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Striving for mental vigor through restorative activities: Application of the Campbell Paradigm to construct the Attitude toward mental vigor scale



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ABSTRACT

Recognizing people at risk is essential for effective prevention. We developed an instrument that conceptually links engagement in restorative activities with persons' appreciation for mental vigor. Based on a sample of 322 persons from the general population and a clinical sample of 56 patients diagnosed with burnout, we found that the scope of a person's recovery-gear activities significantly corresponds with cognitive failures, mental fatigue, need for recovery, psychosomatic complaints, and neuroticism. Patients also engaged in significantly more restorative activities than respondents from the general population. Engagement in recovery activities may indicate elevated vulnerability to stress and a need of restoration.

1. Introduction

Persistent allostatic load - accumulation of stress - is detrimental for human health and well-being (e.g., McEwen & Stellar, 1993); particularly, the combination of high demands, low controllability, and a lack of social support seems excessively harmful (e.g., DeLongis & Holtzman, 2005; Taris, Scheurs, & van Iersel-van Silfhout, 2001). Active engagement in recreational activities has, in turn, been proposed to counteract negative allostatic-load related health effects (e.g., Aronsson, Svensson, & Gustafsson, 2003; Iwasaki & Mannell, 2000; Meijman & Mulder, 1998). Importantly, incomplete restoration makes it more difficult to meet future demands, potentially resulting in a downward health spiral (Sluiter, de Croon, Meijman, & Frings-Dresen, 2003). For example, occupational stress leads to mental fatigue, and when recovery from fatigue is insufficient, stress will gradually increase because these diminishing mental resources are required for a steadily growing number of demands. Even burnout might occur, after prolonged periods of occupational stress with insufficient recovery (Maslach, Schaufeli, & Leiter, 2001).

Unwinding after a loaded day at work is, thus, seen as crucial to avoid detrimental effects of occupational stress on health and well-being. Recovery from work stress can be achieved by engaging in restorative behaviors: recreational activities to replenish mental and physical resources (Sonntag, 2001). The general expectation apparently is that recreational activities can effectively restore depleted mental resources, promote people's resiliency against stress, and even prevent burnout to a certain degree. The question, thus, is what

prompts people to undertake activities restoring their mental and physical resources and do they form a single class of activities? In our research, we developed a new instrument that conceptually links engagement in a variety of recovery-gear activities performed at various occasions with the extent of a person's appreciation for mental vigor.

2. Restorative activities and personal resources

According to Maslach (1982) burnout is characterized by extreme fatigue, depersonalization, and a decrease in experienced personal accomplishment. In addition, she posed that the majority of people suffering from this syndrome have work that requires intense social interactions such as nurses or teachers. Burnout deteriorates job performance and job satisfaction, mental and physical health, and executive functioning (e.g., Maslach et al., 2001). Additionally, people with burnout report more daily cognitive blunders, increased fatigue, more headaches, and emotional exhaustion (e.g., Beer & Beer, 1992; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Maslach & Jackson, 1981; van der Linden, Keijsers, Eling, & van Schaijk, 2005). Recreational activities during leisure time have in turn been positively related to wellbeing (Sonntag, 2001) as well as physical health (Pressman et al., 2009).

Research has indicated that simply taking time off work, for instance by taking a vacation, can help decrease levels of work stress and burnout (Etzion, Eden, & Lapidot, 1998). However, these effects have also been found to vanish quickly after recommencing work (e.g., de

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Bloom et al., 2009; Fritz & Sonnentag, 2006). As soon as four weeks after the vacation, burnout levels and absenteeism normally return to their initial levels before the vacation (Westman & Eden, 2001). Sonnentag (2003), thus, suspects that supportive recreational activities throughout regular weeks are necessary to sustain health and well-being.

Three generic domains of restorative recreational activities have been identified in the literature (e.g., Sonnentag, 2001): passive restoration (e.g., watching television), positive social interactions (e.g., Cohen & Wills, 1985; Smith & Baum, 2003), and physical activities (e.g., Nabkasorn et al., 2005; Salmon, 2001; Scully, Kremer, Meade, Graham, & Dudgeon, 1998; Wankel & Berger, 1990). In addition, exposure to nature has been found beneficial in reducing and preventing stress and negative stress effects, and to improve physical and mental health (e.g., Kaplan (1995), Kaplan & Kaplan (1998), Ulrich et al., 1991; Hartig, Evans, Jamner, Davis, & Gärling, 2003; for an overview, see Beute & de Kort, 2014). Collectively, activities such as spending quiet time by oneself, attending club meetings, going out for meals with friends and relatives, visiting family and friends, and being in parks and other outdoor settings, have proven supportive for people's health and stress levels (Pressman et al., 2009). Conversely, engagement in such activities has been negatively related to burnout (Stanton-Rich & Iso-Ahola, 2006).

