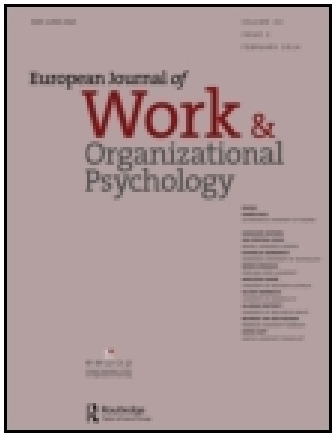
This article was downloaded by: [Erasmus University]
On: 19 March 2015, At: 07:30
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



CrossMark

Click for updates

European Journal of Work and Organizational Psychology

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/pewo20

The state version of the recovery experience questionnaire: A multilevel confirmatory factor analysis

Arnold B. Bakker[ab], Ana I. Sanz-Vergel[c], Alfredo Rodríguez-Muñoz[d] & Wido G. M. Oerlemans[a]

[a] Department of Work and Organizational Psychology, Erasmus University Rotterdam, Rotterdam, The Netherlands

[b] Department of Applied Psychology, Lingnan University, Hong Kong, China

[c] Norwich Business School, University of East Anglia, Norwich, UK

[d] Complutense University of Madrid, Madrid, Spain

Published online: 08 May 2014.

To cite this article: Arnold B. Bakker, Ana I. Sanz-Vergel, Alfredo Rodríguez-Muñoz & Wido G. M. Oerlemans (2015) The state version of the recovery experience questionnaire: A multilevel confirmatory factor analysis, European Journal of Work and Organizational Psychology, 24:3, 350-359, DOI: 10.1080/1359432X.2014.903242

To link to this article: http://dx.doi.org/10.1080/1359432X.2014.903242

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions

European Journal of Work and Organizational Psychology, 2015
Vol. 24, No. 3, 350–359, http://dx.doi.org/10.1080/1359432X.2014.903242

Routledge
Taylor & Francis Group

The state version of the recovery experience questionnaire: A multilevel confirmatory factor analysis

Arnold B. Bakker[1,2], Ana I. Sanz-Vergel[3], Alfredo Rodríguez-Muñoz[4], and Wido G. M. Oerlemans[1]

[1]Department of Work and Organizational Psychology, Erasmus University Rotterdam, Rotterdam, The Netherlands
[2]Department of Applied Psychology, Lingnan University, Hong Kong, China
[3]Norwich Business School, University of East Anglia, Norwich, UK
[4]Complutense University of Madrid, Madrid, Spain

Downloaded by [Erasmus University] at 07:30 19 March 2015

Although many studies in the field of recovery from work utilize a quantitative diary design, little is known about the validity of the daily measures used in such studies. The present study analyses the factor structure of the state version of the Recovery Experience Questionnaire (REQ) on the between-person (trait) and within-person (state) levels. A total of 127 employees participated in the study. Most of them filled out the questionnaire on three consecutive workdays (N = 375 observations). Results of multilevel confirmatory factor analyses (MCFA) showed that a four-factor model fit the data better than alternative models at both levels of analysis (between and within). In addition, some factor loadings of the four recovery experience dimensions (particularly for relaxation and control) were lower on the day level as compared to the general level. Nevertheless, we conclude that both state and trait versions of the REQ show good psychometric properties. Implications for future research on recovery are discussed.

Keywords: Fatigue; Multilevel confirmatory factor analysis; Psychological detachment; Recovery; Relaxation.

Prolonged exposure to high job demands can become a problem because the fatigue that is the consequence of working hard accumulates over time (Bakker & Demerouti, 2007; De Lange et al., 2009). Long working hours and frequent confrontation with high emotional and cognitive job demands may deplete one's energy resources if there are no opportunities to replenish the energy reservoir. However, such job demands may not be a serious problem if employees can recover adequately from their work-related effort during off-job hours (Taris et al., 2006). Research has shown that social activities, physical exercise, sports, and engagement in hobbies during off-job hours can all contribute to recovery (Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag, 2012), because these activities replenish used or build new energetic and psychological resources. Thus, employees who engage in such recovery activities in the evening feel more vigorous during the next morning. As a consequence, they are more engaged during the next working day and perform better (Binnewies, Sonnentag, & Mojza, 2009; Volman, Bakker, & Xanthopoulou, 2013).

Interestingly, research of the past decade has shown that the activities pursued during off-job time do not have the same effect on all employees (Bakker, Demerouti, Oerlemans, & Sonnentag, 2013; Sonnentag, 2003). Sonnentag and Fritz (2007) have argued that what matters most is not the activity per se, but rather the underlying psychological experiences. Thus, whereas some people particularly enjoy social activities during their off-job time, others may prefer to engage in work activities or in hobbies. Sonnentag and Fritz distinguish between four main recovery experiences: psychological detachment from work, relaxation, mastery experiences, and control over leisure time. They developed one of the most widely used measures to assess recovery—the Recovery Experience Questionnaire (REQ), which covers the four different dimensions of recovery. The REQ is a general questionnaire that measures differences between individuals regarding their enduring levels of recovery (technically called "traits"). Since several recovery studies use a daily diary design, it is crucial that we test the psychometric properties of measures assessing daily

Correspondence should be addressed to Arnold B. Bakker, Department of Work & Organizational Psychology, Erasmus University Rotterdam, Woudestein, T13-47, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands. E-mail: bakker@fsw.eur.nl

© 2014 Taylor & Francis

Downloaded by [Erasmus University] at 07:30 19 March 2015

fluctuations in recovery (a within-person approach). Moreover, Binnewies and Sonnentag (2013) have recently argued that it is important to use diary methods to investigate employee recovery. In order to achieve a complete understanding of the phenomena of recovery, it is important to focus on fluctuations within individuals within short periods of time (i.e., from hour to hour, or from day to day), because individuals do not recover equally from work across all days.

