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Volunteer work as a valuable leisure-time activity: A day-level study on volunteer work, non-work experiences, and well-being at work

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In this 2-week diary study, with 105 employees providing data on a total of 476 days, we examined relationships between the amount of time spent on volunteer work activities during leisure time, psychological non-work experiences in the evening (i.e. recovery experiences of psychological detachment from work and mastery as well as need satisfaction), and work outcomes during the following working day (i.e. positive and negative affect, and active listening). Results confirmed the hypothesized positive relationships between the amount of time spent on volunteer work activities and psychological detachment from work, mastery experiences, and need satisfaction in the evening. Psychological detachment from work in the evening was positively related to active listening during the following working day. Need satisfaction in the evening was negatively related to negative affect and positively related to active listening during the following working day. The amount of time spent on volunteer work activities was negatively related to negative affect during the following working day. This relationship was mediated by need satisfaction in the evening.

After coming home from work, many people do not switch on the TV or relax while reading a book, but pursue a very special type of leisure activity: volunteer work. Every third European and every fourth American citizen (TNS Infratest 2007; United States Department of Labor, 2009) spends one or more evenings per week engaging in unpaid activities in which he or she helps another person, group, or cause (Wilson, 2000, p. 215), for instance by coaching a sports team or by leading a self-help group meeting. Most research on volunteer work to date takes a general cross-sectional perspective (e.g. Moen, Dempster-McClain, & Williams, 1989; Wilson, 2000), with a few exceptions of longitudinal studies, for instance with a time interval of 6 months (Thoits & Hewitt, 2001). Against the background of this empirical work that focused on relationships between volunteer work and overall well-being (i.e. outcomes of these studies were such as happiness, life satisfaction, or health), we take a day-level perspective and expand this research in two directions. First, we aim to explore

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immediate consequences of volunteer work for daily psychological non-work experiences during the evening known to be beneficial for peoples' well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sonnentag, Binnewies, & Mojza, 2008) as well as short-term consequences of volunteer work for well-being at work during the following day. Second, we investigate whether these psychological non-work experiences are related to well-being at the workplace and serve as underlying mechanisms connecting volunteer work during the evening to well-being at work the following day. By combining research on voluntary work with research on recovery (Geurts & Sonnentag, 2006; Winwood, Bakker, & Winefield, 2007) and self-determination (Deci & Ryan, 2000), we examine if volunteer work contributes to the two specific recovery experiences of psychological detachment from work and mastery (Sonnentag & Fritz, 2007) and to need satisfaction (Deci & Ryan, 2000) that in turn might be relevant for well-being at work during the following day. By adopting a day-level perspective, we do not only incorporate a different time frame to the study of volunteer work, but explicitly address within-person processes, thereby relying on research showing that processes *between* persons do not necessarily correspond to processes *within* persons (Affleck, Zautra, Tennen, & Armeli, 1999).

With our study, we add to existing knowledge in three research fields. First, we contribute to research on recovery experiences. Given that various leisure-time activities differ in their potential to contribute to recovery experiences (e.g. Rook & Zijlstra, 2006; Tucker, Dahlgren, Akerstedt, & Waterhouse, 2008), we examine the role of volunteer work activities for the recovery experiences of psychological detachment from work and mastery. We strive to know whether one kind of work (i.e. volunteer work) helps to disengage from another kind of work (i.e. paid work). We focused on psychological detachment from work as one core variable when investigating recovery (e.g. Sonnentag & Fritz, 2007) and on mastery experiences because of its importance with respect to volunteer work, as shown empirically (Mojza, Lorenz, Sonnentag, & Binnewies, 2010). Second, we add to research on need satisfaction based on self-determination theory (Deci & Ryan, 2000), which suggests various contexts differing in their potential to satisfy basic psychological needs. Here, we hypothesize volunteer work as a context which promotes the fulfilment of basic psychological needs. Third, we contribute to research on relationships with respect to the interface of non-work and work, which to date mainly focuses on positive relationships between the domains of family and work (Greenhaus & Powell, 2006). Specifically, we examine relationships between time spent on volunteer work, non-work experiences in the evening and outcomes at work during the following day (i.e. positive and negative affect, and active listening). Figure 1 presents the assumed and examined relationships between the core study variables.

Time spent on volunteer work activities and recovery experiences

Recovery experiences such as psychological detachment from work and mastery experiences are defined as those attributes of leisure-time activities that have the

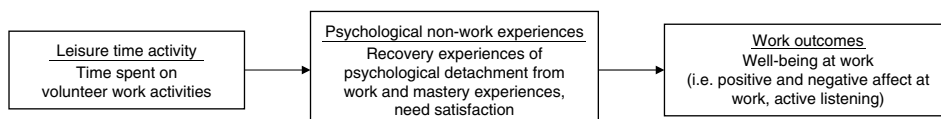


Figure 1. Model of assumed relationships.

potential to contribute to successful recovery from work. Psychological detachment from work refers to the feeling of being mentally away from the work situation and of 'switching off' from work (Etzion, Eden, & Lapidot, 1998; Sonnentag & Bayer, 2005) and can be attained by immersing oneself fully in an activity that is different from one's job activities. It contributes to recovery because it helps to restore resources that have been depleted during a day on the job (Demerouti, Bakker, Geurts, & Taris, 2009). Specifically, refraining from job-related activities and thoughts will help people to focus on the present and therefore to build-up cognitive resources such as awareness and savouring beliefs (i.e. beliefs that emphasize positive experiences and interpretations; Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). Moreover, psychological detachment is associated with the active choice of preferable behaviours (Sonnentag & Fritz, 2007) what will increase momentary regulatory resources and affective resources such as state positive affect (Troughakos & Hideg, 2009). The availability of these resources will help to undo the strain processes initiated during the working day. For example, awareness of the present moment and increased positive affect will reduce negative activation which is - among others - reflected in increased endocrinological and cardiovascular activation (Brosschot, Gerin, & Thayer, 2006; Pressman & Cohen, 2005).

Mastery experiences are defined as experiences that arise during learning or when successfully meeting challenges during leisure time (Sonnentag & Fritz, 2007). Mastery experiences contribute to successful recovery because they help to replenish and build-up new resources. Because they are linked to the subjective experience of success and of broadening of one's action repertoire, mastery experiences foster the development of resources such as self-efficacy. As mastery experiences may imply to overcome problems and difficulties, they also contribute additional psychological resources such as optimism and ego-resilience (Fredrickson *et al.*, 2008). These resources in turn will help to restore a person's self-perceptions that might have been negatively impacted during the day at work. Along with other processes such as sleep (Akerstedt, 2006; Totterdell, Reynolds, Parkinson, & Briner, 1994), psychological detachment, and mastery are helpful in overcoming strain built-up at work. Specifically, as psychological detachment from work is incompatible with worrying about work-related issues, it will also impact the physiological system and reduce activation parameters (Brosschot *et al.*, 2006).

We expect the amount of time spent on volunteer work activities to be positively associated with psychological detachment from work in the evening. Engaging in some kind of volunteer work activity often means to be in a non-work context with other people than one's colleagues and being occupied with activities unrelated to one's job demands, thus on-the-job experiences are mentally less accessible than in situations which either resemble one's job or which make it more likely to reflect on one's job (e.g. when being alone while jogging). Being fully engaged in volunteer work activities should facilitate psychological detachment from work because people are less likely to ruminate about their jobs (e.g. negative work-related thoughts such as recalling conflicts with colleagues).

Hypothesis 1: The amount of time spent on volunteer work activities during leisure time is positively related to psychological detachment from work in the evening.

Further, we hypothesize that amount of time spent on volunteer work activities is positively related to mastery experiences in the evening because volunteering provides learning opportunities and offers challenges. People learn new skills and further develop existing skills when they pursue a volunteer work activity (Clary *et al.*, 1998),

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for instance they can exercise and improve interpersonal and leadership skills (Ruderman, Ohlott, Panzer, & King, 2002). Also, since non-work domains can compensate for dissatisfaction in the work domain (Edwards & Rothbard, 2000), people may also find challenges in the non-work domain which can compensate for the possible lack of challenges in the work domain.

