

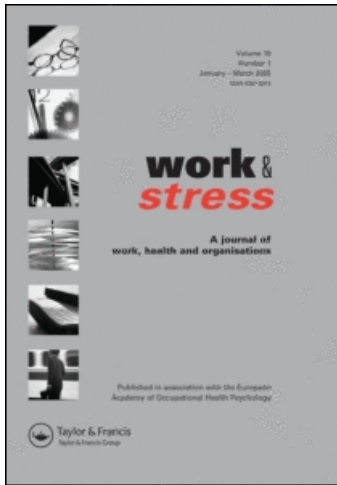
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## Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction

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Within the Job Demands-Resources model, the presence of job demands (e.g., work pressure) and the absence of job resources (e.g., social support) relate to burnout through a psychological energetic process, whereas the presence of job resources associates with work engagement through a motivational process. Although various mechanisms have been suggested to understand these processes, empirical evidence for these mechanisms is scarce within the JD-R framework. This study examines the role of basic need satisfaction, as defined within Self-Determination Theory, in the relationships between job demands, job resources, and employees' exhaustion and vigour, the main components of burnout and engagement, respectively. Structural equation modelling in a heterogeneous sample of 745 employees of the Dutch-speaking part of Belgium confirmed that satisfaction of basic psychological needs partially explained the relationships from job demands to exhaustion and from job resources to vigour. It fully accounted for the relationship between job resources and exhaustion. We conclude that the current study adds to the research pointing at need satisfaction as a promising underlying mechanism for employees' thriving at work.

**Keywords:** Job Demands-Resources model; Self-Determination Theory; burnout; work engagement; need satisfaction

### Introduction

Following the general trend in psychology (Seligman & Csikzentmihalyi, 2000), scholars in the field of work and organizational psychology have become increasingly interested in employees' optimal functioning and positive experiences at work (Luthans, 2002). For example, in addition to burnout, scholars have become attentive to its complement: work engagement. Whereas burnout mainly refers to emotional exhaustion (mental fatigue) and cynicism (a distant attitude towards one's work; Maslach, Schaufeli, & Leiter, 2001), work engagement is mainly defined by vigour (i.e., high levels of mental energy) and dedication (strong involvement and feelings of pride; Bakker, Schaufeli, Leiter, & Taris, 2008). Paying attention to both burnout and engagement seems fruitful, as from such a more encompassing perspective the thriving of employees can be stimulated more fully, that is by preventing ill-health and stimulating well-being (Luthans, 2002).

The Job Demands-Resources model (JD-R model; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) is a recent research model that adopts such a positive perspective, as it considers both the health-impairing and health-enhancing aspects

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of the work-context and their links to the emergence of burnout and engagement. Empirical studies that uncover the processes underlying the relationships between job resources and demands and outcomes are, however, scarce. To address this void in the literature, the present study examines whether satisfaction of the basic psychological needs, as defined within Self-Determination Theory (SDT; Deci & Ryan, 2000; Vansteenkiste, Ryan, & Deci, in press), serves as a mediator in the relationships advanced in the JD-R model. Before detailing the concept of psychological need satisfaction, we first discuss the JD-R model.

### ***The Job Demands-Resources model***

The JD-R model was developed in an attempt to overcome some of the limitations that characterize earlier research models in the field of work psychology, including the Job Demands Control Model (Karasek, 1979) and the Effort Reward Imbalance Model (Siegrist, 1996). One of the drawbacks of these earlier models is their focus upon negative aspects of work (e.g., excessive workload, insufficient rewards) and negative consequences of work (e.g., strain, physical health problems). The JD-R model, in contrast, adopts a more positive view. Along with the negative aspects of work, this model examines positive job characteristics and studies their health-enhancing effects. Furthermore, whereas the older models consider only a limited number of job characteristics, the JD-R model assumes a broad variety of work aspects to relate to employees' well-being (see de Lange, De Witte, & Notelaers, 2008). According to JD-R scholars, job characteristics can be aggregated into two broad higher-order categories: job demands and job resources.

Job demands are defined as those aspects of the work context that tax employees' personal capacities and are, therefore, associated with certain psychological and/or physiological costs (Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003; de Jonge & Dormann, 2006). Job demands are not necessarily negative as long as they do not exceed employees' adaptive capacities. If they do, however, they turn into stressors and elicit burnout (Schaufeli & Bakker, 2004). Depending on the job context under study, the category of job demands can contain job characteristics as diverse as task interruptions, workload, work-home interference, organizational changes, and emotional dissonance (e.g., Bakker, Demerouti, Taris, Schaufeli & Schreurs, 2003). Several studies have provided evidence that, across different professions, sectors and countries (Bakker & Demerouti, 2007), job demands are related to burnout (Bakker, Demerati, de Boer & Schaufeli 2003; Bakker, Demerouti, & Schaufeli, 2005) and predict burnout over time (Hakanen, Schaufeli, & Ahola, 2008).