A first important step in this regard is to examine the similarities of state and trait recovery approaches. Existing measures were developed to assess recovery in general, but not on a daily basis. The question is whether the recovery concepts developed for use in general surveys can be transferred to the day level and used in diary surveys. Thus, in the present study, we examine the psychometric properties of the state version of the REQ. Using multilevel confirmatory factor analysis (MCFA), we investigate whether the recovery experiences have a similar structure across the days. We hypothesize that the recovery experiences as proposed by Sonnentag and Fritz (2007) manifest themselves also on a daily basis and can fluctuate from day to day. Although previous diary research has provided evidence for this, to the best of our knowledge, this is the first study to examine the multilevel factor structure of the complete state version of the REQ.

THEORETICAL BACKGROUND

Recovery has been defined as "a process of psychophysiological unwinding after effort expenditure" (Geurts & Sonnentag, 2006, p. 485) and is considered as the opposite of the strain process. When the recovery concept emerged, most research focused on which recovery activities might be most adequate to recover from stress. Sonnentag (2001) distinguished between various categories of activities that could be performed during leisure time: work-related activities, social activities, household activities, low effort activities, and physical activities. Overall, research on these recovery activities has shown that whereas work-related activities during leisure time are detrimental for well-being, relaxing activities and physical activities have positive effects (Bakker et al., 2013; Sonnentag & Zijlstra, 2006). However, results on social and household activities are more controversial. Whereas some studies show positive effects of social activities (e.g., Ten Brummelhuis & Bakker, 2012), other studies show negative effects (e.g., Sonnentag & Natter, 2004). In the latter study, Sonnentag and Natter also found that household activities had non-significant effects on well-being.

What is the reason for the mixed results regarding the latter types of activities? One possible explanation is that people differ in what they consider a recovery activity: whereas some individuals prefer to read a book or take a walk, others prefer to go out with friends (Oerlemans, Bakker, & Demerouti, in press). This argumentation has led to a new conceptualization of recovery, focusing on the idea that the feeling of being recovered is as important as the activity per se (Sonnentag & Fritz, 2007). Sonnentag and Fritz introduced the phrase "recovery experiences" defined as "strategies individuals pursue to improve their mood, including both cognitive and behavioral approaches" (p. 205). Four recovery experiences were proposed, namely psychological detachment from work, relaxation, mastery experiences, and control over leisure time.

Psychological detachment from work refers to "the individual's sense of being away from the work situation" (Etzion, Eden, & Lapidot, 1998, p. 579). This means not doing work-related tasks such as receiving job-related phone calls or reading emails at home, because such activities would impede the detachment process. It also implies to stop thinking about one's work and job-related problems or opportunities. Overall, detachment means being not only physically but also psychologically absent from the workplace (Sonnentag & Bayer, 2005). In everyday terms, detachment is often experienced as "switching off" during off-job time. *Relaxation experiences* have the potential to reduce activation (decreased sympathetic activation) and to increase positive affect (Sonnentag & Fritz, 2007). This state may be either a result of deliberately chosen strategies such as meditation or progressive muscle relaxation, or it may also be less deliberately, for example, while performing such activities as taking a walk. Processes that reduce prolonged job-related activation are crucial in order to restore an organism's prestressor state.

Mastery experiences refer to challenging activities that offer the opportunity to learn new things, such as following a language course or learning a new hobby—like painting (Fritz & Sonnentag, 2006). Although these experiences may suppose extra demands on the individual, mastery experiences are expected to enhance recovery because they help to build up new internal resources, increasing competence and self-efficacy. Moreover, from an energetic perspective, mastery experiences contribute to well-being by enhancing positive mood (Totterdell & Parkinson, 1999). Finally, *control over leisure time* refers to the degree to which a person can decide what to do during leisure time and how and when to do it (Sonnentag & Fritz, 2007). The experience of control may satisfy individuals' basic needs for autonomy during leisure time (Deci & Ryan, 2000) as well as increase self-efficacy and feelings of competence. Furthermore, personal control may lead to positive reevaluation of potentially stressful situations and is associated with lower distress and higher psychological well-being (Lazarus & Folkman, 1984).

Downloaded by [Erasmus University] at 07:30 19 March 2015

The four recovery experiences have been included in the REQ, which was originally developed in Germany (Sonnentag & Fritz, 2007). The REQ has shown good psychometric properties, not only in the original version but also in adjusted versions. Specifically, the REQ has been validated in Finland (Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011), Spain (Sanz-Vergel et al., 2010), and Japan (Shimazu, Sonnentag, Kubota, & Kawakami, 2012). In these studies, internal consistencies (Cronbach's alpha) were adequate, ranging between .75 and .89. Correlations between the dimensions range from .02 to .70, with a stable pattern in the three validation studies. That is, the highest correlation is usually found between psychological detachment and relaxation, whereas the lowest correlation is usually found between psychological detachment and mastery.

Furthermore, confirmatory factor analyses have clearly supported the four-dimensional structure of the REQ. For example, in the original, German version of the REQ, Sonnentag and Fritz (2007) tested several alternative models in addition to the proposed four-factor model. Specifically, they tested a one-factor model as well as two- and three-factor models with all the possible combinations between constructs. The results of these analyses showed that the four-factor model fit the data better than alternative models. Using the Finnish version of the REQ, Kinnunen et al. (2011) replicated the statistically best fitting models found with the original version of the REQ. Again, the four-factor model showed the best fit to the data.

