SCANDINAVIAN JOURNAL OF WORK AND ORGANIZATIONAL PSYCHOLOGY

Sianoja, M., et al. (2016). Recovery during Lunch Breaks: Testing Long-Term Relations with Energy Levels at Work. *Scandinavian Journal of Work and Organizational Psychology*, 1(1): 7, 1–12, DOI: http://dx.doi.org/10.16993/sjwop.13

ORIGINAL ARTICLE

Recovery during Lunch Breaks: Testing Long-Term Relations with Energy Levels at Work

Marjaana Sianoja*, Ulla Kinnunen*, Jessica de Bloom*, Kalevi Korpela* and Sabine Geurts†

This study had two aims. First, we examined whether lunch break settings, activities, and recovery experiences were associated with lunchtime recovery cross-sectionally. Second, we investigated whether lunchtime recovery was related to energy levels (i.e., exhaustion and vigor) across a 12-month period.

We collected longitudinal questionnaire data among 841 Finnish workers (59% female, mean age 47 years) from 11 different organizations in various fields at two time points (spring 2013 and 2014). We used hierarchical regression analysis to test our hypotheses.

We found that recovery experiences, that is, psychological detachment from work and control during the lunch break, were related to successful lunchtime recovery. After controlling for background factors, main job characteristics (workload and autonomy), and the outcomes at baseline, successful lunchtime recovery was related to a decrease in exhaustion and to an increase in vigor one year later.

To conclude, lunch breaks offer an important setting for internal recovery during working days and seem to relate to energy levels at work over time.

Keywords: lunch breaks; recovery; detachment; control; exhaustion; vigor

Introduction

Recovery from work stress, that is, psycho-physiological unwinding after effort expenditure at work that restores employees' energy and mental resources, is a mechanism explaining how employees can protect their well-being and health in demanding working conditions (Craig & Cooper, 1992; Geurts & Sonnentag, 2006; Meijman & Mulder, 1998). Recovery plays an intervening role in the relationship between stressful job characteristics and the development of chronic load reactions, such as prolonged fatigue, sleep disorders, and cardiovascular diseases (Geurts & Sonnentag, 2006). Therefore, a more profound understanding of recovery processes is essential in promoting sustainable working life.

Recovery occurs during breaks from work when job demands are no longer present (Meijman & Mulder, 1998). Different forms of breaks range from sabbaticals and vacations to short micro-breaks within the working day. Recovery within working days, referred to as internal recovery, has received far less attention in the recovery research literature than off-job recovery, referred to as external recovery (Sonnentag & Fritz, 2015). Although recovery during breaks within the working day may not be as self-evident as recovery during leisure time, internal recovery has potential in preventing stress from accumulating early on, helping to maintain performance throughout the day and preventing high need for recovery at the end of the working day (Coffeng, van Sluijs, Hendriksen, van Mechelen, & Boot, 2015; Geurts, Beckers, & Tucker, 2014).

As workers typically spend a third to a half of their day at the workplace it is important to recognize the recovery potential of within working day breaks, and especially of the lunch break, which is typically the longest and most common of breaks in the course of the working day. Furthermore, organizations have a greater opportunity to influence employees' internal recovery than external recovery and, therefore, lunch breaks as a recovery setting may be of special interest to employers. For example, organizations may encourage regular lunch breaks and provide restorative environments (e.g., quiet rooms for relaxation). The question of how to recover successfully during lunch breaks has recently gained some research attention (Brown, Barton, Pretty, & Gladwell, 2014; Krajewski, Wieland, & Sauerland, 2010; Trougakos, Hideg, Cheng, & Beal, 2014). Nevertheless, research on internal recovery is still scarce (Sonnentag & Fritz, 2015).

In this study we examine which lunchtime settings, activities, and recovery experiences are related to lunchtime recovery (i.e., how often employees recuperate successfully from work during lunch breaks) in a cross-sectional sample (Study 1). Furthermore, we test whether lunchtime recovery is related to energy levels at work, that is, exhaustion and vigor, over a 12-month period (Study 2). Our study contributes to the literature on work stress

* University of Tampere, FI

† Radboud University Nijmegen, NL

Corresponding author: Marjaana Sianoja (marjaana.sianoja@uta.fi)

recovery by extending the understanding of how to promote internal recovery and exploring its relation with maintaining energy at work. **Figure 1** presents the model of the study with hypothesized relationships.

Recovery during lunch break: Theoretical and empirical perspectives

In the effort-recovery (E-R) model (Meijman & Mulder, 1998) recovery has been defined as a process of the psycho-biological system returning to its pre-stressor level. Recovery occurs when the demands causing strain are no longer present (Meijman & Mulder, 1998). When recovery is insufficient, an individual has to invest additional effort at work, which may cause strain and lead to accumulating strain reactions in the long term. Recovery therefore plays a significant role in counteracting strain caused by job demands and helps in maintaining well-being and energy at work.

Besides seeing recovery as a passive process (i.e., caused by mere absence of demands), active perspectives on recovery have also been introduced. According to conservation of resources (COR) theory (Hobfoll, 2002; Hobfoll, 1989), people are motivated to gain new resources and protect their existing resources. Resources are defined broadly as "objects, personal characteristics, conditions, or energies that are valued by the individual" (Hobfoll, 1989, p. 516). When resources are lost, threatened with loss, or new resources are not gained after effort investment, strain occurs. During breaks from work, people have the opportunity to engage in pleasant activities and to regain resources (e.g., energy and positive mood). Thus, to recover during a break, a break must ensure absence of job demands and provide an opportunity for employees to regain valued resources (Hobfoll, 2002; Meijman & Mulder, 1998). This also implies that breaks should be regular and long enough to allow enough time for recovery.

Additionally, break location (the place where the break is spent), break activities, and experiences during the break may influence its recovery potential as they are closely related to the absence of job demands and opportunities for resource gain. These aspects have been argued (Sonnentag & Natter, 2004) and shown (Sonnentag & Fritz, 2015; Sonnentag & Zijlstra, 2006; van Hooff & Baas, 2013) to be of importance in terms of recovery during leisure time. Some of these (e.g., activities) have also been identified in earlier research as important aspects of internal recovery (see Sianoja, Kinnunen, De Bloom, & Korpela, 2015).

