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RESEARCH ARTICLE

Job demands when exhausted: the relationship between exhaustion and the perception of job demands mediated by self-undermining

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Abstract

There is a large body of literature devoted to factors that shape performance in organizations. Although much of this literature focuses on the relationships between job demands, job resources and performance, Bakker and his colleagues (2014; 2018) have recently drawn attention to self-undermining effects that can add support for a deeper understanding of such a relationship. The following contribution explores self-undermining related to exhaustion at work and its mediating role in the perception of three types of job demands in a sample of employees working in IT companies. More specifically, the paper draws on the concept of self-undermining to reflect on how it activates a loss cycle of job demands and potential negative reactions at work. We argue that (i) exhaustion has an indirect effect on the perception of job demands through self-undermining; and so on referring to each dimension of job demands: (ii) exhaustion has an indirect effect on the perception of workload through self-undermining; (iii) exhaustion has an indirect effect on the emotional load through self-undermining; (iv) exhaustion has an indirect effect on the cognitive load through self-undermining. In order to test the hypotheses, a cross-sectional design was employed. The regression analyses revealed that self-undermining mediated the relationship between exhaustion and the perception of workload meeting our expectations, and a significant indirect effect of exhaustion on the perception of job demands and emotional load. However, there is a need for future studies to generalize the results. Finally, theoretical and practical implications are discussed.

Keywords

self-undermining; perception of job demands; exhaustion; perceived workload; IT employees

Over the previous decades, researchers and practitioners have committed vast amounts of time and resources into addressing the factors and challenges associated with the job performance and the quality of working life in a dynamic, complex, and competitive environment. The software industry constitutes a significant component of the global economy that has become increasingly fast-paced in recent years (Fitzgerald & Stol, 2017). Changes like rapid technological developments, fast market dynamics, a growing variety of data sources, and increasing needs for enterprise software to span multiple domains of business oblige software companies to thoroughly evaluate the working conditions, continuously support their workforce, redefine development processes and roles to face the altering conditions, and to facilitate the ongoing acquisition of new skills (Fosso Wamba et al., 2017). Such complex and fast changes add more job demands for the employees in software companies who might suffer from

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increased stress and work exhaustion (Venkatesh et al., 2018). While work exhaustion in software developers accounts for more than 30% of all technical development errors besides other negative results (Furuyama et al., 1997), the importance of exploring its correlates becomes imperative. Considering that employees in the software industry have specific job demands dealing with high responsibility and new knowledge in their daily professional duties, we aim to further explore the relationship between exhaustion and the perception of job demands by including self-undermining.

The concept of self-undermining emerged in professional and occupational contexts as a "behavior that creates obstacles that may weaken performance" (p. 115, Bakker & Costa, 2014). Self-undermining is caused by job stress and consists of behaviors such as poor communication, mistakes, and conflicts at the workplace. The concept was included into the Job Demands–Resources (JD-R) model (Bakker & Demerouti, 2007) by Bakker and Costa (2014), who suggested that self-undermining mediates the relationship between exhaustion and job demands. Besides these, it is widely acknowledged that job strain is caused by job demands and the lack of job resources and employees who experience job strain perceive and create more job demands over time (Demerouti et al., 2014; Vohs & Faber, 2007). In the same manner, the researchers suggested that employees who engage in self-undermining most likely experience high levels of job strain, because they communicate poorly, make more mistakes and create more conflicts and thus increase their job demands unwillingly (Bakker & Yang, 2019).

While past research draws attention to self-undermining by clarifying the concept, the potential connections between self-undermining and other factors have not yet been fully studied, especially the mediating role of self-undermining in the relationship between exhaustion and job demands, as they are presented in the Job Demands-Resources Model (Bakker & Demerouti, 2018). The main aim of this paper is to broaden our understanding of the relationship between self-undermining and the already established one between job demands and exhaustion.