Hypothesis 2: The amount of time spent on volunteer work activities during leisure time is positively related to mastery experiences in the evening.

Time spent on volunteer work activities and need satisfaction

In addition, we expect the amount of time spent on volunteer work activities to be positively related to the satisfaction of basic psychological needs in the evening. Self-determination theory suggests that three basic psychological needs (need for competence, i.e. the desire to feel competent and effective, need for autonomy, i.e. the desire to self-organize experience and behaviour, and need for relatedness, i.e. the desire to feel connected to others, to love and care, and to be loved and cared for), are crucial for human growth, integrity, and well-being (Deci & Ryan, 2000). People are intrinsically motivated when the context provides the opportunity to feel competent, autonomous, and related to other people. Volunteer work, by definition, is an exemplar of intrinsically motivated behaviour because it is based on free choice (Snyder, Omoto, & Lindsay, 2004), and should therefore facilitate need fulfilment. For instance, volunteer work is freely chosen behaviour and therefore satisfies the need for autonomy, or, for instance, volunteer work usually takes place in a social group, hence, it satisfies the need for relatedness.

Hypothesis 3: The amount of time spent on volunteer work activities during leisure time is positively related to need satisfaction in the evening.

Time spent on volunteer work activities, recovery experiences, need satisfaction, and well-being at work

We propose time spent on volunteer work during the evening to be related to well-being at work the following working day via psychological detachment from work, mastery experiences, and need satisfaction (see Figure 1). Because volunteer work during leisure comes along with a break from work, resources (e.g. cognitive resources) which were drawn upon the working day, are no longer used. For example, imagine an accounting clerk working at the office during the day and volunteering as a fire fighter during one or two evenings per week. During the working day, he or she is cognitively absorbed by the job tasks, thus, occupied by data all day long. In the evening during leisure time, he or she leaves the office behind and meets with other volunteers in the fire station. There, he or she is physically challenged and engages him- or herself in the simulated fire-fighting operation. In so doing, he or she is completely away from the working place – not only physically, but also mentally. This is particularly the case because he or she needs to fully immerse him- or herself in the demanding task of the simulated fire-fighting operation. Volunteer work can be physically demanding to allow distance and mental detachment from work. But also engaging in, for instance, a youth group within the churchal or religious context, implies being occupied cognitively in a different ‘field’, therefore getting distance from

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work. The physical and mental distance from the workplace is important and beneficial for the individual. Also, during volunteer work, people have the chance to experience mastery and to fulfil basic psychological needs. Imagine our volunteer fire fighter who succeeds getting better in his or her role during the simulated fire-fighting operation or the churchal volunteer who tries another game with the youth group which turns out as a full success. These mastery experiences should increase resources such as positive feelings and positive self-perceptions (i.e. self-efficacy). Also, feelings of competence, autonomy, and relatedness offered by volunteer work should enhance positive feelings (Deci & Ryan, 2000). Given that people strive to save and gain resources (Hobfoll, 1989), both the restoration of resources – via psychological detachment from work – as well as the acquisition of new resources – via mastery experiences – should enhance positive experiences associated with positive feelings. Positive feelings resulting from psychological detachment from work, mastery experiences, and need satisfaction during volunteer work in the evening, in turn, can spill over into the work domain (cf. Edwards & Rothbard, 2000) and stimulate positive thoughts and their positive retention during the following working day. For instance, when people experience mastery in the evening, they will probably think about their successes during the working day, or even talk about them with their colleagues, what in turn will improve well-being (Langston, 1994).

Hypothesis 4: The amount of time spent on volunteer work activities during leisure time is positively related to well-being during the following working day.

Hypothesis 5: The amount of time spent on volunteer work activities during leisure time is positively related to well-being during the following working day via psychological detachment from work during the evening.

Hypothesis 6: The amount of time spent on volunteer work activities during leisure time is positively related to well-being during the following working day via mastery experiences during the evening.

Hypothesis 7: The amount of time spent on volunteer work activities during leisure time is positively related to well-being during the following working day via need satisfaction during the evening.

Control variables

In the analyses with psychological detachment from work, mastery experiences, and need satisfaction as outcome variables, we controlled for demographic data (i.e. gender, age, number of children), as well as for the general level of the outcome variables (e.g. general psychological detachment from work as a control variable for daily psychological detachment from work). Additionally, we controlled for the amount of time spent on other leisure-time activities (job- and task-related activities, household and child-care activities, low-effort activities, physical activities, social activities) which might also be associated with psychological detachment from work, mastery experiences, and need satisfaction.

In the analyses with well-being at work as outcome variables, we also controlled for demographic data (i.e. gender, age, leadership position), as well as for the general level of the outcome variables. Additionally, we controlled for daily leisure-time activities (e.g. time spent on job- and task-related activities) as well as for daily working hours and daily situational constraints as possible daily predictors of positive and negative affect at work, and active listening.

Method

Overview, procedure, and sample

The study included two types of paper-and-pencil surveys, one general survey and a daily survey over a period of two consecutive working weeks (Monday to Friday, i.e. 10 working days). In the daily survey, each participant completed one questionnaire after work (called 'after-work survey') and one questionnaire before going to bed (called 'bedtime survey').

Participants were recruited via study announcements communicated to voluntary organizations (i.e. auxiliary fire brigades and rescue services, church-related voluntary organizations and self-help-groups), as well as on a large Internet business platform. Within these study announcements, we searched for participants who (a) were employees with at least a half-time job and (b) volunteered regularly at least 1 day during their working week. Participants could register individually for the study.

We used different strategies to enhance compliance of our participants following, including an attractive booklet design, face-to-face meetings, and reminder calls. As often as possible, the time lag between completing the general questionnaire and the start of the diary study was 2 weeks, at a minimum this time lag was 3 days. When analysing the data, we had to match the bedtime survey to the after-work survey completed *during the following day*, in order to test relationships between daily volunteer work activities, experiences in the evening (e.g. psychological detachment from work) and well-being the following working day. Thus, we could only analyse data where we had information on both consecutive days (e.g. data from the bedtime survey of Monday as well as from the after-work survey of the following Tuesday). Participants indicated the time they completed every survey as well as the time they went to bed and the end of their working day. With these time specifications, we could verify if the surveys were filled out at the correct time and we could therefore exclude surveys filled out at a wrong time (e.g. the bedtime survey that were filled the following morning).

Overall, 201 volunteers agreed to participate, and finally 140 took part in the study (response rate of 69.7%). Data from 35 participants who did not provide sufficient information for the analyses and surveys that were filled out too early or too late were excluded from the analyses, resulting in a final sample of 105 persons who provided, altogether, data on 476 days.

Of the 105 participants, 41.9% were female, and the mean age was 42.7 years ($SD = 12.0$). Participants worked at least 19.25 h per week (corresponding to at least half-time jobs) with one exception (i.e. one participant indicated 16 h per week). On average, participants worked 5 days per week (ranging from 3 to 7 days per week).

Participants' overall average volunteer work tenure was 15.4 years ($SD = 9.3$), and the average amount of the amount of time spent on volunteer work activities per week was 6.7 h ($SD = 4.9$). Participants worked for voluntary organizations such as auxiliary fire brigades and rescue services (37.1%), church-related voluntary organizations (28.6%), self-help groups (20.0%), and others (14.3%).

Measures

All items were in German, the language spoken by the participants. We used the instructions and items from the sources cited here for measures in the general survey, while we adapted the instructions and items in the daily survey to measure day-level variables. For one measure (i.e. active listening), we used a shorter version of the scale in

the daily survey than in the general survey, to limit the time needed for completing the daily survey.

Time spent on volunteer work activities was assessed with the single item ‘How much time did you spend on volunteer work activities today?’ in the bedtime survey. The item was presented as an open question without any response format.

