e.g. job or no job, and average weekly work hours). Employed individuals that had already filled out a profile on the general informational website were approached via social media or e-mail to participate in this online diary study. Upon their agreement, participants created a unique name and password which allowed them access to the online diary.

Over a period of two consecutive weeks, participants received daily reminders via e-mail (sent daily on workdays at 6:00 a.m.) to fill out the diary before going to work, with a hyperlink to the online diary which employed a Day Reconstruction Method (DRM; Kahneman et al., 2004). The DRM asks participants to chronologically reconstruct the preceding day ("yesterday") into episodes. A particular episode is operationalized by the time an activity began and ended, the domain where such an activity took place (e.g. at home or at work), and also social interactions that may have occurred during such episodes. After carefully reconstructing all episodes of a particular day, participants are asked to indicate their momentary experiences for each episode. The DRM facilitates access to encoded episodic experiences by asking individuals about specific episodes, including start and end times, which occurred in the recent past (e.g. Kurby & Zacks, 2008).

In particular, participants first indicated in chronological order their activities of the preceding day, by filling out the approximate times at which an activity began and ended. Next, the selected activities were presented in a chronological order and participants were asked to rate how happy they had felt during each activity. Thereafter, participants answered questions about their daily recovery before going to sleep during that day. The online diary was programmed such that participants could only fill out the diary once per day. Upon completing the diary, the date was automatically stored in the database. Note that analyses are based on workdays only, in order to concentrate on the kind of activities that hinder or enhance day-to-day recovery on workdays.

Participants and response rate

A total of 2379 individuals filled out a personal profile on the general website that provided information on occupational health and well-being. From this population, employed individuals ($N = 1816$) were asked via e-mail to participate in the online diary study. A total of 562 participants (31% of the employed individuals) decided to participate and filled out the diary at least once. In the final study sample, we included participants who filled out the diary on 5 workdays or more. In total, 384 participants met this criterion. The average number of diaries filled out in the study sample per participant was 7 ($SD = 1.9$), and ranged from 5 to 10.

The mean age of the participants in the study sample was 41 years ($SD = 13.4$), and 68% were female. Regarding level of education, 2% finished primary school, 12% finished lower secondary education, 31% finished higher secondary education, 35% finished a professional education, and 20% held a bachelors or master's degree. Also, 79% of the respondents worked more than 30 hours per week on average (i.e. in response to the question in the trait questionnaire: "How many hours per week do you usually work?").

A comparison between the study sample ($N = 384$) and the total sample of employed individuals who did not participate in the online study ($N = 1816$) showed no significant differences with regard to age ($F = 0.51$, *n.s.*), weekly work hours ($F = 2.52$, *n.s.*), and trait happiness ($F = 1.81$, *n.s.*). However, the study sample differed significantly from the total sample of employed individuals in terms of educational level ($F = 13.90$, $p < .001$), gender (Pearson $\chi^2 = 0.02$), and number of days worked ($F = 5.29$, $p < .05$). The study sample was slightly more highly educated ($M = 5.01$ vs. $M = 4.59$), had a slightly lower average number of weekly workdays ($M = 3.95$ vs. $M = 4.17$) and a higher percentage of females (73% vs. 66%). Moreover, we compared the study sample with the sample of individuals who did participate in the online study, but filled out the diary on only 4 days or less. Analyses of variance did not reveal significant differences ($p < .05$) in age ($F = 0.12$, *n.s.*), gender (Pearson $\chi^2 = 0.11$, *n.s.*), educational level ($F = 1.88$, *n.s.*), weekly work hours ($F = 0.53$, *n.s.*), number of days worked ($F = 0.51$, *n.s.*), trait happiness ($F = 0.03$, *n.s.*), and diary outcomes such as happiness reported during off-work activities ($F = 0.04$, *n.s.*), and daily recovery from work ($F = 1.50$, *n.s.*).