The category of job resources is defined as those physical, psychological, social, or organizational aspects of the work context that (1) can reduce the health-impairing impact of job demands, (2) are functional in achieving work goals, and (3) stimulate personal growth, development, and learning (Schaufeli & Bakker, 2004). Like job demands, the category of job resources contains various job characteristics such as opportunities for skill utilization, supervisor support, financial rewards, and career opportunities (e.g., de Lange et al., 2008). Job resources are considered to enhance employees' well-being, that is, they are assumed to stimulate employees' work engagement and prevent burnout. In line with these assumptions, several studies have shown that job resources are negatively related to exhaustion and cynicism (Bakker, Demerouti, & Verbeke, 2004; Hakanen, Bakker, & Schaufeli, 2006) and are positively related to work engagement (Bakker et al., 2005; Salanova, Agut, & Peiró, 2005). Moreover, recent research has found that job resources are not only associated concurrently

with job engagement, but also promote employees' engagement over time (de Lange et al., 2008; Hakanen et al., 2008).

Job demands and job resources are theorized to be associated with employees' burnout and engagement through two different processes (Schaufeli & Bakker, 2004). Whereas the presence of job demands and the absence of job resources are expected to associate positively with employees' burnout through an energetic process, job resources are expected to relate positively to employees' engagement through a motivational process. To understand these processes, JD-R scholars have relied on various frameworks (e.g., Schaufeli & Bakker, 2004). For instance, the Stress Adaptation Model (Selye, 1956) and the State Regulation Model of Compensatory Control (Hockey, 1997) are used to describe the energetic process. These theories suggest that job demands wear out employees' energy, which subsequently leads them to adopt a cynical attitude towards their work. To detail the motivational process between job resources and engagement, various theories are used. On the basis of these frameworks, it has been suggested that job resources lead directly to engagement (Conservation of Resources Theory; Hobfoll, 2002) or indirectly through, for instance, stimulating goal accomplishment (Goal Theory; Locke & Latham, 2002), enhancing employees' self-efficacy (Bandura, 1977), or contributing to the satisfaction of their basic psychological needs (Self-Determination Theory; Deci & Ryan, 2000).

Although each of these theories received considerable empirical evidence in other contexts, to date they have not been used to directly examine the mechanisms underlying the relationships within the JD-R model. Self-efficacy theory (Bandura, 1977) forms an exception, as initial evidence has been reported for the explanatory role of self-efficacy in the relationship between job resources and engagement (Llorens, Salanova, Schaufeli, & Bakker, 2007). In the present article, we aim to elaborate upon and empirically test the explanatory role of the satisfaction of the basic psychological needs as defined within Self-Determination Theory (SDT; Deci & Ryan, 2000) in the relationship between job resources and work engagement, as well as in the relationships between job demands, job resources, and burnout.

### *Self-Determination Theory*

The concept of needs has a long tradition in motivation psychology (Deci & Ryan, 2000) and work and organizational psychology (Latham & Budworth, 2006). Murray (1938), for example, postulated various socially acquired needs such as the needs for achievement, affiliation, and power. Maslow (1943), in contrast, proposed a limited set of inborn needs such as the needs for self-actualization and social recognition.

Within SDT, basic psychological needs are stringently defined as "those nutriment that must be procured by a living entity to maintain its growth, integrity and health" (Deci & Ryan, 2000, p. 326). Metaphorically speaking, just as water, minerals, and sunshine are crucial for plants to blossom, SDT scholars regard satisfaction of the basic psychological needs to be essential for humans to actualize their potentials, to flourish, and to be protected from ill health and maladaptive functioning. Within SDT, three basic psychological needs are postulated: the needs for Autonomy, Belongingness, and Competence, which can be referred to by the acronym "ABC."

The need for autonomy is defined as people's desire to experience ownership of their behaviour and to act with a sense of volition (Deci & Ryan, 2000). This sense of volition can be achieved through having the opportunity to make personal choices, but also through the full endorsement of an externally induced request. The latter is stimulated if one is provided

with a meaningful rationale for executing the request and one's feelings are acknowledged. In this respect, SDT's concept of autonomy is different from the conceptualization of autonomy in terms of personal freedom, discretion, or independence, as commonly used in work and organizational psychology (e.g., Hackman & Oldham, 1976; Vansteenkiste, Zhou, Lens, & Soenens, 2005). Indeed, employees who fully endorse their actions and stand behind the reasons for their behaviour are likely to act willingly or autonomously, no matter whether the impetus for action came from themselves (as in the case of making a personal choice) or from the external environment but was fully accepted as their own (as is the case when one is being empathically provided with a meaningful rationale for fulfilling a request; Soenens, Vansteenkiste, Lens, et al., 2007).

Second, the need for belongingness or relatedness is defined as the human striving for close and intimate relationships and the desire to achieve a sense of communion and belongingness (Baumeister & Leary, 1995). Employees who feel part of a team and feel free to express their work-related and personal troubles are more likely to have their need for belongingness fulfilled than employees who feel lonely and lack confidants at work. Finally, the need for competence represents individuals' desire to feel capable of mastering the environment, to bring about desired outcomes, and to manage various challenges (White, 1959). The concept of competence is somewhat related to the construct of self-efficacy, but is also different in important aspects. Self-efficacy refers to individuals' socially acquired, cognitive expectancies of being able to enact successfully specific actions that are required to reach a desired end state (Bandura, 1977). The satisfaction of the inborn need for competence represents current (instead of future-oriented) and more general (instead of specific) feelings of effectiveness. Whereas self-efficacy stimulates the behaviour for which one feels self-efficacious, satisfaction of the need for competence is likely to stimulate individuals' functioning and well-being on a more general level.

