

**Why are you not burned out yet? The role of psychological needs satisfaction and appraisal
in the Job Demands-Resources Model**

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ABSTRACT

Why are you not burned out yet? The role of psychological needs satisfaction and appraisal in the Job Demands-Resources Model

While studies have found that greater job demands leads to greater burnout, there have been some inconsistent findings in the effects of demands. Building on Job Demands-Resources research and the challenge-hindrance framework, we investigate how (a) appraisals and (b) psychological needs satisfaction affect the relationship between job demands and burnout/engagement. A time-lagged online survey was conducted with 160 full-time employees across diverse locations and occupations (51.9% women, mean age was 30.0 years old, SD 7.14). The data was analyzed using multiple regression analysis. We found that some hindrance and challenge appraisals of job demands moderated the relationship between job demands (cognitive and emotional) and burnout/engagement, and satisfied psychological needs (relatedness and autonomy) moderated the relationship between job demands and engagement. This study extends existing research by investigating job demand appraisals and psychological needs as moderators of the job demands-well-being relationship and by partially explaining job demands' relationship with positive and negative well-being outcomes.

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INTRODUCTION

The relationship that we have with our work can affect us as individuals, affect our families, our organizations, and society at large. Burnout is on the rise, a survey by Indeed found that more than half of 1,500 US workers reported experiencing burnout in 2021, up from 43% in 2020 (Kelly, 2021). Burnout is significantly related to the employees' respiratory problems, coronary heart disease, chronic fatigue, and dying before age forty five (Salvagioni et al., 2017), and it degrades support networks and relationships, causing greater conflict and withdrawal (Innstrand et al., 2008; Jackson & Maslach, 1982). The effects of burnout do not disappear after the symptoms are gone; one study found that former burnout patients were 34.4% less likely to be promoted after returning to their previous employer (Sterkens et al., 2021). The consequences of burnout also have a significant cost to the organization, increasing an employee's intention to leave (Jackson & Maslach, 1982). These trends have reinforced the need to understand what leads to workplace burnout.

The Job Demands-Resources (JD-R) model has become the dominant model over the years to explain burnout. It predicts burnout is preceded by high demands, such as workload, time pressure and role conflict, and not enough resources to manage the demands (Demerouti et al., 2001). Although the model has garnered a lot of support, there have been some inconsistent findings in the effects of demands, with studies finding that some demands can lead to positive outcomes such as job satisfaction (Cavanaugh et al., 2000), motivation (Lepine et al., 2005) and engagement (Crawford et al., 2010). Several researchers have found other variables such as personal resources (Bakker & Sanz-Vergel, 2013; Trépanier et al., 2013; Xanthopoulou et al., 2007) may play an important role in the effects of job demands and job resources on the individual. Scholars have also suggested that the appraisal process (Lazarus & Folkman, 1984)

plays a role in explaining how demands lead to different outcomes (e.g., Lepine et al., 2005). It is not clear however what role appraisals play, what leads employees to interpret demands differently, and how it changes the outcome of well-being (Mockało & Widerszal-Bazyl, 2021). A recent review by Bakker and Demerouti (2017) calls for further investigation. This study aims to address some of these gaps by examining needs satisfaction and appraisal in the prediction of burnout.

THEORY AND HYPOTHESES

The Job Demands-Resources Model

Burnout is defined by three symptoms: emotional exhaustion, depersonalization, and reduced personal efficacy (Jackson & Maslach, 1982). Emotional exhaustion, the core component of burnout, is the feeling of not being able to give any more personal, physical or emotional resources (Maslach & Leiter, 2008). Depersonalization is characterized by disengagement, while reduced personal efficacy is a reduced belief in one's abilities to do the job (Maslach & Leiter, 2008). This study focuses on emotional exhaustion as the core component of burnout. The Job Demands-Resources Model (JD-R; Bakker & Demerouti, 2007; Demerouti, et al., 2001) has been used in a wide variety of settings and samples to explain burnout and has become one of the dominant models over the past decade (Bakker et al., 2014; Bakker & Demerouti, 2017). Job demands are “physical, social, or organizational aspects of the job that require sustained physical or mental effort,” such as time pressure, workload, or the physical environment. Job resources are the aspects of the job that are meant to help in achieving goals, lessening the demands, or promoting personal growth; these can include social support, job control, or performance feedback (Demerouti et al., 2001). The JD-R model contains two parallel

processes: the health-impairment process and the motivational process (Bakker & Demerouti, 2007). In the health-impairment process, job demands predict exhaustion and lower organizational commitment, lack of resources predicts disengagement (i.e., lack of motivation), and jobs with both high demands and low resources can lead to both exhaustion and disengagement (i.e., burnout syndrome) (Bakker, Boyd, et al., 2010; Bakker, van Veldhoven, et al., 2010; Bakker & Demerouti, 2007; Demerouti et al., 2001). Job resources, on the other hand, are motivational in that they promote organizational commitment (Bakker, Boyd, et al., 2010; Bakker et al., 2003; Bakker, van Veldhoven, et al., 2010), task enjoyment (Bakker, van Veldhoven, et al., 2010), work engagement (Schaufeli & Bakker, 2004), and decrease symptoms of burnout (Schaufeli & Bakker, 2004).

Previous research has found support for the JD-R model processes (Demerouti et al., 2001; Korunka et al., 2009). Recently, Lesener et al. (2019) conducted a meta-analysis with only longitudinal studies and found significant evidence for a causal, positive relationship between job demands and burnout, but no significant relationship between job demands and engagement.