Measures

Daily off-job activities. Based on the work of Sonnentag (Sonnentag, 2001; Sonnentag & Zijlstra, 2006) the online diary included main activity categories for (i) work-related activities, for instance, finishing or preparing work duties; (ii) household activities, for example, cooking, household finances, doing dishes and grocery shopping; (iii) social activities, for example, meeting with family, friends and telephone conversations; (iv) physical activities, for example, sports, cycling and hiking; (v) low-effort activities, for example, watching TV, relaxing on the sofa and doing nothing; and (vi) other types of activities that participants could describe for themselves. Participants reported their daily off-job activities on 2558 workdays. Participants reported on average 4 off-job activities per day ($SD = 1.53$). In total, 25% of the activities were job-related, 25% household, 10% social, 11% physical and 30% low-effort activities. Other activities (8%) included commuting, eating, personal care, hygiene or other types. These activities were not further analyzed.

Momentary happiness during off-job activities was rated with one item for each reported activity using a "faces scale" that ranged from 0 (*extremely unhappy*) up to 10 (*extremely happy*). The item specifically asked: "How happy did you feel during this activity?". Note that single-item measures are commonly used in day reconstruction studies (e.g. Dockray et al., 2010; Stone, Shiffman, Atienza, & Nebeling, 2007). This measure is similar to the displeasure-pleasure continuum as proposed in the circumplex model of affect (Russell, 1980, 2003). In the analyses, we included the momentary happiness scores for each of the reported activity categories. Over 95% of the rated happiness scores varied from neutral to extremely happy.

Daily recovery before sleep was assessed with three items that were slightly adapted from the measure of Sonnentag (2003), being "Before going to sleep I felt recovered", "Before going to sleep, I felt rested" and "Before going to sleep I felt I had had enough time to recover from my workday". Items were answered on a seven-point Likert scale ranging from 1 (*don't agree at all*), to 7 (*totally agree*). Cronbach's α varied between .87 and .96 depending on the day, indicating good reliabilities.

Control variables. At the between-person level, we controlled for demographics (age, gender and educational level) and trait happiness as an indicator for enduring well-being, as is common in diary studies on daily recovery (e.g. Mojza, Binnewies, & Sonnentag, 2010; Sonnentag, 2001). Trait happiness was measured with a one-item question: "How happy did you feel during the past month?". Individuals answered this question using a faces scale ranging from 0 (*extremely unhappy*) to 10 (*extremely happy*). Past research has indicated that both demographics and trait happiness may be associated with (daily) subjective well-being (e.g. Sonnentag, 2003; Sluiter, De Croon, Meijman, & Frings-Dresen, 2003). At the within-person level, we corrected for day of the week, the lagged effect of the previous day's recovery, the time spent at work and the happiness experienced at work during regular work hours. Time factors (e.g. daily work hours) may influence subsequent recovery experiences (Mojza et al., 2010), and previous affective experiences of work events are considered to influence behaviours and attitudes both at work and in the family domain (Ilies et al., 2007). Moreover, we added the lagged effect of daily recovery in order to analyze whether time spent and happiness during off-job activities would contribute to daily recovery from work above and beyond the baseline recovery of the previous day.

Analysis strategy

The data had a hierarchical structure with days nested within persons. Therefore, we used hierarchical linear modelling to analyze the data. Time spent on, and happiness derived from, activities were centred at the person mean, so that scores reflected intra-individual (daily) differences. We tested the improvement of each multi-level model over the previous one by computing the differences of the respective log-likelihood statistic −2*log and submitting this difference to a chi squared (χ^2) test. Please note that only workdays were included in the analyses to assess daily recovery from work.

Results

Descriptive statistics

Table 1 reports means, standard deviations and zero-order correlations of the study variables. Hierarchical Linear Modelling (HLM) was used to test if daily recovery at bedtime showed significant variations on a day-to-day level. The intra-class correlations of a two-level HLM (null) model indeed showed that 46% of the total variance for daily recovery resided at the within-person (day) level, indicating that daily recovery fluctuates substantially on a within-person and day-to-day level.