More specifically, the objective of this paper is to tackle the mediation role of self-undermining in the relationship between exhaustion and the perception of job demands in a sample of employees working in software industry. To address the objective, we rely on the Job Demands-Resources Model as proposed by Bakker and Demerouti (2018). We follow Bakker and Demerouti's prediction that there are two independent processes in this model: a process of health impairment and a motivational one. Therefore, although workplace resources are the most important predictors of engagement, motivation, and well-being (Bakker, et al., 2007) through mediators such as job crafting, workplace demands are generally the best predictors of exhaustion, health problems, burnout (Bakker et al., 2003; Hakanen, et al., 2005) and the relationship could be mediated by self-undermining. Moreover, the literature (Bakker et al., 2014) suggests that the behavior of self-undermining could act as a catalyst for a spiral of losses by facilitating demands and efforts and could be considered the link between demands and exhaustion in the process of health impairment.

Thus, understanding the vicious cycle between exhaustion and job demands might mitigate well-known individual and organizational outcomes (e.g., work performance, turnover intentions or sick leave) and might offer a means to positively influence exhausted employees. A scientific understanding of the role of self-undermining in connection with exhaustion and job demands perceived by the employees could, in the future, help researchers find better ways of counteracting their negative effects on employee well-being and performance.

A further aim of this study is to explore the relationship between self-undermining and different types of job demands. By identifying differences in such relationships, this paper addresses a current gap in job demands research which suggests considering a more analytical approach. To address this gap, our goal aims at exploring the way self-undermining relates to different types of perceived job demands in exhausted

employees. Besides, we will explore how different types of job demands are indirectly predicted by exhaustion through self-undermining. We will first provide the relevant theoretical background and describe the current state of research on job demands, exhaustion, and self-undermining. Second, based on these foundations, we develop the hypotheses concerning the relationships between exhaustion, perception of job demands, and self-undermining.

Job Demands

Job demands are defined as "those physical, social, or organizational aspects of the job that require sustained physical and/or psychological effort on the part of the employee, and are therefore associated with certain physiological and/or psychological costs" (Demerouti et al., 2001, p. 501). A specific interest in job demands has been shown by the scholars in the field of job stress who also started incorporating job resources into their models, in order to examine the impact of the job demands in relationship with job resources on organizational outcomes. To better framing the concept of job demands, we have documented the most impactful theories or models on job demands – job resources in organizational psychology, namely Michigan Model (Caplan et al.,1980), the demand-control model (Karasek, 1979: Karasek & Theorell, 1999), and Job Demands–Resources (JD-R) theory (Demerouti et al., 2001).

First, the Michigan Model (Caplan et al., 1980), for example, has suggested that objective job demands (e.g., role ambiguity, role conflict, job insecurity, workload) are subjectively perceived by employees and indirectly lead to mental and physical health complaints. The mentioned relationship was expected to be moderated by neuroticism and social support such that individuals more emotionally stable and with a stronger social network experience fewer health complaint in response to high job demands.

Second, the demand-control model (Karasek, 1979) has posited that job demands particularly lead to job strain and health complaints when job control (or decision latitude; i.e. a combination of autonomy, variety, and skill use) is low. Thus, job control becomes the most important job resource and is expected to buffer the impact of job demands. Karasek and Theorell (1990) expanded the demand-control model by including a second job resource—social support—that can also help in dealing with high job demands. Evidence for those models are rather mixed (De Lange et al., 2003).

Third, Job Demands–Resources (JD-R) theory (Demerouti et al., 2001) builds on and expands these earlier models in suggesting that many different job resources and job demands could and should be considered, as all organizations and jobs may have unique, distinctive job characteristics. While previous models propose a predefined set of job characteristics to predict job stress and motivation, JD-R theory is more flexible and can accommodate various specific job demands and job resources.

The well-known Job Demands-Resources Model (Bakker et al., 2011) argues that, regardless of the type of organization, work can be divided into two broad categories - demands and resources - thus offering a theoretical framework in which the two, together with various psychological states and effects can be associated (Bakker & Demerouti, 2017). Job demands consists of characteristics of the working environment that require physical, cognitive, and emotional energy and that incur costs to the individual. Job resources are the physical, psychological, social, or organizational aspects of the job that are functional in achieving work goals and stimulate personal growth, learning, and development (Demerouti et al., 2001; Bakker & Demerouti, 2017). While job demands are the most important causes of a health-impairment process leading to job strain, job resources are seen as the most important causes of a motivational process leading to work engagement (Bakker & Demerouti, 2017).