Evidently, there are quite a number of miscellaneous restorative activities identified in the literature. The question is, do they represent a single class of behaviors that eventually can be promoted conjointly? In the following, we introduce a new model from attitude research that describes each individual recovery activity as a function of two parameters: (a) an individual's general appreciation for feeling mentally vigorous (i.e., the person's corresponding attitude) and (b) the composite of the costs—that is the difficulty of a specific behavior—involved when implementing the particular recreational activity (e.g., financial expenses, inconvenience, physical and mental effort, social pressure). So far, this approach, called the Campbell Paradigm, has been predominantly used as a conceptual framework for environmental attitude (see Kaiser, Byrka, & Hartig, 2010) and for the measurement of the corresponding behavioral performance (e.g., Kaiser & Wilson, 2004), but not exclusively as it was also applied to assess, for example, health attitudes of individuals (Byrka & Kaiser, 2013) and restorative (Smolders, de Kort, Tenner, & Kaiser, 2012) and privacy regulatory preferences (Haans, Kaiser, & de Kort, 2007).

2.1. Restorative activities within the Campbell Paradigm

If a person cherishes his or her mental vigor, and aspires to preserve it, we expect that the person—depending on his or her attitude level—will implement a set of behavioral measures. At the same time, the person's esteem for the very attitudinal object (e.g., mental vigor) or goal (e.g., preserving mental vigor) becomes most obvious in the obstacles a person overcomes when implementing the particular goal. In other words, why would someone express loathing stress, spend time with a hobby, go for restorative walks, and retreat to bed early, if he or she was not dedicated to vigor preservation or restoration? Engaging in recreational activities involves costs, such as time, effort, and money (Hobfoll, 1998; Sonnentag, 2001). These costs may be rather small, as when a person claims on a survey to dislike feeling stressed, or may be relatively substantial, as when a person actually leaves work for home prematurely. Across persons, the costs of a specific behavior are expected to be comparable (see, e.g., Byrka & Kaiser, 2013). As a consequence, recovery activities can be transitively ranked according to their costs in an order that is independent of actors. This specific transitive order of behaviors ultimately defines the attitude toward feeling mentally vigorous (e.g., Table 1).

Often, there is an abundance of behavioral options. When people implement their vigor preservation goal, they will do so—irrespective of their attitude level—in a cost-effective, rational manner (Kaiser et al.,

2010). For example, before someone engages in demanding and costly practices, the individual will more likely verbally express the importance of having time off for better performance. From a person who engages in a strenuous activity, we must, in turn, also expect that he or she practices less demanding behaviors directed at the same goal. This means-goal relation between one's appreciation for feeling mentally vigorous (i.e., one's attitudinal goal) and all the behavioral means one employs to restore vigor precludes any form of attitude-behavior gap. Mathematically, the very link between a person's attitude and his or her probability to engage in any specific attitude-relevant behavior can be described with the Rasch model (for more details see, e.g., Bond & Fox, 2007):

$$\ln\left(\frac{p_{ki}}{1-p_{ki}}\right) = \theta_k - \delta_i \quad (1)$$

In this probabilistic version of the Campbell Paradigm, the natural logarithm of the ratio of the probability (p_{ki}) of person k 's engagement in an activity or endorsement of a statement i relative to the probability of non-engagement in or non-endorsement of a specific restorative activity i ($1-p_{ki}$) is given by the difference between k 's attitude toward feeling mentally vigorous (θ_k) and the difficulty—the compound of all behavioral costs—of the activity i (δ_i).

Within this paradigm, explaining restorative activities by means of a person's attitude toward mental vigor becomes conceptually trivial as attitude is defined by the attitude-relevant class of behaviors: the behavioral measures a person could use to implement his or her specific attitude level (Kaiser et al., 2010). This does not say that exploring the origins behind an attitude or behind a performance class, respectively, is superfluous as we will see in this research; rather, it entails that the attitude toward feeling mentally vigorous and the overall performance of recovery activities, and thus, their two measures, are indistinguishable—are one and the same (cf. Kaiser, Oerke, & Bogner, 2007).

2.2. Research goals

In our research, we explore the proposed conception of an attitude towards feeling mentally vigorous in various ways. First, we test whether the set of restorative activities that we found in the literature adheres to the proposed conceptual model following the logic of the Campbell Paradigm. Second, we validate this newly developed attitude-toward-mental-vigor measure with well-established measures reflecting depleted personal resources. We expect, for example, the extent of people's mental exhaustion, and noticeable side effects of a perpetuated fatigue to correlate with people's attitude toward mental vigor and, thus, with these people's overall engagement in restorative activities. As people high on extraversion or on conscientiousness have been found comparatively less, and people high on neuroticism to be comparatively more vulnerable to many types of mental conditions (see Kotov, Gamez, Schmidt, & Watson, 2010)—including burnout (see Maslach et al., 2001)—we also expect restorative activities and, thus, people's attitude toward mental vigor to correlate with these three personality traits accordingly. Last, we compare results from a convenience sample of the general population with findings from a clinical sample diagnosed with burnout syndrome (i.e., ICD-10/Z73).