When looking at recovery research on where breaks are spent, a recent 5-day diary study found no difference between spending breaks inside or outside the office in terms of resource recovery (Hunter & Wu, 2016). However, in this study carried out among 95 university staff members, the outside condition also included different spaces inside the office building (e.g., a break room), which may not offer as beneficial conditions for detachment from work as spaces outside the office building (e.g., a café or restaurant). Other studies have been specifically interested in natural environments. According to an intervention study by Brown et al. (2014), spending one's lunchtime walking in a natural environment was beneficial in terms of improved mental health when compared to walking in built environments. Accordingly, this study suggests that

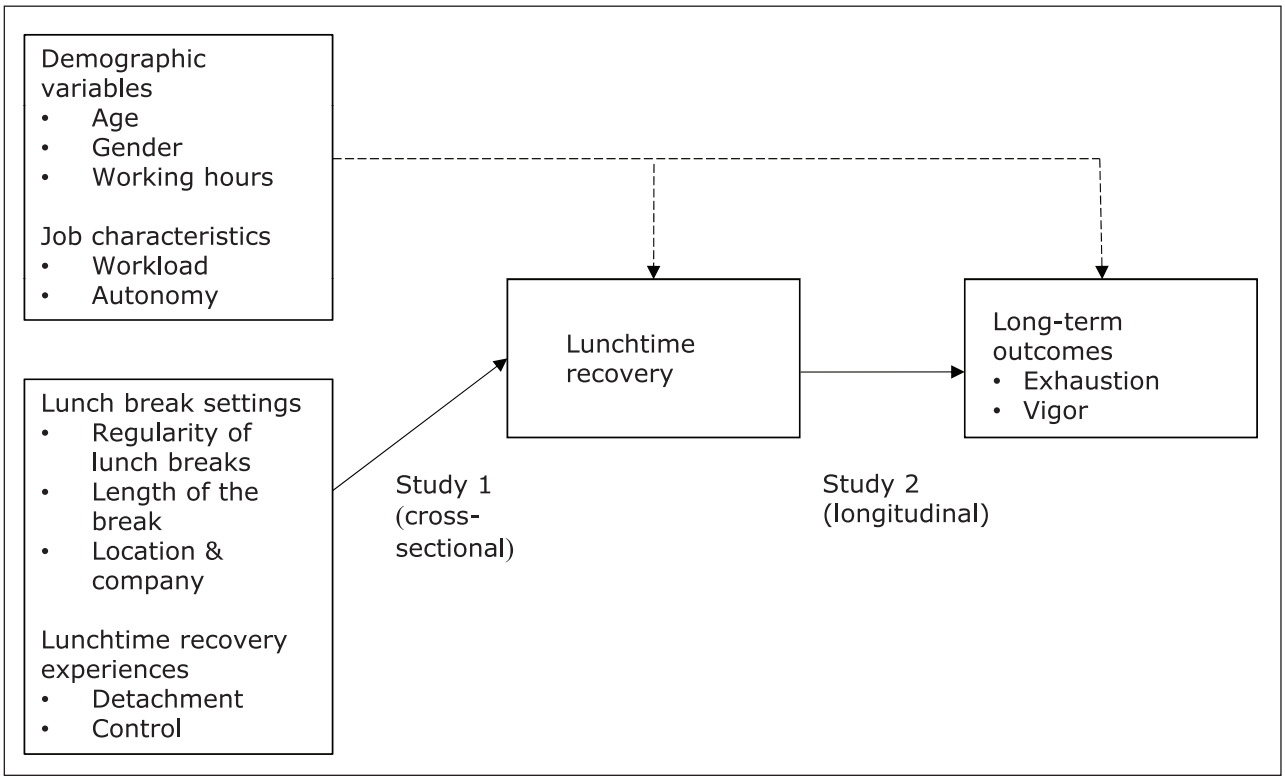

Figure 1: Model of the study.

break location may be significant in terms of recovery. To conclude, spending the lunch break outside the office building should, in theory, aid recovery, as it ensures better mental detachment from work offering a "change of scenery" where job demands are not present (e.g., Korpela, De Bloom, & Kinnunen, 2015).

Concerning break activities, earlier studies on internal recovery have associated relaxing, physical, and social activities with positive recovery outcomes (Coffeng et al., 2015; Krajewski et al., 2010; Trougakos et al., 2014). Of these, we focused on social activities. Wendsche et al. (2014) showed that collective rest breaks (i.e., breaks including social activities) were associated with less turnover than breaks spent alone. In addition, a study by Trougakos et al. (2014) focusing on different lunch break activities revealed that social activities that were based on individuals' own choice, were conducive to recovery.

In sum, in addition to absence of job demands, as suggested by the E-R model, earlier research shows that recovery may be also enhanced by engaging in activities that enable resource replenishment, as suggested by the COR theory.

Hypothesis 1: a) Having lunch breaks regularly, b) having longer lunch breaks, c) spending lunch breaks outside the office building and d) spending lunch breaks with others are positively associated with recovery during lunch breaks.

Furthermore, it has been argued that a recovering break should promote recovery experiences (Coffeng et al., 2015; Trougakos et al., 2014). According to Sonnentag and Fritz (2007), there are four such mechanisms: psychological detachment, relaxation, mastery, and control. Of these, we examined detachment, that is, not thinking about work, and control, that is, getting to choose how to spend one's free time (e.g., lunch breaks). These two experiences were chosen as they have gained most support in earlier studies. In studies focusing on recovery during leisure time, detachment has been identified as a core recovery experience (Sonnentag & Fritz, 2015). Psychological detachment from work, in addition to physical detachment, is crucial, as continuing to think about job demands during breaks may result in strain (Sonnentag & Fritz, 2007). In fact, in a cross-sectional study detachment during work breaks was connected to less need for recovery at the end of the day (Coffeng et al., 2015). Furthermore, autonomy (i.e., control) during lunch breaks has previously been linked to beneficial outcomes (Trougakos et al., 2014). More specifically, autonomy during lunch breaks was recognized as a moderator between lunch break activities and recovery outcomes: autonomy strengthened the positive effects of the activities. In addition, preferred work break activities have been associated with increased resources after the break (Hunter & Wu, 2016). Therefore break characteristics that enhance psychological detachment from work and allow control, may provide beneficial setting for recovery.

Hypothesis 2: Recovery experiences (detachment and control) during lunch breaks are positively associated with recovery during lunch breaks.

Long-term associations between lunchtime recovery and energy levels at work

As long-term outcomes of recovery we focused on energy, specifically on exhaustion and vigor at work. According to the E-R model (Meijman & Mulder, 1998), when recovery is insufficient, high and continuous demands lead to negative load effects and depletion of energy, which in the long term can lead to emotional exhaustion. Emotional exhaustion is one of the core burnout dimensions and refers to "feelings of being overextended and depleted of one's emotional and physical resources" (Maslach, Schaufeli, & Leiter, 2001, p. 399). Research has shown that emotional exhaustion predicts mental and physical illness, such as depression and cardiovascular diseases (Ahola, 2007), as well as increased sickness absence (Toppinen-Tanner, Ojajärvi, Väänänen, Kalimo, & Jäppinen, 2005).

Hunter and Wu (2016) found that resource recovery during workday breaks across one working week was associated with lower levels of exhaustion at the end of the week. As far as we know, the long-term effects between poor recovery during lunch breaks and exhaustion have not yet been examined. However, over time employees go through numerous cycles of daily lunchtime recovery processes, which may ultimately result in either gain or loss of energy depending on whether recovery is successful or incomplete. Therefore, insufficient recovery may, over time, result in cumulative resource loss in terms of higher exhaustion.