It is important to note that, within SDT, individuals' experience of need *satisfaction* is emphasized rather than individuals' need *strength*, as is the case for the socially acquired needs for achievement or affiliation (Atkinson, 1964; Murray, 1938). In the latter case, it is argued that need *strength* is important, as only individuals high in a particular acquired need are likely to benefit psychologically from having that need satisfied. For instance, individuals with a high need for achievement are likely to benefit from being offered a bonus, as these individuals are most ambitious and most focused on achieving high performance standards, whereas individuals with a low need for achievement are not. Within SDT, however, most attention is paid to interindividual and intra-individual (i.e., day-to-day) variation in experienced need *satisfaction*, as it is precisely the variation in satisfaction that is considered to be most critical for one's motivation, well-being, and performance, regardless of whether one reports a weak or strong desire for having one's needs for autonomy, belongingness, and competence met.

In line with this assumption, several empirical studies have found basic need satisfaction to associate positively with individuals' optimal functioning in terms of well-being, attitudes, and behaviour (Deci & Ryan, 2000). These findings were observed cross-culturally (e.g., Deci, Ryan, Gagné, Leone, Usunov, & Kornazheva, 2001) when assessing basic need satisfaction across different life domains (e.g., Sheldon, Ryan, & Reis, 1996) as well as within various life domains, including sports and exercising, schooling and education, and interpersonal relationships (see Deci & Ryan, 2000, for an overview). With respect to the work and organizational context, basic need satisfaction has been positively related to employees' well-being (e.g., Lynch, Plant, & Ryan, 2005), job satisfaction (e.g., Ilardi, Leone, Kasser, & Ryan, 1993), intrinsic and autonomous work motivation (Gagné,

2003; Richer, Blanchard, & Vallerand, 2002), time spent voluntarily at work (Gagné, 2003; Kasser, Davey, & Ryan, 1992), and performance evaluations (Baard, Deci, & Ryan, 2004). Moreover, and importantly for the present research, basic need satisfaction has been found to relate positively to vigour and dedication, whereas it has associated negatively with emotional exhaustion (Vansteenkiste, Neyrinck, Niemic, Soenens, De Witte, & Van den Broeck, 2007). In line with SDT's assumption that the satisfaction of one need is likely to go hand in hand with the satisfaction of the other two needs, such that all three are positively related, the three needs have been grouped in several previous studies to form a composite score of general need satisfaction (e.g., Deci et al., 2001; Kasser et al., 1992, Vansteenkiste et al., 2007).

The present research aims to extend the research on need satisfaction in the work context by examining whether basic need satisfaction can explain the relationships between different types of job characteristics and employees' well-being. Specifically, following Schaufeli and Bakker (2004), we suggest that need satisfaction can explain the association between job resources and engagement. Notably, as job resources are growth promoting and SDT assumes need satisfaction to be a necessary condition for individuals to thrive, it is likely that the stimulating influence of job resources on work engagement can be explained by need satisfaction. In addition to the claim that need satisfaction can account for the motivational process between job resources and employees' engagement, we argue that need satisfaction can also explain the so-called energetic associations between job demands, job resources, and employees' burnout. As job demands and the absence of job resources are considered to be health-impairing and SDT holds that frustration of the psychological needs is the basic principle underlying individuals' malfunctioning (Ryan & Deci, 2000), it is likely that the health-impairing characteristics of job demands and the absence of job resources are due to need thwarting. This is because, within SDT, basic need satisfaction is considered to represent individuals' psychological energetic resource and to fuel individuals' well-being and performance, whereas thwarting of those needs has an energy-depleting effect (Deci & Ryan, 2000; Moller, Deci, & Ryan, 2006). In sum, we hypothesize that need satisfaction can account for both the motivational and the energetic relationships between job demands, job resources, burnout, and engagement.

### *The present study*

The present study aimed to shed light on the processes that can account for the relationships between demands, job resources, and burnout and engagement, as defined within the JD-R model. Different from previous research (Llorens et al., 2007), we not only examined the motivational relationship between job resources and employees' work engagement, but also the energetic associations between job demands, job resources, and burnout. In doing so, we investigated whether the same fundamental process, that is satisfaction of basic psychological needs, could account for these different relationships. More specifically, we predicted that job demands would thwart those needs, whereas job resources would allow for their satisfaction. Basic need satisfaction would, in turn, be negatively associated with burnout and positively with engagement.

In sum, the central hypothesis of this study is: basic need satisfaction mediates the relationships between (1) job demands and employees' burnout; (2) job resources and burnout; and (3) job resources and engagement. The proposed mediational model is graphically displayed in Figure 1. To preclude the possibility that observed relationships

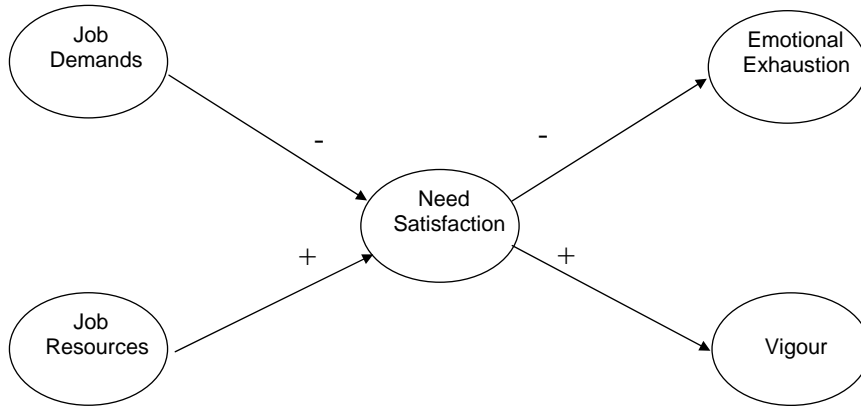


Figure 1. Theoretical model.

would be due to employees' background variables, the hypotheses were examined after controlling for gender, age, and educational level.