JD-R Remaining questions

While many studies have found support for the JD-R's key tenets, namely the dual health-impairment/motivational process, some aspects of the model remain unclear. For instance, the JD-R proposed that resources would buffer the impact of demands on stress-related outcomes (Bakker & Demerouti, 2007). Some studies have found support for this effect. For instance, Bakker and colleagues (2005) found that autonomy, receiving feedback, having social support, and a high-quality relationship with their supervisor buffered the relationships of work overload, emotional demands, physical demands, and work-home interference with burnout. Xanthopoulou

et al. (2007) found that job resources such as autonomy and social support can buffer the negative effects of job demands. Similarly, Bakker, van Veldhoven, et al. (2010) found that the greatest organizational commitment and task enjoyment happened when job resources and job demands were both high. However, other research findings indicate that neither job resources nor personal resources interact with job demands, including the meta-analysis by Korunka et al. (2009). Some studies suggest that job resources interact with demands under specific circumstances. For instance, job resources may only buffer the negative effects of job demands when individuals are high in self-determined motivation (Fernet et al., 2004), or in certain professional domains, as Hu et al. (2011) found an interaction effect for health professionals but not in blue collar workers. The authors explain the sample differences through motivational differences, citing previous findings that white-collar workers tend to be more internally driven compared to blue collar workers. They hypothesize that healthcare workers are more internally driven (i.e., intrinsically motivated) while blue collar workers are more externally driven (i.e., extrinsically motivated). These mixed findings indicate that other variables likely play a role in explaining the differential effects of job demands on outcomes. Recently, there has been a growing interest in the effects of individual appraisal of job demands.

This is related to other findings which contradict the JD-R's original propositions: not all job demands result in negative outcomes (Crawford et al., 2010; Van den Broeck, De Cuyper, et al., 2010). Demands such as job complexity, time pressure, and workload can often lead to both burnout and greater work engagement, whereas other demands such as role ambiguity and resource inadequacy more consistently lead to only greater burnout and less engagement (Crawford et al., 2010). These findings highlight that although the JD-R model has been very

useful in researching job characteristics' effects on wellbeing, these relationships have proved to be very complex and there are remaining questions to address.

The Challenge-Hindrancel framework and the role of appraisals

Given these mixed effects of job demands, Cavanaugh et al. (2000) hypothesized that these differences might be due to differences in the nature of the demands themselves. They called to split job demands into challenges and hindrances based on Lazarus and Folkman's (1984) transactional stress theory. This theory states that when an individual is faced with a stressful demand, they first evaluate whether the demand is relevant to them, and then whether they have adequate resources to manage the demand (Lazarus & Folkman, 1984). If they have the resources and capacity to manage the demand, then it is viewed as a challenge, otherwise it is viewed as a threat. However, unlike the transactional stress theory, Cavanaugh et al. (2000) pre-categorized the demands into challenges or hindrances and many of the studies inspired by theirs did the same thing (e.g. Kim & Beehr, 2018; Ma et al., 2021; Searle & Lee, 2015; Tadić Vujčić et al., 2017). Challenges are stressors that can be accomplished with enough skills and resources and can be fulfilling. Hindrances on the other hand are stressors that are unmanageable obstacles that are either "excessive or undesirable" (Cavanaugh et al., 2000; pg. 67). There has been mixed support for the challenge-hindrancel model. Some studies have investigated whether challenge demands can become hindering if the levels of demands become too great, leading to a curvilinear relationship. There has been some support for this with two diary studies (although with small samples) finding that daily challenge demands can have a curvilinear relationship with daily work engagement (Sheng et al., 2019; Tadić Vujčić et al., 2017). A recent review by Mazzola and Disselhorst (2019) suggests there might be a different explanation for this mixed

support. These authors suggest differing effects of job demands may be due to personal differences in the appraisal of demands, which would be more in line with the influential transactional stress model. Appraisals reflect if the individual has the resources to manage different types of high demands, so some individuals may be more likely to appraise demands as hindrances if they do not have the appropriate resources to manage it. While there is meta-analytic support for the challenge-hindrance stressor framework (Lepine et al., 2005), the role of appraisals remains under-researched. Bakker and Demerouti's (2017) recent review of the JD-R model and Lesener et al.'s (2019) meta-analysis call for future research to investigate the individual appraisal and categorization of job demands, particularly in understanding relationships between job demands and engagement, to try and reconcile the somewhat inconsistent effects of demands in the JD-R model.

Previous research supports Mazzola and Disselhorst's (2019) assertion and has found that the subjective appraisal of the demands has a significant effect even after accounting for the effect of the demands themselves (Searle & Auton, 2015). For example, challenge appraisals significantly mediated the effect of job complexity on greater motivation to work and greater task persistence, whereas hindrance appraisals fully mediated the negative effect of role conflict on motivation to work and task persistence. Importantly the relationship between the demand and effect became non-significant after taking out the effect of appraisal (Liu & Li, 2018). Challenge appraisals can also evoke more positive affect and problem-focused coping strategies (Searle & Auton, 2015), and positively relate to organization based self-esteem and feelings of meaningfulness (Kim & Beehr, 2020). Hindrance appraisals promote negative affect (Searle & Auton, 2015), and negatively relate to organization based self-esteem and meaningfulness (Kim & Beehr, 2020). More recently, researchers have investigated whether appraisals can strengthen

or weaken the negative effects of demands on wellbeing. Challenge appraisals were found to moderate the relationship between demands and burnout such that higher challenge appraisal weakened the positive relationship between demands and burnout (Li et al., 2020).