Psychological detachment from work was assessed in the bedtime survey with four items (e.g. ‘Tonight, I distanced myself from my work’) from Sonnentag and Fritz (2007), using a five-point Likert scale from 1 (*not true at all*) to 5 (*very true*). Cronbach’s alphas for daily psychological detachment from work, computed separately for the 10 days of data collection, ranged from .89 to .96 (mean $\alpha = .93$). In the general survey, four items assessed the general level of psychological detachment from work ($\alpha = .89$).

Mastery experiences were also assessed in the bedtime survey with four items (e.g. ‘Tonight, I learned new things’) from Sonnentag and Fritz (2007), again using a five-point Likert scale from 1 (*not true at all*) to 5 (*very true*). Cronbach’s alphas for daily mastery experiences ranged from .82 to .92 (mean $\alpha = .87$). In the general survey, four items assessed the general level of mastery experiences ($\alpha = .80$).

Need satisfaction was assessed in the bedtime survey with nine items from the Need Satisfaction Scale (La Guardia, Ryan, Couchman, & Deci, 2000), measuring the need satisfaction for competence (e.g. ‘Tonight, I felt like a competent person’), autonomy (e.g. ‘Tonight, I felt free to be who I am’), and relatedness (e.g. ‘Tonight, I felt loved and cared about’). All items were measured on a scale ranging from 1 (*not true at all*) to 7 (*very true*). Cronbach’s alphas for daily need satisfaction ranged from .79 to .86 (mean $\alpha = .82$). In the general survey, nine items assessed the general level of need satisfaction ($\alpha = .81$).

We computed confirmatory factor analyses with person mean-centred data (Bolger, Davis, & Rafaeli, 2003) to test whether the three experience variables, i.e. psychological detachment from work, mastery experiences, and need satisfaction, represent distinct constructs. Analyses showed a better fit of the data for the three-factor model ($\chi^2 = 846.64$, $df = 116$, $p < .001$, RMSEA = .077, CFI = .94, GFI = .91, NFI = .93), with all items loading on their corresponding factors, than for a one-factor model ($\Delta\chi^2 = 4,474.87$, $\Delta df = 3$, $p < .001$), or a two-factor model with the items that measure the recovery experiences of psychological detachment from work and mastery loading on one factor, and the items that measure need satisfaction loading on another factor ($\Delta\chi^2 = 2,492.37$, $\Delta df = 2$, $p < .001$). To rule out an overlap between the constructs mastery experiences and need satisfaction (as need satisfaction includes the need for competence which could be similar to mastery experiences), we tested if the three-factor model with all items loading on their corresponding factors (i.e. items that measure psychological detachment from work loading on one factor, items that measure mastery experiences loading on a second factor, and items that measure need satisfaction on a third factor) fit the data better than a two-factor model with the items that measure psychological detachment from work on one factor and the items that measure mastery experiences as well as the items that measure need satisfaction on a second factor. Analyses showed a better fit for the three-factor model than for this two-factor model ($\Delta\chi^2 = 2,027.12$, $\Delta df = 2$, $p < .001$).

Positive affect at work was measured in the after-work survey with six adjectives (e.g. enthusiastic, calm) from Warr (1990) and the instruction ‘Thinking of the working day today, how did you feel today at work?’. All items were measured on a seven-point Likert scale from 1 (*not true at all*) to 7 (*very true*). Cronbach’s alphas for daily positive

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affect at work ranged from .82 to .90 (mean $\alpha = .86$). In the general survey, six items assessed the general level of positive affect at work ($\alpha = .82$).

Negative affect at work was measured in the after-work survey with six adjectives (e.g. depressed, tense) from Warr (1990) following the instruction 'Thinking of the working day today, how did you feel today at work?'. All items were measured on a seven-point Likert scale from 1 (*not true at all*) to 7 (*very true*). Cronbach's alphas for daily negative affect at work ranged from .79 to .89 (mean $\alpha = .83$). In the general survey, six items assessed the general level of negative affect at work ($\alpha = .78$).

Active listening was measured in the after-work survey with four items (e.g. 'Today, I paid attention to what co-workers said to me') based on the *Communication Competence Questionnaire* (Monge, Bachman, Dillard, & Eisenberg, 1982a,b) using a five-point Likert scale (1 = *not true at all* to 5 = *very true*). Cronbach's alphas for daily active listening ranged from .85 to .91 (mean $\alpha = .88$). In the general survey, eight items assessed the general level of active listening ($\alpha = .68$).

We computed confirmatory factor analyses with person mean-centred data to test whether the three outcomes positive affect, negative affect, and active listening, represent distinct constructs. Analyses showed a better fit for the three-factor model ($\chi^2 = 382.61$, $df = 101$, $p < .001$, RMSEA = .055, CFI = .97, GFI = .95, NFI = .96), with all items loading on their corresponding factors, than for a one-factor model ($\Delta\chi^2 = 2, 260.77$, $\Delta df = 3$, $p < .001$).

Additionally, we ran confirmatory factor analysis with all core variables, i.e. psychological detachment from work, mastery experiences, need satisfaction, positive affect at work, negative affect at work, and active listening. We tested if the six-factor model with all items loading on their corresponding factors fit the data better than a one-factor model with all items loading on one factor. Analyses showed a better fit of the data for the six-factor model ($\chi^2 = 960.34$, $df = 480$, $p < .001$, RMSEA = .046, CFI = .96, GFI = .89, NFI = .92), than for the one-factor model ($\Delta\chi^2 = 6, 810.92$, $\Delta df = 15$, $p < .001$).

Control variables

Demographic data (i.e. gender, age, number of children, leadership position) were captured with single questions in the general survey. Additionally, in the general survey, the participants had to indicate their non-work experiences and well-being at work *in general* (e.g. psychological detachment from work). In contrast, in the diary survey, they indicated how they experience or felt *during the respective evening or working day*. For instance, while in the general survey, participants indicated how they could psychologically detach from work in general, in the bedtime survey, they indicated how they could psychologically detach from work during the particular evening. We were interested in the day-specific aspect of our outcome variables (e.g. psychological detachment from work) and therefore controlled for the general level of the respective variable. The residual of the outcome variable (after controlling for the general level) corresponds to the day-specific variation that we wanted to predict. Without controlling for the general level, there would be within-person and between-person variance in the outcome variables.

The amount of time spent on other leisure-time activities (job- and task-related activities, household and child-care activities, low-effort activities, physical activities, and social activities) was assessed with single items in the bedtime survey (e.g. 'How much time did you spend on job-related and task-related activities today?'). Participants

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were specifically instructed to assign every activity they had pursued during the day only once and to the one activity category that was the most salient one to them. For example, persons who volunteered as soccer coaches indicated volunteering if they perceived their activity mainly as contributing to the good cause and as physical activity if they did it mainly to play sports.

Daily working hours were measured with the item 'How long did you work today?', and daily situational constraints were measured with three items (e.g. 'Today, I had to work with materials and information that were incomplete and out-dated') adapted from Semmer (1984), both assessed in the after-work survey. Cronbach's alpha for daily situational constraints ranged from .65 to .85 (mean $\alpha = .80$).

Table 1 displays means, standard deviations, and correlations between study variables.

Results

Preliminary analysis

As we had data on two levels (day-level data such as psychological detachment from work and person-level data such as gender), we analysed our data with hierarchical linear modelling (Bryk & Raudenbush, 1992). For this purpose, person-specific data (i.e. information about gender, age, number of children, general level of the outcomes variables, e.g. general psychological detachment from work), assessed with the general survey, constituted Level 2 data, whereas day-specific data (i.e. working hours, time spent on job- and task-related activities, time spent on household and child-care activities, time spent on low-effort activities, time spent on physical activities, time spent on social activities, time spent on volunteer work activities), recorded on a daily basis, constituted Level 1 data. Level 2 data were centred around the grand mean, whereas Level 1 predictor variables were centred around the respective person mean. By centring the predictors around the person mean, our results cannot be explained by stable differences between participants.