3. Method

3.1. Participants & procedures

Two samples participated in the experiment.

3.1.1. Convenience sample

From employees of the Eindhoven University of Technology, Eindhoven, The Netherlands, and personal acquaintances that were contacted, 322 (181—56.2% males) responded to our email invitation to complete a survey. Being employed for at least 20 h per week was the

Table 1
Forty-two self-reported recovery activities and six expressions of personal preferences.

		δ	MS	P_{gen}	P_{clin}
1.	At work, I retreat to the toilet	2.84	1.02	.24	.28
2.	At my day off, I do not answer my phone	2.62	1.14	.28	.33
3.	On a regular week-night, I do not answer my phone	2.38	0.93	.34	.38
4.	At work, I wear earplugs / headsets	2.32	1.06	.35	.40
5.	Upon arriving at home from work, I order takeout food	2.20	0.95	.38	.43
6.	On a regular week-night, I take a nap	1.64	1.13	.51	.56
7.	At work, I avoid tasks that require reading	1.61	0.95	.52	.57
8.	Upon arriving at home from work, I have a beer or a glass of wine	1.46	1.04	.56	.61
9.	At my day off, I take a nap	1.18	0.99	.63	.67
10.	At my day off, I avoid using a computer	1.17	0.90	.63	.67
11.	On a regular week-night, I go out for a walk even when it is cold and rainy	1.14	0.93	.64	.68
12.	On a regular week-night, I avoid using a computer	1.00	0.93	.67	.71
13.	Upon arriving at home from work, I change my clothes	0.84	1.05	.70	.74
14.	On a regular week-night, I watch nature documentaries	0.83	1.05	.70	.74
15.	On a regular week-night, I observe nature (e.g., sunset, a pristine spot, the stars at night)	0.53	0.99	.76	.80
16.	At a regular working day, I leave for home early	0.47	0.97	.77	.81
17.	I dislike having even the slightest feeling of stress	0.33	1.04	.80	.83
18.	At my day off, I go to bed early	0.21	0.94	.82	.84
19.	On a regular week-night, I do nothing (e.g., hang around, day dream)	0.19	0.90	.82	.85
20.	On a regular week-night, I avoid busy places	0.17	1.12	.82	.85
21.	On a regular week-night, I go to a café or restaurant	0.09	0.98	.83	.86
22.	On a regular week-night, I practice outdoor sports (e.g., jogging, hiking, football)	-0.01	1.01	.85	.87
23.	On a regular week-night, I take a shower or bath	-0.18	0.99	.87	.89
24.	Upon arriving at home from work, I sit down before I do anything else	-0.26	0.98	.88	.90
25.	At work, I look out the window	-0.29	1.03	.88	.90
26.	Upon arriving at home from work, I take off my shoes	-0.53	0.98	.90	.92
27.	On a regular week-night, I go to bed early	-0.77	0.98	.92	.94
28.	On a regular week-night, I listen to music	-0.85	1.02	.93	.94
29.	At my day off, I go for a walk	-0.88	0.97	.93	.94
30.	At work, I flex my muscles actively and/or passively (e.g., sit-up straight, stretch, rub my eyes)	-0.95	0.98	.93	.95
31.	It is important to me to avoid feeling mentally fatigued	-1.05	1.02	.94	.95
32.	Upon arriving at home from work, I talk to someone about my day	-1.06	1.01	.94	.95
33.	On a regular week-night, I read	-1.10	1.02	.94	.95
34.	I perform best when I had some time off	-1.16	0.99	.95	.96
35.	On a regular week-night, I spend time on my hobby (e.g., painting, my car)	-1.42	1.03	.96	.97
36.	At my day off, I take time to cook and eat	-1.63	0.95	.97	.97
37.	I dislike having difficulties concentrating	-1.76	1.01	.97	.97
38.	I can only work well when I am under pressure	-1.91	0.98	.97	.98
39.	<i>On a regular week-night, I resume work after dinner</i>	-2.10	0.98	.98	.98
40.	I dislike it when I cannot focus while reading	-2.23	1.02	.98	.98
41.	On a regular week-night, I meet friends or family	-2.31	0.95	.98	.99
42.	<i>At my day off, I work</i>	-2.66	1.00	.99	.99

Note. *Items in italics* represent negatively formulated items. **Bold items** represent personal preferences (i.e., evaluative statements). Difficulty estimates (δ) are expressed in logits. Fit statistics are reported as mean square (MS) statistics. p stands for the engagement likelihood of a person with an average level of attitude toward mental vigor. It can also be read as the prevalence or assertion rate of the specific item. p_{gen} and p_{clin} stand for the engagement likelihoods of the average person from the nonclinical, general population sample and from the clinical sample, respectively.

sole condition for participation. As an incentive, participants took part in a lottery, in which 6 prizes of € 25 could be won. Of the 322 respondents, 262 had filled in valid email addresses. Age ranged from 19 to 75 ($M = 35$; $SD = 12$). Of the 322 respondents, 269 (83.5%) had a university level education, and 209 (64.9%) worked full time. This first survey took approximately 20 min to complete.