Hypothesis 3: Insufficient recovery during lunch breaks is related to high level of emotional exhaustion over time.

In contrast, successful recovery ensures that energy levels are sufficient for people to experience vigor at work (Meijman & Mulder, 1998). Vigor is one of the core dimensions of work engagement and is characterized by high activation, energy, and mental resilience while working (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Work engagement, and particularly vigor, has been shown to be important in terms of motivation and performance at work (Bakker, Demerouti, & Sanz-Vergel, 2014). It has also been shown that exhaustion and vigor are not endpoints of the same energy construct (Demerouti, Mostert, & Bakker, 2010; Mäkikangas, Feldt, Kinnunen, & Tolvanen, 2012). Thus we cannot conclude that absence of exhaustion automatically implies high levels of vigor. It is therefore important to measure both when examining the energy levels of individuals.

To the best of our knowledge, studies on internal recovery and its relation to vigor are so far lacking. However, on a daily level taking micro-breaks at work has been associated with vitality, a concept related to vigor (Zacher, Brailsford, & Parker, 2014). Furthermore, earlier research has established a positive link between external recovery and work engagement (Kühnel, Sonnentag, & Westman, 2009; Sonnentag, 2003). If recovery is repeatedly insufficient during lunch breaks, it may lead to loss of energy and over time reduce vigor. In addition, recovery is associated with resource gain (e.g., energy), and resources tend to accumulate and generate other resources in the long term (Hobfoll, 2002). Accordingly, successful

recovery during lunch breaks may result in energy gain, resulting in higher levels of vigor over time.

Hypothesis 4: Successful recovery during lunch breaks is related to high level of vigor over time.

Methods

Participants and Procedure

The data were collected as a part of larger project on recovery from work (see Kinnunen et al., 2016). The participants of this study were Finnish employees working in 11 different organizations in various fields, mostly working in cognitively or emotionally demanding jobs. The most common fields were education, information technology, and media. The questionnaire data were collected in two phases. First, in spring 2013 (Time 1), an electronic questionnaire was sent either directly to the employees' work e-mail addresses (in seven organizations) or the link to the questionnaire was delivered to the employees by our contact persons (in four organizations). Of the employees contacted (N = 3,593), 1,347 returned the completed questionnaire after two reminders, yielding a response rate of 37.5%. Second, in spring 2014 (Time 2) the electronic questionnaire was sent to those employees' e-mail addresses who responded in 2013 and who were still employed in the same organizations (N = 1,192). Of these, a total of 841 employees returned the completed questionnaire, yielding a response rate of 70.6%. In both study phases the employees were informed about the goals of the study, assured that responses would be treated confidentially and reminded that participation was voluntary.

In Study 1, we used the cross-sectional sample collected at T2, because not all variables (i.e., spending lunch breaks outside, spending breaks with others, lunchtime detachment, and lunchtime control) were measured at T1. A cross-sectional design was considered appropriate because we were interested in the immediate relations of break settings, activities, and experiences with lunchtime recovery. Study 2 was based on the longitudinal sample covering both measurements with a 12-month time lag between the measurements. It is difficult to theoretically determine the most appropriate time lag as we lack theories of change, and therefore even descriptive research on the time courses of important relationships has been recommended (Kelloway & Francis, 2013). We consider one year to be an appropriate time lag, as it is so far the most typical time period used in earlier recovery studies showing long-term effects (Kinnunen & Feldt, 2013; Siltaloppi, Kinnunen, Feldt, & Tolvanen, 2011; Sonnentag, Binnewies, & Mojza, 2010). Additionally, the reality of data collection in organizations imposed certain limitations. We were not able to schedule measurements more frequently because we had to consider the organizations' wishes and time constraints.

Of the sample used in both studies (N = 841), 58.6% were women. The participants' average age was 47.1 years (range 21–67, SD = 10.0). Most of the participants (76.4%) were living with a partner (either married or cohabiting), and 45.6% had children (average of two) living at home. Of the sample, 38.2% held a university degree (master's level or higher), 26.6% had a polytechnic degree, and the rest (35.2%) had a vocational school qualification or less. Of the participants, 8.3% were blue-collar workers (e.g., cleaners), 30.0% lower white-collar workers (e.g., office workers), 57.8% senior white-collar workers (e.g., teachers) and 3.8% senior-level managers (e.g., chief executive officers). The majority had a permanent job (89.0%), worked full-time (96.8%) and had a regular day shift (89.7%). Average weekly working hours were 39.1 (SD = 5.9). Of the participants, 53.6% worked in the public sector as teachers or administrative staff in vocational or upper secondary schools, or in a polytechnic (university of applied sciences). The rest (46.4%) worked in the private sector in various jobs.

In analyzing sample attrition we compared the respondents (n = 841) of the longitudinal sample with the non-respondents. The results indicated that the respondents did not differ from the non-respondents in terms of gender, age, having a partner, number of children or level of education. They also did not differ in terms of the study variables measured at both time points (regularity of taking lunch breaks, lunch break length, lunchtime recovery, exhaustion, or vigor). However, the respondents were more often employed as senior white-collar workers (58% vs. 50%) than the non-respondents ($p < .05$) and more often on a permanent job contract (89% vs. 79%) than the non-respondents ($p < .001$). Also, the respondents worked more hours per week (39.1 vs. 37.9 hours, $p < .01$) and more often on regular day shifts (90% vs. 83%, $p < .01$) than the non-respondents. As we used the data collected at T2 in our cross-sectional study, this sample attrition concerns both Study 1 and Study 2.

Measures

Recovery during lunch breaks

To measure the degree of *recovery during lunch breaks* at T1 and T2, we used one item "I recuperate from work during my lunch break" from the Recovery after Breaks Scale (Demerouti, Bakker, Sonnentag, & Fullagar, 2012) aiming to capture specifically how well and regularly employees recover during their lunch breaks. The item was rated on a scale from 1 (very seldom or never) to 5 (very often or always). Earlier studies have provided support for the validity of single item measures (e.g., Drolet & Morrison, 2001; Elo, Leppänen, & Jahkola, 2003). Concerning recovery, it has been shown that recovery from work measured with one item correlated highly with longer recovery scales, such as need for recovery (Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011).

Break settings, activities and experiences

Of *break settings and activities*, we measured regularity of lunch breaks [dichotomized to 0 = occasionally (1–3 times a week), 1 = regularly (4–5 times a week)] and length of the lunch break (in minutes). Those participants (n = 36 at T1 and n = 32 at T2) who reported not taking lunch breaks, were not asked to answer any further lunch break related questions (recovery during lunch break, break activities, or experiences) and as lunch break recovery was the main focus in our study, they were excluded from the analyses.

In addition at T2, we asked whether the employees habitually spent their lunch breaks outside the office building ["I spend my lunch break outside my company building (e.g., in a restaurant or in a café)"] or with others ["I spend my lunch break with others (e.g., with colleagues, acquaintances, friends or family members)"]. The answers were dichotomized [0 = no (hardly ever or once a week), 1 = yes (2–5 times a week)].