To check whether hierarchical linear modelling was appropriate for data analysis, we examined whether our outcome variables differed substantially within persons. For this purpose, we partitioned the total variance into within-individual and between-individual variance. For psychological detachment from work, within-individual variance was 55.1% (Level 1 intercept variance, i.e. 0.734 divided by total variance, i.e. 0.734 + 0.597, cf. Table 2); 81.7% for mastery experiences, 68.4% for need satisfaction, 42.1% for positive affect at work, 41.5% for negative affect at work, and 55.1% for active listening. Thus, for all outcome variables, a substantial portion of the variance could be attributed to variance within persons, suggesting that hierarchical linear modelling was suitable and necessary.

Test of hypotheses

We ran several models to test our hypotheses. For all tests, we started with a Null Model which included only the intercept. To test Hypotheses 1-3, we entered the control variables at the person level (i.e. gender, age, number of children, general level of the outcome variable, e.g. general psychological detachment from work as a control variable for day-specific psychological detachment from work) in Model 1. In Model 2, we entered control variables at the day level, i.e. the amount of time spent on job- and

Table 1. Means, standard deviations, and correlations between study variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1 Gender ^a	1.58	0.50											
2 Age	42.74	11.95	-.33**										
3 Number of children	1.12	1.09	-.22**	.54**									
4 Leadership position ^b	1.35	0.48	.14	-.01	.10								
5 General psychological detachment from work	3.10	0.84	-.06	.21*	.03	-.14							
6 General mastery experiences	3.40	0.62	-.18	-.08	-.06	.11	.17						
7 General need satisfaction	5.59	0.73	.04	-.12	-.19	-.10	.20*	.25**					
8 General positive affect at work	4.74	1.10	.01	-.14	-.12	.18	-.20*	.12	.12				
9 General negative affect at work	2.46	0.95	.12	-.25**	-.11	.05	-.15	-.01	-.15	-.27**			
10 General active listening	3.88	0.35	-.05	.16	.15	.04	.06	.24*	.37**	.11	-.14		
11 Working hours	7.51	2.16	.29**	-.28**	-.26**	.19*	-.26**	-.12	.16	.15	.12	-.05	.09
12 Situational constraints	1.62	0.84	.21*	-.08	-.05	-.05	-.03	.04	-.12	-.19*	.18	.03	.01
13 Job- and task-related activities	0.54	0.71	-.02	.06	.12	.09	-.01	.01	-.00	.01	.04	-.01	.01
14 Household and child-care activities	0.84	0.99	-.41**	.18	.34**	.03	.09	-.07	-.10	-.17	-.11	-.01	-.20*
15 Low-effort activities	1.29	1.12	.07	.04	.06	-.10	.03	.04	-.02	.08	-.08	.04	-.06
16 Physical activities	0.27	0.55	-.04	.01	-.02	.05	-.05	.07	-.01	-.19*	.04	.04	.01
17 Social activities	1.14	1.27	.16	-.14	-.12	.11	.09	.16	.01	.06	.07	-.02	-.08
18 Volunteer work activities	1.12	1.52	.13	-.14	-.20*	.06	.07	.08	.05	.00	-.03	-.10	-.03
19 Psychological detachment from work	3.47	1.14	.09	.05	-.14	-.13	.53**	.01	.04	.04	-.10	.04	-.21*
20 Mastery experiences	2.60	0.98	-.06	.01	-.12	.06	.29**	.44**	.16	.01	-.12	.02	-.13
21 Need satisfaction	5.37	0.90	.11	-.13	-.16	.04	.10	.18	.44**	.18	.06	.17	-.06
22 Positive affect at work	4.08	1.17	.13	-.08	-.07	-.05	.00	.14	.19	.43**	-.34	.16	-.02
23 Negative affect at work	2.02	0.95	.15	-.17	-.12	.00	.02	.06	.05	-.21*	.49**	-.04	.12
24 Active listening	3.71	0.81	.17	-.06	-.19*	-.02	.10	.17	.28**	.25**	.06	.20*	.10

Table 1. (Continued)

	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Gender ^a													
2 Age													
3 Number of children													
4 Leadership position ^b													
5 General psychological detachment from work													
6 General mastery experiences													
7 General need satisfaction													
8 General positive affect at work													
9 General negative affect at work													
10 General active listening													
11 Working hours	-.03	.00	-.26**	.01	-.12	-.08	-.12**	-.21**	-.14**	-.06	-.01	.12**	-.01
12 Situational constraints	.02	.06	.06	.05	.02	.07	.03	.10*	.14**	-.02	-.26**	.33**	-.05
13 Job- and task-related activities	-.18	.08	.08	-.03	-.00	-.17**	-.08	-.08	.08	-.14	-.03	.02	-.07
14 Household and child-care activities	-.11	-.08	.01	-.00	.01	-.06	-.11*	-.01	-.04	-.08	-.12**	-.01	-.02
15 Low-effort activities	.02	-.10	.04	.16**	.12**	-.12**	-.23**	.02	-.14**	-.11*	-.17**	-.05	-.08
16 Physical activities	.13	.19*	.09	-.01	-.04	-.04	-.10	.09*	.05	.04	-.00	-.03	-.09*
17 Social activities	.10	-.22*	-.15	.03	-.01	-.04	-.04	.11*	.06	.17**	.01	.03	.04
18 Volunteer work activities	-.19*	.13	-.08	-.06	-.15	-.05	-.05	.18**	.40**	.23**	.01	.00	.02
19 Psychological detachment from work	.04	-.08	-.10	.14	.12	.23*	.25**	.26**	.29**	.11*	-.19**	.13**	
20 Mastery experiences	.15	.10	-.04	.03	.22*	.27**	.37**	.44**	.33**	.05	-.02	-.02	.02
21 Need satisfaction	.07	-.03	-.11	.11	.09	.30**	.38**	.36**	.46**	.17**	-.14**	-.14**	.24**
22 Positive affect at work	-.25**	-.05	-.21*	.14	-.19*	.24*	.13	.06	.15	.20*	-.52**	-.52**	.34**
23 Negative affect at work	.29	.07	-.07	-.05	.09	-.04	-.09	-.03	-.10	-.05	-.53**	-.53**	-.18**
24 Active listening	-.06	-.07	-.13	.26**	-.21*	.08	.11	.17	.08	.24*	.41**	.41**	-.16

Note. Means and standard deviations of the leisure-time activities (e.g. job- and task-related activities) refer to hours.

Correlations below the diagonal are person-level correlations ($N = 105$), with correlations $r \geq .19$ being significant at $p < .05$ and $r \geq .25$ being significant at $p < .01$.

Correlations above the diagonal are day-level correlations ($N = 476$), with correlations $r \geq .09$ being significant at $p < .05$ and $r \geq .12$ being significant at $p < .01$.

^a 1, female; 2, male.

^b 1, no leadership position; 2, leadership position.

Table 2. Multi-level estimates for predicting psychological detachment from work

	Null Model		Model 1		Model 2		Model 3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	3.435	0.087	3.469	0.245	3.466	0.246	3.498	0.250
Gender ^a			-0.015	0.148	-0.010	0.149	-0.018	0.151
Age			0.003	0.007	0.003	0.007	0.003	0.007
Number of children			-0.077	0.076	-0.076	0.076	-0.075	0.077
General psychological detachment from work			0.635	0.082	0.631	0.083	0.636	0.084
Time spent on job- and task-related activities					-0.086	0.074	-0.041	0.073
Time spent on household and child-care activities					-0.020	0.067	0.013	0.066
Time spent on low-effort activities					-0.005	0.050	0.066	0.052
Time spent on physical activities					0.094	0.086	0.144	0.085
Time spent on social activities					0.026	0.038	0.054	0.038
Time spent on volunteer work activities							0.125	0.032
-2*log			1,307.095		1,303.755		1,288.587	
Diff -2*log			50.978***		3.340		15.168***	
df			4		5		1	
Level 1 intercept variance (SE)	1,358.073		0.731	0.724	0.724	0.690	0.690	0.690
			(0.054)	(0.053)	(0.053)	(0.050)	(0.050)	(0.050)
Level 2 intercept variance (SE)			0.597	0.300	0.303	0.324	0.324	0.324
			(0.110)	(0.067)	(0.067)	(0.069)	(0.069)	(0.069)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a 1, female; 2, male.