Three months later, the 262 (81.4%) respondents with valid email addresses were contacted to complete a second questionnaire. The response rate was 61.8% (162 respondents; 90 – 55.6% males). Eight respondents had to be excluded because their identification number did not match with one from the first data collection wave. Respondents' ages ranged between 21 and 63 ($M = 35$, $SD = 11$). No significant differences were found on any of the initial outcome variables between responders and non-responders. The second survey took 10 min to complete.

3.1.2. Clinical sample

A clinical sample of 56 patients (31—55.4% male) came from a psychosomatic hospital in Rheinfelden, Switzerland. They were notified about the study by their therapist when diagnosed with ICD-10 code Z73 (i.e., burnout). Participation was voluntary and anonymous. For that reason, patients received a paper questionnaire with an

accompanying envelope to return the completed survey directly to the authors in the Netherlands. Patients' ages ranged from 20 to 59 ($M = 47$, $SD = 8.4$). Comparing the two samples, we must conclude that the clinical sample was significantly older than its nonclinical benchmark: $F(1365) = 62.9$; $p < .001$; in their gender composition, they, however, are statistically indistinguishable: $\chi^2(1) = .04$; $p = .84$.

Of the patients, 46 (82.1%) had taken sick leave in the last three months, eight (14.3%) had not (2 not reported). In comparison with the nonclinical calibration sample of Halbesleben & Demerouti (2005: $N = 2431$) our clinical sample scored higher on the exhaustion subscale: 3.27 ($SD = .43$) vs. 2.99 ($SD = .61$), but lower on the disengagement subscale: 2.51 ($SD = .41$) vs. 2.87 ($SD = .64$) of the Oldenburg Burnout Inventory.

3.2. Measures

In our research, we employed 7 instruments: 2 measures of a lack of mental vigor (i.e., chronic fatigue, need for recovery), 2 measures of noticeable side-effects of a perpetuated lack of recovery of personal resources (i.e., self-reflection on everyday lapses, psychosomatic complaints), 2 attitude measures grounded in the Campbell Paradigm (i.e., health attitude and the novel attitude toward mental vigor), and a

conventional personality inventory. Participants were asked to respond to all questions with respect to the last three months, or to the three months just before their sick leave.

3.2.1. Attitude toward mental vigor – Scale construction

Attitude toward mental vigor, the new measure, is based on 36 self-reports of restorative activities and 6 expressions of personal preference for certain restorative activities (i.e., evaluative statements), see Table 1. The majority of items were derived from the literature and describe well-known restorative activities; viewing nature (e.g., Beute & de Kort, 2014, Ulrich et al., 1991; items 14, 15), active leisure activities (e.g., McAuly, Kramer, & Colcombe, 2004; Sonnentag, 2001, van Hooff, Geurts, Kompier, & Taris, 2007; items 11, 22, 29), social activities (e.g., Sonnentag, 2001; items 21, 32, 41), sleeping (Zijlstra & Sonnentag, 2006; items 6, 9, 18, 27), passive activities (e.g., Sonnentag, 2001; van Hooff et al., 2007 items 19, 23, 28, 33, 36), and mastery (e.g., Hobfoll, 1998; item 35). Reversely, two items were related to overtime work (see, e.g., van Hooff, et al., 2007; items 39, 42). Some were selected from Smolders, de Kort, Tenner, and Kaiser (2012), who developed a scale with behaviors that office employees might engage in to seek recovery at work. The list was complemented with items based on a pilot study in which 22 respondents indicated which recreational activities they engaged in during and after work to unwind (items 2, 3, 5, 8, 10, 12, 13, 20, 24, 26). All together, we had anticipated that the behavioral indicators of active restoration would represent the typical range of activities. Of the 36 behaviors, 6 can be performed while working, 6 upon arrival at home after work, 17 on regular weeknights, and 7 were for regular days off. Please note that the Campbell Paradigm and the Rasch model do not require a comprehensive set of behaviors to measure attitude. Rather, it is crucial to consider items with a wide range of difficulties. Both person attitudes and item difficulties are estimated within a Rasch model test.