Testing the hypotheses

Table 2 shows results of the HLM analyses of three nested Models. Model 1 included the between-person control variables (age, gender, educational level, trait happiness) as well as the within-person control variables (day of the week, time spent at work during the day, happiness felt at work during the day and the lagged effect of the previous day's recovery). Results showed that trait happiness, happiness derived from work during daytime and the lagged effect of previous day's recovery, were all significantly and positively related to daily recovery from work at bedtime. Next, Model 2 shows the main

Table 1. Means, standard deviations and correlations between the study variables (N = 384 employees, and 2558 days).

	Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Age	41.37	13.44	–																
2.	Gender (0 = male, 1 = female)	0.68	0.46	−.02	–															
3.	Educational level	4.87	1.81	−.10	−.03	–														
4.	Trait happiness	6.82	2.25	−.02	−.10	.09	–													
5.	Time spent at work during daytime	6:20	2:42	−.16	.01	.17	.05	–	.12	−.21	−.36	−.13	−.36	−.03	−.16	−.02	−.17	−.02	−.02	−.02
6.	Time work-related activities[a]	1:18	1:20	−.02	−.02	.08	.00	.12	–	−.05	−.05	−.01	−.02	−.05	.12	.02	.06	.08	.18	.07
7.	Time household activities[a]	1:01	0:42	.10	.13	−.01	−.06	−.13	−.01	–	−.09	−.02	.02	−.01	−.01	.03	.02	−.05	−.12	.06
8.	Time social activities[a]	1:49	1:26	−.18	.05	.15	−.01	.38	.05	.01	–	.13	.03	−.05	−.05	.02	−.09	−.03	.15	−.03
9.	Time physical activities[a]	1:17	0:46	.08	.06	.05	.03	−.06	.04	.08	.03	–	.04	−.03	−.01	−.11	.07	.04	.04	−.04
10.	Time low-effort activities[a]	1:32	1:20	.00	.05	.04	−.07	−.15	.00	.15	.09	.07	–	.07	−.05	−.01	.15	.11	.04	.01
11.	Happiness at work during daytime	7.69	1.52	.11	−.02	.08	.47	−.04	.04	.00	−.01	.08	.01	–	.03	.21	.23	.19	−.20	.23
12.	Happiness work-related activities	7.21	2.06	.05	−.01	.02	.51	.01	.02	−.10	.01	−.04	−.13	.55	–	.26	.20	.20	−.18	.24
13.	Happiness household activities	6.44	1.48	.04	−.01	.06	.42	.02	.02	.05	.10	.11	.04	.40	.09	–	.04	.19	.12	.17
14.	Happiness social activities	7.87	1.46	.08	−.01	.08	.43	−.03	.02	.08	.04	.12	.09	.43	.06	.36	–	.18	.34	.13
15.	Happiness physical activities	7.57	1.44	.01	.00	.02	.55	.01	−.01	.13	.01	.18	−.02	.49	.06	.31	.46	–	.28	.25
16.	Happiness low-effort activities	7.22	1.34	−.06	−.02	−.03	.50	.06	.02	.01	.11	.00	.01	.42	.38	.31	.47	.49	–	.11
17.	Daily Recovery before sleep	4.18	0.18	.16	−.10	.06	.12	.03	−.02	−.08	.02	.06	.09	.32	.32	.35	.34	.40	.34	–

Note: Correlations below the diagonal are grand-mean centered correlations (N = 384 employees) with correlations $r \geq .12$ being significant at $p < .05$ and $r \geq .15$ being significant at $p < .01$. Correlations above the diagonal are person-centered correlations (N = 2558 days) with correlations $r \geq .08$ being significant at $p < .05$ and $r \geq .12$ being significant at $p < .01$. Time = time spent on activity. Happiness = happiness during activity.

[a]Means and standard deviations for time are reported in an hour:minute format, and are based on individuals who spent at least five or more minutes on a specific activity category.

Table 2. Multilevel estimates for models predicting changes in recovery before sleep on workdays (N = 384 employees, and 2558 days).