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task-related activities, the amount of time spent on household and child-care activities, the amount of time spent on low-effort activities, the amount of time spent on physical activities, and the amount of time spent on social activities. Finally, in Model 3 we entered the amount of time spent on volunteer work activities as a predictor. To examine the improvement of each model over the previous one, we calculated the differences between the corresponding likelihood statistics and tested them with chi-squared difference tests.

Table 2 displays the results of the multi-level analysis for psychological detachment from work. Model 1 showed significant improvement over the Null Model. General psychological detachment from work was a significant predictor of daily psychological detachment. Model 2 did not show further improvement over Model 1, but Model 3 showed significant improvement over Model 2. The amount of time spent on volunteer work activities was a significant predictor of psychological detachment from work indicating support for Hypothesis 1.

Table 3 displays the results of the multi-level analysis for mastery experiences. Model 1 showed improvement over the Null Model. General mastery experiences were a significant predictor of daily mastery experiences. Model 2 showed further improvement over Model 1. The amount of time spent on low-effort activities was a significant negative predictor of mastery experiences. Model 3 showed further improvement over Model 2. The amount of time spent on volunteer work activities was a significant predictor of mastery experiences, thus, supporting Hypothesis 2. The amount of time spent on physical activities also became a significant predictor of mastery experiences.

Table 4 displays the results of the multi-level analysis for need satisfaction. Model 1 showed improvement over the Null Model. General need satisfaction was a significant predictor of daily need satisfaction. Model 2 showed further improvement over Model 1. Both the amount of time spent on job- and task-related activities and the amount of time spent on low-effort activities were significant negative predictors of need satisfaction. Model 3 showed further improvement over Model 2. The amount of time spent on volunteer work activities was a significant predictor of need satisfaction, providing support for Hypothesis 3.¹ The amount of time spent on social activities also became a significant predictor of need satisfaction.

To test Hypotheses 4-7, we entered the control variables at the person level (i.e. gender, age, leadership position, general level of the outcome variable, e.g. general positive affect at work as a control variable for positive affect at work) in Model 1. In Model 2, we entered day-level control variables with respect to the working day, i.e. working hours and situational constraints. In Model 3, we entered control variables at the day-level with respect to leisure-time activities during the evening, i.e. the amount of time spent on job- and task-related activities, the amount of time spent on household and child-care activities, the amount of time spent on low-effort activities, the amount of time spent on physical activities, and the amount of time spent on social activities. In Model 4, we entered the amount of time spent on volunteer work activities as a predictor. Finally, in Model 5 we entered psychological detachment from work, mastery experiences, and need satisfaction as further predictors. To examine

¹ We ran the same models for the three needs as separate outcomes. The results of these analyses were similar to the composed measure need satisfaction: the amount of time spent on volunteer work activities during leisure time was a significant predictor of all three needs when they were tested separately as outcomes.

Table 3. Multi-level estimates for predicting mastery experiences

	Null Model			Model 1			Model 2			Model 3		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	2.615	0.060	43.58	2.562	0.200	12.81	2.534	0.198	12.80	2.604	0.196	13.29
Gender ^a				0.043	0.121	0.36	0.044	0.120	0.37	0.027	0.118	0.23
Age				0.008	0.006	1.33	0.008	0.006	1.33	0.008	0.006	1.33
Number of children				-0.029	0.060	-0.48	-0.035	0.059	-0.59	-0.032	0.059	-0.54
General mastery experiences				0.415	0.091	4.56***	0.410	0.090	4.56***	0.439	0.089	4.93***
Time spent on job- and task-related activities							0.015	0.074	0.20	0.108	0.069	1.57
Time spent on household and child-care activities							-0.068	0.067	-1.01	0.007	0.063	0.11
Time spent on low-effort activities							-0.177	0.050	-3.54***	-0.031	0.049	-0.63
Time spent on physical activities							0.069	0.086	0.80	0.172	0.080	2.15*
Time spent on social activities							-0.045	0.038	-1.18	0.014	0.036	0.39
Time spent on volunteer work activities										0.259	0.030	8.63***
-2*log			1,308.686			1,288.253			1,272.616			1,204.002
Diff - 2*log						20.433***			15.637**			68.614***
df						4			5			1
Level 1 intercept variance (SE)			0.789			0.786			0.759			0.636
			(0.057)			(0.057)			(0.055)			(0.046)
Level 2 intercept variance (SE)			0.177			0.116			0.115			0.137
			(0.051)			(0.042)			(0.041)			(0.040)

*p < .05; **p < .01; ***p < .001.

^a 1, female; 2, male.

Table 4. Multi-level estimates for predicting need satisfaction

	Null Model			Model 1			Model 2			Model 3		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	5.356	0.063	85.02	5.546	0.182	30.47	5.520	0.182	30.33	5.548	0.187	29.67
Gender ^a				-0.115	0.110	-1.05	-0.101	0.111	-0.91	-0.108	0.112	-0.96
Age				-0.001	0.005	-0.20	-0.002	0.005	-0.40	-0.002	0.005	-0.40
Number of children				0.011	0.057	0.19	0.014	0.057	0.25	0.014	0.058	0.24
General need satisfaction				0.495	0.070	7.07***	0.505	0.071	7.11***	0.508	0.072	7.06***
Time spent on job- and task-related activities							-0.144	0.063	-2.29*	-0.103	0.062	-1.66
Time spent on household and child-care activities							-0.034	0.058	-0.59	-0.003	0.057	-0.52
Time spent on low-effort activities							-0.091	0.042	-2.17*	-0.025	0.044	-0.57
Time spent on physical activities							-0.021	0.073	-0.29	0.025	0.072	0.35
Time spent on social activities							0.055	0.032	1.72	0.081	0.032	2.53*
Time spent on volunteer work activities										0.118	0.027	4.37***
-2*log Diff - 2*log df	1,193.921			1,151.309			1,134.740			1,116.282		
Level 1 intercept variance (SE)	0.567 (0.041)			42.612***			16.569***			18.458***		
Level 2 intercept variance (SE)	0.262 (0.056)			4			5			1		

* $p < .05$; ** $p < .01$; *** $p < .001$.^a 1, female; 2, male.

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the improvement of each model over the previous one, we calculated the differences between the corresponding likelihood statistics and tested them with chi-squared difference tests.

Table 5 displays the results of multi-level analysis for positive affect at work. Model 1 showed improvement over the Null Model. General positive affect at work was a significant predictor of daily positive affect at work. Model 2 showed further improvement over Model 1. Situational constraints were a significant negative predictor of positive affect at work. Model 3 did not show further improvement over Model 2. Model 4 did not show further improvement over Model 3, time spent on volunteer work activities did not predict positive affect at work. Finally, Model 5 did not show improvement over Model 4. Neither psychological detachment from work, nor mastery experiences or need satisfaction predicted positive affect at work.

Table 6 displays the results of the multi-level analysis for negative affect at work. Model 1 showed improvement over the Null Model. General negative affect at work was a significant predictor of daily negative affect at work. Model 2 showed further improvement over Model 1. Working hours and situational constraints were significant predictors of negative affect at work. Model 3 did not show further improvement over Model 2. Model 4, in contrast, showed improvement over Model 3. Time spent on volunteer work activities was a significant negative predictor of negative affect at work. Model 5 showed further improvement over Model 4. Need satisfaction was a significant negative predictor of negative affect at work, whereas psychological detachment from work and mastery experiences were not.