Interestingly, in their Japanese study, Shimazu et al. (2012) found evidence for a three-factor model using exploratory factor analysis. The results showed that the psychological detachment and relaxation items collapsed into one factor, and that the mastery and control items loaded on two other factors. Although the REQ distinguishes between four separate factors, Sonnentag and Fritz (2007) have argued that psychological detachment and relaxation can be considered as "diversionary strategies", whereas mastery can be classified as a "mastery-oriented strategy", and control over leisure time can be classified as an "external resource". Thus, in a subsequent confirmatory factor analysis (CFA), Shimazu et al. (2012) compared a three-factor model (psychological detachment and relaxation, mastery, and control) with the classical four-factor model. Again, the results showed that the four-factor model fit the data best. This means that the four recovery experiences can be empirically distinguished—at least in cross-sectional research.

RECOVERY EXPERIENCES AS STATES: EVIDENCE FROM DIARY STUDIES

Taken together, the evidence indicates that recovery experiences are positively related to well-being and reduce the negative impact of stressors. Thus, one could argue that people who generally score high on recovery experiences will experience better well-being than those who score low on recovery experiences, even when job demands are high. However, recovery has been defined as a process (Sonnentag & Fritz, 2007). Thus, scholars have started to use quantitative diary designs under the assumption that to achieve a better understanding of this phenomenon, we should know what happens before and after recovery takes place—on a daily basis (see Demerouti et al., 2009).

Diary studies allow researchers to explore everyday experiences, analysing how variations in specific characteristics may affect levels of well-being across days or weeks (Ohly, Sonnentag, Niessen, & Zapf, 2010). In the field of recovery, it makes sense to consider that detaching from work, being relaxed, or learning new things are not strategies that people can pursue equally every day. Actually, research indicates that recovery-related concepts show considerable within-person variation. Some studies suggest that more than 80% of the variance in recovery can be attributed to within-person variations (Sonnentag, 2003; Ten Brummelhuis & Bakker, 2012). Daily opportunities for recovery may depend on the effort employees have invested on a specific day at work, the leisure time they have that day, and certain situational constraints. Indeed, it has been found that day-specific workload is negatively related to psychological detachment during the evening (Sonnentag & Bayer, 2005). In addition, employees who detach from work during the evening experience higher levels of vigour (Demerouti, Bakker, Sonnentag, & Fullagar, 2012) as well as a positive mood and lower levels of fatigue at bedtime (Sonnentag & Bayer, 2005). The same pattern was observed when well-being measures were taken the next morning (Sonnentag, Binnewies, & Mojza, 2008). Specifically, low psychological detachment during the evening predicted morning negative activation and fatigue, whereas mastery experiences and relaxation predicted positive activation and serenity, respectively. Ten Brummelhuis and Bakker (2012), in a study among 74 employees over 5 consecutive days, found that leisure activities increased next morning vigour through two recovery experiences: psychological detachment from work and relaxation.

The finding that daily diary survey studies generally confirm the results of cross-sectional and longitudinal survey studies is important, since diary studies suffer less from retrospective bias. Moreover, in diary studies, we can separate the predictors from the outcomes over short periods of time, for example, use time spent on activities during the evening as a predictor of bedtime well-being. In diary research, scholars typically use adapted versions of the REQ. The items are adjusted so that the experiences refer to a short time period, such as "When I came home today … I forgot about work", and "Today in my free time after work … I sat back and relaxed". The scales of the adapted version of the REQ have shown adequate reliabilities (e.g., Demerouti

Downloaded by [Erasmus University] at 07:30 19 March 2015

et al., 2012; Ten Brummelhuis & Bakker, 2012). However, most scholars have focused on psychological detachment and/or relaxation and did not include the mastery or control dimensions of recovery in their diary study designs (e.g., Sonnentag et al., 2008; Ten Brummelhuis & Bakker, 2012). Moreover, the factor structure of the complete state version of the REQ has not been tested previously. It is unclear whether the items used to assess daily recovery have the same meaning on the different days. In response to a recent call to test the factorial validity of daily organizational psychological phenomena with a multilevel structure (Breevaart, Bakker, Demerouti, & Hetland, 2012), the objective of the present study is to analyse the factor structure of the state (instead of "trait") version of the REQ by performing a MCFA. Based on previous research showing preliminary evidence for the factorial validity of the REQ when two or three dimensions of the scale were examined, we predict that a four-factor model will present the best fit to the data at both the between- and the within-person level.

> *Hypothesis 1:* The state version of the recovery experiences questionnaire will show a four-factor structure at the within- and between-person levels.

Although we predict that the factor structure of the REQ will be the same across levels, we expect that the factor loadings will be lower on the day level as compared to the general level (see also Breevaart et al., 2012). Factor loadings at the day level tell something about the correlations between the items on a daily basis and about the importance of each item (facet of recovery) for the underlying factor (theoretical dimension of recovery). Since certain recovery experiences may be less likely on a daily basis, it is conceivable that respondents will indicate on some days that they engage in (or feel) the recovery experiences, whereas on other days they do not. For example—applied to the recovery experience of control—young dual-earner parents may generally experience low levels of control over their leisure time, because they have high responsibilities in the work and home domain. However, there are days on which they can decide what they want to do and how they want to spend their time (indicating high control; for example, on the days they are travelling for their work or on the days the grandparents take care of the children). It is the fluctuations at the day level that may result in lower factor loadings; the fluctuations in the experiences or behaviours may also explain why researchers sometimes find lower internal consistencies for day-level variables as compared to general-level variables (e.g., Bakker & Xanthopoulou, 2009). In a general survey, respondents are asked to indicate their general recovery experiences, and they will thus aggregate their experiences over time and report their average experiences. This will logically result in higher factor loadings at the general level, because the responses will be more consistent with each other.

> *Hypothesis 2:* The factor loadings of the four recovery experience dimensions (psychological detachment, relaxation, mastery, and control) will be lower on the day- or within-person level as compared to the general or between-person level.