For the 36 behavior items, engagement could be expressed with a 5-point frequency scale (0 = *never*, 4 = *always*). The responses to this set of items were recoded into a dichotomous format by collapsing *seldom*, *occasionally*, *often*, and *always* into 1 = *engagement*. *Never*, by contrast, was retained as 0 = *non-engagement*. For the 6 evaluative statements, one's personal opinion could be expressed with a 5-point frequency scale (0 = *disagree completely*, 4 = *agree completely*). The responses to these 6 items were recoded into a dichotomous format by collapsing *disagree completely*, *disagree*, and *neither/nor* into 0 = *negative response*. *Agree* and *agree completely* were joined as 1 = *affirmative response*. Recoding was again a precaution measure against response bias with polytomous response alternatives. For all items, we included a *not applicable* option. These responses were treated as missing values (0.7%).

3.2.2. Lack of mental vigor

Chronic mental fatigue was measured with the Fatigue Assessment Scale (Michielsen, de Vries, & van Heck, 2003). Responses to the 10 items, such as "I am bothered by fatigue" and "I have problems thinking clearly" could be expressed with a 5-point frequency scale (0 = *never*, 4 = *always*). For all items, *no response possible* was an alternative reply option; these responses were treated as missing values (0.1%). The internal consistency of the scale was $\alpha = .86$. Person scores were calculated as mean values of the original 10 items.

The Need for Recovery Scale by van Veldhoven and Broersen (2003) involves 11 statements, such as "I find it difficult to relax at the end of a working day" and "Generally, I need more than one hour before I feel completely recuperated from work." Respondents responded with 1 = *yes* or 0 = *no*. For all items, *no response possible* was a reply option when an answer was not possible, again these answers were coded as missing values (0.9%). The internal consistency of the scale was $\alpha = .83$. Person scores were calculated as mean values of the original 11 items.

3.2.3. Noticeable side-effects

Everyday lapses were assessed with the Cognitive Failures

Questionnaire consisting of 25 items (Broadbent, Cooper, Fitzgerald, & Parkes, 1982). Respondents were asked how often they had experienced these common, everyday lapses in the past three months. Example items are: "Did you fail to see traffic signs along the road?", "Have you bumped into people?", or "Have you forgotten appointments?" Responses could be given on 5-point frequency scales (0 = *never*, 4 = *very often*). Due to missing values (i.e., 1.2%), we calculated mean values across the 25 responses. The internal consistency of the scale was $\alpha = .93$.

Psychosomatic complaints related to stress involved (a) heart palpitations, (b) shortness of breath, (c) stomach or bowel problems, (d) headaches, (e) neck and back problems, and (f) chest pain. With the convenience sample, respondents were originally asked to state how often they had experienced any of the 6 health problems (1 = *very often*, 5 = *never*); these responses were later recoded to 1 = *yes* (anything but *never*; responses 1 through 4), or 0 = *no* (for 5 = *never*). With the clinical sample, respondents expressed their experiences with 1 = *yes* or 0 = *no*. Person scores were calculated as mean values of the 6 psychosomatic complaint items, with an internal consistency of $\alpha = .77$.

3.2.4. Health attitude

The health attitude measure in the present study was the 50-item Health Attitude Scale developed by Byrka and Kaiser (2013). Respondents reported their health performance in 5 domains: nutrition, hygiene, stress recovery, risk prevention, and physical exercise. Examples of items are "I brush my teeth at least twice a day", "I take time to relax", and "I exercise at least 15 min per day." Engagement was verified with a yes/no format for 22 behaviors and with 5-point frequency scales (0 = *never*, 4 = *always*) for the remaining 28 behaviors. The responses to the latter set of behaviors were recoded into a dichotomous format by collapsing *never*, *seldom*, and *occasionally* into 0 = *unreliable engagement*. *Often* and *always* were joined as 1 = *reliable engagement*. This measure was taken as a precaution against response bias because participants were previously found to inconsistently use the polytomous response alternatives (e.g., Kaiser & Wilson, 2000).

For all behavioral self-reports, we included a *not applicable* option. Such answers were treated as missing values (1.2%). The calibration of the health attitude measure was based on the classical Rasch model (for more details, see Bond & Fox, 2007). The instrument was calibrated in line with its previous calibration (see Byrka & Kaiser, 2013). The items fit the respective Rasch model. The Rasch-model-based reliability estimates was $rel = .62$. Person scores were derived as weighted maximum likelihood estimates. Person scores are expressed in logits, reflecting the natural logarithm of the engagement/non-engagement ratio of a person across all items of the health attitude measure. The higher the logit value, the more pronounced or strong the particular attitude is.

3.2.5. Personality inventory

The Big Five Inventory by John, Donahue, and Kentle (1991) consists of 44 items; 9 measure agreeableness, 9 conscientiousness, 8 extraversion, 8 neuroticism, and 10 openness. Respondents are asked to indicate the extent to which they agree or disagree to a given statement. For example, "I see myself as someone who is talkative" (extraversion), "I see myself as someone who is helpful and unselfish with others" (agreeableness), or "I see myself as someone who is depressed, blue" (neuroticism). Responses could be given on 5-point scale (1 = *disagree strongly*, 5 = *agree strongly*). The internal consistency of the five personality traits ranged from $\alpha = .70$ (for agreeableness) to $\alpha = .84$ (for neuroticism).