	Model 1			Model 2			Model 3		
	Est	*SE*	*t*	Est	*SE*	*t*	Est	*SE*	*t*
Constant	4.492	0.211	21.29***	4.450	0.212	20.99***	3.396	0.270	12.58***
Age	−0.006	0.007	−0.86	−0.006	0.007	−0.86	−0.002	0.007	−0.29
Female (1 = female, 0 = male)	−0.194	0.182	−1.07	−0.219	0.184	−1.19	−0.161	0.172	−0.94
Educational level	−0.021	0.047	−0.45	−0.026	0.047	−0.55	0.006	0.045	0.13
Trait happiness	0.116	0.032	3.63***	0.118	0.032	3.69***	0.083	0.030	2.77**
Monday (reference = Wednesday)	0.016	0.199	0.08	−0.034	0.202	−0.17	−0.051	0.194	−0.26
Tuesday	−0.116	0.203	−0.57	−0.128	0.204	−0.63	−0.149	0.199	−0.75
Thursday	−0.054	0.224	−0.24	−0.059	0.224	−0.26	−0.154	0.217	−0.71
Friday	0.282	0.241	1.17	0.277	0.242	1.14	0.232	0.233	1.00
Time worked during the day	−0.057	0.033	−1.73	−0.089	0.124	−0.72	0.001	0.121	0.01
Happiness derived from work during the day	0.059	0.029	2.03*	0.035	0.058	0.60	0.011	0.056	0.20
Recovery previous day (lagged effect)	0.331	0.046	7.20***	0.349	0.046	7.59***	0.298	0.045	6.62***
Time work-related activities				−0.056	0.035	−1.60	−0.186	0.060	−3.10***
Time household activities				−0.073	0.075	−0.97	−0.466	0.185	−2.52**
Time social activities				−0.007	0.022	−0.32	−0.057	0.041	−1.39
Time physical activities				−0.254	0.224	−1.13	−0.283	0.626	−0.45
Time low-effort activities				−0.184	0.172	−1.07	−0.146	0.205	−0.71
Happiness work-related activities				0.060	0.035	1.71	0.046	0.031	1.48
Happiness household activities				0.026	0.027	0.96	0.054	0.029	1.86
Happiness social activities				−0.016	0.023	−0.70	0.041	0.036	1.14

Table 2 (*Continued*)

	Model 1			Model 2			Model 3		
	Est	*SE*	*t*	Est	*SE*	*t*	Est	*SE*	*t*
Happiness physical activities				0.072	0.045	1.60	0.080	0.044	1.82
Happiness low-effort activities				−0.006	0.039	−0.15	−0.006	0.041	−0.15
Time × happiness work-related activities							0.038	0.011	3.45***
Time × happiness household activities							0.076	0.031	2.45**
Time × happiness social activities							0.046	0.012	3.83***
Time × happiness physical activities							0.257	0.083	3.10**
Time × happiness low-effort activities							0.023	0.043	0.53
−2*log (lh)		1474.368			1466.337			1426.375	
Diff-2*log		866.443***			8.031			39.962***	
Df		12			10			5	
Between- person variance, Level 2 (with *SE*)		0.797 (0.183)			0.725 (0.178)			0.727 (0.155)	
Within-person variance, Level 1 (with *SE*)		1.242 (0.145)			1.258 (0.146)			1.208 (0.142)	

Note: Est = estimate; *SE* = standard error; *t* = *t*-value. Model 1 was compared with a null model with the intercept as the only predictor ($\gamma = 4.125$; $SE = 0.073$; $t = 56.493$; −2*log = 3317.369; Level 2 variance = 1.444; $SE = 0.197$; Level 1 variance = 1.214; $SE = 0.132$). Time = time spent on activity. Happiness = happiness during activity.
*$p < .05$; **$p < .01$; ***$p < .001$.

effects for time spent on off-job activities and the happiness derived from these activities. Interestingly, the results for Model 2 revealed no significant main effects of time spent and happiness derived from off-job activities on daily recovery. As shown in Table 2, Model 3 included the five interaction terms regarding the time spent at work during the day and momentary happiness during the off-job period, derived from the five categories of off-job activities (i.e. work-related, household, social, physical and low-effort) on daily recovery from work. The results showed that four out of five interaction terms (with the exception of low-effort activities) were significantly related to daily recovery from work. To get more insight into the nature of the five interaction effects, simple slope tests for interaction effects in HLM models were calculated, as proposed by Preacher, Curran, and Bauer (2006).