METHOD

Procedure and participants

Participants were recruited via a Dutch university website that provided general information on occupational health and well-being. Upon agreement, participants first filled in a background questionnaire. Thereafter, participants received daily reminders via email to fill out the recovery questionnaire on three consecutive workdays before going to bed. A total of 127 individuals participated in the study. Of these participants, 123 completed the state recovery questionnaire on three consecutive workdays, two participants filled in the questionnaire on two consecutive workdays, and two participants on one workday. In total, 375 workdays were included in the sample.

The mean age of the participants was 45 years (SD = 14.95), and 75% was female. In the Netherlands, there are different types of secondary and tertiary education levels. As for tertiary education, 28.3% of the participants held a higher professional education degree, 25.2% held a lower professional education degree, and 19.7% held a university degree. As for secondary education, 8.7% held a lower secondary educational degree, 13.4% held a higher secondary educational degree, and 4.7% held no secondary or tertiary educational degree at all. Participants worked in various sectors such as health care (35.1%), business services (12%), government (9.8), retail (8.3%), education (5.4%), transportation (5.1%), the catering industry (3.6%), cultural sector (3.3%), or other (17.4%). On average, participants worked 28 hours or 4 days a week (SD = 1.55), with males (M = 4.8 days, SD = 1.38) working more days per week as compared to women (M = 3.7 days, SD = 1.52).

Measure

The REQ (Sonnentag & Fritz, 2007) includes four subscales, namely detachment from work, relaxation, mastery, and control. In the present study, all the items were reframed to measure recovery experiences on a daily basis. The instrument consists of four subscales each containing four items, which could be rated on a 5-point Likert scale (1 = totally disagree, 5 = totally agree). Sample items are "Today, during my off-job

time, I tried to forget about work" and "Today, during my off-job time, I used the time to relax". See the Appendix for all the items. The internal consistency (Cronbach's alpha) for psychological detachment from work varied from .88 to .95, for relaxation from .90 to .95, for mastery from .88 to .91, and for control from .87 to .93, depending on the day of measurement.

Statistical analyses

Data were analysed using a MCFA procedure (Muthen, 1994). Previous research on daily recovery has used single-level CFA to analyse the structure of the REQ (e.g., Sonnentag et al., 2008). However, according to Muthen (1994), this approach is biased because single-level CFA does not take into account that a measure and its psychometric properties may vary depending on the level of analysis. Whereas single-level CFA analyses the total variance-covariance matrix of the observed variables, MCFA splits the total sample covariance matrix into within-group and between-group covariance matrices and uses these two matrices in the analyses of the factor structure at each level. Thus, with MCFA, it is possible to overcome the limitations of single-level CFA when examining the psychometric properties of a measure at multiple levels.

We used the maximum-likelihood estimation method, since all variables had acceptable values of skewness (< 2.0) and kurtosis (< 7.0) for the use of this estimation (Curran, West, & Finch, 1996). Specifically, responses were approximately normally distributed with skewness values ranging from 0.07 to −1.03 and kurtosis values ranging from −1.05 to 1.08. Analyses were conducted with Mplus 6.12 (Muthén & Muthén, 2010). Goodness-of-fit for the models was evaluated using the χ^2-likelihood ratio statistic. Because the chi-square test is sensitive to sample size, we also used the comparative fit index (CFI), the Tucker–Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) as guides in assessing fit. Levels of .90 or higher for CFI and TLI and .08 or lower for RMSEA and SRMR indicate a good fit of the model to the data (Hu & Bentler, 1999).

RESULTS

Descriptive statistics

The means, standard deviations, and correlations between the 16 items, at the between and within levels of analysis, are presented in Table 1. Prior to conducting the MCFA, we examined the intraclass correlations (ICC) to determine whether the use of multilevel analysis was justified. The ICC reflects the amount of between-person variability compared to the amount of total variability. In this study, ICC values of the items ranged from .32 to .44. The ICC ranges in value from 0 to 1, with higher values indicating greater proportions of between-level variance, which means a higher bias probability if the multilevel nature of the data is not taken into account (Dyer, Hanges, & Hall, 2005). Previous MCFA research has reported lower ICC values than those in the present study (e.g., Dyer et al., 2005; Hox, 2002). Within the literature, there are no clear guidelines for appropriate values of ICC. However, a review by James (1982) found values ranging from 0 to 0.50, with 0.12 as the median. We therefore assume that our ICC values indicate sufficient between-person variation in our data to use multilevel analysis.

TABLE 1
Descriptive statistics and between-level (below diagonal) and within-level correlations