The research findings reviewed here support the importance of demand appraisal and its inclusion in the JD-R framework. Thus far, only a few studies have tested a theoretical model that combines the JD-R framework and the challenge-hindrance framework (Kim & Beehr, 2020; Li et al., 2020; Mockało & Widerszal-Bazyl, 2021; Van den Broeck, De Cuyper, et al., 2010), and recent publications are calling for more research into appraisals (Bakker & Demerouti, 2017; Lesener et al., 2019; Mazzola & Disselhorst, 2019). Additionally, the findings reviewed here are very recent and have not been replicated in many samples or occupational fields. The Li et al. (2020) study mentioned above, for instance, was conducted with employees in China and measured demand appraisals as “general beliefs” about demands using hypothetical framing. Their findings are yet to be replicated in a different geographical sample and with measurement of appraisal grounded in actual job demands that employees are experiencing. This study aims to address these gaps and answer the call to test a challenge-hindrance addition to the JD-R framework. Based on the above, we propose the following hypothesis:

Hypothesis 1: Appraisals moderate a) a positive relationship between job demands and employee emotional exhaustion and b) a negative relationship between job demands and employee engagement such that these relationships are weaker when demands are appraised as challenging, and stronger when demands are appraised as hindering.

Self-Determination Theory: Psychological Needs Satisfaction

Previous research has found that individual differences in the quality of motivation can moderate the effect of job demands and job resources on wellbeing and functioning. When individuals engage in a task because they feel that it is their choice, or in other words have higher self-determined motivation, job demands and poor quality co-worker relationships no longer have negative effects on wellbeing (Fernet et al., 2010; Trépanier et al., 2013). In addition, self-determined motivation interacts with job resources such as job control to buffer the negative effects of high demands (Fernet et al., 2004) and promote greater dedication (Parker et al., 2010), while non-self-determined motivation can cause job resources such as job control and job recognition to result in greater burnout (Trépanier et al., 2020). Therefore, as discussed earlier, the presence of job demands or resources alone is not enough to predict employee functioning as originally proposed by the JD-R framework. Reviews have called for research into the effects of personal resources on the JD-R model and into the circumstances when job demands result in positive versus negative outcomes (Bakker et al., 2014; Bakker & Demerouti, 2017; Lesener et al., 2019). Self-determination theory (SDT; Deci et al., 2017; Deci & Ryan, 1985, 2000) compliments the JD-R model by providing a theoretical explanation of the psychological mechanism in which demands and resources can both have positive or negative effects on functioning.

According to SDT, motivation exists on a spectrum that goes from autonomous to controlled motivation (Deci & Ryan, 1985; Gagné & Deci, 2005; Howard et al., 2017). To be autonomously motivated means to internalize and align external goals and values with one's own goals and values, or to work out of inherent satisfaction. To be controlled motivated means to work because of an external regulation or reward (Gagné & Deci, 2005). There are three

universal psychological needs that must be fulfilled in order to have optimal autonomous motivation: need for autonomy, need for relatedness, and need for competence (Chen et al., 2015; De Cooman et al., 2013; Deci & Ryan, 2000; Trépanier et al., 2015). The need for autonomy is the need to subjectively perceive that one has volition and freedom of choice while completing a task (deCharms, 1968; Gagné & Deci, 2005). This is sometimes met by a task that is objectively autonomous, but autonomy can also be felt and psychologically satisfied when completing tasks that would not necessarily qualify as objectively autonomous (Van den Broeck, De Cuyper, et al., 2010). The need for competence is the psychological need “to feel effective” (Deci & Ryan, 2000; White, 1959). Lastly the need for relatedness is the need to feel a sense of belonging and connection to others (Baumeister & Leary, 1995; Deci & Ryan, 2000).

Psychological needs satisfaction and autonomous motivation have each been linked to greater work engagement, job satisfaction and less turnover intention (Gillet et al., 2013; Parker et al., 2010; Van den Broeck et al., 2016). On the other hand, unmet needs and controlled motivation results in less satisfaction, higher turnover intention, and anxiety/depression (Gillet et al., 2013; Parker et al., 2010; Van den Broeck et al., 2016). The mechanism underlying the motivation to pursue a goal is whether these psychological needs can be satisfied; the mechanism is not the potential outcome of the goal itself (Deci & Ryan, 2000).

Many things can satisfy these basic psychological needs, including job characteristics, interpersonal relationships, and personality factors. Researchers have used the self-determination theory of motivation to explain how job resources and demands cause psychological, health, and social outcomes. Job resources (e.g., social support, job control, job recognition) have been found to satisfy the three psychological needs, leading to autonomous motivation and positive outcomes such as work engagement, job performance, goal progress, higher performance,

positive affect and self-regulation (Fernet et al., 2013; Trépanier et al., 2015; Van den Broeck et al., 2008). Studies have also shown that job demands, on the other hand, frustrate psychological needs satisfaction, leading to controlled motivation and subsequently negative outcomes such as psychological distress, burnout, psychosomatic complaints, and less engagement (Brunet et al., 2015; Fernet et al., 2012, 2013; Trépanier et al., 2015). However, in a recent meta-analysis of 119 samples, Van den Broeck et al. (2016) found the relationship between job demands and psychological needs satisfaction to be more complex. Cognitive demands were found to positively relate to competence and relatedness satisfaction, and be unrelated to autonomy satisfaction, while emotional demands and workload negatively related to autonomy and competence satisfaction (Van den Broeck et al., 2016). This points to the same conclusions from JD-R literature (e.g., Bakker & Demerouti's 2017 review, Lesener et al.'s 2019 review) that job demands are not only related to negative outcomes and job resources to positive outcomes, and there are possible positive outcomes of job demands.

In addition to being used to explain the mechanism of JD-R pathways, satisfied needs for autonomy, relatedness, and competence can be viewed as personal resources that are essential factors for well-being and optimal functioning (Boudrias et al., 2020; Deci & Ryan, 2000). Previous research has used this conceptualization of psychological needs as a personal resource but most have used the outcome of autonomous motivation to represent satisfied psychological needs (Fernet et al., 2004; Parker et al., 2010; Trépanier et al., 2013, 2020). For example, Fernet et al. (2004) found a three-way interaction wherein motivation interacted with job resources to buffer the negative effects of high demands. Instead of job resources directly moderating the job demands-burnout relationship, the individual's motivation affected whether job resources could be used effectively to moderate the demands-burnout relationship. Fernet et al. (2004) found that

employees who were more autonomously motivated used the job resource of job control more effectively to buffer the negative effects of high job demands than employees who were less autonomously motivated. These employees were in turn less exhausted and experienced less depersonalization. Conversely, job control did not buffer the negative effects of job demands on depersonalization for employees with low autonomous motivation. The autonomously motivated workers still experienced greater exhaustion when faced with greater demands versus fewer demands, but their findings reveal that job resources alone are not enough to prevent burnout in a high demand environment. The job resources must be available, but the individual must have the motivation to utilize those job resources.