Another aspect the JD-R model brings is the multidimensional nature of job resources and job demands. These resources and demands include emotional, cognitive, and physical components. Consequently, job demands can be divided into three dimensions: workload, cognitive load and emotional load. Examples of job demands may be work pressure, unfavorable work environment, extended work hours, etc. However, all these

do not necessarily have negative effects, but can turn into stressors when the employees fail to employ work recovery activities suitable for the effort made (Demerouti & Bakker, 2011). Scholars have pointed out that the emotional demands have not traditionally valued as high as cognitive and/or technical demands. For instance, wages and cognitive demands are linearly related, whereas wages and physical demands are curvilinearly related (with compensation rates higher at more extreme levels of physical demands). Wages and emotional demands have been shown to be unrelated (Glomb et al., 2004).

In order to clarify the role of these demands, LePine et al. (2005) have mentioned other two categories: challenging demands and hindrance demands. Challenging stressors (eg. high workload, pressure, increased responsibility) promote personal development and employee achievement (Podsakoff et al., 2007). Moreover, despite the discomfort involved, they are seen as "beneficial stressors" that bring positive work experiences. On the other hand, hindrance stressors (e.g. role conflict, role overload or role ambiguity) inhibit individuals in achieving their goals and are thus characterized as "unfavorable stressors" (Cavanough et. al, 2000).

In addition to the analytical approach of the job demands, the nature of job demands is thought to depend on varying individual evaluations, which can be modified by work-related boundary conditions such as the amount of social support and job control (Gerich & Weber, 2020). As we have already specified, Bakker and Demerouti (2018) included exhaustion and self-undermining as predictors of perception of various job demands.

Exhaustion at work

Exhaustion is mostly studied as a dimension of the burnout syndrome, which, in turn, has been recently accepted as a legitimate medical diagnosis, according to the International Classification of Diseases, or the ICD-11, the World Health Organization's handbook that guides medical providers in diagnosing diseases.

The Job Demands-Resources Model specifies that the level of exhaustion / burnout can affect the demands of employees at the workplace, through the context of reversed causal relationships. For example, some studies have argued the predictive effect of employee exhaustion or burnout on demands (Bakker et al., 2000; Demerouti et al., 2004; Zapf et al., 1996). This effect can be explained by the fact that employees who experience a low level of engagement behave in ways that generates even more demands, thus increasing the level of stress and problematic interactions (Demerouti et al., 2009). We argue that this causal effect is mediated by the newly integrated concept in the Job Demands-Resources Model: self-undermining (Bakker & Costa, 2014; Bakker & Demerouti, 2018).

The second assumption of the model is that work environments can cause two types of psychological processes: motivational and of health impairment. The first process starts from a high level of resources and stimulates the increase of the commitment to work, as well as the decrease of the level of cynicism towards the work (Demerouti & Bakker, 2011). In contrast, the process of health impairment starts from a high level of demands and depletes the energy resources of the employees, thus stimulating fatigue, exhaustion, and health problems (Hakanen et al., 2006). According to the first two assumptions, the optimization of the levels of resources and demands in the workplace for employees could stimulate the development of the organizational commitment, and later, increase the performance.

It is also important to note that, although the predictive relationship between job demands and exhaustion is already known (Bakker & Demerouti, 2007; Demerouti et al., 2001; Lee & Ashforth, 1996), exhaustion or burnout can also have a negative effect on demands over time (Bakker et al., 2000; Demerouti et al., 2004; Zapf et al.1996). A possible explanation for such an inverse effect is that the already exhausted employees begin to engage in behaviors that increase their demands, staying behind with work or often making mistakes (Demerouti et al., 2004). Hereinafter, the role of self-undermining behaviors in exhausted employee could be as

a facilitator of demands this inversed causal effect.

Self-Undermining

According to previous research (Demerouti et al., 2004; Schaufeli et al., 2009; Ten Brummelhuis et al., 2011), employees that show low engagement, therefore an increased risk of burnout, get to create more demands in their role. When they become exhausted and develop an aversion or cynicism towards their work, individuals put less effort and attention into their tasks and become prone to mistakes, which ultimately predicts poor performance and accumulation of demands in the workplace.