Variable	*M (SD)*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1. Item 1 (De)	3.02 (1.38)	—	.68	.61	.58	.28	.23	.16	.22	.11	.05	.06	.12	.27	.23	.24	.10
2. Item 2 (De)	3.06 (1.33)	.80	—	.67	.59	.35	.29	.29	.32	.06	.04	.10	.12	.32	.21	.22	.19
3. Item 3 (De)	3.33 (1.26)	.82	.86	—	.70	.33	.33	.33	.36	.14	.03	.14	.16	.33	.32	.34	.18
4. Item 4 (De)	3.43 (1.23)	.88	.82	.95	—	.42	.39	.36	.42	.07	.02	.16	.11	.38	.30	.36	.23
5. Item 5 (Re)	3.80 (1.02)	.48	.44	.60	.58	—	.57	.58	.62	.11	.12	.11	.16	.45	.30	.39	.24
6. Item 6 (Re)	3.96 (0.86)	49	.43	.58	.59	.96	—	.60	.68	.27	.22	.24	.26	.52	.36	.37	.36
7. Item 7 (Re)	3.77 (1.06)	.51	.49	.61	.60	.92	.97	—	.59	.21	.18	.20	.26	.49	.34	.40	.26
8. Item 8 (Re)	3.94 (0.99)	.48	.38	.57	.58	.93	.96	.92	—	.19	.19	.26	.27	.46	.31	.41	.28
9. Item 9 (Ma)	3.19 (1.13)	.12	.08	.21	.29	.61	.63	.48	.60	—	.52	.50	.52	.18	.03	.01	.11
10. Item 10 (Ma)	3.06 (1.17)	.13	.15	.14	.23	.51	.58	.48	.48	.80	—	.49	.54	.14	.07	.11	.22
11. Item 11 (Ma)	3.12 (1.18)	.15	.12	.16	.27	.54	.62	.53	.52	.91	.82	—	.63	.22	.08	.18	.26
12. Item 12 (Ma)	3.06 (1.21)	.17	.16	.17	.29	.65	.66	.52	.63	.91	.83	.63	—	.27	.09	.20	.33
13. Item 13 (Co)	3.65 (1.07)	.42	.47	.53	.56	.78	.85	.84	.78	.68	.66	.22	.71	—	.57	.61	.52
14. Item 14 (Co)	3.57 (1.15)	.36	.49	.54	.51	.81	.85	.84	.80	.66	.61	.08	.67	.96	—	.76	.44
15. Item 15 (Co)	3.54 (1.16)	.35	.50	.56	.54	.79	.84	.81	.83	.67	.52	.18	.66	.92	.97	—	.51
16. Item 16 (Co)	3.62 (1.02)	.30	.39	.44	.49	.63	.69	.68	.70	.48	.57	.26	.57	.83	.81	.79	—

De = psychological detachment, Re = relaxation, Ma = mastery, Co = control, N = 127 individuals, N = 375 observations.

Downloaded by [Erasmus University] at 07:30 19 March 2015

TABLE 2
Goodness-of-fit indices

Factor model	χ^2 *(df)*	*CFI*	*TLI*	*RMSEA*	*SRMR*
One-factor model	1556.6 (208)	.645	.591	.131	*W* = .17, *B* = .64
Two-factor model	1314.6 (206)	.726	.687	.118	*W* = .17, *B* = .59
Three-factor model	877.51 (202)	.834	.809	.093	*W* = .13, *B* = .50
Four-factor model	372.60 (196)	.964	.957	.041	*W* = .06, *B* = .07

W = within-person part of the model, *B* = between-person part of the model, *N* = 127 individuals, *N* = 375 observations.

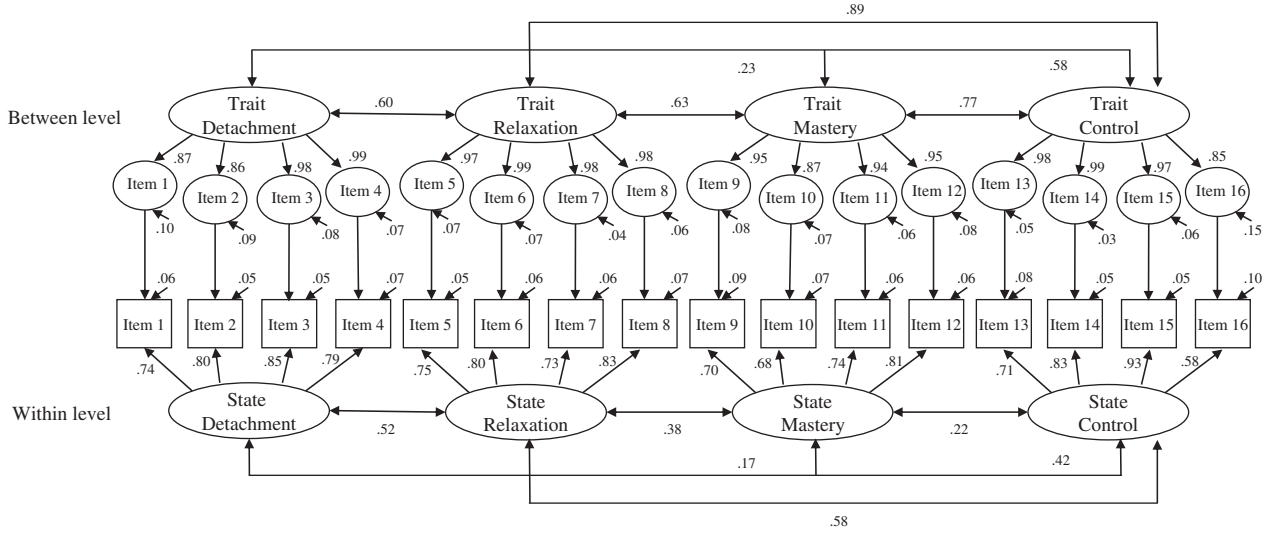


Figure 1. Path diagram of the final four-factor model of recovery (standardized solution).

Multilevel confirmatory factor analyses

Table 2 shows the fit indices of the four competing models. Model 1 was proposed as the null hypothesis, postulating a single factor in which the items of the four dimensions loaded on one overall factor. In addition, we tested a two-factor model, in which the items of the psychological detachment and relaxation dimensions collapsed into one factor, and the items of the mastery and control dimensions collapsed into a second factor (Model 2; see Kinnunen et al., 2011). Furthermore, consistent with Shimazu et al. (2012), we tested a three-factor model (Model 3), in which detachment and relaxation collapsed into one factor, whereas control and mastery were represented by two additional factors. Finally, the proposed model (Model 4) assumed the original four-factor structure.