3.2.6. Statistical analysis

Using Winsteps (Linacre, 2009), we tested our Rasch model expectation for the Attitude-toward-Mental-Vigor measure by calibrating our 42 proposed items (see Table 1; [Dataset] Beute, Kaiser, Haans & de Kort, 2017a). Fit statistics are reported as mean square (MS)

Table 2
Descriptive statistics and bivariate correlations of appreciation of mental vigor with convergent and divergent concepts.

	N	M	SD	reliability	bivariate correlations	
					uncorrected	corrected
Attitude toward mental vigor	378	1.30	.76	.67		
Lack of mental vigor:	322	1.39	.54	.86	.33**	.43
Chronic mental fatigue						
Need for recovery	322	.73	.26	.83	.24**	.32
Noticeable side-effects:	210	1.40	.61	.93	.29**	.37
Cognitive failures						
Psychosomatic complaints	210	.53	.28	.77	.21**	.29
Health attitude	154	1.52	.01	.62	-.01	-
Personality:	322	2.48	1.11	.70	-.10	-
Agreeableness						
Conscientiousness	322	2.49	1.08	.80	-.13 [†]	-.18
Neuroticism	322	2.38	1.07	.84	.26**	.35
Extraversion	322	2.57	1.13	.83	-.08	-
Openness	322	2.38	1.09	.80	-.04	-

Note. Reliability estimates are either Cronbach's Alpha or Rasch-model-based reliabilities. Bivariate correlations are either Pearson correlation or Kendall's τ coefficients: uncorrected and corrected for measurement error attenuation. A generic correction for measurement error attenuation adjusts correlations for the low reliabilities of the two measures involved (Charles, 2005). Widely accepted significance tests are available only for uncorrected correlations.

* $p < .05$.

** $p < .01$.

statistics—weighted by the item variance. Pearson correlation or Kendall's τ coefficients were used to assess the strength of the bivariate relations. ANOVAs were employed for the comparisons of the non-clinical, general and the clinical sample ([Dataset] Beute, Kaiser, Haans &, de Kort, 2017b). For our analyses, we did not exclude statistical outliers unless outliers resulted in significantly different conclusions regarding our findings. In case an outlier was detected, we will report outcomes both with and without these outliers. For this research, we defined outliers as persons with scores more than 3 SDs from the group average for parametric and more than 4 SDs for nonparametric variables.

4. Results

We report our findings in two sections. In the first section, we explore whether restorative activities fall into one general class of activities that can be modeled as a function of the level of a person's attitude toward mental vigor and the costs involved when implementing the particular activity. In the second section, we provide evidence that speaks of the construct validity of our newly developed attitude toward mental vigor scale.

4.1. Attitude-toward-Mental-Vigor

The restorative activities' items were successfully calibrated within the Campbell Paradigm as a unidimensional scale measuring attitude toward mental vigor. All 42 items fit the model prediction with very reasonable mean square (MS) values between .90 and 1.14 (for reference values, see e.g., Bond & Fox, 2007; Wright & Linacre, 1994). MS-values reflect the relative discrepancy in variation between model prediction and observed data. They are not sensitive to sample size. A MS-value of 1.20 reflects, for example, 20% more, a MS-value of .80, by contrast, reflects 20% less variation in the data than was predicted by the Rasch model. Table 1 displays the difficulties (δ), and fit statistics for the various items.

Of all participants, only a tolerable number of 17 (4.5%) demonstrated poor fit with the model prediction ($t > 1.96$). Accordingly, the

Rasch-model-based reliability of our newly developed measure was acceptable with a person reliability of $rel = .67$, and an item reliability of $rel = .99$.

With probabilistic models, there unavoidably is information that remains unaccountable by the Rasch model, even with perfect data-to-model fit. This shows in an estimated amount of variance in our data that is technically explainable of 29.7%. The Rasch model, in turn, accounted for 29.6% of the variance in the data. In other words, it is paramount that the modeled amount of explained variance (about 29.6%) is almost perfectly comparable to the technically explainable amount of variance (29.7%). This first test, thus, confirms that the explainable variance is basically explained.

In a second test, we explored whether the unexplained variance by the Rasch model is more or less random. For that, we conducted a principal component analysis (PCA) on the information that remains unaccounted for by the Rasch model (i.e., on the residuals). With 4.6% our PCA revealed a fairly small amount of unaccounted common variance in the residual data—data that are not already addressed by our Attitude-toward-Mental-Vigor model. In other words, we apparently did not overlook a significant additional influence—apart from a person's attitude toward mental vigor—behind the responses of our participants to the suggested items. Thus, we can safely conclude that all behaviors and statements included in the scale indeed fall on a single dimension, expectedly a person's attitude toward mental vigor. In other words, we found a means-goal relation between behaviors/statements and the underlying attitude; meaning that the items can be reliably ranked based on their difficulty. This order in turn allows us to assess a person's propensity to attain the presumed attitudinal goal (expectedly, feeling mentally vigorous).