Of *recovery experiences*, we measured detachment and control during lunchtime at T2. Both detachment and control were measured with one item (respectively: "I distance myself mentally from my work during lunch breaks" and "I decide myself how to spend my lunch breaks") from the Finnish version of the Recovery Experience Questionnaire (Kinnunen et al., 2011; Sonnentag & Fritz, 2007). The items were adapted to concern lunch breaks and measured on a scale from 1 (very seldom or never) to 5 (very often or always).

Potential long-term outcomes

Emotional exhaustion was measured at T1 and T2 with the five-item scale (e.g., "I feel emotionally drained from my work") from the Maslach Burnout Inventory (Kalimo, Hakanen, & Toppinen-Tanner, 2006; Maslach, Jackson, & Leiter, 1996) with response options on a seven-point response scale from 0 (never) to 6 (every day). The Cronbach's alphas were .93 at T1 and .93 at T2.

Vigor was measured at T1 and T2 with the three-item shortened scale (e.g., "At my work, I feel bursting with energy") from the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006) using a seven-point response scale ranging from 0 (never) to 6 (every day). The Cronbach's alphas were .89 at T1 and .90 at T2.

Control variables

Of the background factors, we controlled for age (in years), gender (1 = woman, 2 = man) and working hours per week, as these may play a role in recovery (e.g., Mohren, Jansen, & Kant, 2010; Siltaloppi et al., 2011). *Working hours* were measured with a single question: "How many hours do you actually work per week? (Include paid and unpaid overtime, but not your commuting time)".

We also controlled for main *job characteristics*, namely workload and autonomy, measured at T1 and T2 as they may act as confounding variables in our study. First, appropriate job design may above all promote internal recovery (Geurts et al., 2014) as it enables the employees to adjust their work according to their current need for recovery. Furthermore, job demands and resources play a pivotal role in maintaining energy as job demands may start a health deteriorating process leading to exhaustion, and job resources, in turn, to a health promoting process leading to an increase in vigor (Bakker et al., 2014). *Workload* was measured with three items (e.g., "How often does your job require you to work under time pressure?", Cronbach's alphas .88 at T1 and .87 at T2) from the Quantitative Workload Inventory (Spector & Jex, 1998). *Autonomy* was measured with five items (e.g., "I can influence decisions that are important for my work", Cronbach's alphas .77 at T1 and .78 at T2) from the QPS Nordic-ADW (Dallner et al., 2000). All job characteristics were measured with a five-point scale from 1 (very seldom or never) to 5 (very often or always).

Analyses

In both studies (Studies 1 and 2), we used hierarchical regression analyses to test our hypotheses. In the cross-sectional Study 1 lunchtime recovery served as a dependent variable. At the first step, we added the control variables (age, gender, weekly working hours, workload, and autonomy). At the second step we added variables describing lunch break settings and activities (regularity of the lunch breaks, length of the lunch break, break outside, and with others). Finally, at the third step we added recovery experiences (detachment and control) during lunch breaks.

In the longitudinal Study 2, we followed similar steps with both outcomes (exhaustion and vigor). At the first step, we controlled for the outcome at Time 1. At the second step, we added control variables (age, gender, weekly working hours, workload, and autonomy). Lunchtime recovery at Time 1 was added at the final step, as we were interested in its explanatory power after controlling for the outcome at Time 1, background factors and work characteristics.

Results

Descriptive results

Means, standard deviations, and zero-order correlations of the study variables are presented in **Table 1** (Study 1) and **Table 2** (Study 2). We first looked at the frequencies of lunch break characteristics examined in Study 1, in which all variables were measured at T2. To have a regular lunch break was common in our sample, as 86% of the participants reported taking a lunch break 4–5 times a week. Of those participants who took lunch breaks at least once a week, 37% reported habitually spending the break outside the office building and 71% with other people. In Study 1, of the lunch break settings and activities, regular lunch breaks (r = .21), longer lunch breaks (r = .16), breaks outside the office building (r = .17), and breaks with others (r = .08) showed positive associations with lunchtime recovery. However, both recovery experiences – detachment and control – during lunch breaks showed the strongest correlations: high level of detachment (r = .59) and control (r = .30) during lunch breaks were associated with successful lunchtime recovery. In addition, of the control variables, workload was negatively (r = –.12) and autonomy positively (r = .33) associated with recovery during lunch breaks.

In Study 2 there were significant longitudinal correlations between lunchtime recovery and both potential long-term outcomes (**Table 2**). Lunchtime recovery at T1 was negatively related to exhaustion at T2 (r = –.35) and positively related to vigor at T2 (r = .36). Of the control variables gender (female), long weekly working hours, high workload and low autonomy were related to exhaustion at T2, and gender (female) and high level of autonomy were related to vigor at T2. In addition, lunchtime recovery (r = .48) and both outcomes (r = .69 for exhaustion and

	M / %	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Lunchtime recovery	3.42	0.97	–										
2. Age	48.13	10.02	.04	–									
3. Gender[1]	58.6%	–	.03	.04	–								
4. Weekly working hours	38.65	5.90	−.03	−.06	.07*	–							
5. Workload	3.82	0.79	−.12***	−.07	−.15***	.27***	–						
6. Autonomy	3.20	0.80	.33***	−.06	.16***	.05	−.24***	–					
7. Regularity of lunch breaks[2]	86.2%	–	.21***	−.13***	−.04	.04	−.05	.10**	–				
8. Length of lunch break	29.02	8.55	.16***	−.05	.11**	−.02	−.05	.06	.08*	–			
9. Lunch break outside[3]	36.9%	–	.17***	−.04	.11**	.12**	.08*	.14***	.15***	.15***	–		
10. Lunch break with others[4]	71.4%	–	.08*	−.09**	−.13***	.03	.02	.05	.21***	.07*	.12**	–	
11. Detachment at lunch break	3.33	1.06	.59***	.01	.01	−.09*	−.16***	.18***	.21***	.18***	.19***	.03	–
12. Control at lunch break	4.27	0.96	.30***	.03	.11**	.03	–.05	.38***	.05	.19***	.22***	.05	.24***

Table 1: Means, standard deviations, and zero-order correlations of the study variables in Study 1.

Note. [1]Gender: 1 = female, 2 = male; [2]Regularity of lunch breaks: 0 = occasionally (1–3 times a week), 1 = regularly (4–5 times a week); [3]Break outside: 0 = no (hardly ever or once a week), 1 = yes (2–5 times a week); [4]Break with others: 0 = no (hardly ever or once a week), 1 = yes (2–5 times a week).

The second column shows percentages for categorical variables: [1] % of female participants; [2] % of participants taking lunch breaks regularly; [3] % of participants typically spending lunch breaks outside; [4] % of participants typically spending lunch breaks with others.

* $p < .05$; ** $p < .01$; *** $p < .001$; $807 < N < 841$.