First, we hypothesized that momentary happiness would buffer negative relationships between daily off-job time spent on work-related or household activities and daily recovery at bedtime (Hypotheses 1 and 2). As demonstrated in Figure 1, simple slope tests revealed that on days when employees spent more of their off-job time on work-related activities (at least one standard deviation above the mean), they felt significantly less recovered at bedtime when momentary happiness during such activities was low (one *SD* below the mean; $\gamma = -0.397$, $SE = 0.203$, $z = -1.97$, $p < .05$). However, employees did not experience a significant decline in daily recovery at bedtime when momentary happiness during work-related activities was high (one *SD* or more above the mean; $\gamma = -0.127$, $SE = 0.193$, $z = 0.65$, *ns*). Similarly, on days when individuals spent more time on household activities, they felt less recovered when momentary happiness was low (one *SD* below the mean; $\gamma = -0.439$, $SE = 0.063$, $z = -6.94$, $p < .001$), but they did not feel significantly less recovered when happiness was high (one *SD* above the mean; $\gamma = -0.243$, $SE = 0.127$, $z = -1.92$, *ns*). Hence, these results confirmed Hypotheses 1 and 2.

Next, it was hypothesized that momentary happiness would moderate relationships between daily off-job time spent on leisure activities (social, physical, low-effort) and

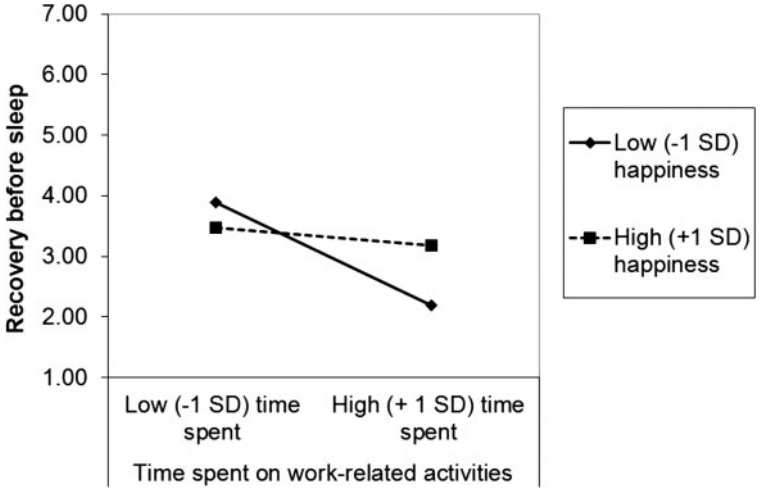

Figure 1. Interaction effect of time spent on work-related activities and happiness derived from work-related activities during off-job time.
Note: −1 *SD* = 1 standard deviation or more below the mean; +1 *SD* = 1 standard deviation or more above the mean.