Table 7 displays the results of the multi-level analysis for active listening. Model 1 showed improvement over the Null Model. General active listening was a significant predictor of daily active listening. Neither Model 2 nor Model 3 or 4 showed improvement over the previous model. Time spent on volunteer work activities did not predict active listening at work. However, Model 5 showed improvement over Model 4. Psychological detachment from work as well as need satisfaction was significant positive predictor, mastery experiences did not predict active listening at work.

We tested if psychological detachment, mastery experiences, and need satisfaction are mediators in the relation between time spent on voluntary work in the evening and well-being during the following working day following the mediation steps by Baron and Kenny (1986): the first condition (i.e. the presumed independent variable accounts for variation in the presumed mediator) was met as showed hypothesis testing of Hypotheses 1-3. To test the second condition (i.e. the presumed mediator accounts for variation in the presumed dependent variable), we run additional analyses, where we entered the same variables as described above for testing Hypotheses 4-7 excluding the control variables measured during the evening (i.e. the amount of time spent on job- and task-related activities, the amount of time spent on household and child-care activities, the amount of time spent on low-effort activities, the amount of time spent on physical activities, and the amount of time spent on social activities) as well excluding the predictor time spent on volunteer work. With respect to positive affect at work, neither psychological detachment from work, nor mastery experiences, nor need satisfaction were significant predictors. For negative affect at work, need satisfaction was a significant predictor ($\gamma = -0.102$, $SE = 0.043$, $t = -2.37$). For active listening, psychological detachment from work ($\gamma = 0.104$, $SE = 0.038$, $t = 2.74$) as well as need satisfaction were significant predictors ($\gamma = 0.088$, $SE = 0.044$, $t = 2.00$). As to the third condition (i.e. a previously significant relationship between the independent variable and the dependent variable

Table 5. Multi-level estimates for predicting positive affect at work

	Null Model		Model 1		Model 2	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	4.0339	0.0966	4.0382	0.3601	4.0404	0.3582
Gender ^a			0.2643	0.1868	0.2597	0.1858
Age			0.0031	0.0077	0.0030	0.0076
Leadership position ^b			-0.3105	0.1858	-0.3086	0.1848
General positive affect at work			0.4432	0.0820	0.4417	0.0815
Working hours		41.76				
Situational constraints					-0.0178	0.0282
Time spent on job- and task-related activities					-0.2278	0.0657
Time spent on household and child-care activities						
Time spent on low-effort activities						
Time spent on physical activities						
Time spent on social activities						
Time spent on volunteer work activities						
Psychological detachment from work						
Mastery experiences						
Need satisfaction						
-2*log		1,298.4060		1,271.2070		1,258.0550
Diff - 2*log				27.199***		13.152***
df				4		2
Level 1 intercept variance (SE)		0.5909 (0.0434)		0.5904 (0.0432)		0.5716 (0.0419)
Level 2 intercept variance (SE)		0.8132 (0.1339)		0.5924 (0.1041)		0.5893 (0.1029)

Table 5. (Continued)

	Model 3			Model 4			Model 5		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	4.0481	0.3569	11.34	4.0559	0.2586	15.68	4.0508	0.3578	11.32
Gender ^a	0.2626	0.1851	1.42	0.2594	0.1859	1.40	0.2640	0.1856	1.42
Age	0.0028	0.0076	0.37	0.0029	0.0076	0.38	0.0031	0.0076	0.41
Leadership position ^b	-0.3102	0.1842	-1.68	-0.3075	0.1850	-1.66	-0.3061	0.1847	-1.66
General positive affect at work	0.4459	0.0813	5.48***	0.4486	0.0816	5.50***	0.4470	0.0815	5.48***
Working hours	-0.0187	0.0282	-0.66	-0.0194	0.0281	-0.69	-0.0181	0.0281	-0.64
Situational constraints	-0.2350	0.0659	-3.57***	-0.2318	0.0658	-3.52***	-0.2371	0.0658	-3.60***
Time spent on job- and task-related activities	-0.0603	0.0665	-0.91	-0.0462	0.0671	-0.69	-0.0388	0.0676	-0.57
Time spent on household and child-care activities	0.0019	0.0610	0.03	0.0120	0.0613	0.20	0.0095	0.0611	0.16
Time spent on low-effort activities	0.0509	0.0448	1.14	0.0719	0.0475	1.51	0.0694	0.0476	1.46
Time spent on physical activities	-0.0085	0.0771	-0.11	0.0061	0.0777	0.08	-0.0054	0.0783	-0.07
Time spent on social activities	0.0326	0.0341	0.96	0.0412	0.0346	1.19	0.0348	0.0348	1.00
Time spent on volunteer work activities				0.0377	0.0290	1.30	0.0235	0.0322	0.73
Psychological detachment from work							0.0574	0.0486	1.18
Mastery experiences							0.0050	0.0494	0.10
Need satisfaction							0.0386	0.0569	0.68
-2*log			1,255.0880			1,253.4060			1,250.8060
Diff - 2*log			2.967			1.682			2.600
df			5			1			3
Level 1 intercept variance (SE)			0.5683 (0.0416)			0.5644 (0.0413)			0.5612 (0.0413)
Level 2 intercept variance (SE)			0.5843 (0.1021)			0.5918 (0.1029)			0.5893 (0.1030)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a 1, female; 2, male.^b 1, no leadership position; 2, leadership position.

Table 6. Multi-level estimates for predicting negative affect at work

	Null Model		Model 1		Model 2	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	2.0256	0.0771	1.8623	0.2575	1.8645	0.2551
Gender ^a			0.2035	0.1335	0.2111	0.1322
Age			-0.0018	0.0056	-0.0018	0.0055
Leadership position ^b			-0.1256	0.1304	-0.1340	0.1292
General negative affect at work			0.4636	0.0651	0.4663	0.0646
Working hours		26.27				
Situational constraints						
Time spent on job- and task-related activities						
Time spent on household and child-care activities						
Time spent on low-effort activities						
Time spent on physical activities						
Time spent on social activities						
Time spent on volunteer work activities						
Psychological detachment from work						
Mastery experiences						
Need satisfaction						
-2 [×] log		1,076.1590		1,029.6750		1,009.5590
Diff - 2 [×] log				46.484 ^{***}		20.116 ^{***}
df				4		2
Level 1 intercept variance (SE)		0.3690 (0.0270)		0.3715 (0.0272)		0.3538 (0.0259)
Level 2 intercept variance (SE)		0.5192 (0.0860)		0.2868 (0.0533)		0.2840 (0.0524)

Table 6. (Continued)

	Model 3			Model 4			Model 5		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	1.8658	0.2555	7.30	1.8578	0.2570	7.23	1.8618	0.2570	7.24
Gender ^a	0.2089	0.1324	1.58	0.2134	0.1332	1.60	0.2056	0.1332	1.54
Age	-0.0018	0.0055	-0.33	-0.0018	0.0056	-0.32	-0.0021	0.0056	-0.38
Leadership position ^b	-0.1327	0.1294	-1.03	-0.1375	0.1302	-1.06	-0.1340	0.1302	-1.03
General negative affect at work	0.4654	0.0647	7.19***	0.4663	0.0651	7.16***	0.4657	0.0651	7.15***
Working hours	0.0657	0.0222	2.96**	0.0664	0.0220	3.02**	0.0651	0.0218	2.99**
Situational constraints	0.1537	0.0519	2.96**	0.1501	0.0516	2.91**	0.1561	0.0511	3.05**
Time spent on job- and task-related activities	0.0299	0.0522	0.57	0.0134	0.0525	0.26	0.0018	0.0524	0.03
Time spent on household and child-care activities	-0.0013	0.0478	-0.03	0.0132	0.0479	0.28	-0.0094	0.0474	-0.20
Time spent on low-effort activities	0.0004	0.0352	0.01	-0.0249	0.0372	-0.67	-0.0258	0.0369	-0.70
Time spent on physical activities	0.0043	0.0606	0.07	-0.0134	0.0609	-0.22	0.0001	0.0607	0.02
Time spent on social activities	-0.0069	0.0268	-0.26	-0.0170	0.0271	-0.63	-0.0060	0.0270	-0.22
Time spent on volunteer work activities				-0.0453	0.0227	-2.00*	-0.0218	0.0250	-0.87
Psychological detachment from work							-0.0421	0.0378	-1.11
Mastery experiences							-0.0195	0.0384	-0.51
Need satisfaction							-0.0981	0.0443	-2.21*
-2*log			1,009.1110			1,005.1600			996.0671
Diff - 2*log			0.448			3.951*			9.0929*
df			5			1			3
Level 1 intercept variance (SE)			0.3532 (0.0258)			0.3483 (0.0255)			0.3401 (0.0249)
Level 2 intercept variance (SE)			0.2849 (0.0524)			0.2906 (0.0530)			0.2922 (0.0530)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a 1, female; 2, male.^b 1, no leadership position; 2, leadership position.