	M / %	*SD*	1	2	3	4	5	6	7	8	9
1. Lunchtime recovery T1	3.39	1.00									
2. Age T1	47.13	10.02	.08*								
3. Gender[1]	58.6%	–	.01	.04							
4. Weekly working hours T1	39.09	5.94	−.09*	−.01	.06						
5. Workload T1	3.89	0.82	−.16***	.03	−.16***	.28***					
6. Autonomy T1	3.18	0.82	.30***	−.08*	.16***	.05	−.30***				
7. Exhaustion T1	1.92	1.45	−.41***	.04	−.11**	.12**	.36***	−.35***			
8. Vigor T1	4.53	1.21	.43***	.01	−.06	.05	.01	.26***	-.45***		
9. Exhaustion T2	1.92	1.41	−.35***	−.02	−.15***	.08*	.31***	−.30***	.69***	−.35***	
10. Vigor T2	4.37	1.32	.36***	.00	−.09**	.07	.04	.19***	−.37***	.68***	-.45***

Table 2: Means, standard deviations, and zero–order correlations of the study variables in Study 2.
Note. [1]Gender: 1 = female, 2 = male.
The second column shows percentages for categorical variables: [1] % of female participants.
* $p < .05$; ** $p < .01$; *** $p < .001$; $785 < N < 841$.

$r = .68$ for vigor) were relatively stable between T1 and T2. No mean level changes occurred in lunchtime recovery or exhaustion between T1 and T2. However, vigor was significantly lower at T2 than at T1 ($p < .001$).

Testing the hypotheses

Study 1

The results of the hierarchical regression analysis concerning the associations between lunch break settings, activities, recovery experiences, and lunchtime recovery are shown in **Table 3**. At step 1, control variables (background variables and job characteristics) explained 12% of the variance in lunchtime recovery and autonomy at work significantly contributed to lunchtime recovery. Regular lunch breaks, longer lunch breaks and habitually spending lunch breaks outside the office building contributed to successful lunchtime recovery, increasing the explanation rate of the model to 17%. Spending lunch breaks with others did not contribute to lunchtime recovery. After adding recovery experience variables to the model at step 3, only regularity of the lunch breaks (of the lunchtime characteristics entered at step 2) continued to be associated with lunchtime recovery. Both detachment and control were positively related to recovery, and they raised the explanation rate of the model to 41%. Detachment ($\beta = .51$, $p < .001$) predicted lunchtime recovery more strongly than control ($\beta = .09$, $p < .01$).

In sum, Hypothesis 1 was partially supported, as most of the positive effects of lunchtime settings and activities disappeared when lunchtime recovery experiences were entered into the model. More specifically, Hypothesis 1a was fully supported, as taking lunch breaks regularly contributed to successful lunchtime recovery. Hypotheses 1b and 1c were partially supported, as longer lunch breaks and spending breaks outside were only significant before recovery experiences were entered into the model. Hypothesis 1d did not receive support, as spending lunch breaks with others did not contribute to recovery. Furthermore, Hypothesis 2 was fully supported, as both high levels of detachment and control during lunch break contributed to successful lunch break recovery.

Study 2

The results of hierarchical regression analyses exploring the longitudinal relationships of lunchtime recovery with exhaustion and vigor are shown in **Table 4**. Concerning *exhaustion*, at step 1, exhaustion at T1 strongly predicted exhaustion at T2 explaining 47% of the variance. At the second step, adding the control variables, the explanation rate of the model increased by 1 %, as gender (female) was significantly related to exhaustion. At the final step, lunchtime recovery at T1 contributed significantly ($\beta = -.07$) to exhaustion at T2. The increase in the explanation rate was significant, although it increased only 0.3%. The explanation rate of the final model was 48%. Thus, in line with Hypothesis 3, successful recovery at lunch breaks seems to explain – to a minor degree – a decrease in exhaustion across one year.

In the model predicting *vigor*, at step 1, vigor at T1 strongly predicted vigor at T2 explaining 47% of the variance. At the second step, adding the control variables neither background factors nor job characteristics were significant predictors of vigor. At the final step, lunchtime recovery at T1 contributed significantly ($\beta = .10$) to vigor at T2 and added 1% to the explanation rate. The explanation rate of the final model was 48%. Thus, in line with Hypothesis 4 successful recovery at lunch breaks seems to explain – to a minor degree – an increase in vigor across one year.

Discussion

This study had two main aims. First, we investigated whether certain lunch break settings, activities, and experiences were related to recovery during lunch breaks. Second, we examined whether lunchtime recovery was associated with energy levels at work one year later. We based our study on the E-R model and the COR theory.

	Lunchtime recovery		
	Step 1	Step 2	Step 3
Predictors	β	β	β
Age	.06	.09*	.06*
Gender[1]	−.03	−.04	−.03
Weekly working hours	−.04	−.05	.00
Workload	−.04	−.04	.01
Autonomy	.33***	.30***	.22***
Regularity of lunch breaks[2]		.15***	.07*
Length of lunch break		.11**	.03
Lunch break outside[3]		.11**	.01
Lunch break with others[4]		–.00	.02
Detachment at lunch break			.51***
Control at lunch break			.09**
ΔR^2	.12***	.06***	.24***
R^2	.12***	.17***	.41***

Table 3: Results of hierarchical regression analysis for lunchtime recovery (Study 1), N = 774.
Note. [1]Gender: 1 = female, 2 = male; [2]Regularity of lunch breaks: 0 = occasionally (1–3 times a week), 1 = regularly (4–5 times a week); [3]Break outside: 0 = no (hardly ever or once a week), 1 = yes (2–5 times a week); [4]Break with others: 0 = no (hardly ever or once a week), 1 = yes (2–5 times a week).
* $p < .05$; ** $p < .01$; *** $p < .001$.

	Model 1			Model 2		
	Exhaustion			Vigor		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Predictors at T1	β	β	β	β	β	β
Dependent variable at T1[1]	.68***	.65***	.63***	.69***	.68***	.64***
Age T1		−.04	−.03		−.03	−.04
Gender[2]		−.07*	−.07*		−.05	−.05
Weekly working hours T1		−.02	−.02		.04	.05
Workload T1		.05	.06		.02	.03
Autonomy T1		−.03	−.02		.03	.01
Lunchtime recovery T1			−.07*			.10**
ΔR^2	.47***	.01**	.003*	.47***	.01	.01**
R^2	.47***	.48***	.48***	.47***	.48***	.49***