The research discussed here assumes that the psychological mechanism underlying this moderation is psychological needs satisfaction, but there is only preliminary evidence in support of this. Only Boudrias et al. (2020) have so far investigated the moderating effect of psychological needs satisfaction in the job stressor-strain relationship. They found that satisfaction of the need for autonomy moderated the demands-turnover intention relationship, satisfaction of the need for competence partially moderated it and satisfaction of the need for relatedness did not moderate it at all. Further research is needed to confirm these findings as the authors only investigated cognitive demands (role conflict and role ambiguity), and different types of demands and resources have been shown to impact different psychological needs (Van den Broeck et al., 2016).

Examining psychological needs directly as a personal resource is in-line with transactional stress theory. Transactional stress theory and the challenge-hindrance model argue that demands will be appraised as challenges when the individual perceives that they have the resources to manage the demand (Cavanaugh et al., 2000; Lazarus & Folkman, 1984).

Considering psychological needs rather than motivation has advantages for the practitioner. Practitioners strive to help employees have optimal functioning and wellbeing, and there are many ways to satisfy psychological needs (discussed above) that can help achieve this. Satisfying the psychological needs offers a direct mechanism for practitioners.

Given SDT's proposition that optimal functioning and well-being depends on satisfying basic psychological needs, these needs' satisfaction may be a key resource when it comes to the effects of demands on functioning and well-being. For example, Trépanier et al. (2013) found that autonomous motivation buffered the negative impact of high demands and the authors hypothesized it was because autonomous motivation (i.e., satisfied psychological needs) is a "key personal resource which leads employees to appraise demanding aspects of their job as challenges, such could trigger adaptive coping strategies" (p. 101).

The present study aims to investigate the theoretical proposition that basic needs satisfaction, as a personal resource, can buffer the negative effects of job demands on well-being. We examine this side by side with job demand appraisals because both have been used to theoretically explain the underlying mechanism of positive and negative effects of job demands. Therefore, challenge appraisal should moderate the effects of job demands in a similar way as basic needs satisfaction. As such, we aim to answer recent calls for research into personal resources and strategies in the JD-R framework (Bakker et al., 2014; Bakker & Demerouti, 2017; Lesener et al., 2019). We hypothesize that:

Hypothesis 2: Satisfaction of the psychological needs for autonomy, relatedness and competence moderate a) a positive relationship between job demands and employee emotional exhaustion and b) a negative relationship between job demands and employee engagement such

that these relationships are weaker when basic needs satisfaction is high, and stronger when basic needs satisfaction is low.

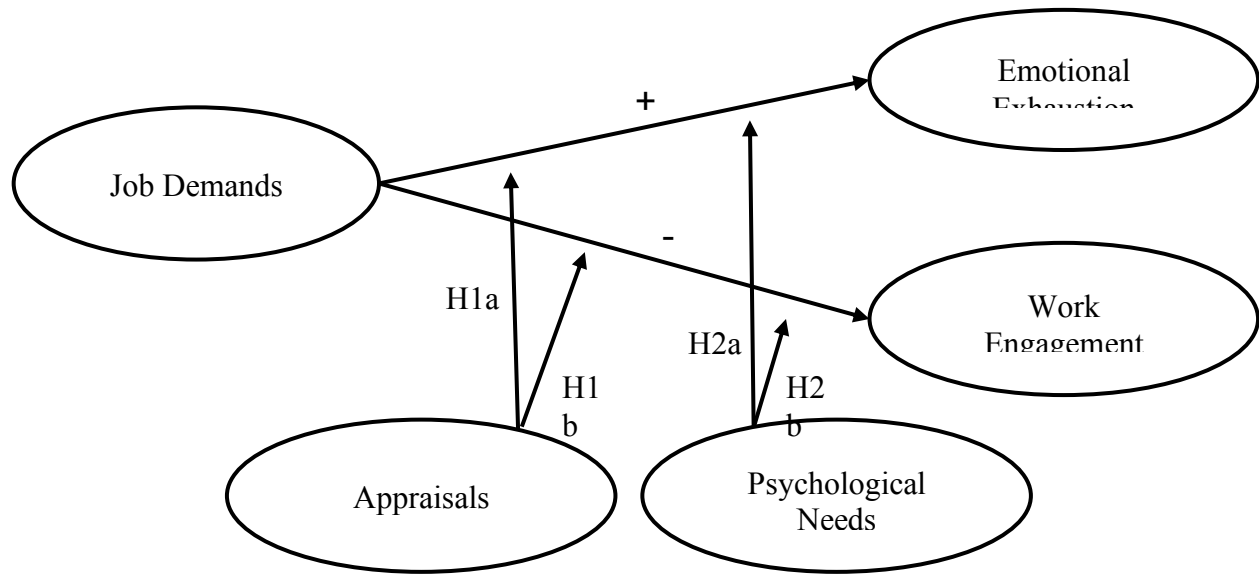


Figure 1. Study model

METHODS

Participants and Procedure

We recruited full-time employees (N=160) across various industries and countries using the online participant pool Prolific. All Prolific users who met our eligibility criteria (being 18 years and older, employed full-time with a direct supervisor, and fluent in English) based on their Prolific profiles were notified about our online survey at Time 1. They were informed of the confidentiality and anonymity of their responses, and that participation was completely voluntary. Data were collected through online questionnaires using a time-lagged design. Both questionnaires were identical except for demographic variables, which were omitted in the

second questionnaire. Previous research on job demands and appraisals has a wide range of time lags (Ma et al., 2021); we chose to have a time lag of 3 weeks between the first and second questionnaires. Of the 237 responses to the survey at Time 1, 28 respondents did not meet the eligibility criteria, 14 responses were incomplete, and 4 responses answered both attention checks incorrectly, so a total of 191 responses from Time 1 were included in analyses and were invited on Prolific to complete the Time 2 survey. Of those 191, 183 individuals completed the survey at Time 2. After removing those who failed 2 or more of 3 attention check questions or had incomplete responses, our final sample was 160 responses.