Table 7. Multi-level estimates for predicting active listening at work

	Null Model		Model 1		Model 2	
	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	3.6795	0.0620	3.4859	0.2250	3.4862	0.2250
Gender ^a			0.2062	0.1172	0.2058	0.1172
Age			0.0019	0.0048	0.0019	0.0048
Leadership position ^b			-0.0953	0.1143	-0.0953	0.1143
General active listening at work			0.7880	0.1560	0.7873	0.1560
Working hours	59.35					
Situational constraints					-0.0016	0.0227
Time spent on job- and task-related activities					-0.0205	0.0530
Time spent on household and child-care activities						
Time spent on low-effort activities						
Time spent on physical activities						
Time spent on social activities						
Time spent on volunteer work activities						
Psychological detachment from work						
Mastery experiences						
Need satisfaction						
-2*log					1,007.7010	1,007.5350
Diff - 2*log					24.3200 ^{***}	0.1660
df					4	2
Level 1 intercept variance (SE)					0.3766 (0.0275)	0.3764 (0.0275)
Level 2 intercept variance (SE)					0.1975 (0.0408)	0.1977 (0.0409)

Table 7. (Continued)

	Model 3			Model 4			Model 5		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	3.4967	0.2258	15.49	3.4957	0.2255	15.50	3.4940	0.2234	15.64
Gender ^a	0.2069	0.1176	1.76	0.2073	0.1175	1.76	0.2116	0.1164	1.82
Age	0.0017	0.0049	0.35	0.0017	0.0048	0.35	0.0021	0.0048	0.44
Leadership position ^b	-0.0919	0.1148	-0.80	-0.0925	0.1147	-0.81	-0.0895	0.1136	-0.79
General active listening at work	0.7802	0.1566	4.98***	0.7799	0.1564	4.99***	0.7768	0.1550	5.01***
Working hours	-0.0006	0.0226	-0.03	-0.0005	0.0226	-0.02	0.0001	0.0222	0.01
Situational constraints	-0.0329	0.0530	-0.62	-0.0344	0.0530	-0.65	-0.0390	0.0523	-0.75
Time spent on job- and task-related activities	-0.0327	0.0350	-0.93	-0.0350	0.0537	-0.65	-0.0129	0.0533	-0.24
Time spent on household and child-care activities	0.0355	0.0486	0.73	0.0337	0.0490	0.69	0.0308	0.0482	0.64
Time spent on low-effort activities	0.0373	0.0358	1.04	0.0336	0.0381	0.88	0.0279	0.0377	0.74
Time spent on physical activities	0.0706	0.0617	1.14	0.0681	0.0624	1.09	0.0564	0.0620	0.91
Time spent on social activities	0.0433	0.0273	1.59	0.0419	0.0278	1.51	0.0296	0.0276	1.07
Time spent on volunteer work activities				-0.0065	0.0232	-0.28	-0.0212	0.0254	-0.83
Psychological detachment from work							0.1027	0.0386	2.66**
Mastery experiences							-0.0410	0.0392	-1.05
Need satisfaction							0.0926	0.0452	2.05*
-2*log			1,002.3400			1,002.2610			987.1823
Diff - 2*log			5.1950			0.0790			15.0787**
df			5			1			3
Level 1 intercept variance (SE)			0.3707 (0.0271)			0.3709 (0.0271)			0.3581 (0.0262)
Level 2 intercept variance (SE)			0.2005 (0.0410)			0.1998 (0.0409)			0.1973 (0.0401)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a 1, female; 2, male.^b 1, no leadership position; 2, leadership position.

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is no longer significant when controlling for the mediator), the results of testing Hypotheses 5-7 (Tables 5-7) showed that the effect of time spent on volunteer work activities for negative affect at work disappeared when including psychological detachment from work, mastery experiences, and need satisfaction in the multi-level models. Regarding the tests of these three conditions in sum, there is evidence for a relationship between time spent on volunteer work activities and negative affect at work mediated by need satisfaction. An additional Sobel test confirmed the significance of indirect effect ($z = -1.98, p < .05$).

Taken the results together, Hypotheses 1-3 were fully supported, whereas Hypotheses 4 and 7 were partially supported, Hypotheses 5 and 6 were not supported. A summary of the results of hypothesis testing is presented in Table 8.

Table 8. Summary of the seven hypotheses and the results of hypothesis testing

	Hypothesis	Results of hypothesis testing
1	Positive relationship between time spent on volunteer work activities during leisure time and psychological detachment from work	Fully supported
2	Positive relationship between time spent on volunteer work activities, activities during leisure time, and mastery experiences	Fully supported
3	Positive relationship between time spent on volunteer work activities during leisure time and need satisfaction	Fully supported
4	Positive relationship between time spent on volunteer work activities during leisure time and well-being during the following working day	Partially supported: the amount of time spent on volunteer work activities was positively related to negative affect at work during the following day
5	Psychological detachment from work during the evening as mediator for the positive relationship between time spent on volunteer work activities during leisure time and well-being during the following working day	Not supported
6	Mastery experiences during the evening as mediator for the positive relationship between time spent on volunteer work activities during leisure time and well-being during the following working day	Not supported
7	Need satisfaction during the evening as mediator for the positive relationship between time spent on volunteer work activities during leisure time and well-being during the following working day	Partially supported: the negative relationship between the amount of time spent on volunteer work activities during the evening and negative affect at work during the following day was mediated by need satisfaction

Discussion

The amount of time spent on volunteer work activities in the evening was positively related to psychological detachment from work, mastery experiences, and need satisfaction in the evening. Furthermore, psychological detachment from work in the evening was positively related to active listening at work during the following day. Need satisfaction in the evening was negatively related to negative affect at work during the following day and positively related to active listening at work during the following day. Furthermore, time spent on volunteer work during the evening was negatively related to negative affect at work during the following day. Need satisfaction in the evening mediated this relationship.

Positive relationships between the amount of time spent on volunteer work activities and psychological detachment from work and mastery experiences in the evening suggest volunteer work's potential to provide a break from paid work and to offer opportunities for recovery experiences. These results contribute to recovery research and are in line with similar research (e.g. Etzion *et al.*, 1998), as they show that even demanding and potentially stressful leisure-time activities such as volunteer work (Kinzel & Nanson, 2000) can be beneficial and can help people to temporarily disengage from work and thereby replenish their resources.

The positive relationship between the amount of time spent on volunteer work activities and need satisfaction in the evening suggests that volunteer work is a context which facilitates the fulfilment of basic psychological needs for competence, autonomy, and relatedness. Accordingly, this result complements existing research that considers the workplace as a context which facilitates the satisfaction of basic psychological needs (e.g. Baard, Deci, & Ryan, 2004; Ilardi, Leone, Kasser, & Ryan, 1993).