Table 4: Results of hierarchical regression analysis for exhaustion (Model 1) and vigor (Model 2) at T2 (Study 2), N = 745.
Note. [1]Dependent variable at T1: For the first model Exhaustion at T1, for the second model Vigor at T1. [2]Gender: 1 = female, 2 = male.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Among our sample of Finnish workers, having lunch breaks was common, as 86% of the participants took them 4–5 times a week. On average, the participants felt occasionally recovered after their lunch breaks and no changes in this regard were observed across one year. In line with our expectations, of the break settings or activities, regularity of the lunch breaks, length of the lunch break and spending lunch breaks outside the office contributed to successful lunchtime recovery. Thus, our study supports the importance of taking regular lunch breaks. However, associations between break length and breaks outside were no longer significant after taking recovery experiences into account. As expected, we found that higher levels of detachment and control during lunch breaks were related to more successful lunchtime recovery. This finding concurred with earlier research on internal recovery (Coffeng et al., 2015; Trougakos et al., 2014). In light of our results, it seems that detachment is more meaningful in terms of lunchtime recovery than control. This is logical, as detachment ensures total absence of job

demands, whereas employees with high level of control may still choose to engage, for example, in discussing work issues. Our result therefore extends the earlier finding that detachment from work is a powerful recovery experience during non-work time (Sonnentag & Fritz, 2015). However, our one-item measure for control did not necessarily capture all dimensions of control as a recovery experience, for example control over when to take lunch breaks (cf. Sonnentag & Fritz, 2007). The measure used may therefore have underestimated the importance of control during breaks. We recommend future studies to assess recovery experiences at lunchtime with multiple items to capture their full meaning.

Both taking longer lunch breaks and habitually spending breaks outside the workplace premises were correlated with higher levels of detachment. Thus our results suggest that lunch break length and spending lunch breaks outside the office building may matter for lunchtime detachment, which in turn relates to lunchtime recovery. We recommend that future studies, with longitudinal designs enabling appropriate mediation analysis, test whether lunchtime recovery experiences mediate the effects of lunchtime settings and activities on recovery. One earlier study found that spending the break inside versus outside one's office (outside = in the same building or outside the building) did not have an effect on recovery after breaks during the working day (Hunter & Wu, 2016). As our results suggest that where lunch breaks are spent could matter, it is important to note that our measure (outside = outside the office building) was different from the one used by Hunter and Wu (2016). Therefore we suggest that future studies use more comprehensive measures in differentiating where breaks are spent to disentangle these differing results. For example, spending breaks in the break room of the department could have different recovery outcomes from spending breaks outside the office building in a restaurant. Furthermore, our outside condition was quite general, and did not take specific recovery enhancing environmental factors (e.g., natural settings) into account. Given that natural settings are more likely to afford restorative experiences than are built environments, comparing them would be a good option for future studies (Brown et al., 2014).

Furthermore, in our study, spending the lunch breaks with others was not associated with recovery. This is surprising, as earlier research suggests that breaks including social activities are more beneficial for recovery than breaks spent alone (Wendsche et al., 2014). However, earlier research has also suggested that social activities are more beneficial when based on one's own choice (Trougakos et al., 2014). Our study took no account of this issue, which may explain our non-significant finding. Additionally, we did not distinguish between spending the break with colleagues and spending the break with other people, like friends and family. This may be important, as in theory spending the lunch break with friends or family may relate to more successful detachment from work than spending the break with colleagues. Therefore we recommend that future studies take into account whether social activities are based on employees' own choice and with whom employees spend their breaks.

When looking at lunchtime recovery and its long-term relationship with energy levels, we found that successful lunchtime recovery was associated with less exhaustion one year later, as expected. Although the effects we found were small, it is worth noting that this relationship was still valid after controlling for baseline level of exhaustion and several controls. Thus successful lunchtime recovery explained a minor decrease in exhaustion in the long term. Our findings lend tentative support to our expectations derived from the E-R model: insufficient recovery during lunch breaks is related to loss of energy. When this loss of energy accumulates over time due to repeated episodes of insufficient recovery, it may partly explain increased levels of exhaustion. Furthermore, our result is in line with the conclusions of earlier studies linking internal recovery with less exhaustion in the short term (Hunter & Wu, 2016).

Similarly, the connection between lunchtime recovery and vigor was supported. Successful recovery was related to a minor increase in vigor one year later after controlling for baseline level of vigor and several other controls. These findings tentatively support our expectations derived from the E-R and COR theories that successful recovery prevents energy loss and increases internal resources (e.g., energy). When lunchtime recovery is repeatedly successful, it accumulates and generates new resources across time, relating to a small increase in vigor. As the levels of exhaustion and vigor at work were reasonably stable over one year (i.e., the T1 level explained about half of their variance at T2), our findings estimating the long-term change in energy levels due to lunchtime recovery can be considered promising. Taken together, lunchtime recovery seems to be of importance in terms of energy at work over time.

Limitations, strengths, and suggestions for future studies

This study has certain limitations that should be considered. First, choosing the best time lag for studying longitudinal relations between internal recovery and energy is not self-evident and the one-year time lag used in our study is debatable. Our results explained variation in energy levels only to a minor degree. The effects would likely be stronger if more frequent measures over shorter time lags (e.g., every couple of months) were applied. Future research may benefit from testing similar long-term effects with more frequent measurements over different time spans. Nevertheless, our longitudinal analysis supported long-term relationships between lunchtime recovery, exhaustion and vigor, supporting the view that employees' degree of recovery during their lunch breaks may have significance, not only on a daily level, but also in the long-term.

Second, although previous studies have demonstrated one item measures to be valid substitutes for longer scales (Drolet & Morrison, 2001; Elo et al., 2003; Fisher, Matthews, & Gibbons, 2016; Kinnunen et al., 2011) future research may benefit from using multiple item measures for lunchtime recovery and recovery experiences. Third,

a further limitation concerning the measures is that our study relies solely on self-report measures and may therefore suffer from common method bias. This limitation mainly concerns the cross-sectional part of this study, as temporal separation can be an effective way to reduce common method bias (Spector, 2006). Still, future studies may benefit from using measures that are more objective, such as physiological measures, in examining internal recovery. Also, the cross-sectional study permits no causal interpretations. In the future the question of what factors promote recovery during lunch breaks may best be tested with intervention studies.

Fourth, the response rate was relatively low (37.5% at T1 and 23.4% at T2 relative to baseline respondents) and self-selection occurred between T1 and T2 in terms of a permanent job contract, occupational status (more often senior white-collar workers), working more often on regular day shifts, and longer working hours per week. This self-selection also concerns the cross-sectional part of our study, where we used the sample collected at T2. This was due to the fact that our T1 questionnaire did not include all items related to lunch breaks (spending lunch breaks outside, spending breaks with others, detachment, or control). Therefore, the generalizability of our results may be limited. However, the response rate is similar to those of other studies conducted in organizational settings (see Baruch & Holtom, 2008, for a review), and our large and diverse sample makes the results more generalizable to wider populations. Nevertheless, it would be useful to replicate our results in other samples in future.

Fifth, our study included a limited variety of lunchtime activities and only examined their frequency. For example, we asked how often employees engaged in social activities or spent their breaks outside the office building, but did not differentiate with whom and where exactly the breaks were spent. Therefore we recommend that future studies take these issues into account using more specific and comprehensive measures. We also recommend measuring other experiences in addition to detachment and control during workday breaks. For example, relaxation may be important in terms of internal recovery, as it reduces psycho-physiological activation and elicits positive affect (Sonnentag & Fritz, 2007). It may be possible to increase the experience of relaxation during breaks by engaging in relaxation exercises (Krajewski et al., 2010) or less deliberately by engaging in other relaxing activities, such as listening to music or going for a walk.