The chi-square difference test shows that the four-factor model provided a much better fit to the data than (a) a one-factor model ($\Delta\chi^2 = 1184$, $\Delta df = 12$; $p < .001$); (b) the best fitting two-factor model—with items for psychological detachment and relaxation loading on a first factor and items for mastery experiences and control loading on a second factor ($\Delta\chi^2 = 942$, $\Delta df = 10$; $p < .001$); and (c) the best fitting three-factor model—with items for psychological detachment and relaxation loading on one factor, and the other items loading on the two intended separate factors of mastery and control ($\Delta\chi^2 = 504.9$, $\Delta df = 6$; $p < .001$). In addition, the RMSEA of .041, TLI of .957, and CFI of .964 indicated good overall fit. The SRMR at the two levels indicated that the fit of the within part of the model was slightly better than the between part of the model (SRMR-within = .06 vs. SRMR-between = .07). Note also that all the values of the alternative models indicated a significant lack of fit. Thus, the four-factor model explains our data best. This means that Hypothesis 1 is accepted.

According to Hypothesis 2, the factor loadings of the four recovery experience dimensions (psychological detachment, relaxation, mastery, and control) would be lower on the day level as compared to the general level. As can be seen in Figure 1, all factor loadings were significant (p's < .001). Overall, the factor loadings at the between-person level were higher (.85–.99) than at the within-person level (.58–.93). As in the original study (Sonnentag & Fritz, 2007), item 16 showed the lowest factor loading ("Today, during my off-job time, I took care of things the way that I want them done").

We also performed a series of MCFA analyses to examine the equality of factor loadings across levels. First, we compared a four-factor model in which all loadings for recovery experiences were constrained to

Downloaded by [Erasmus University] at 07:30 19 March 2015

Downloaded by [Erasmus University] at 07:30 19 March 2015

be equal across the two levels with a freely estimated four-factor model across the two levels. The constrained model showed a significant increase of χ^2 ($\Delta\chi^2$ (20) = 92.82, $p < .001$). This implies that factor loadings are *not* all equal across levels for all of the items. Subsequently, we followed an iterative process to investigate which items were responsible for the difference in factor loadings between both levels of analysis. The examination of the factor loadings for each of the items revealed that for relaxation, freeing the item "I used the time to relax" ($\Delta\chi^2$ (3) = 12.06, $p < .01$) or the item "I took time for leisure" ($\Delta\chi^2$ (3) = 9.22, $p < .05$) led to small but significant increases in model fit, indicating that these items are not equal across the two levels. For the dimension "control", freeing each of the four items resulted in a significantly better model fit. Thus, the items "I felt like I could decide for myself what to do" ($\Delta\chi^2$ (3) = 53.68, $p < .001$); "I decided my own schedule" ($\Delta\chi^2$ (3) = 53.97, $p < .001$), "I determined for myself how I spent my time" ($\Delta\chi^2$ (3) = 59.36, $p < .001$); and "I took care of things that way that I wanted them done" ($\Delta\chi^2$ (3) = 53.99, $p < .05$) all resulted in significant and strong increases in model fit. In addition, when freeing the 2 items for relaxation mentioned earlier and the 4 items for control while constraining all other (10) items, the model fit was similar to that of the freely estimated model ($\Delta\chi^2$ (11) = 14.41, $p = .21$).

In conclusion, Hypothesis 2 was accepted as well. The results show that both psychological detachment and mastery experiences show equal factor loadings across both levels. However, two items for the dimension "relaxation" and all of the items for the dimension "control" show different factor loadings across the two levels. Finally, we would like to note that correlations between the factors were higher at the between level (.23–.89) than at the within level (.17–.58). This suggests that discriminant validity is better for the dimensions of recovery at the within level of analysis. All correlations were positive and significant, with the exception of psychological detachment and mastery at both levels.

DISCUSSION

The objective of the present study was to investigate the factor structure of the state version of the REQ, originally developed by Sonnentag and Fritz (2007). The increasing number of studies using a quantitative diary design led researchers to adapt the trait version of the REQ to the day level. Indeed, the daily diary study design, as argued in the beginning of the article, represents the most appropriate design to analyse short-term processes such as recovery from job stress. Daily diaries enable an investigation of daily fluctuations in recovery and the possible causes and consequences of recovery in the short run (Demerouti et al., 2009). Although a previous study by Breevaart et al. (2012) examined the psychometric properties of the state version of the Utrecht Work Engagement Scale, to the best of our knowledge, there are no other studies in the field of organizational psychology that analysed the factor structure of a daily measurement instrument. Moreover, this is the first study analysing the factor structure of the state version of the REQ.

The results of the MCFA showed that the state version of the REQ has adequate psychometric properties, both at the between and within levels of analysis. As in the original version of the questionnaire, the four-factor model (psychological detachment from work, relaxation, mastery experiences, and control over leisure time) fits the data better than the alternative models. The present findings are thus in line with previous (between-person) survey studies demonstrating that the four-factor trait version of the REQ has good psychometric properties in different countries (Kinnunen et al., 2011; Sanz-Vergel et al., 2010; Shimazu et al., 2012).

However, our results show that the factor loadings of the items were higher at the between (i.e., trait) than the within (i.e., state) levels of analysis. These findings are consistent with previous studies examining other daily phenomena that found higher factor loadings at the between level (Breevaart et al., 2012; Dyer et al., 2005). Additional analyses indicate that two items of relaxation and especially the four items for control have a substantially different meaning (i.e., factor loadings) on a between level vs. a within level. More specifically, these items show higher factor loadings on the between level of analysis than on the within level of analysis.

Please note that the two items of relaxation and the four items of control are related to the possibility of deciding how to use leisure time. These facets of the recovery experiences are less likely to occur on a daily basis (e.g., during the working week, people may need to attend to work and family responsibilities, reducing the possibility to decide how to use time or to actually have available time to engage in leisure activities). Thus, their response may vary depending on the day, and these fluctuations result in lower factor loadings at the within-person of analysis.