This dysfunctional behavior of the employees was captured in the form of the concept of self-undermining. The concept, though similar, is different from "self-handicapping" because the latter is characterized by a defensive behavior against obstacles or a strategy used by individuals to protect their self-esteem in the face of failure (Jones & Berglas, 1978). Therefore, a person shows the behavior of "self-handicapping" by creating obstacles in the face of achievement (ex: procrastination) and when failure occurs he attributes it to the obstacles and not to personal characteristics or efforts (ex: intelligence, perseverance, abilities, etc.).

It is also important to note that self-undermining is not a personality trait and cannot be included in personality models because the concept may change depending on the situation and consequences (e.g. fatigue level). Personality models such as Big Five (Digman, 1990) proposes certain characteristics that remain similar in a wide variety of situations (for example, individuals with a high level of Neuroticism will tend to perceive negative experiences and be irritable both in work-related situations, as well as in other areas of life). Bakker and Costa (2014) argued that the term self-undermining should be reserved for those behaviors that "create obstacles which could weaken performance" (p. 115) such as lack of effective communication, the creation of frequent mistakes, conflict creation and failure to perform tasks.

According to the Job Demands-Resources Model, engaged employees exhibit proactive behavior in creating challenging resources and demands, behavior that has been conceptualized as job crafting. In contrast, employees who are exposed to a high level of job demands become exhausted and end up creating hindrance demands through self-undermining (Bakker et al., 2014). This behavior thus becomes the catalyst for a dysfunctional cycle of losses for the employee, both by facilitating new hindrance demands and by increasing the efforts made that ultimately predispose the individual to exhaustion or burnout (Bakker et. al, 2014).

Another mention concerns the correlation between self-undermining and the concepts of interest in this study. According to the proposed model in the previous research, self-undermining is positively correlated with and even predicts job demands and also positively correlated with exhaustion and burnout (Bakker et al., 2014).

Thus, we can conclude that self-undermining is not a belief, but behaviors manifested at work that could be targeted through organizational interventions. The literature (Bakker & Costa, 2014; Bakker & Demerouti, 2018) suggests that while job crafting is the link between resources and engagement in the motivational process of the Job Demands-Resources Model, self-undermining might be the link between the perception of demands and exhaustion in the process of health impairment, leading to higher job demands in a loss cycle.

In sum, based on the theoretical and previous empirical research, we expect that:

Hypothesis 1. Exhaustion positively relates to the perception of job demands.

Hypothesis 2. Exhaustion positively predicts self-undermining.

Hypothesis 3a. Self-undermining is a positive mediator between exhaustion and the perception of job demands.

Hypothesis 3b. Self-undermining is a positive mediator between exhaustion and different types of the job demands: (H3b1) the perception of workload, (H3b2) emotional load and (H3b3) cognitive load.

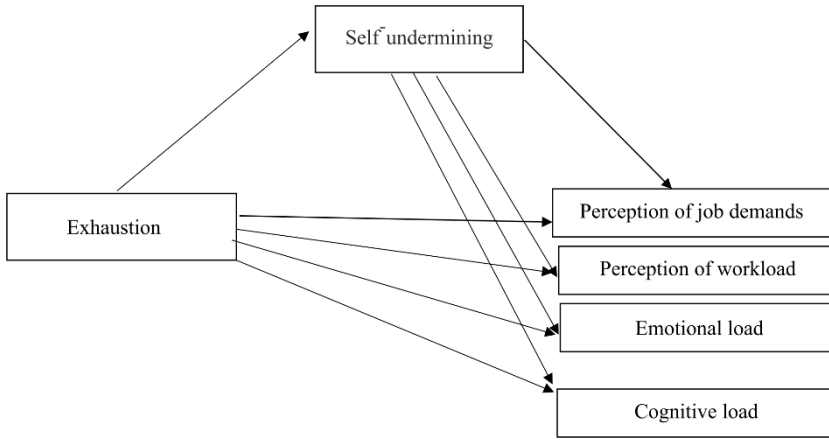

Figure 1. *The overall model*

Method

Sample

We invited two large IT companies to participate in our research project. We offered the opportunity to receive feedback to encourage participation. The study was conducted in a single stage. The authors contacted the management teams of the companies to present the potential benefits of participation and to get the official approval. Once the approval was received, the questionnaire was set up on an online survey platform. The link was sent to 210 individuals working in different departments (Human Resources, Facility Department, IT Support, Financial, etc.). Participants were informed through a letter that accompanied the questionnaire, that the information provided would be treated confidentially, trying to reduce the response distortion. Data collection was run according to the instructions provided by the APA (American Psychological Association), so the participation in the study was voluntary and the respondents did not receive any monetary compensation for their participation.