Despite these limitations, our study has several strengths. Earlier research on recovery has focused almost exclusively on external recovery. This study provides new insights on recovery during within working day breaks. Specifically, it demonstrated that although lunch breaks are limited in time, taking regular lunch breaks, which enhance mental detachment and control over how to spend the break, relate positively to successful recovery. Our study also demonstrated that lunchtime recovery has importance in terms of long-term exhaustion and vigor. Our results on lunchtime recovery may be of particular interest to organizations, as compared to external recovery, organizations may influence the settings they provide for recovery during within working day breaks.

Conclusions

This study demonstrated that lunchtime recovery may best be promoted by ensuring control and especially detachment during lunch breaks. In practice, organizations could promote lunchtime recovery by giving options to spend lunch breaks in different ways that enable detachment, such as spending the break in a non-work environment or offering a space for relaxing activities. This recommendation is suitable for fields where workers are at risk of insufficient recovery, for example, employees in cognitively or emotionally demanding jobs, and where the work tasks enable flexibility in terms of lunch break settings and activities. Furthermore, our study suggests that recovery during lunch breaks and energy levels at work are related across time. Thus if lunchtime recovery is repeatedly successful, it may contribute to a decrease in exhaustion and an increase in vigor. In summary, lunch breaks offer an important recovery setting to promote occupational health and well-being alongside recovery during leisure time.

Funding Statement

This study was supported by the Academy of Finland (grant 257682).

Competing Interests

The authors declare that they have no competing interests.

References

Ahola, K. (2007). *Occupational Burnout and Health*. People and Work Research Reports, 81. Helsinki: Finnish Institute of Occupational Health.

Bakker, A. B., Demerouti, E., & **Sanz-Vergel, A. I.** (2014). Burnout and work engagement: The JD–R approach. *Annu. Rev. Organ. Psychol. Organ. Behav., 1*, 389–411. DOI: http://dx.doi.org/10.1146/annurev-orgpsych-031413-091235

Baruch, Y., & **Holtom, B. C.** (2008). Survey response rate levels and trends in organizational research. *Human Relations, 61*, 1139–1160. DOI: http://dx.doi.org/10.1177/0018726708094863

Brown, D. K., Barton, J. L., Pretty, J. N., & **Gladwell, V.** (2014). Walks4Work: Assessing the role of the natural environment in a workplace physical activity intervention. *Scandinavian Journal of Work, Environment & Health, 40*, 390–399. DOI: http://dx.doi.org/10.5271/sjweh.3421

Coffeng, J. K., van Sluijs, E. M., Hendriksen, I., van Mechelen, W., & **Boot, C.** (2015). Physical Activity and Relaxation During and After Work are Independently Associated With Need for Recovery. *J Phys Act Health, 12*, 109–115. DOI: http://dx.doi.org/10.1123/jpah.2012-0452

Craig, A., & **Cooper, R. E.** (1992). Symptoms of acute and chronic fatigue. In Smith, A., & Jones, D. (Eds.), *Handbook of Human Performance*. London:

Academic Press, Vol. 3, pp. 289–339. DOI: http://dx.doi.org/10.1016/b978-0-12-650353-1.50017-4

Dallner, M., Elo, A.-L., Gamberale, F., Hottinen, V., Knardahl, S., Lindström K., et al. (2000). *Validation of the General Nordic Questionnaire (QPSNordic) for Psychological and Social Factors at Work*. Nordic Council of Ministers, Copenhagen. Nord.

Demerouti, E., Bakker, A. B., Sonnentag, S., & **Fullagar, C. J.** (2012). Work-related flow and energy at work and at home: A study on the role of daily recovery. *Journal of Organizational Behavior, 33*, 276–295. DOI: http://dx.doi.org/10.1002/job.760

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

Drolet, A. L., & **Morrison, D. G.** (2001). Do we really need multiple-item measures in service research? *Journal of Service Research, 3*, 196–204. DOI: http://dx.doi.org/10.1177/109467050133001

Elo, A.-L., Leppänen, A., & **Jahkola, A.** (2003). Validity of a single-item measure of stress symptoms. *Scandinavian Journal of Work, Environment & Health, 29*, 444–451. DOI: http://dx.doi.org/10.5271/sjweh.752

Fisher, G. G., Matthews, R. A., & **Gibbons, A. M.** (2016). Developing and investigating the use of single-item measures in organizational research. *Journal of Occupational Health Psychology, 21*(1), 3–23. DOI: http://dx.doi.org/10.1037/a0039139

Geurts, S., Beckers, D., & **Tucker, P.** (2014). Recovery from demanding work hours. In Peeters, M., De Jonge, J., & Taris, T. (Eds.), *An introduction to Contemporary Work Psychology*. Chichester: Wiley.

Geurts, S., & **Sonnentag, S.** (2006). Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scandinavian Journal of Work, Environment & Health, 32*, 482–492. DOI: http://dx.doi.org/10.5271/sjweh.1053

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*, 513–524. DOI: http://dx.doi.org/10.1037/0003-066X.44.3.513

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

Hunter, E. M., & **Wu, C.** (2016). Give Me a Better Break: Choosing Workday Break Activities to Maximize Resource Recovery. *Journal of Applied Psychology, 101*, 302–311. DOI: http://dx.doi.org/10.1037/apl0000045

Kalimo, R., Hakanen, J., & **Toppinen-Tanner, S.** (2006). *Maslachin yleinen työuupumuksen arviointimenetelmä MBI-GS* (*The Finnish version of the Maslach burnout inventory –general survey*). Helsinki: Finnish Institute of Occupational Health.

Kelloway, E. K., & **Francis, L.** (2013). Longitudinal research and data analysis. In Tetric, L., Wang, M., & Sinclair, R. (Eds.), *Research Methods in Occupational Health Psychology: Measurement, Design, and Data Analysis*. New York: Routledge, pp. 303–374.