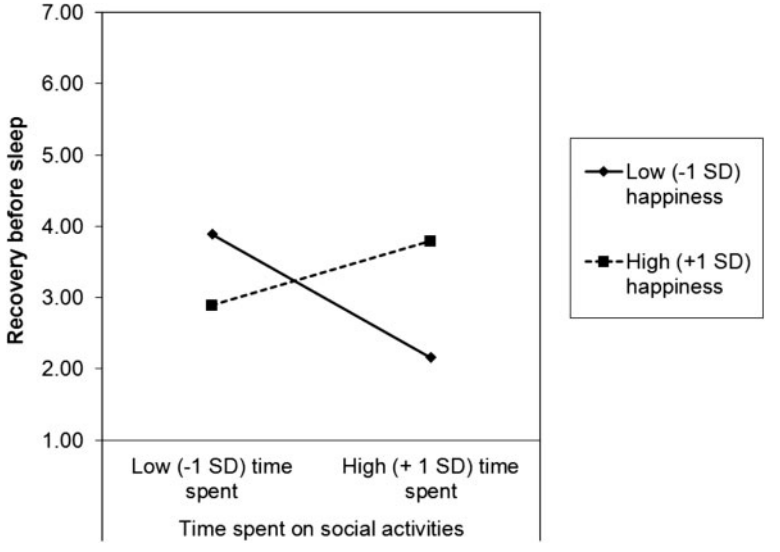

Figure 2. Interaction effect of time spent on social activities and happiness derived from social activities during off-job time.
Note: −1 *SD* = 1 standard deviation or more below the mean; +1 *SD* = 1 standard deviation or more above the mean.

daily recovery at bedtime (Hypotheses 3, 4 and 5). As shown in Figure 2, simple slope tests revealed that on days where individuals spent more time on social activities (one *SD* above the mean), individuals felt more recovered when also experiencing high momentary happiness during such activities (one *SD* above the mean; $\gamma = 0.432$, $SE = 0.176$, $z = 2.45$, $p < .05$). In contrast, when individuals experienced low momentary happiness during those activities, more time spent on social activities led to a significantly lower daily recovery at bedtime (one *SD* below the mean; $\gamma = -0.088$, $SE = 0.032$, $z = -2.78$, $p < .01$). Similar effects were found for physical activities. On days when individuals spent more time on physical activities, they felt more recovered when the experience of happiness during such activities was high (one *SD* above the mean; $\gamma = 1.615$, $SE = 0.664$, $z = 2.43$, $p < .05$). However, when individuals experienced low momentary happiness when spending off-job time on physical activities, they felt significantly less recovered at bedtime (one *SD* below the mean; $\gamma = -0.455$, $SE = 0.190$, $z = -2.40$, $p < .05$). No significant interaction effect was found for low-effort activities. To summarize, the results confirmed Hypotheses 3 and 4, but Hypothesis 5 was rejected.

Discussion

This diary study is, to our knowledge, the first that examines the subjective experience of happiness during specific off-job activities as a potential moderator in the relationship between time spent on daily off-job activities and daily recovery at bedtime. Participants were followed on workdays over a two-week period. A Day Reconstruction Method (DRM; Kahneman et al., 2004) was used as an ecologically valid method that can accurately capture both the daily amount of time individuals spent, as well as the happiness they derived from their daily activities. Importantly, this study examined

intra-individual changes in daily recovery at bedtime, while correcting for the individual's recovery of the previous day, and for the individual's trait happiness.

The results were largely supportive of the hypotheses, showing that work-related and household activities in off-job time only related to a decline in daily recovery when individuals experienced low (but not when experiencing high) momentary happiness during such activities. Moreover, daily amount of time spent on social and physical activities was associated with a higher daily recovery level at bedtime when individuals experienced high happiness during such activities, but was adversely related to daily recovery when individuals experienced low happiness. Finally, time spent on low-effort activities, as well as happiness derived from low-effort activities, had no impact whatsoever on daily recovery at bedtime. We discuss these findings in more detail below, together with the limitations, avenues for future research and practical implications.

Momentary happiness during off-job activities and daily recovery at bedtime

The findings that off-job time spent on work-related and household activities only results in a lower daily recovery at bedtime when happiness during such activities is low, but not when happiness is high (confirming Hypotheses 1 and 2), have important theoretical implications. The findings indicate that enjoyment in these activity types can cancel out negative effects of such effortful activities on daily recovery. The motivational literature (e.g. self-determination theory; Gagné & Deci, 2005) may provide a theoretical explanation for such effects. For example, self-concordant motivation (i.e. a motivation that arises from one's authentic choices, personal values and interests) influences the way people approach activities, how much effort they put into the activity, and how they feel while engaging in them (Gagné & Deci, 2005; Judge, Bono, Erez, & Locke, 2005). Thus, although work-related and household activities are generally considered as effortful activities one "has to do", this might not always be the case. For example, for highly conscientious individuals, self-concordant behaviour may encompass work-related or household activities such as cleaning and tidying (e.g. Jackson et al., 2010). Also, individuals may themselves choose to perform work-related activities in their leisure time out of their own interest (Beckers et al., 2008). The degree to which activities are (non) self-concordant likely influences experiences of momentary happiness and daily recovery. Self-concordance may well be the missing link that explains why detrimental effects of work-related or household activities on daily recovery have not been empirically confirmed (e.g. Sonnentag, 2001; Sonnentag & Bayer, 2005).