The respondents were from various countries such as South Africa (25.3%), Poland (15.4%), Mexico (14.2%), Portugal (13.6%), United Kingdom (5.6%), Greece (4.9%), Hungary (4.3%), Czechia (2.5%), Spain (2.5%), among others (10.6%). Respondents were mostly in white-collar industries such as Education/Academia (15.4%), Computers/Information Technology (14.2%), Engineering/Architecture (9.9%), Commerce (9.3%), Health/Social Services (8.6%), Accounting/Finance (4.3%), Marketing/Sales (4.3%), Communications/Media (3.7%), Biotechnologies/Pharmaceutical (2.5%), among others (27.8%). The sample was almost evenly split between men and women (47.5% and 51.9% respectively, 0.6% non-binary). The mean age was 30.0 years old (SD 7.14), the average organization tenure was 3.86 years (SD 4.62), and the majority were employees (84.4%) versus managers (15.6%).

Measures

Employees were instructed to reply on a 5-point Likert scale, and all scales used were previously validated. We first verified that each respondent was fluent in English, 18 years or older, currently employed full-time, and has an immediate supervisor (i.e., not working for themselves).

Job demands. Cognitive and emotional job demands were measured using De Jonge et al.'s (2007) Demand-Induced Strain Compensation Questionnaire. Example items are “I will have to do a lot of emotionally draining work” (emotional demand; T1 $\alpha = 0.813$ / T2 $\alpha = 0.836$), “I will need to display high levels of concentration and precision at work” (cognitive demand; T1 $\alpha = 0.789$ / T2 $\alpha = 0.821$). Items were measured on a 5-point Likert-type scale ranging from “1=never or very rarely” to “5=very often or always.” The psychometric properties and cross-national validity has been supported by previous research (Bova et al., 2015).

Appraisals were measured using two instruments, for a total of six scales. The first instrument was a global or overall appraisal of demands assessed with a 6-item scale by LePine et al. (2016). Challenge appraisals (e.g. “Working to fulfill the demands of my job helps to improve my personal growth and well-being;” T1 $\alpha = 0.879$ / T2 $\alpha = 0.882$) and hindrance appraisals (e.g. “In general, I feel that my job hinders my personal accomplishment;” T1 $\alpha = 0.806$ / T2 $\alpha = 0.749$) were each assessed with 3 items.

Second, we measured specific appraisals of cognitive and emotional demands. Before each appraisal, respondents were asked how often they experienced cognitive and emotional demands in the past week on a scale of “1 (Never)” to “5 (Almost Always).” For example, “In the past week at your job, have you experienced any mentally taxing work? For example, complex decision making, time pressure, or displaying high concentration or precision.” If respondents answered anything other than “Never” then they were asked how this job demand affected them with a scale adapted from Searle and Auton (2015). To assess the appraisal of cognitive job demands, respondents were asked to “Think about the amount of mentally taxing work you are experiencing this week at work, such as complex decision making, time pressure, or displaying high concentration or precision. Please now assess how this mentally taxing work

is likely to affect you.” Challenge appraisals (e.g. “It will help me to learn a lot;” T1 $\alpha = 0.876$ / T2 $\alpha = 0.892$) and hindrance appraisals (e.g. “It will restrict my capabilities;” T1 $\alpha = 0.871$ / T2 $\alpha = 0.872$) were assessed with 3 items each rated on a 5-point Likert-type scale from “1 (strongly disagree)” to “5 (strongly agree).” To assess emotional demands (challenge appraisal T1 $\alpha = 0.875$ / T2 $\alpha = 0.882$; hindrance appraisal T1 $\alpha = 0.858$ / T2 $\alpha = 0.888$), respondents were asked the same questions with examples of each type of demand. In sum, we used six different measures of appraisal: hindrance and challenge for overall demands, for emotional demands and for cognitive demands.

Basic needs satisfaction was assessed with the 16-item Work Related Basic Needs Satisfaction scale by Van den Broeck, Vansteenkiste, et al. (2010) to capture basic needs satisfaction, and a 5-point Likert-type scale ranging from “1= strongly disagree” to “5=strongly agree.” Example items are “I feel like I can be myself at my job” (autonomy; T1 $\alpha = 0.754$ / T2 $\alpha = 0.789$), “I feel competent at my job” (competence; T1 $\alpha = 0.871$ / T2 $\alpha = 0.897$) and “At work, I feel part of a group” (relatedness; T1 $\alpha = 0.887$ / T2 $\alpha = 0.873$).

Emotional exhaustion was measured with 5 high-loading items from the emotional exhaustion subscale of the Maslach Burnout Inventory (Maslach & Jackson, 1981), We adapted the original 7-point Likert-type scale ranging from 1 (“Never”) to 7 (“Everyday”) to a 5-point Likert-type scale for consistency. The scale includes items such as “I feel emotionally drained from my work” (T1 $\alpha = 0.874$ / T2 $\alpha = 0.901$). The Maslach Burnout inventory is highly utilized and cited as a standard measure of emotional exhaustion and its symptoms (e.g. Fernet et al., 2012; Halbesleben & Buckley, 2004; Rijk et al., 1998).