## Method

### *Procedure and participants*

To test relationships between job characteristics and outcomes, Warr (1990) advises the inclusion of a broad range of jobs to increase the variability in job characteristics. To obtain such a heterogeneous sample, 17 organizations were recruited in the Dutch-speaking part of Belgium. In these organizations, 1450 questionnaires were distributed, accompanied by a letter emphasizing the confidentiality and anonymity of responses. A total of 745 questionnaires were returned (overall response rate = 51%).

The total sample contained 65% ( $n=483$ ) female and 35% ( $n=257$ ) male participants. Participants' age varied between 18 and 62 years, with a mean of 37.54 years. With respect to level of education, 3% of the participants ( $n=22$ ) completed primary school, 38% ( $n=275$ ) completed secondary education, 42% ( $n=308$ ) acquired a professional bachelor's degree, and 18% ( $n=136$ ) obtained an academic master's degree. With respect to professional level, 20% of the participants ( $n=142$ ) were blue-collar workers, 44% ( $n=323$ ) were white-collar workers, 31% ( $n=225$ ) were superiors, and 6% ( $n=43$ ) were self-employed. With respect to sector, 15% of the participants ( $n=110$ ) worked in the public sector, 6% ( $n=42$ ) in the agricultural sector, 2% ( $n=15$ ) in the socio-cultural sector, 7% ( $n=50$ ) in the service sector, 44% ( $n=343$ ) in the health sector, 14% ( $n=105$ ) were employed in the various industries, and 13% ( $n=95$ ) were teachers. Of the total sample, 86% of the participants had a permanent job ( $n=631$ ) and 14% ( $n=105$ ) were temporarily employed. Finally, 71% of the participants ( $n=525$ ) were full-time workers, whereas 29% ( $n=214$ ) worked part time.

### *Measurements*

#### *Job characteristics*

As we used a heterogeneous sample, we selected four job demands (workload, emotional demands, physical demands, and work-home interference) and four job resources (task

autonomy, supervisory support, skill utilization, and positive feedback) that are present across various jobs and organizations and are frequently studied within the JD-R model. All job characteristics were assessed with scales taken from well-established Dutch questionnaires. *Workload* (4 items, e.g., “Often, I have to work extra hard to get things done”; Cronbach’s  $\alpha = .68$ ) and *emotional demands* (4 items, e.g., “At my work, I’m confronted with emotional situations”; Cronbach’s  $\alpha = .79$ ) were taken from Bakker, Demerouti, de Boer & Schaufeli (2003). *Physical demands* (3 items, e.g., “I have to work in an uncomfortable position”;  $\alpha = .85$ ) were assessed with the questionnaire of Van der Doef and Maes (1999). *Work-home interference* (WHI; 4 items; e.g., “How often does it happen that your work schedule makes it difficult for you to fulfil your domestic obligations?”; Cronbach’s  $\alpha = .79$ ) was measured with the “Survey Work-Home Interference Nijmegen” (SWING; Geurts, Taris, Kompier, Dikkers, Van Hooff, & Kinnunen, 2005). The scale for *Task autonomy* (9 items, e.g., “I can choose my way of working”; Cronbach’s  $\alpha = .85$ ) was taken from Van Veldhoven and Meijman (1994). *Opportunities for skill utilization* (4 items, e.g., “My work requires me to be creative”;  $\alpha = .75$ ) was measured with the questionnaire of Van der Doef and Maes (1999). *Positive feedback* was measured with three self-constructed items, namely, “I get mainly positive feedback on my work method,” “I get mainly positive feedback on the amount of work I accomplish,” and “I get mainly positive feedback on the results of my work.” Cronbach’s  $\alpha$  was .88. Participants rated their agreement with each of the items on a scale from 1 (“totally disagree”) to 5 (“totally agree”).

### *Need satisfaction*

An adapted version of the Basic Need Satisfaction at Work Scale (BNS-W; Deci et al., 2001) was used to assess need satisfaction. We chose to use an adapted rather than the original version as some of the original BNS-W items reflect the perception of need-supportive contextual aspects (e.g., “People at work tell me I’m good at my job”) rather than the psychological experience of need satisfaction itself. The removal of these problematic items was deemed necessary as these items might artificially inflate the relationship between job resources and basic need satisfaction. In total, 15 items (5 items for each of the three needs) were used to assess *autonomy satisfaction* (e.g., “I feel like I can pretty much be myself at work”), *belongingness satisfaction* (e.g., “People at work care about me”), and *competence satisfaction* (e.g., “I don’t feel very competent at work, reversed coded”). The adapted scale is available upon request from the first author. All items were to be answered on a 5-point scale ranging from 1 (“totally disagree”) to 5 (“totally agree”). Principal Component Analysis (PCA, promax rotation) revealed three factors with an eigenvalue above 1, reflecting respectively competence, belongingness, and autonomy. However, in line with SDT’s assumptions and previous research, the scree plot showed a strong drop in eigenvalue from the first (eigenvalue = 4.67) to the second (eigenvalue = 2.10) and third (eigenvalue = 1.31) factor, which empirically justifies the use of a general need satisfaction scale. Cronbach’s  $\alpha$  of the 15-item scale was .84.