The final sample for this study consisted of 96 participants (N = 96) with a response rate of 46%. The respondents were 59% female and 41% male. The age distribution was as follows: 20-24 years (28%), 25-29 years (44%), 30-34 years (19%), 35-39 years (3%), 40-44 years (5%), 45-49 years (0%), 50-54 years (1%). 18 % out of the full sample hold leadership position. A percentage of 74% have between 0-3 years of seniority in the organization, 15% have between 3-5 years of seniority in the organization, and 12% have been working in the company for over 5 years. The average seniority in the organization was around 3 years. Most employees worked on a full-time contract. Those working on a part-time contract (6 hours/day) were either students or parents.

The participants reported their multiple membership, as well. The organizations involved in the study offer project-based work. The duration of the projects varies on the type of the relationship with the customers, starting from 3-6 months up to 10-20 years. The projects are often organized based on the SCRUM methodology so that the employees can be part of one or more teams for a specific time. According to the respondents, 71% were members of a single team in the organization and 29% were part of 2 or more teams. 28% of the participants have worked in the same team for 0-9 months, 49% for 1-3 years and 19% have worked in the same team for over 3 years. The changes from one team to another are part of the dynamism of the organizations and most of the time they are even preferred by the employees in order to develop the programming or testing skills.

Instruments

Self-undermining was measured using the scale developed by Bakker & Wang (2019). The scale measures the frequency of dysfunctional behaviors that employees exert at work and impede their development. Examples of items used are: "I make mistakes at work", "I admit that I trigger stress at work" and "At work, I put others in trouble when I communicate with them". Each item required a response on a 5-point Likert-type scale ranging from 1 (never) to 5 (very often). According to Bakker & Wang (2019), this scale demonstrated a high convergent, divergent and predictive validity. The scale comprised six items that had high inter-item reliability ($\alpha = .73$) in the present study.

Exhaustion was evaluated as energy depletion and was assessed using 3 items of the Utrecht Work Engagement Scale (Schaufeli et al., 2006) referring to vigour which, actually is considered the direct opposite of exhaustion (Maslach et al., 2001; Schaufeli & Bakker, 2004). Vigour is characterized by a high level of energy and resilience, a willingness to invest effort in work and persistence in the face of obstacles (Schaufeli et al., 2002), whereas exhaustion seen as energy depletions is represented by the opposite of those characteristics, such as very low levels of energy, lack of willingness to invest in work and giving up in the face of obstacles. Examples of items used are: "At work, I feel like I am bursting with energy", "At work, I feel strong and full of energy". Participants were kindly requested to respond to each statement using a 7-point answer format where 1 = never and 7 = always. Value of Cronbach's alpha for this scale exceed the value of .70 ($\alpha = .91$).

Perception of job demands were assessed using the Questionnaire on the Experience and Assessment of Work scale (van Veldhoven et al., 2005) and included the three dimensions of the concept: the perception of workload, emotional load and cognitive load. The first dimension – *perception of workload* – was measured by 11 items (ex: "I have to work at a very alert pace"), the second one – *emotional load* – using 6 items (ex: "My activity is emotionally difficult") and *the cognitive load* was assessed by 8 items (ex: "My professional activity requires a lot of concentration"). All items are scored on a 4-point frequency rating scale ranging from 1(never) to 4 (every day). The Cronbach alpha coefficients for the perception of workload subscale was .69, for emotional load subscale was .82, and for cognitive load subscale was .84.

Results

In line with our interests, all variables were assessed at the individual level. Because the data for all variables were collected from the same source, we performed a common method bias test by using Harman's single-factor test. Analyses revealed that only one factor emerged and that it explained only 24.22% of the variance, which is less than 50%, indicating that common method bias was not a problem in the current study.

Data analysis was performed primarily in SPSS 23 for data screening, means, standard deviations, Cronbach alpha coefficient, and bivariate correlations (Table 1). In order to test the mediations hypotheses, we have employed ordinary least squares regression method using PROCESS (Model 4) (Hayes, 2012) with the perception of job demands and each of type of job demands as the criterion, and exhaustion and self-undermining as predictors.