Engagement was measured using the 9-item Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002), a short version of the original 17-item scale that has been shown to be

valid and reliable (Mills et al., 2012). Items were measured on a 5-point Likert-type scale ranging from 1 (“Never”) to 5 (“Everyday”). The scale includes items such as “At my work, I feel bursting with energy” (T1 $\alpha = 0.901$ / T2 $\alpha = 0.920$). The scale is composed of the subscales vigor, dedication and absorption, which were assumed to represent engagement together (Hu et al., 2010; Korunka et al., 2009; Schaufeli and Bakker, 2004).

Control variables. We included gender, organizational tenure and negative affect as control variables, as these have been linked to employee wellbeing in past studies (Fernet et al., 2004, 2013; Gray et al., 2020; Li et al., 2021). Mood was measured with the PANAS (Watson et al., 1988). This instrument contains adjectives such as “Upset”, “Distressed”, and respondents will be asked “the extent you have felt this way over the past week,” on a scale ranging from “1 = Very slightly or not at all” to “5 = Extremely.” The scale has two subscales, positive mood (T1 $\alpha = 0.894$ / T2 $\alpha = 0.911$) and negative mood (T1 $\alpha = 0.868$ / T2 $\alpha = 0.824$).

RESULTS

Statistical analyses

The analyses only included participants who completed both Time 1 and Time 2 surveys and did not fail 2 or more attention check questions in either survey. Moderation analyses were performed using PROCESS v4.1 in SPSS v28, and each moderator was investigated separately. The independent and moderating variables were centered using PROCESS before calculating the interaction terms in order to avoid multicollinearity (Aiken et al., 1991). We used Time 1 measures for independent variables, and Time 2 measures for moderators and dependent variables. When examining the moderating role of specific appraisals (cognitive and emotional) on relationships between job demands and outcomes, we matched the appraisal scale to the

demand such that cognitive appraisals with cognitive demands, and emotional appraisals with emotional demands. Gender, organizational tenure, and negative affect (at Time 2) were included as control variables.

Descriptive statistics

Properties of the scales including means, standard deviations and correlations among study variables are presented in Table 1. As shown in Table 1, there was a positive correlation between cognitive demands and work engagement ($r = .29, p < .001$) and between emotional demands and emotional exhaustion ($r = .35, p < .001$). Overall hindrance appraisal, hindrance appraisal of cognitive job demands and hindrance appraisal of emotional job demands all displayed positive correlations with emotional exhaustion ($r = .31, r = .44, r = .37$, respectively; $p < .001$), suggesting relevant associations between these variables. Additionally, overall challenge appraisal, challenge appraisal of cognitive demands and challenge appraisal of emotional demands both showed positive correlations to work engagement ($r = .78, r = .64, r = .46$, respectively; $p < .001$). Turning to needs satisfaction, only relatedness needs satisfaction and autonomy needs satisfaction negatively correlated with emotional exhaustion ($r = -.32, r = -.66$, respectively; $p < .001$), while relatedness, autonomy, and competence, positively correlated with engagement ($r = .57, r = .61, r = .59$, respectively; $p < .001$).

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

Variables	mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Cognitive Demands	3.69	0.76	1												
2. Emotional Demands	2.78	0.90	.39**	1											
3. OCA T2	3.70	1.03	.28**	-.01	1										
4. OHA T2	2.63	1.06	.114	.120	-.24**	1									
5. CACD T2	3.69	0.95	.024	-.06	.63**	-.33**	1								
6. HACD T2	2.44	1.01	.10	.23**	-.36**	.44**	-.61**	1							
7. CAED T2	3.22	1.11	.13	.06	.48**	-.02	.53**	-.29**	1						
8. HAED T2	2.86	1.06	-.14	.01	-.43**	.34**	-.49**	.60**	-.61**	1					
9. RNS T2	3.50	0.95	.24**	-.04	.43**	.01	.29**	-.23**	.25**	-.20*	1				
10. ANS T2	3.21	0.81	.03	-.19*	.57**	-.23**	.46**	-.34**	-.37**	-.37**	.47**	1			
11. CNS T2	4.03	0.81	.20*	.09	.48**	-.04	.37**	-.25**	.11	-.19	.49**	.39**	1		
12. EE T2	2.54	1.06	.12	.35**	-.51**	.31**	-.38**	.44**	-.19	.37**	-.32**	-.66**	-.17*	1	
13. WE T2	3.30	0.85	.29**	.06	.78**	-.14	.64**	-.39**	.46**	-.47**	.57**	.61**	.59**	-.51**	1

14. Negative Affect	2.0	.71	.12	.31**	-.12	.22**	-.13	.26**	-.06	.19	-.17*	-.34**	-.17*	.42**	-.20*
15. Organization Tenure	3.86	4.62	.04	.04	.14	-.10	.04	-.16*	.13	-.29**	.03	.03	.04	-.16*	.10

*p< .05; **p<.01; OCA: Overall Challenge Appraisals; OHA: Overall Hindrance Appraisals; CACD: Challenge Appraisal of Cognitive Demands; HACD: Hindrance Appraisal of Cognitive Demands; CAED: Challenge Appraisal of Emotional Demands; HAED: Hindrance Appraisal of Emotional Demands; CNS: Competency Needs Satisfaction; ANS: Autonomy Needs Satisfaction; RNS: Relatedness Needs Satisfaction; EE: Emotional Exhaustion; WE: Work Engagement

Hypothesis testing

Hypothesis 1: Appraisals moderate the demands-well-being relationship

Our first hypothesis was that appraisals moderate a) a positive relationship between job demands and employee emotional exhaustion and b) a negative relationship between job demands and employee engagement such that these relationships are weaker when demands are appraised as challenging, and stronger when demands are appraised as hindering. Results of these analyses are presented below in Tables 2 and 3 regarding emotional exhaustion, and Tables 4, 5, 6, and 7 regarding engagement.