4.2. Construct validation

Convergent validity information was derived from the pattern of correlations between our new attitude measure and lack of mental vigor, noticeable side-effects measures, and the Big Five personality traits. In line with our hypothesis, measurement-error-attenuation-corrected Kendall's τ or Pearson correlation coefficients of need for recovery, chronic fatigue, cognitive failure, and psychosomatic complaints with attitude toward mental vigor revealed that the four measures substantially shared information with our newly developed measure. This was indicated by consistently moderate effect sizes ($.29 < r_{corr} < .43$; see Table 2).

The measurement-error-attenuation-corrected Pearson correlations of conscientiousness ($r_{corr} = -.18$) and neuroticism ($r_{corr} = .35$) also substantially shared information with a person's attitude toward mental vigor. Extraversion, agreeableness, and openness, by contrast, did not (see Table 2). Note that outliers would have affected our conclusions with two of the latter three correlations. With outliers included (1 for openness, 1 for extraversion, 3 for agreeableness, 1 for conscientiousness, and 3 for our scale), we would have additionally found small negative correlations with extraversion ($r = -.13, p = .02$) and agreeableness ($r = -.13, p = .02$).

Discriminant validity should be demonstrated by an absence of a correlation between two attitudes, which we thought to be distinct despite a possible conceptual similarity: a person's attitude toward mental vigor and a person's attitude toward his or her personal health. In line with our hypothesis, the Pearson correlation turned out to be insignificant with $r = -.01$. Apparently, people's appreciation for their health is separate from their appreciation for their mental vigor.

Postdictive validity was evaluated by comparing a general, non-clinical sample with a clinical sample of patients diagnosed with ICD-10 code Z73 (i.e., burnout). Not surprisingly, our clinical sample reported significantly more psychosomatic complaints right before starting treatment ($M = .67$; $SD = .27$) than persons from our general sample ($M = .47$; $SD = .26$; $F(1207) = 24.1, p < .001, \eta^2 = .10$). Moreover, our clinical sample reported more cognitive failures ($M = 1.94$; $SD =$

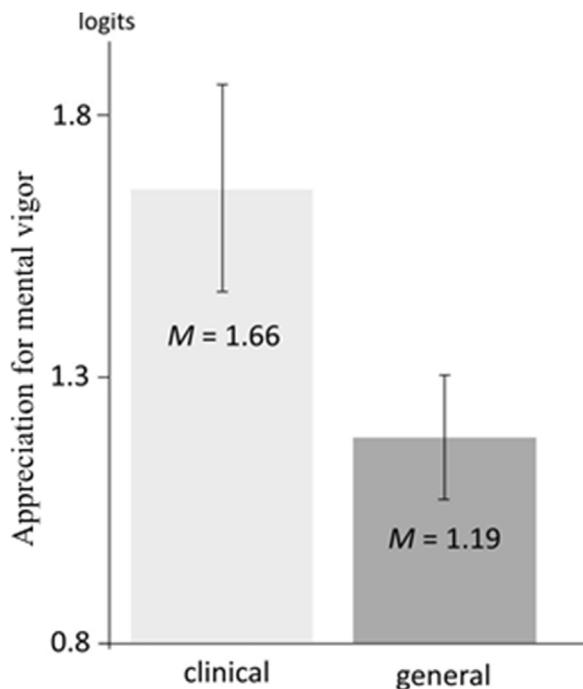


Fig. 1. Average appreciation for mental vigor (i.e., attitude toward mental vigor) for the clinical and the nonclinical sample; vertical bars indicate the 95%-confidence intervals.

.68) than our general sample ($M = 1.20$; $SD = .44$; $F(1208) = 86.7$, $p < .001$, $\eta^2 = .29$).

Respondents diagnosed with burnout had significantly elevated appreciation-for-mental-vigor levels ($M = 1.66$; $SD = .88$) compared to respondents from the general population ($M = 1.19$; $SD = .69$): $F(1376) = 14.9$, $p < .001$, $\eta^2 = .07$ (see Fig. 1). In Table 1, we translated these mean differences between the clinical and the nonclinical, general sample into engagement or affirmation probabilities for every single of the 42 restorative activities' items. From these figures, one can compare the behavioral implications of the attitudinal differences for an average person in the two samples. Not answering the phone at a day off and avoiding tasks that require reading at work, are, for example, both 5% more likely for an average person diagnosed with burnout than for a person from the general population. Whereas the former behavior is - even for a burnout patient - rather unlikely with $p = .33$, the latter is, by contrast, with $p = .57$ rather likely.