### *Burnout*

In line with previous research within the JD-R framework (Xanthopoulou, Bakker, Demerouti, & Schaufeli, in press), burnout was measured using the *exhaustion* scale of the Dutch version of the Maslach Burnout Inventory General Survey (MBI-GS; Schaufeli & van Dierendonck, 2000; Schaufeli, Leiter, Maslach, & Jackson, 1996). Participants rated items



such as “I feel totally exhausted in my job” on a 7-point scale from 0 (“never”) to 6 (“always, every day”). Cronbach’s  $\alpha$  was .84. Although burnout is a multidimensional phenomenon, including besides emotional exhaustion the experiences of cynicism and reduced personal efficacy, exhaustion is considered the central aspect of burnout (Maslach et al., 2001). In addition, job demands have been found to be related more strongly to emotional exhaustion than to the other components (Brenninkmeijer & Van Yperen, 2003).

### *Engagement*

Engagement was tapped using the Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003) of *vigour* (5 items; e.g., “At my work, I feel bursting with energy”; Cronbach’s  $\alpha = .84$ ). Vigour has previously been shown to be complementary to the burnout measure of exhaustion (Gonzalez-Roma, Schaufeli, Bakker, & Lloret, 2006). Participants indicated on a scale from 1 (“never”) to 7 (“always, every day”) how often they experienced these feelings.

## **Results**

### *Preliminary analyses*

Independent samples *t*-testing indicated that men and women differed in need satisfaction,  $t(715) = -2.87, p < .01$ , with female employees reporting more need satisfaction ( $M = 3.88, SD = .41$ ) compared to male employees ( $M = 3.78, SD = .43$ ). Age was positively related to vigour ( $r = .10, p < .01$ ). Educational level was unrelated to need satisfaction, exhaustion, or vigour and was therefore not included as a control variable in subsequent model testing. Table 1 shows the descriptive statistics of the measured variables. The four types of assessed job demands were weakly to moderately interrelated. Workload was positively related to need satisfaction, vigour, and exhaustion. Emotional demands, physical demands, and work-home interference, in contrast, were negatively associated with need satisfaction, positively with exhaustion, and unrelated to vigour. The three job resources were moderately interrelated. They were all positively related to need satisfaction and vigour and negatively to exhaustion. Need satisfaction was negatively associated with exhaustion and positively with vigour. Finally, exhaustion and vigour were correlated negatively.

Next, we inspected the fit of the measurement model comprising the independent variables (job demands and job resources), the mediating variable (need satisfaction), the dependent variables (exhaustion and vigour), and the control variables (gender and age). Job demands and job resources were represented by their respective job characteristics. The latent construct of need satisfaction was composed of three indicators, representing the three separate needs for autonomy, belongingness, and competence. Exhaustion and vigour were modelled by their five items. Data screening using Prelis 2.71 (Jöreskog & Sörbom, 2004) revealed data non-normality at the univariate and the multivariate level. Therefore, in all subsequent models, in addition to the covariance matrix, the asymptotic covariance matrix was used and the Satorra-Bentler Scaled Chi-square (SBS- $\chi^2$ ; Satorra & Bentler, 1994) instead of the common  $\chi^2$  was inspected. Solutions were generated based on the maximum likelihood estimation (Bollen, 1989).

In line with the recommendation of Bollen and Long (1993) and Byrne (2001), the fit of the model was evaluated using several goodness of fit indices: the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residuals (SRMR), and the Non-Normed Fit Index (NNFI). RMSEA below .05 in

Table 1. Means, standard deviations, and correlations among the study variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
<i>Control variables</i>														
1. Gender	1.65	.48												
2. Age	37.54	10.53	-.03											
3. Educational level	5.22	1.59	-.11**											
<i>Job demands</i>														
4. Workload	3.63	.61	-.02	.05	.06									
5. Emotional demands	2.81	.79	.07	-.03	.15***	.29***								
6. Physical demands	2.38	1.08	.06	-.02	-.36***	.20***	.27***							
7. WHI	1.87	.59	.05	.10**	.13***	.36***	.41***	.13***						
<i>Job resources</i>														
8. Task autonomy	3.17	.65	-.02	.05	.08*	.00	-.22***	-.22***	-.13***					
9. Skill utilization	3.62	.64	-.06	.01	.17***	.27***	.14**	-.07*	.07*	.29***				
10. Positive feedback	3.33	.74	.07	-.03	.01	.11**	-.12**	-.10**	-.19***	.30***	.41***			
11. Need satisfaction	3.84	.42	.11**	-.04	.07	.13***	-.13***	-.09*	-.22***	.30***	.41***	.52***		
12. Emotional exhaustion	1.74	1.0	-.04	.06	-.04	.17***	.42***	.32***	.44***	-.24***	-.10**	-.30***	-.37***	
13. Vigour	3.91	.96	.07	.10**	.05	.23**	-.02	-.05	-.03	.24***	.38***	.34***	.47***	-.29***

Note: WHI = Work-Home Interference.