For the analysis of indirect effects, more and more research in this direction proposes the use of bootstrapping (Bollen & Stine, 1990; MacKinnon et al., 2000). The technique represents a resampling strategy for estimating and testing hypotheses. Within it, the sample is conceptualized as a pseudo-population, which represents a larger population from which the sample was extracted. Thus, it is allowed to assign the accurate measurements in terms of bias, variance, confidence intervals, error predictions, etc., to the sample estimates.

Table 1. *Means, standards deviations and bivariate correlations*

	M	SD	1	2	3	4	5	6	7
1. Age	27.88	5.66	1						
2. Gender	1.58	0.49	-.220*	1					
3. Exhaustion	3.41	1.13	.147	-.012	1				
4. Self-undermining	1.93	.48	.218*	-.134	.222*	1			
5. Perception of job demands	2.51	.36	.056	.040	.155	.454**	1		
6. Perception of workload	2.32	.39	.034	-.027	.268**	.540**	.854**	1	
7. Cognitive Load	3.24	.50	.120	-.030	-.038	.108	.722**	.442**	1
8. Emotional load	1.87	.59	-.036	.171	.110	.372**	.680**	.448**	.162

$N = 96$

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

The first hypothesis posits that exhaustion positively relates to the perception of job demands. According to the bivariate correlation analysis, the proximal association between exhaustion and the perception of the job demands is not statistically significant (r = .155, p = .13). Thus, the first hypothesis has not been supported by the data. Instead, the second hypothesis regarding the predictive relation between exhaustion and self-undermining was tested and the results showed that it was significant at a threshold of $p < 0.5$ (β = .10, t = 2.21, 95% CI [.01, .18], p < .05).

The third (a) hypothesis stated that self-undermining was a positive mediator in the relationship between exhaustion and the perception of job demands. According to JD-R theory, employees are active actors of their work by modeling the loss and gain cycles so that employees who are too strained by their job demands will become exhausted and will initiate a loss cycle (Bakker & Demerouti, 2018). Given that we have not found a statistically significant association between the exhaustion and the perception of job demands, we assumed that there was a distal effect and proceeded further to test the indirect effect. In this additional analysis, we have drawn on the theoretical logic rather than on the bivariate test of association between the predictor and the criterion (Shrout & Bolger, 2002). First, we tested the relationship between self-undermining and the perception of job demands and we did find that it was significant (β = .43, t = 5.87, 95% CI [.28, .57], p < .00). Second, the indirect effect of exhaustion on the perception of job demands through self-undermining was tested using bootstrap analysis. The results showed that the indirect effect was .03 with a 95% CI of [.01, .07], which partially supported hypothesis 3(a).

Hypothesis 3(b) regarding the different types of demands predicted by exhaustion through self-undermining was partially supported. The results of the first mediation analysis in which the variables perceived workload (hypothesis 3(b1)), exhaustion and self-undermining were included indicated that exhaustion is a significant predictor for the perceived workload (β = .09, t = 2.66, 95% CI [.02, .17], p <.05). Also, exhaustion predicted self-undermining (β = .10, t = 2.21, 95% CI [.01, .18], p <.05)), and self-undermining predicted the perception of workload (β = .43, t = 5.87, 95% CI [.28, .57], p <.001. Finally, the mediation analysis showed that self-undermining totally mediated the relationship between exhaustion and perception of workload, age being included as a control variable (R^2 = .33, F(3,92) = 14.17, p < .001). The bootstrapping analysis revealed an indirect effect of .04 with a 95% CI of [.01, .09].

In what concerns the perception of emotional load (hypothesis 3(b2)), we found significant only the indirect effect. Self-undermining predicted emotional load (β = .45, t = 3.71, 95% CI [.21, .69], p <.001) and exhaustion had the indirect effect on emotional load with value of .04 with a 95% CI of [.01, .09]. The last mediation analysis in which the variables cognitive load (hypothesis 3(b3)), exhaustion and self-undermining were included indicated that exhaustion is not a significant predictor for the cognitive load (β = -.02, t = -.36, 95% CI [-.11, .08], p > .05). Moreover, the relationship is negative. The analysis showed that neither the relationship between the mediator and the outcome is significant, so in this relationship self-undermining does not predict cognitive load alone (β =.13, t=1.16, 95% CI [-.09, .35], p = ns). Therefore, no effect of exhaustion on the outcome cognitive load seems to be direct or mediated, so that we consider that hypothesis 3(b) is not statistically supported by data.