Results also showed that strength of the relationships between the recovery dimensions was considerably greater at the between-person level. Taken together, these results indicate that discriminant validity is better for the dimensions of recovery at the within-person level of analysis. This makes sense, since recovery is a highly fluctuating experience, with significant variations between days. These findings also suggest that people are better able to distinguish between the four recovery experiences when the time lag between the experience itself and the reporting of that experience is shorter. When people are

Downloaded by [Erasmus University] at 07:30 19 March 2015

instructed to look back and report on their general recovery experiences, they seem to aggregate their judgements and experiences.

The correlation pattern also informs about the close relationships between dimensions, with the exception of detachment and mastery at both levels of analysis. As Sonnentag and Fritz (2007) suggested, these two experiences are different: psychological detachment is aimed at avoiding the stressful events and is useful to restore depleted resources, whereas mastery is an engagement strategy that requires investment of resources in order to build up new resources (e.g., when learning a new hobby people have to make an effort, but they acquire new skills). Our correlation pattern means that state recovery experiences can be discriminated, but also co-occur. For example, an experience such as a massage not only facilitates relaxation but may also be associated with other recovery experiences (e.g., psychological detachment). In the same vein, recovery experiences such as detachment or relaxation cannot occur without the possibility to organize your leisure time. Indeed, the dimension of state control correlates with these two experiences, suggesting that the external resource of control is needed to engage in diversionary strategies.

The current study has some limitations that need to be mentioned. A first possible limitation is that our sample mainly consisted of women. Although the issue of gender differences in recovery experiences has received limited attention to date, research has indicated that women report more rumination and cognitive activation than men (Nolen-Hoeksema & Harrell, 2002). Thus, the dimension of psychological detachment may be affected by gender. However, results from different studies are mixed, which makes it difficult to conclude whether recovery experiences may vary depending on gender. For instance, Kinnunen, Mauno, and Siltaloppi (2010) found that men were more likely to experience psychological detachment, whereas Shimazu et al. (2012) found the opposite. In a daily diary study, Sonnentag and Bayer (2005) did not find a significant effect of gender on daily psychological detachment. Additional multilevel analyses of our own sample did not show any significant effect of gender (and also no significant effects of age, educational level, and work hours per week) on the four recovery experiences. Therefore, we expect that the overrepresentation of women in the current study does not reduce the generalizability of the findings. However, future studies should try to replicate our results in a more balanced sample in terms of gender.

Another concern may be that we measured recovery only once every day. This means that we measured it as a daily fluctuating experience, but recovery may also show fluctuations within the same day. Thus, our assessment excludes the possibility of analysing these momentary recovery experiences. Although most researchers have followed this approach, future research could use the experience sampling method (e.g., Hektner, Schmidt, & Csikszentmihalyi, 2007) to examine possible variations throughout the same day. Similarly, future research should analyse the psychometric properties of other state versions of the REQ. For instance, some studies have investigated the recovery experiences during the weekend (Hahn, Binnewies, & Haun, 2012) and during vacation (Fritz & Sonnentag, 2006). In these cases, the questions are slightly different (e.g., "During the weekend, I forgot about work", instead of "Today, during my off-job time, I forgot about work"). Moreover, we would like to note that the high between-level loadings for the factor "trait relaxation" may be the result of a methodological artefact that occurs when item scales are too coarse (e.g., use a 5-point Likert scale). We decided to use a 5-point scale to be consistent with the original questionnaire (Sonnentag & Fritz, 2007). Future studies could replicate our analyses by using a different format (e.g., a 7-point Likert scale). Finally, other innovative methods are possible, such as the day reconstruction method, where the participants report about the type of recovery activities they pursued, the time spent on these activities, and the recovery experiences during the activities (Bakker et al., 2013; Oerlemans et al., in press). These new approaches require more concrete items, asking for the experiences several times a day.

CONCLUSION

In conclusion, the present study investigated the factor structure of the state version of the REQ. Results of MCFA showed that a four-factor model discriminating between psychological detachment, relaxation, mastery, and control fit the data better than alternative models. This means that the factor structure of the REQ is the same on every day and that the REQ can be used as a valid measure of daily recovery experiences.

REFERENCES

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

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

Bakker, A. B., & Xanthopoulou, D. (2009). The crossover of daily work engagement: Test of an actor-partner interdependence model. *Journal of Applied Psychology*, *94*, 1562–1571. doi:10.1037/a0017525

Binnewies, C., & Sonnentag, S. (2013). The application of diary methods to examine workers' daily recovery during off-job time. In A. B. Bakker & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 72–84). Hove: Psychology Press.

Binnewies, C., Sonnentag, S., & Mojza, E. (2009). Daily performance at work: Feeling recovered in the morning as a predictor of day-level job performance. *Journal of Organizational Behavior*, *30*, 67–93. doi:10.1002/job.541

Breevaart, K., Bakker, A. B., Demerouti, E., & Hetland, J. (2012). The measurement of state work engagement: A multilevel factor analytic study. *European Journal of Psychological Assessment*, *28*, 305–312. doi:10.1027/1015-5759/a000111

Downloaded by [Erasmus University] at 07:30 19 March 2015

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to non-normality and specification error in confirmatory factor analysis. *Psychological Methods*, *1*, 16–29. doi:10.1037/1082-989X.1.1.16

De Lange, A. H., Kompier, M. A., Taris, T. W., Geurts, S. A., Beckers, D. G., Houtman, I. L., & Bongers, P. M. (2009). A hard day's night: A longitudinal study on the relationships among job demands and job control, sleep quality and fatigue. *Journal of Sleep Research*, *18*, 374–383. doi:10.1111/j.1365-2869.2009.00735.x

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268. doi:10.1207/S15327965PLI1104_01

Demerouti, E., Bakker, A. B., Geurts, A. E. G., & Taris, T. W. (2009). Daily recovery from work-related effort during non-work time. In S. Sonnentag, P. L. Perrewé, & D. C. Ganster (Eds.), *Current perspectives on job-stress recovery: Research in occupational stress and well-being* (Vol. 7, pp. 85–123). Bingley: Jai Press.