Kinnunen, U., & **Feldt, T.** (2013). Job characteristics, recovery experiences and occupational Well-being: Testing cross-lagged relationships across 1 year. *Stress and Health, 29*, 369–382. DOI: http://dx.doi.org/10.1002/smi.2483

Kinnunen, U., Feldt, T., de Bloom, J., Sianoja, M., Korpela, K., & **Geurts, S.** (2016). Linking Boundary Crossing from Work to Non-work to Work-Related Rumination: A Variable- and Person-Oriented Approach. *Journal of Occupational Health Psychology*. DOI: http://dx.doi.org/10.1037/ocp0000037

Kinnunen, U., Feldt, T., Siltaloppi, U., & **Sonnentag, S.** (2011). Job demands-resources model in the context of recovery: Testing recovery experiences as mediators. *European Journal of Work and Organizational Psychology, 20*, 805–832. DOI: http://dx.doi.org/10.1080/1359432X.2010.524411

Korpela, K., De Bloom, J., & **Kinnunen, U.** (2015). From restorative environments to restoration in work. *Intelligent Buildings International, 7*, 215–223. DOI: http://dx.doi.org/10.1080/17508975.2014.959461

Krajewski, J., Wieland, R., & **Sauerland, M.** (2010). Regulating strain states by using the recovery potential of lunch breaks. *Journal of Occupational Health Psychology, 15*, 131–139. DOI: http://dx.doi.org/10.1037/a0018830

Kühnel, J., Sonnentag, S., & **Westman, M.** (2009). Does work engagement increase after a short respite? The role of job involvement as a double-edged sword. *Journal of Occupational and Organizational Psychology, 82*, 575–594. DOI: http://dx.doi.org/10.1348/096317908X349362

Mäkikangas, A., Feldt, T., Kinnunen, U., & **Tolvanen, A.** (2012). Do low burnout and high work engagement always go hand in hand? Investigation of the energy and identification dimensions in longitudinal data. *Anxiety, Stress & Coping: An International Journal, 25*, 93–116. DOI: http://dx.doi.org/10.1080/10615806.2011.565411

Maslach, C., Jackson, S. E., & **Leiter, M. P.** (1996). *Maslach Burnout Inventory manual* (3rd ed.). Mountain View, CA: CPP, Inc.

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

Meijman, T. F., & **Mulder, G.** (1998). Psychological aspects of workload. In Drenth, P., & Thierry, H. (Eds.), *Handbook of Work and Organizational Psychology* (Vol. 2 Work psychology,). Hove: Psychology Press, pp. 5–33.

Mohren, D. C. L., Jansen, N. W. H., & **Kant, I. J.** (2010). Need for recovery from work in relation to age: a prospective cohort study. *International Archives of Occupational and Environmental Health, 83*, 553–561. DOI: http://dx.doi.org/10.1007/s00420-009-0491-9

Schaufeli, W. B., Bakker, A. B., & **Salanova, M.** (2006). The measurement of work engagement with a short questionnaire a cross-national study. *Educational and Psychological Measurement*, *66*, 701–716. DOI: http://dx.doi.org/10.1177/0013164405282471

Schaufeli, W. B., Salanova, M., González-Romá, V., & **Bakker, A. B.** (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*, 71–92. DOI: http://dx.doi.org/10.1023/A:1015630930326

Sianoja, M., Kinnunen, U., De Bloom, J., & **Korpela, K.** (2015). Insufficient recovery from job stress as a risk factor for poor health and well-being. In Hopkins, C. R. (Ed.), *Job Stress: Risk Factors, Health Effects and Coping Strategies*. New York: Nova Publishing Company, pp. 27–48.

Siltaloppi, M., Kinnunen, U., Feldt, T., & **Tolvanen, A.** (2011). Identifying patterns of recovery experiences and their links to psychological outcomes across one year. *International Archives of Occupational and Environmental Health, 84*, 877–888. DOI: http://dx.doi.org/10.1007/s00420-011-0672-1

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: a new look at the interface between nonwork and work. *Journal of Applied Psychology, 88*, 518–528. DOI: http://dx.doi.org/10.1037/0021-9010.88.3.518

Sonnentag, S., Binnewies, C., & **Mojza, E. J.** (2010). Staying well and engaged when demands are high: the role of psychological detachment. *Journal of Applied Psychology, 95*, 965–976. DOI: http://dx.doi.org/10.1037/a0020032

Sonnentag, S., & **Fritz, C.** (2007). The Recovery Experience Questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology, 12*, 204–221. DOI: http://dx.doi.org/10.1037/1076-8998.12.3.204

Sonnentag, S., & **Fritz, C.** (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*, 72–103. DOI: http://dx.doi.org/10.1002/job.1924

Sonnentag, S., & **Natter, E.** (2004). Flight attendants' daily recovery from work: Is there no place like home? *International Journal of Stress Management, 11*(4), 366–391. DOI: http://dx.doi.org/10.1037/1072-5245.11.4.366

Sonnentag, S., & **Zijlstra, F. R. H.** (2006). Job characteristics and off-job activities as predictors of need for recovery, well-being, and fatigue. *Journal of Applied Psychology, 91*(2), 330–350. DOI: http://dx.doi.org/10.1037/0021-9010.91.2.330

Spector, P. E. (2006). Method variance in organizational research: truth or urban legend. *Organizational Research Methods, 9*, 221–232. DOI: http://dx.doi.org/10.1177/1094428105284955

Spector, P. E., & **Jex, S. M.** (1998). Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3*, 356–367. DOI: http://dx.doi.org/10.1037/1076-8998.3.4.356

Toppinen-Tanner, S., Ojajärvi, A., Väänänen, A., Kalimo, R., & **Jäppinen, P.** (2005). Burnout as a predictor of medically certified sick-leave absences and their diagnosed causes. *Behavioral Medicine, 31*, 18–32. DOI: http://dx.doi.org/10.3200/BMED.31.1.18-32

Trougakos, J. P., Hideg, I., Cheng, B. H., & **Beal, D. J.** (2014). Lunch breaks unpacked: The role of autonomy as a moderator of recovery during lunch. *Academy of Management Journal, 57*, 405–421. DOI: http://dx.doi.org/10.5465/amj.2011.1072

van Hooff, M. L. M., & **Baas, M.** (2013). Recovering by means of meditation: The role of recovery experiences and intrinsic motivation. *Applied Psychology: An International Review, 62*, 185–210. DOI: http://dx.doi.org/10.1111/j.1464-0597.2011.00481.x

Wendsche, J., Hacker, W., Wegge, J., Schrod, N., Roitzsch, K., Tomaschek, A., & **Kliegel, M.** (2014). Rest break organization in geriatric care and turnover: A multimethod cross-sectional study. *International Journal of Nursing Studies, 51*, 1246–1257. DOI: http://dx.doi.org/10.1016/j.ijnurstu.2014.01.006

Zacher, H., Brailsford, H. A., & **Parker, S. L.** (2014). Micro-breaks matter: A diary study on the effects of energy management strategies on occupational well-being. *Journal of Vocational Behavior, 85*, 287–297. DOI: http://dx.doi.org/10.1016/j.jvb.2014.08.005

How to cite this article: Sianoja, M., Kinnunen, U., de Bloom, J., Korpela, K. and Geurts, S. (2016). Recovery during Lunch Breaks: Testing Long-Term Relations with Energy Levels at Work. *Scandinavian Journal of Work and Organizational Psychology*, 1(1): 7, 1–12, DOI: http://dx.doi.org/10.16993/sjwop.13

Submitted: 04 April 2016 **Accepted:** 08 August 2016 **Published:** 30 August 2016

Scandinavian Journal of Work and Organizational Psychology is a peer-reviewed open access journal published by Stockholm University Press.

OPEN ACCESS