As can be seen in Tables 2 and 3, emotional job demands positively and significantly predicted emotional exhaustion, and the relationship between cognitive demands and emotional exhaustion, while in the expected direction, was not significant. With regards to moderating effects and emotional exhaustion results revealed marginally significant interactions between some appraisals and job demands on emotional exhaustion. Specifically, overall hindrance appraisals of job demands marginally moderated the effect of cognitive job demands on emotional exhaustion ($\beta = .17, p = .0959$). Moreover, hindrance appraisals of emotional demands marginally moderated the effect of emotional job demands on emotional exhaustion ($\beta = .17, p = .0858$). Figures 2 and 3, below, display these interactions. Consistent with hypothesis 1a, greater hindrance appraisals strengthened the positive effect of job demands on emotional exhaustion. However, other interactions involving overall hindrance appraisals, hindrance appraisals of cognitive job demands, or challenge appraisals were not significant. Overall, these results offer some support for Hypothesis 1a.

Table 2. Regression results for the moderation of appraisals on the relationships between job demands and emotional exhaustion.

(n=156)				
Variables	Unstandardized	SE	<i>t</i>	<i>p</i>
Coefficients (β)				
Constant	1.27	.32	3.90	.0001
Cognitive Job Demands	.10	.10	.98	.3304
Overall Hindrance Appraisal	.16	.08	2.18	.0311
Interaction	.17	.10	1.68	.0959

Dependent Variable: Emotional Exhaustion. All predictors centered before analysis.

$R^2 = .2493$, $F(6, 149) = 8.2463^{**}$

** $p < .01$

Table 3. Regression results for the moderation of appraisals on the relationships between job demands and emotional exhaustion.

(n=98)				
Variables	Unstandardized	SE	<i>t</i>	<i>p</i>
Coefficients (β)				
Constant	1.82	.41	4.48	.0000
Emotional Job Demands	.38	.11	3.55	.0006

Hindrance Appraisal Emotional Demands	.30	.09	3.46	.0008
Interaction	.17	.10	1.74	.0858

Dependent Variable: Emotional Exhaustion. All predictors centered before analysis.

$R^2 = .3760, F(6, 91) = 9.1399^{**}$

$^{**}p < .01$

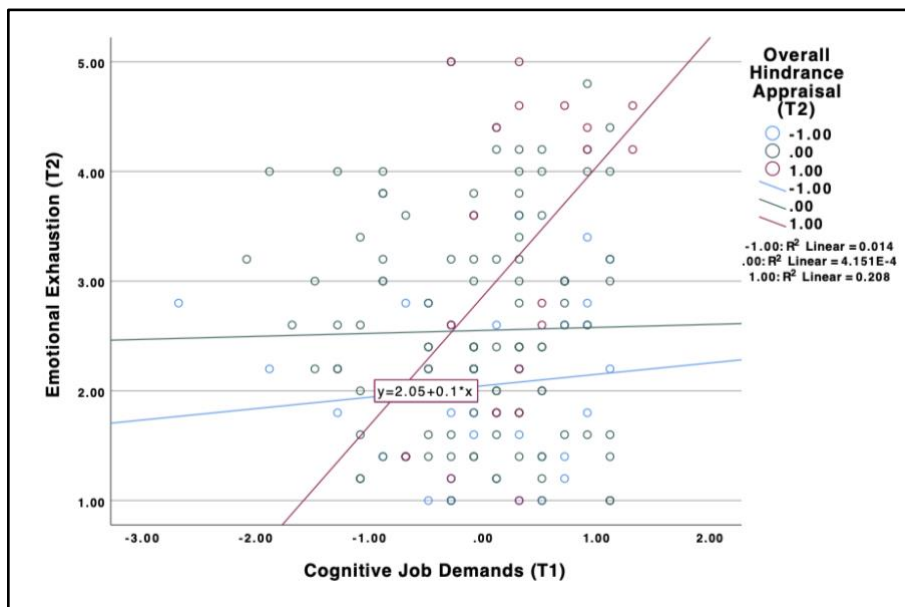


Figure 2. The interaction between overall hindrance appraisals and cognitive job demands on emotional exhaustion.

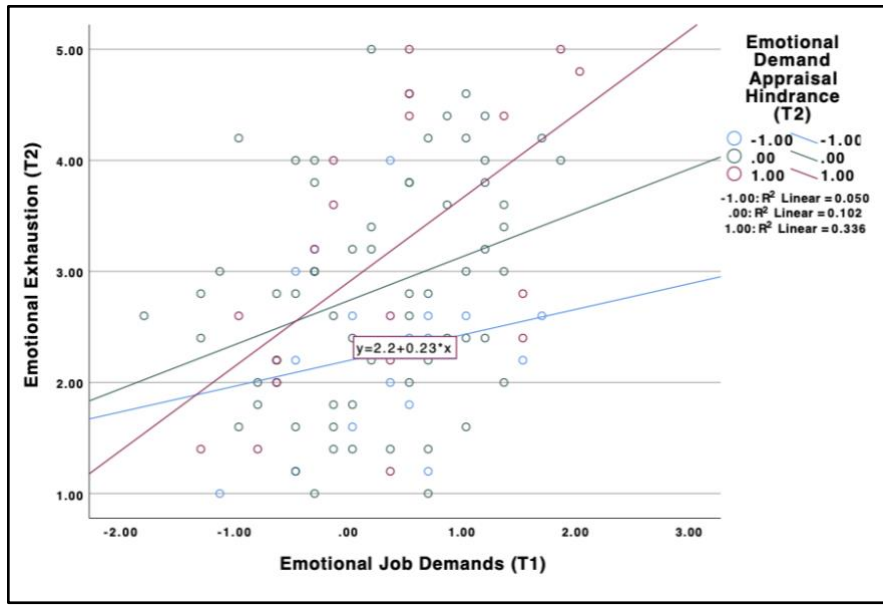


Figure 3. The interaction between hindrance appraisals of emotional demands and emotional job demands on emotional exhaustion.