One may ask whether job-related activities during the evening are also important for positive non-work experiences such as mastery experiences or need satisfaction. The fundamental difference between volunteer work activities and job-related activities during leisure time is that volunteer work activities are per definition voluntary, whereas job-related activities during leisure time are probably not always voluntary. Although specific tasks in a voluntary work context might involve an obligatory aspect, the overall control whether to spend time on voluntary work is still in the hand of the volunteer. People may engage in job-related activities after work because they could not bring their task to an end during the working day, thus often job-related activities are associated with a 'must'. We would not exclude the possibility that job-related activities during leisure time offers possibilities for mastery experiences and need satisfaction – even if our data does not points into this direction (see Tables 3 and 4). However, in terms of recovery, people need breaks and disengagement from work (Meijman & Mulder, 1998) – experiences that are not possible during job-related activities during leisure time.

The positive relationship between psychological detachment from work in the evening and active listening during the following working day highlights the importance of psychological detachment from work. Other diary studies showed that psychological detachment from work in the evening is positively related to well-being at bedtime (Sonnentag & Bayer, 2005) and the following morning (Sonntag *et al.*, 2008). Our results suggest that the beneficial effects of psychological detachment from work continue during the following working day and enhance well-being at work (i.e. active listening). However, psychological detachment from work in the evening was neither related to positive nor to negative affect at work during the following working day.

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Maybe psychological detachment from work during the evening enables employees to react more positively to co-workers; positive and negative affect at work, however, might be influenced by more immediate events happening during the working day (Weiss & Cropanzano, 1996).

The finding that need satisfaction in the evening is negatively related to negative affect at work and positively related to active listening at work underlines the importance of need satisfaction for the individual. In other diary studies, daily need satisfaction was shown to be positively related to well-being before going to bed (Reis *et al.*, 2000; Sheldon, Ryan, & Reis, 1996). Here, we showed that the benefits of need satisfaction in the evening persist during the following working day and influences well-being at work.

The amount of time spent on volunteer work activities during leisure time was, via need satisfaction in the evening, negatively associated with negative affect at work during the following day. These results contribute to existing research on the relationships between non-work experiences and work outcomes in two perspectives: first, they suggest that there are positive connections between volunteer work and work and offer a valuable addition to the existing focus in the literature, which mainly concentrates on connections between family and work (Greenhaus & Powell, 2006). Second, because we established need satisfaction as a mediator, we are beginning to clarify the underlying processes involved in relationships between non-work experiences and work outcomes.

Need satisfaction in the evening was related to low levels of negative affect at work during the following day, but it was not related to positive affect at work during the following day. A possible explanation for this result is the ample importance of the three basic needs for competence, autonomy, and relatedness. Given that these three needs are fundamental to people's well-being (Deci & Ryan, 2000), their satisfaction seems to protect people from negative affect at work, rather to enhance positive affect at work. Neither need satisfaction nor psychological detachment from work seems to be sufficient to enhance positive affect at work, probably positive events *at work* are more relevant for positive affect at work.

Mastery experiences were not related to well-being at work. Although mastery experiences are important in the evening, they seem to not influence the following working day. Perhaps, mastery experiences influence one's working life in the long run, but not on a daily basis. One could imagine that competencies learned during mastery experiences in the evening accumulate and help to cope at work or enhance self-efficacy in the long run.

Limitations

One limitation of our study is that we assessed all variables with self-report measures instead of, for instance, using co-worker ratings. However, it was not certain that co-workers would have a realistic possibility to give valid ratings each day. To reduce the problem of common method variance, we separated the measurement of our predictors and outcomes temporally as often as possible (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Moreover, confirmatory factor analysis showed that our measures cannot be reduced to one underlying factor, making it unlikely that our findings can be solely attributed to common method bias.

A second limitation of our study pertains to the generalizability of the study results. Because we surveyed people who performed a volunteer work activity during their

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leisure time, the results of our study hold, strictly speaking, only for the population of volunteers. People who are not volunteering at all might derive mastery experiences and need satisfaction from other activities (e.g. physical and social activities).

Two of our measured non-work experiences, i.e. mastery experiences and need satisfaction may be seen as overlapping constructs given the closeness between mastery experiences and need for competence. However, there are important distinctions. First, the two constructs come from different research areas. While mastery experiences roots in the research area of recovery (Sonnentag & Fritz, 2007), need satisfaction roots in the area of motivation (Deci & Ryan, 2000). Second, the two constructs measure different experiences. While mastery experience refers to opportunities for experiencing proficiency and competence during a leisure-time activity, need for competence captures the actual perception of feeling competent. In line with this reasoning, our confirmatory factor analysis showed that mastery experience and need satisfaction are distinct constructs. In the future, both research directions – recovery and motivation – could profit from each other. Most probably, recovery research would benefit from the integration of the idea of importance of need satisfaction during leisure time.

Perhaps, the one-item measurement of leisure-time activities is suboptimal. However, such measurements of leisure-time activities are not unusual (e.g. Rook & Zijlstra, 2006) and mostly unavoidable in diary studies that ask a high level of involvement from the participants. Nevertheless, because we measured leisure-time activities and particular volunteer work with one item, we could capture a range of activities which people categorize themselves as the typical leisure-time activities. As we found a positive relationship between volunteer work – as measured here with one item – and recovery experiences as well as with need satisfaction and negative affect at work, we feel that all volunteer work activities have something in common, namely, they help to disengage from work, they provide mastery experiences and fulfil basic human needs. These relationships are important and interesting because they show that one kind of work (i.e. volunteer work; cf. Bierhoff, 2002) can help disengaging from another kind of work and because volunteer work is fundamental for many individuals' lives (i.e. when regarding the positive relationship with need satisfaction). However, in future studies, one should rethink the measurement of leisure-time activities (e.g. capturing the meaningfulness or enjoyment of volunteer work; cf. Berg, Grant, & Johnson, 2010). Knowing the special meaning of different leisure-time activities could help us to gain more insight about how people experience their activities. Associating time spent on different leisure-time activities with recovery experiences, need satisfaction, and well-being at work as we did it in our study, is, however, a first step towards the aim to detect important experiences associated with activities many people pursue in their leisure time.

Implications for future research and practice

Our study showed that the amount of time spent on volunteer work activities was related to non-work experiences, i.e. psychological detachment from work, mastery experiences, and need satisfaction in the evening. In future studies, further relationships between the amount of time spent on volunteer work activities and non-work experiences in the evening should be considered. For example, an interesting question for future research is whether need satisfaction through volunteer work can compensate for a lack of need satisfaction in the workplace.

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Having measured the recovery experiences of psychological detachment from work and mastery as well as need satisfaction, we investigated psychological non-work experiences that are known to be associated with a daily improvement of well-being (Sheldon *et al.*, 1996; Sonnentag & Bayer, 2005), thus that they are beneficial for recovery. Future research should also capture the relationship between time spent on volunteer work and the recovery experience of control (i.e. the degree to which a person can decide which activity to pursue during leisure time, as well as when and how to pursue this activity; Sonnentag & Fritz, 2007, p. 207). As we did not directly measure recovery in our study, we advise future studies to include measures such as need for recovery (van Veldhoven & Broersen, 2003), state of being recovered (Binnewies, Sonnentag, & Mojza, 2009), or fatigue (van Hooff, Geurts, Taris, & Kompier, 2007), that directly capture recovery as a result of respite experiences off the job. Furthermore, besides our examined indicators of well-being at work (i.e. positive and negative affect at work, active listening), one could explore other work outcomes such as, for instance, work engagement (Schaufeli, Bakker, & Salanova, 2006). Future research might also want to address the physiological and neuropsychological recovery processes in more detail, for instance the neuropsychological processes underlying the subjective experience of psychological detachment from work (cf. McEwen, 2007; Winwood *et al.*, 2007).

Considering the practical implications, organizations should facilitate their employees' volunteer work during leisure time. Assuming that need satisfaction in the evening is the mechanism linking the amount of time spent on volunteer work activities to well-being during the following working day, voluntary organizations, especially those which strongly rely on volunteers (e.g. the Red Cross) could pay attention to this issue and design tasks accordingly to make need satisfaction possible (e.g. by providing feedback).

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