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

combination with SRMR values below .09 indicate excellent fit, whereas values below .08 and .10, respectively, indicate good fit (Browne & Cudeck, 1993; Byrne, 2001; Hu & Bentler, 1999). CFI and NNFI values larger than .90 indicate good fit, whereas values larger than .95 indicate excellent fit (Bentler, 1990; Hoyle, 1995). Estimation of the measurement model with 22 observed variables (2 control variables, 7 job characteristics, 3 needs, and 9 well-being items) and 7 latent factors yielded a good fit,  $SBS-\chi^2(190) = 717.61$ ,  $p < .001$ ; RMSEA = .06; SRMR = .07; CFI = .93, and NNFI = .92. All observed variables had significant ( $p < .001$ ) loadings (ranging from .37 to .92) on their latent factor (mean  $\lambda = .68$ ). A reliable measurement model was thus obtained.

Whereas Warr (1990) advises the inclusion of a heterogeneous sample to examine the relationships among job characteristics and well-being, within the JD-R framework it is suggested that job characteristics might be experienced differently by employees of different sectors and professions. To deal with this issue, we examined the equivalence of the measurement model among blue-collar workers and health care workers when compared with the employees of the other professional levels and sectors. Notably, the Consistent Akaike Information Criterion (CAIC) improved gradually from the measurement model, in which all parameters were set free, to the measurement invariance model, which indicates that there were no large differences across these groups.

### *Primary analyses*

Mediational analyses were performed following the recommendations of Holmbeck (1997). First, the direct relationships between job demands and exhaustion and between job resources and exhaustion and vigour were modelled and an additional path was allowed between age and vigour. The errors of exhaustion and vigour were allowed to correlate. The model describing the direct relationships between job demands, job resources, exhaustion, and vigour yielded a good fit to the data,  $SBS-\chi^2(128) = 558.62$ ,  $p < .001$ ; RMSEA = .07; SRMR = .08; CFI = .93, and NNFI = .91. As expected, job demands related positively to exhaustion ( $\gamma = .68$ ), whereas job resources related negatively to exhaustion ( $\gamma = -.33$ ) and related positively to vigour ( $\gamma = .59$ ); all  $ps < .001$ . The amount of variance explained in exhaustion and vigour was .60 and .36, respectively.

Next, we examined whether need satisfaction mediated the direct relationships between job demands, job resources, and employees' exhaustion and vigour. Therefore, a comparison was made between the full and the partial mediation model. In the full mediation model, the independent variables (i.e., job demands and job resources) were only indirectly related to the dependent variables (i.e., exhaustion and vigour) through the mediating variable (i.e., need satisfaction). In the partial mediating models, additional direct paths were allowed between the independent and the dependent variables. According to Holmbeck (1997), evidence for full mediation is found if the full mediation model fits the data at least equally well as the partial mediational model. Because the partial and full mediational models are nested, Satorra-Bentler Scaled  $\chi^2$  difference tests were used to test differences in model fit ( $\Delta SBS-\chi^2$ ; Satorra & Bentler, 1994).

The full mediation model yielded an acceptable fit to the data,  $SBS-\chi^2(198) = 903.84$ ,  $p < .001$ ; RMSEA = .07; SRMR = .10; CFI = .91, and NNFI = .90, although there was room for improvement. We then proceeded in a stepwise fashion to examine whether adding direct paths between job demands and resources and outcomes would be associated with an