Second, the present study shows that off-job time spent on active leisure activities (social, physical) relates positively to daily recovery at bedtime when momentary happiness is high during such activities. However, the same activities appear to be harmful for daily recovery when experienced happiness is low (confirming Hypotheses 3 and 4). These findings may explain results from earlier diary studies showing that social activities can have positive (Sonnentag & Zijlstra, 2006) as well as negative consequences for daily recovery (Sonnentag & Natter, 2004). In particular, one key element for optimal recovery to occur would be that lost personal resources after a day's work are restored during off-job time (Demerouti et al., 2009; Sonnentag, 2001). When individuals are in a positive momentary state of happiness, acquisition of such personal resources may be more likely than when individuals are in a neutral or negative momentary state. Thus,

happiness may aid in acquiring personal resources (e.g. psychological, physical and social resources) which contribute to higher well-being (Fredrickson, 2001). Vice versa, the absence of positive emotions predicts a more self-focused and narrow mindset (Basso, Schefft, Ris, & Dember, 1996; Fredrickson, 1998, 2001), which may hamper individuals in acquiring personal resources when engaging in social or physical activities. For instance, individuals who feel happier are more likely to receive social support from others (Lyubomirsky et al., 2005). Social support can buffer the influence of (daily) job demands on (daily) psychological well-being (Bakker et al., 2005). The findings of this study demonstrate that when employees do not experience the associated rewards in terms of happiness during social and physical activities, the effortful nature of such activities actually undermines the recovery process.

Third and contrary to what was hypothesized, the findings indicate that low-effort activities do not enhance daily recovery, even when momentary happiness during low-effort activities is high (rejecting Hypothesis 5). This contradicts assumptions based on the effort-recovery process, stating that low-effort activities enhance daily recovery from work because of their passive nature, which would allow employees to return to their pre-stressor level after work is done. One explanation for this unexpected finding may be that low-effort activities are less likely to facilitate recovery from work because of their passive nature, even under conditions of high happiness. For instance, activities that are more active in nature may require higher concentration and involvement, allowing employees to become fully immersed in such activities and psychologically detach from their work, which enhances daily recovery (Sonnentag & Fritz, 2007). Also, participation in high-effort activities that are enjoyed may lead to more rewards in terms of social, physical or physiological resources as compared to low-effort activities that are enjoyed (Waterman, 2005), which may result in higher recovery levels.

Null findings regarding time spent on off-job activities

We did not find any main effects of time spent on off-job activities on the individual's daily recovery level before bedtime. Additional analyses, which included curvilinear effects of time spent on activity types on daily recovery from work, also turned out to be insignificant (available on request from first author). Null findings concerning off-job activities and daily recovery are not unique. Demerouti et al. (2009) reported that off-job activities sometimes relate positively, negatively or not at all to situational well-being at the end of the day, depending on the specific diary study. We therefore conclude that time-based measures on activities during off-job time alone do not consistently predict situational well-being outcomes.

Limitations

This study has limitations. First, we assessed the data with self-report measures, raising concerns about common-method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, by performing intra-individual HLM analyses, we eliminated the potential influence of response tendencies stemming from individual differences, and we thereby reduced the problems associated with common-method data.

Another issue is that the day reconstruction method is susceptible to recall bias, as it uses chronological reconstruction to recall into memory the momentary happiness during

activities that occurred the previous day. However, a recent study indicated that happiness ratings as collected with the DRM converge well with concurrent reports of happiness as collected with experience sampling methods (Dockray et al., 2010).