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:10.1002/job.760

Dyer, N. G., Hanges, P. J., & Hall, R. J. (2005). Applying multilevel confirmatory factor analysis techniques to the study of leadership. *The Leadership Quarterly*, *16*, 149–167. doi:10.1016/j.leaqua.2004.09.009

Etzion, D., Eden, D., & Lapidot, Y. (1998). Relief from job stressors and burnout: Reserve service as a respite. *Journal of Applied Psychology*, *83*, 577–585. doi:10.1037/0021-9010.83.4.577

Fritz, C., & Sonnentag, S. (2006). Recovery, well-being, and performance-related outcomes: The role of workload and vacation experiences. *Journal of Applied Psychology*, *91*, 936–945. doi:10.1037/0021-9010.91.4.936

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:10.5271/sjweh.1053

Hahn, V. C., Binnewies, C., & Haun, S. (2012). The role of partners for employees' recovery during the weekend. *Journal of Vocational Behavior*, *80*, 288–298. doi:10.1016/j.jvb.2011.12.004

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. London: Sage.

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Lawrence Erlbaum.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*, 1–55. doi:10.1080/10705519909540118

James, L. R. (1982). Aggregation bias in estimates of perceptual agreement. *Journal of Applied Psychology*, *67*, 219–229. doi:10.1037/0021-9010.67.2.219

Kinnunen, U., Feldt, T., Siltaloppi, M., & 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:10.1080/1359432X.2010.524411

Kinnunen, U., Mauno, S., & Siltaloppi, M. (2010). Job insecurity, recovery and well-being at work. Recovery experiences as moderators. *Economic and Industrial Democracy*, *31*, 179–194. doi:10.1177/0143831X09358366

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Muthen, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research*, *22*, 376–398. doi:10.1177/0049124194022003006

Muthén, L., & Muthén, B. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén and Muthén.

Nolen-Hoeksema, S., & Harrell, Z. A. (2002). Rumination, depression, and alcohol use: Tests of gender differences. *Journal of Cognitive Psychotherapy*, *16*, 391–403. doi:10.1891/jcop.16.4.391.52526

Oerlemans, W. G. M., Bakker, A. B., & Demerouti, E. (in press). How feeling happy helps to successfully recover from work: A day reconstruction study. *Work and Stress*.

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology*, *9*, 79–93. doi:10.1027/1866-5888/a000009

Sanz-Vergel, A. I., Sebastián, J., Rodríguez-Muñoz, A., Garrosa, E., Moreno-Jiménez, B., & Sonnentag, S. (2010). Adaptación del "cuestionario de experiencias de recuperación" a una muestra espanola. *Psicothema*, *22*, 990–996.

Shimazu, A., Sonnentag, S., Kubota, K., & Kawakami, N. (2012). Validation of the Japanese version of the recovery experience questionnaire. *Journal of Occupational Health*, *54*, 196–205. doi:10.1539/joh.11-0220-OA

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

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

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

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

Sonnentag, S., Binnewies, C., & Mojza, E. J. (2008). "Did you have a nice evening?" A day-level study on recovery experiences, sleep, and affect. *Journal of Applied Psychology*, *93*, 674–684. doi:10.1037/0021-9010.93.3.674

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:10.1037/1076-8998.12.3.204

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

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

Taris, T., Beckers, D., Verhoeven, L., Geurts, S., Kompier, M., & van der Linden, D. (2006). Recovery opportunities, work-home interference, and well-being among managers. *European Journal of Work and Organizational Psychology*, *15*, 139–157. doi:10.1080/13594320500513889

Ten Brummelhuis, L. L., & Bakker, A. B. (2012). Staying engaged during the week: The effect of off-job activities on next day work engagement. *Journal of Occupational Health Psychology*, *17*, 445–455. doi:10.1037/a0029213

Totterdell, P., & Parkinson, B. (1999). Use and effectiveness of self-regulation strategies for improving mood in a group of trainee teachers. *Journal of Occupational Health Psychology*, *4*, 219–232. doi:10.1037/1076-8998.4.3.219

Volman, F. E., Bakker, A. B., & Xanthopoulou, D. (2013). Recovery at home and performance at work: A diary study on self-family facilitation. *European Journal of Work and Organizational Psychology*, *22*, 218–234. doi:10.1080/1359432X.2011.648375

Original manuscript received March 2013
Revised manuscript received March 2014
Revised manuscript accepted March 2014
First published online April 2014

APPENDIX

The state version of the recovery experience questionnaire (based on Sonnentag & Fritz, 2007)

Today, during my off-job time,

Psychological detachment

1. I forgot about work
2. I didn't think about work at all
3. I distanced myself from my work
4. I got a break from the demands of work

Relaxation

5. I kicked back and relaxed
6. I did relaxing things
7. I used the time to relax
8. I took time for leisure

Mastery

9. I learned new things
10. I sought out intellectual challenges
11. I did things that challenged me
12. I did something to broaden my horizons

Control

13. I felt like I could decide for myself what to do
14. I decided my own schedule
15. I determined for myself how I spent my time
16. I took care of things the way that I want them done

Answer categories were: 1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree.

Copyright © 2007 by the American Psychological Association. Adapted with permission. The official citation that should be used in referencing this material is Sonnentag & Fritz, 2007. No further reproduction or distribution is permitted without written permission from the American Psychological Association.

Downloaded by [Erasmus University] at 07:30 19 March 2015