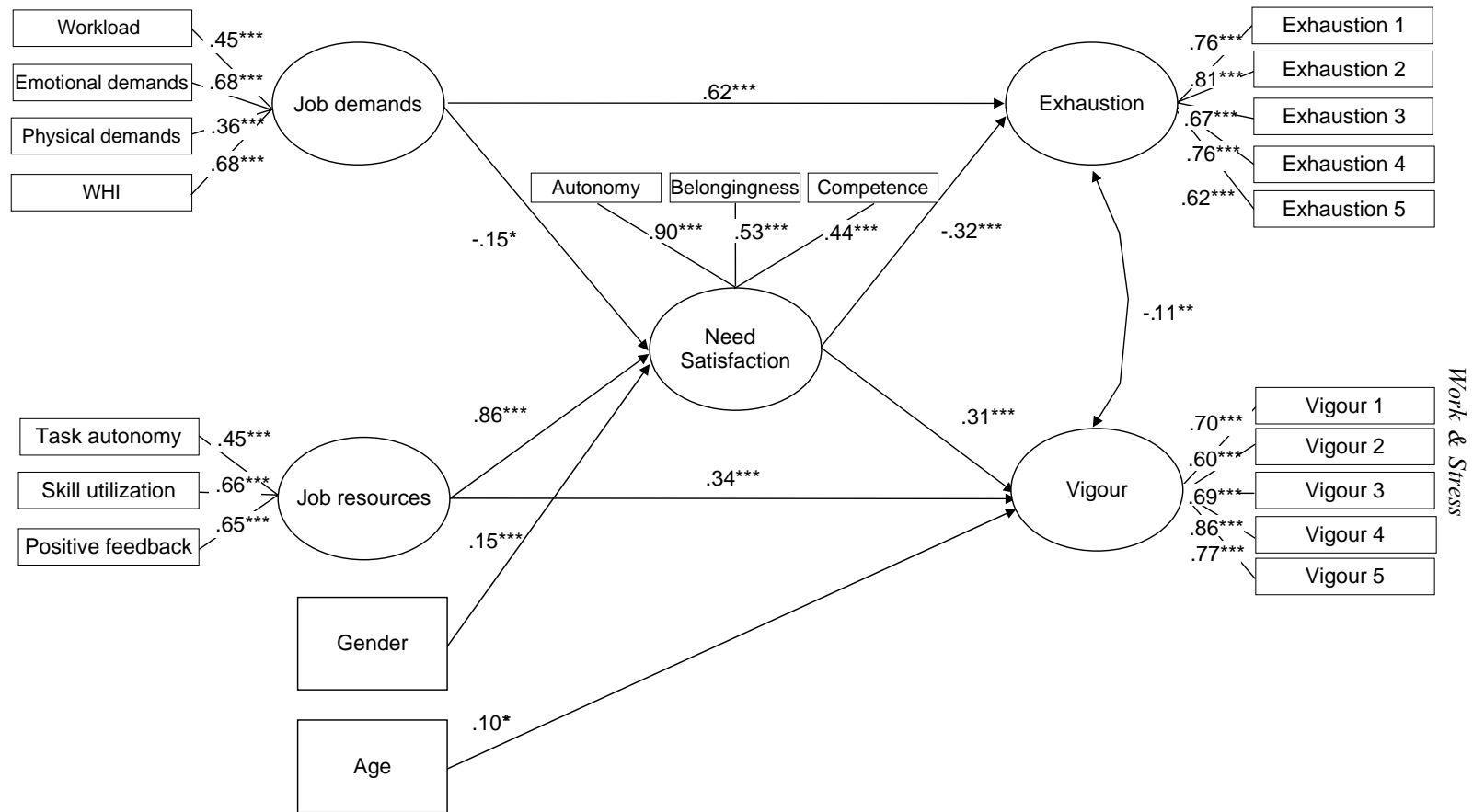


Figure 2. Structural model of the relationships between job characteristics, need satisfaction and job well-being outcomes. Coefficients represent standardized estimates. \*\* $p < .01$ ; \*\*\* $p < .001$ .

increased model fit. First, adding a direct path from job demands to exhaustion was associated with a significant increase in model fit;  $\Delta\text{SBS-}\chi^2(1) = 155.96, p < .001$ . Second, adding a direct path from job resources to burnout did not result in a better fit compared to the full mediational model;  $\Delta\text{SBS-}\chi^2(1) = .01, n.s.$  Third, allowing a direct path from job resources to engagement resulted in an improved model fit,  $\Delta\text{SBS-}\chi^2(1) = 8.94, p < .01$ . This final model yielded an excellent fit to the data;  $\text{SBS-}\chi^2(196) = 738.94, p < .001$ ;  $\text{RMSEA} = .06$ ;  $\text{SRMR} = .08$ ;  $\text{CFI} = .93$ , and  $\text{NNFI} = .92$  (Figure 2).

Finally, we more formally tested whether job demands and job resources yielded an indirect effect to the outcome variables through need satisfaction by performing a series of Sobel tests. The indirect effects from job demands to exhaustion ( $z = .05, p < .001$ ) and from resources to exhaustion ( $z = -.27, p < .001$ ) and vigour ( $z = .27, p < .01$ ) through basic need satisfaction were confirmed. In short, model testing indicated that satisfaction of the basic psychological needs acted as a partial mediator in the relationship between job demands and exhaustion and the relationship between job demands and vigour, whereas it fully accounted for the association between job resources and burnout.

## Discussion

This study aimed to add to the literature on burnout and engagement by examining the processes underlying the relationships between job characteristics (i.e., job demands and job resources) and employees' well-being (i.e., exhaustion and vigour, the core components of burnout and engagement respectively), as hypothesized in the JD-R model. Specifically, we relied on Self-Determination Theory, which maintains that the satisfaction of the basic psychological needs is the fundamental process through which individual's optimal and dysfunctional functioning can be understood. The study's findings provide evidence that satisfaction of needs fully accounted for the relationship between job resources and exhaustion and partially explained the relationships between job demands to exhaustion and between job resources to vigour. This suggests that employees who are surrounded by resourceful job characteristics are more likely to experience a general feeling of psychological freedom (i.e., autonomy), interpersonal connectedness (i.e., belongingness), and effectiveness (i.e., competence), which in turn explains why they feel less exhausted, and more vigorous in their jobs. Employees who encounter many job demands, in contrast, seem to be more likely to have their basic psychological needs thwarted and therefore experience more exhaustion.

These findings help to shed light on the processes underlying the relationships between job characteristics and burnout and engagement. The study aligns with the general theorizing that health-enhancing job characteristics fuel employees' critical psychological states and therefore relate to employees' functioning (Hackman & Oldham, 1976). More specifically, it builds on the JD-R literature as it tests one of the proposed mechanisms in the relationship between job resources and work engagement (Schaufeli & Bakker, 2004). However, the present study also extends the JD-R literature by suggesting that one mechanism, namely psychological need satisfaction as defined within SDT, helps to explain the relationships between the health-impairing as well as the health-enhancing job characteristics and both employees' ill-health (i.e., burnout) and well-being (i.e., work engagement). Notably, within the JD-R literature, two different processes are assumed, that is, an energy depleting process in the development of burnout and a motivational process in the emergence of work engagement. The results of this study, however, suggest

that basic need satisfaction intervenes in the energetic as well as the motivational process. These findings are in line with SDT, which assumes that the support of one's basic psychological needs stimulates optimal motivation, both in terms of the quantity and the quality of motivation, and engenders a sense of psychological energy (Deci & Ryan, 2000; Lens & Vansteenkiste, 2006). The frustration of one's basic psychological needs is likely to undermine motivation and to prevent one from being energized psychologically. Herein, we thus suggest that the concept of basic needs might represent an overarching mechanism fuelling both employees' motivation and energy and, hence, explaining the emergence of both work engagement and burnout.