The current diary study relies on longitudinal data rather than interventions. Therefore, we have to be cautious about making causal inferences based on the current study. Moreover, we did not control for dispositional variables, such as personality. However, the study examined happiness during activities and daily recovery at the intra-individual level. This means that between-person differences cannot account for the intra-individual results of this study. We used time spent at work and happiness derived from work as a proxy for the individual's need to recover from work. This was done to specifically assess the loss and restoration process of mood (happiness) as a resource that helps individuals to recover. Future studies may include a more direct measure for the daily need to recover from work.

A one-item faces scale for momentary happiness during activities was used in this study. This may cause some confusion as happiness may take the form of cognitions (i.e., when a person performs a conscious evaluative judgement about an activity) or the form of affect (i.e., when people experience unpleasant or pleasant emotions in response to daily activities). However, we asked participants specifically to indicate how happy they felt during specific activities rather than to provide a cognitive evaluation.

Unreported analyses showed that momentary happiness as experienced during off-job activities not only depends on the time spent on specific off-job activities, but also on earlier experiences, more enduring levels of happiness and time factors (e.g. day of the week). Therefore, we controlled for these types of variables in the multi-level analyses (e.g. trait happiness, day of week, happiness experienced at work earlier that workday).

Directions for future research and practical implications

Future studies may consider other cognitive or psychological processes that lead to daily recovery. For instance, ruminating about unpleasant experiences at work in the evening obviously does not promote recovery from work, but positive work reflections do have the potential to contribute to recovery from work (Binnewies et al., 2009). Also, psychological experiences, such as psychological detachment from one's job, feeling relaxed or a sense of mastery and control appear to decrease the need for recovery (Sonnentag & Fritz, 2007). As recovery experiences are very similar to forms of affect regulation strategies, future studies may further investigate the link between daily recovery experiences, momentary emotional experiences during specific off-job activities and daily recovery. For instance, happiness during physical activities in the evening may contribute to mastery experiences, whereas high happiness during low-effort activities may contribute to relaxation.

Another direction for future research is to include dispositional characteristics like personality. For example, high (vs. low) extraverted individuals have been found to experience higher increases in their momentary happiness whilst engaging in social activities (Oerlemans, Bakker, & Veenhoven, 2011), which would affect daily recovery.

Future research should also investigate why individuals feel (un)happy while engaging in their off-job activities. For example, the motivational literature (e.g. self-determination theory; Gagné & Deci, 2005) suggests that self-concordant motivation (i.e. a motivation that arises from one's authentic choices, personal values and interests)

influences the way people approach activities, how much effort they put into the activity and, in turn, how persistent and successful they are in pursuit of their goals and activities, as well as how they feel while engaging in them (Gagné & Deci, 2005; Judge et al., 2005).

Our study also yields implications for practice. Organizations should be aware that employees run the risk of poorer recovery when continuing to work in off-job time, and when experiencing little happiness while doing so. This can be the case when employees continue work-related activities during off-job time because of high work pressure rather than voluntary choice (Ryan & Deci, 2006). Active leisure activities, such as social and physical activities, have recovery potential when such activities are enjoyed. Organizations could therefore encourage their employees to discontinue their work outside regular work hours and support opportunities for active leisure activities that fit the employees' interests (such as providing sports facilities, promoting socio-cultural events, etc.).

Conclusions

This study set out to examine if the extent to which off-job activities are enjoyable can increase our understanding of how such activities may or may not contribute to daily recovery. The overall conclusion is that subjective experiences affect the way in which off-job activities contribute to recovery from work. In particular, daily recovery from work is enhanced when individuals are involved in an active leisure activity (social, physical) during off-job time, and feel happy whilst being engaged in such an activity. Moreover, work-related and household activities in off-job time were only found to be related to a decline in daily recovery when individuals experienced low (but not when experiencing high) momentary happiness during such activities. This explains some of the earlier unclear findings about what kind of off-job activities would enhance daily recovery from work (Demerouti et al., 2009). The findings expand effort recovery theory and broaden and build theory by showing that both time spent on different types of off-job activities *and* happiness during off-job activities determine employee daily recovery from work.

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