Discussion

The aim of this study was to investigate the role of self-undermining in the relationship between exhaustion and the perception of job demands in a sample of employees in software industry. Our study brings empirical support for and extends the research on the reverse relationship between exhaustion and job demands, a relationship advanced by Bakker & Demerouti (2018).

We chose to collect the data from a specific group of participants working in two software companies assuming that the level of exhaustion in IT employees was high. Actually, it is widely accepted that working in technology industry exhausts the engineers and other employees in the field who need to achieve goals, to solve issues, to catch deadlines, to learn new technologies really fast (Kim & Wright, 2007).

The results of the study showed that self-undermining did not mediate the relationship between exhaustion and the perception of job demands as a global concept. So that, based on the theoretical model we have documented before, we further explored the potential distal relationship between exhaustion and the perception of job demands and we did find a significant indirect effect. The nonsignificant relationship might be attributed to the characteristics of the sample or suppression process (Shrout & Bolger, 2002). Such suppression factors can be task-related and organizational characteristics as boundary conditions that affect how employees appraise specific job demands (Gerich & Weber, 2020).

Most studies based on the JD-R model have reported on job demands as a global concept. Therefore, we built on a multidimensional approach of job demands beyond the other indicators like time pressure, and role ambiguity that have been studied before. The data provided different patterns in relationship with exhaustion and self-undermining.

Considering the self-undermining characteristic, the results revealed that it was significantly predicted by exhaustion, and furthermore it predicted the perception of job demands. This, therefore, supports the suggestion that there is a reverse relationship in understanding the perception of job demands (Bakker & Costa, 2014; Bakker & Demerouti, 2018). However, previous studies have not explicitly tested such a relationship. More specifically, the higher exhausted employees were, the more undermining behaviors they scored. In other words, while individuals are more likely to feel lack of energy and vigor, they may make more mistakes, worse communicate, initiate conflicts.

Based on the data, we also found support for the undermining effect concerning perception of workload and emotional load, as well. Both perception of workload and emotional load were positively and statistically significant predicted by self-undermining. But self-undermining did not predict cognitive load. Besides, the negative correlation, even nonsignificant with exhaustion suggested that at some level, exhausted employees did not pay too much attention to the cognitive dimension of the work. Of course, this is only a possible explanation that needs to be addressed in future research. However, a recent study (Moeller et al., 2018) has identified different profiles of highly engaged-exhausted and moderately engaged-exhausted employees.

This research adds to a growing body of research that has examined the JD-R model

but rather focuses on the new pattern of the model including self-undermining. The first theoretical contribution of the study consists in deepening the knowledge on the concept of self-undermining and its relationship with exhaustion and the perception of job demands in the workplace that has not been investigated so far. To date, the studies have addressed the issue of self-undermining and its relation to other concepts such as the prediction of the demands at the workplace (Bakker et al., 2014), the negative correlation with initiative and job crafting (Bakker et al., 2014; Hakanen et al., 2008), the negative correlation with commitment and high levels of performance (Crawford et al., 2010; Bakker et al., 2014).

Secondly, the present study furthers our knowledge of the relationship between exhaustion and the perception of job demands focusing on the reversed relationship Thus, these results partially support the theory of Bakker and Costa (2014), who argued that employees who have self-undermining behaviors such as lack of effective communication, frequent mistakes, conflict creation, and task failure create even more demands at the work-place, which in turn increase their level of exhaustion in the future. This behavior, however, remains of particular importance in the study of the loss spiral in which employees may fall when they become exhausted.

Thirdly, this research empirically addressed different types of job demands as they are perceived by the employees (Gerich & Weber, 2020). This could be extended in future research to examine other dimensions of job demands.

Finally, this research adds to the knowledge on perception of work characteristics by employees in software industry. Research into employees working in software industry has previously explored, for instance, the organizational context variables and job-related stressors as antecedents of work exhaustion and turnover intentions as consequences highlighting the importance of better understanding the working context, personal and organizational factors in IT professionals (Kim & Wright, 2007).