Basic need satisfaction could however not *fully* account for the relationship between job resources and vigour and the relationship between job demands and exhaustion. Other mediators might therefore be examined to fully understand the relationship between job resources and vitality, including for example goal-accomplishment (Schaufeli & Bakker, 2004). In addition to examining various mechanisms separately, it might be interesting to explore their relative importance. We would also like to encourage future research to examine the relationships between job demands and exhaustion more closely, as there was a strong direct relationship between job demands and exhaustion after controlling for need satisfaction, and job demands were only moderately negatively related to need satisfaction. The latter finding might be explained in various ways. A first explanation could be that job demands contain an important physical component, which might directly contribute to the emergence of emotional exhaustion without interfering with need satisfaction (Schaufeli & Bakker, 2004). Indeed, because need satisfaction is a process capturing individuals' *psychological* energy, it is unlikely to account for the *physical* energetic component of job demands. In line with such an explanation, in the present study, physical job demands were related less strongly to need satisfaction compared to the other job demands. A second explanation is that job demands might have a curvilinear relationship with employees' motivation and energetic level. That is, whereas high levels of job demands might be energy depleting, low to moderate levels might stimulate employees need satisfaction. Third, the category of job demands might only be moderately related to need satisfaction because of the undifferentiated nature of the construct of job demands. Notably, whereas WHI, emotional demands and physical demands correlate negatively with need satisfaction, workload related positively. Similar diverging results have been found in the relationship between job demands and engagement (e.g., Mauno, Kinnunen, & Ruokolainen, 2007). When studied together under the overarching concept of job demands, these divergent relationships might cancel each other out, resulting in a null or low relationship between the general category of job demands and need satisfaction, depending on the type of included job demands. Some scholars indeed suggest that the category of job demands should better be broken down in two qualitative subcategories, that is, hindrance-related stressors and challenge-related stressors (Podsakoff, LePine, & LePine, 2007). Further research is, however, needed to examine whether this correlational pattern is due to specific characteristics of this study and to disentangle the moderate relationship between job demands and need satisfaction in general. In line with previous research (e.g., Vansteenkiste et al., 2007), we considered need satisfaction as an undifferentiated construct, tapping individuals' psychological energy. Future research might explore whether the different basic needs for autonomy, belongingness, and competence yield unique power in explaining the beneficial or detrimental associations between job characteristics and employees' well-being.

### **Limitations**

Although this study provides evidence for the mediating role of need satisfaction in the relationships between job characteristics, burnout, and engagement, some limitations need to be mentioned. First, as we studied a limited set of job demands and resources, the generalizability of the current findings to other, omnipresent (e.g., role conflict) or organization-specific (e.g., organizational changes) job characteristics need to be demonstrated. Second, although we studied a heterogeneous rather than a representative sample of employees, we are unable to generalize from the current results. However, as basic need satisfaction represents an inborn and fundamental mechanism, we would expect need satisfaction to account for the effects of job characteristics regardless of employees' profession, educational level, and age.

Third, as all data were gathered through self-reports, common method variance might contaminate the results. Such method effects might be avoided in future research by using objective rather than subjective assessments of job characteristics. Such research would be particularly welcomed because the rather strong relationship between job resources and need satisfaction observed in the present research might be due to the self-report nature of both constructs. Although a measurement model in which both job resources and need satisfaction were modelled as two separated constructs fitted the data better than a one-factor model, it seems critical to re-examine this association using an objective measure of job resources. Given that previous SDT-based studies found that objectively manipulated positive feedback (e.g., Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008) and choice (e.g., Reeve, Nix, & Hamm, 2003) predicted need satisfaction, we would expect objectively assessed job characteristics to be related to need satisfaction as well.

A final limitation concerns the cross-sectional character of the current study. Although SEM analysis gives some information about the possible direction of the relationships, cross-sectional study designs do not allow one to draw firm conclusions regarding the causal ordering among studied variables. Thus, longitudinal research and cross-lagged model testing are encouraged to examine the causal relationships between job characteristics, need satisfaction, and job well-being (e.g., de Lange et al., 2008; Hakanen et al., 2008).

### **Practical implications and conclusion**

The observation that basic need satisfaction plays an explanatory role in the relationships between job demands, job resources, and the core components of burnout (i.e., exhaustion) and engagement (i.e., vigour) has practical implications. Specifically, for jobs to be health promoting, it would seem useful to design them so that they yield supportive features for employees to experience volitional functioning, competence, and belongingness. Moreover, this study adds to the growing body of work that shows that basic need satisfaction can account for the effects of a variety of social-contextual and personal characteristics on job well-being and performance, including the effects of leadership styles (Baard et al., 2004), work climates (Deci et al., 2001; Gagné, 2003), and employees' personal intrinsic (relative to extrinsic) work value orientations (Vansteenkiste et al., 2007). The concept of basic need satisfaction, as defined within Self-Determination Theory, might thus form a promising mechanism through which organizational policies can be adjusted.

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