5. Discussion

Our aim was to investigate whether self-reports of recreational and restorative behaviors performed during and after work, and expressions of appreciation for feeling mentally vigorous, form a single transitively ordered class of activities following the logic of the Campbell Paradigm. Overall, the results are encouraging in terms of fit statistics and reliability. As a consequence, it becomes possible to collapse the various types of restorative activities and expressions of appreciation into a single performance and/or attitude measure. Due to the transitive order, our research demonstrates that persons' attitudes toward feeling mentally vigorous can be translated directly into their restorative performance, and vice versa.

With respect to the validity of our proposed attitude toward mental vigor measure, we found significant positive correlations with chronic fatigue, need for recovery, psychosomatic complaints, and daily cognitive failures. Moreover, we found that people recently diagnosed with burnout had a more pronounced attitude toward mental vigor and had engaged in more, and more demanding, restorative activities than respondents from the general population. Combined, these effects speak of persons' engagement in restorative activities as related to their

susceptibility for fatigue and psychosomatic symptoms.

These findings are corroborated by further correlations between our scale and personality dimensions. People low on conscientiousness—maybe extraversion and agreeableness too—and high on neuroticism comparatively engaged more in restorative activities, reflecting a more pronounced appreciation for mental vigor. Previous research has revealed similar patterns between personality and susceptibility to burnout (Langelaan et al., 2006; Maslach et al., 2001), psychopathology (Kotov et al., 2010), and job strain (Fogarty, 1999).

At first sight, these results seem to contradict earlier findings on the relation between engagement in recreational behaviors and stress outcomes. Activities such as gardening or a walk in nature are consistently found to alleviate experienced stress (see, e.g., Hartig et al., 2003; van den Berg, & Custers, 2011) and to shield a person against imminent stressors, and past research has thus predominantly indicated beneficial effects of recreational activities on health, wellbeing, and burnout level (e.g., Sonnentag, 2001, 2003; Pressman et al., 2009; Stanton-Rich & Iso-Ahola, 2006). Besides, earlier research did not reveal a positive relationship between a person's attitude toward engaging in leisure activities and burnout (Stanton-Rich & Iso-Ahola, 2006). In contrast, we find people with a more positive attitude toward mental vigor to be more—rather than less—vulnerable to burnout and other stress-related cognitive and health outcomes. In other words, when restorative activities, which by themselves are beneficial in preventing or shielding against stress, are manifestations of a personal motivation to feel mentally vigorous, and thus of a positive attitude toward mental vigor, a higher vulnerability to burnout is to be expected with increasing engagement in such activities.

This does not necessarily contrast earlier findings. We should note that the activities included in the scale are specifically geared towards unwinding and include a substantial number of avoidance behaviors not investigated earlier. These avoidance behaviors may be more imminent for those with a disrupted work-life balance, which in itself has been found an indicator of burnout prevalence (Peeters, Montgomery, Bakker, & Schaufeli, 2005). The results do stress the fact that under persistent threats to one's mental vigor (i.e., the attitude goal), such as when confronted with continuing stress levels, persons may need - and seek - restoration incessantly, as the engagement in such activities may neither remove the stressor nor offer more than a temporary buffer.

Although our research shows that there is a positive link between behavioral endorsement and burnout, this may not apply to people that are completely burned out. Engaging in recreational activities - or active restoration - may only be possible once one is again able to cope with burnout. Thus, it may be an early indicator of recovery.

Limitations of this study include having used a convenience sample with an overrepresentation of highly educated respondents. Furthermore, the general sample was drawn from the Dutch population, and the clinical sample consisted of Swiss respondents. Possible cultural differences can therefore not be excluded.

In addition, even though we have carefully selected our items, certain behaviors such as a reading at work, even though reading is found to require focused attention, may be in fact recreational when it involves reading magazines or other non-work related text. However, the empirical data (fit statistics) do demonstrate that the item, even when not formulated perhaps adequately, could be ranked reliable in difficulty, and thus used to measure the attitude toward mental vigor.

Despite these limitations, we were able to confirm a range of activities and statements with which working people realize their specific levels of attitude toward mental vigor, following the Campbell Paradigm. Whereas previous research has generally indicated restorative and protective effects of restorative activities, our findings illustrate that things may be more complex than previously assumed. Interestingly, our results suggest that active engagement in recovery is less preventive than curative. It may not always effectively shield us from detrimental health effects and burnout but rather seems to indicate that people feel vulnerable to stress and experience that their

mental vigor is threatened and in need of restoration.

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Conflicts of interest

None.

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Data sets

- F. Beute F.G. Kaiser A. Haans Y.A.W. de Kort, 2017a. Striving for mental vigor through restorative activities. Dataset for Rasch analysis of scales (Winsteps), Permanent Identifier unknown.
- F. Beute F.G. Kaiser A. Haans Y.A.W. de Kort, 2017b. Striving for mental vigor through restorative activities. Dataset for validity analyses (SPSS), Permanent Identifier unknown.