By pointing out the role of self-undermining, this paper offers opportunities for further expansion of JD-R theory, which have previously been inferred but not fully tested. For example, it would be interesting to longitudinally examine antecedents to perceived job demands by combining the self-report measurements with multisource data to detect more precisely causal relationships.

The results of this study offer organizations practical implications for designing interventions that consider individual differences in job demands, and exhaustion and self-undermining as well. As it has been shown that exhaustion and self-undermining can have negative effects on employee health, initiative, and performance (Bakker et al., 2014; Hakanen et al., 2008; Crawford et al., 2010). Therefore, increased attention paid to these aspects in organizations could prevent the loss of resources and could positively influence market sustainability and retention and prevent absenteeism. Drawn on JD-R theory, Bakker and Demerouti (2014) proposed an intervention model based on the target and level of intervention required. According to the model, at the individual level, job crafting interventions are needed to reduce job demands and improve job resources, and strength-based interventions are needed to improve personal resources. According to Bakker and Demerouti (2014), employees can proactively craft the job demands and job resources in the workplace. However, other personal characteristics, like exhaustion and self-undermining cannot be ignored. As the results of this study suggest, exhausted employees are likely to perceive more workload or emotional load. That why to spot those fatigued workers and to address the issue before it gets out of hand would prevent negative consequences. Also, at the organizational level, a variety of customized interventions for the employees should be provided, considering the differences in the profiles of the employees. More precise, tailored interventions could be designed for employees with high scores on exhaustion, perception of job demands, and self-undermining. Such an intervention could decrease the level of exhaustion the employee is experiencing, and in time, mitigate self-undermining behaviors. Moreover, organizations could provide counseling

services for employees who scored high on self-undermining behaviors. Developing an organizational culture that promotes open discussion of problems and solving them, together with the appropriate counseling services, could be the secret ingredient to getting out of the negative spiral between exhaustion, self-undermining, and high job demands. Also, a structured recognition program for employees who invest in their development and well-being could encourage such actions.

Limitations and future directions

The present study showed some promising results regarding concepts such as exhaustion, self-undermining and the perception of job demands. However, these results must be interpreted given certain limitations. The first limitation concerns the cross-sectional design to estimate and predict certain outcomes which does not allow us to draw conclusions about causal relationships. In order to check the spiral of losses between exhaustion, self-undermining, and demands, at least 3 measurements should be performed at different times (Salanova, et al., 2010), preferably within a longitudinal design.

Furthermore, the data were collected based on self-report, so they were not completely objective, which may have influenced the magnitude of relationships between the study variables. Although most studies focus on self-reports, certain variables can be evaluated by other measures, using, for example interview, feedback from the team, the manager to report on self-undermining behaviors.

Also, the study was based on a fairly homogeneous sample because all the respondents were undergraduates, the average seniority in organizations was 3 years, and the proportion of the ages was mainly between 20-29 years (72%). All these characteristics could affect how they perceived job demands or how much they experienced self-undermining behaviors. The fact that most of them are still undergraduate or master's degree students might have influenced the reported level of exhaustion and the perception of the workload.

The sample size can be considered an additional limit because the response rate was 46%, and the final sample was rather small. Using a larger sample, future studies could focus on testing the integrated Job Demands-Resources Model (Demerouti et al., 2001), which incorporates both the direct predictive relationships between resources and commitment, demands and exhaustion, the moderating effects of resources and demands but also the mediating effects of the concepts of job crafting and self-undermining.

Despite the limitations, the main contributions of the study consist in deepening the knowledge on the concept of self-undermining and its relationships with exhaustion and the perception of job demands. Although the results partially support the hypotheses formulated, we can consider that self-undermining remains of great importance in the study of the loss spiral that employees fall into and the study can be seen as a first step in researching these relationships.

The added value and the empirical data could inspire the people in the organizations as a point to invest in the well-being of the employees and to promote breaks or trainings of work recovery, optimization of the resources and demands of the employees or implementation of job crafting/elimination of self -undermining. However, to be able to generalize these results, it would be advisable for future endeavors to incorporate these studies into longitudinal designs, based on larger samples.

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