Turning to engagement, as can be seen in Tables 4 through 7, contrary to expectations, cognitive demands and, in some cases emotional demands, significantly positively predicted engagement. Consistent with the literature, measures of challenge appraisals positively related to engagement, while measures of hindrance appraisals negatively related to engagement, but hindrance appraisals were not significant.

With regards to moderating effects and engagement, interactions between some measures of appraisals and job demands were significant or marginally significant predictors of work engagement. Specifically, overall hindrance appraisals significantly moderated the effect of cognitive demands on work engagement ($\beta = -.21, p = .0130$), and the interaction between overall hindrance appraisals and emotional demands was a marginally significant predictor of engagement ($\beta = -.13, p = .0979$). Figures 4 and 5, below, display these interactions. Results suggest that job demands are negatively related to engagement when hindrance appraisal is high,

but that they positively contribute to engagement when hindrance appraisal is low. Looking at challenge appraisals of cognitive demands, the interaction with cognitive demands was a marginally significant predictor of engagement ($\beta = -.13, p = .0898$). Meanwhile the interaction between overall challenge appraisals and emotional demands was a significant predictor ($\beta = -.12, p = .0042$) of engagement. Figures 6 and 7, below, display these interactions. Interactions involving hindrance appraisals of cognitive demands and hindrance and challenge appraisals of emotional demands were not significant. Overall, these results offer some support for Hypothesis 1b, as some measures of challenge and hindrance appraisals moderated the effects of cognitive and emotional demands on work engagement but relationships involving challenge appraisals, in particular, were not in the expected direction.

Table 4. Regression results for the moderation of appraisals on the relationships between job demands and engagement.

(n=156)				
Variables	Unstandardized Coefficients (β)	SE	<i>t</i>	<i>p</i>
Constant	3.82	.28	13.81	.0000
Cognitive Job Demands	.34	.09	4.00	.0001
Overall Hindrance Appraisal	-.06	.06	-.92	.3570
Interaction	-.21	.08	-2.51	.0130

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .1941, F(6, 149) = 5.9802^{**}$

$^{**}p < .01$

Table 5. Regression results for the moderation of appraisals on the relationships between job demands and engagement.

Variables	(n=147)			
	Unstandardized Coefficients (β)	SE	<i>t</i>	<i>p</i>
Constant	3.67	.22	17.05	.0000
Cognitive Job Demands	.21	.07	2.86	.0048
Challenge Appraisal Cognitive Demands	.56	.05	10.32	.0000
Interaction	-.13	.07	-1.71	.0898

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .4942, F(6, 140) = 22.8003^{**}$

$^{**}p < .01$

Table 6. Regression results for the moderation of appraisals on the relationships between job demands and engagement.

(n=154)			
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Variables	Unstandardized Coefficients (β)	SE	<i>t</i>	<i>p</i>
Constant	3.81	.30	12.52	.0000
Emotional Job Demands	.11	.08	1.44	.1531
Overall Hindrance Appraisal	-.08	.07	-1.19	.2359
Interaction	-.13	.08	-1.67	.0979

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .0881$, $F(6, 147) = 2.3660^{**}$

** $p < .01$

Table 7. Regression results for the moderation of appraisals on the relationships between job demands and engagement.

(n=154)				
Variables	Unstandardized Coefficients (β)	SE	<i>t</i>	<i>p</i>
Constant	3.54	.19	19.28	.0000
Emotional Job Demands	.09	.05	1.87	.0642
Overall Challenge Appraisal	.64	.04	15.95	.0000
Interaction	-.12	.04	-2.91	.0042

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .6656$, $F(6, 147) = 48.7655$ **

** $p < .01$

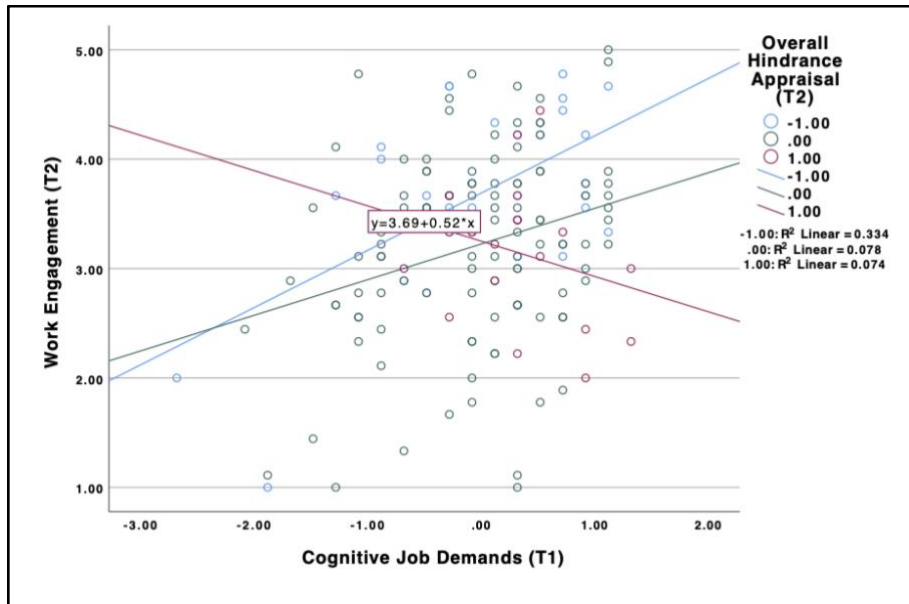


Figure 4. The interaction between overall hindrance appraisal and cognitive job demands on work engagement.

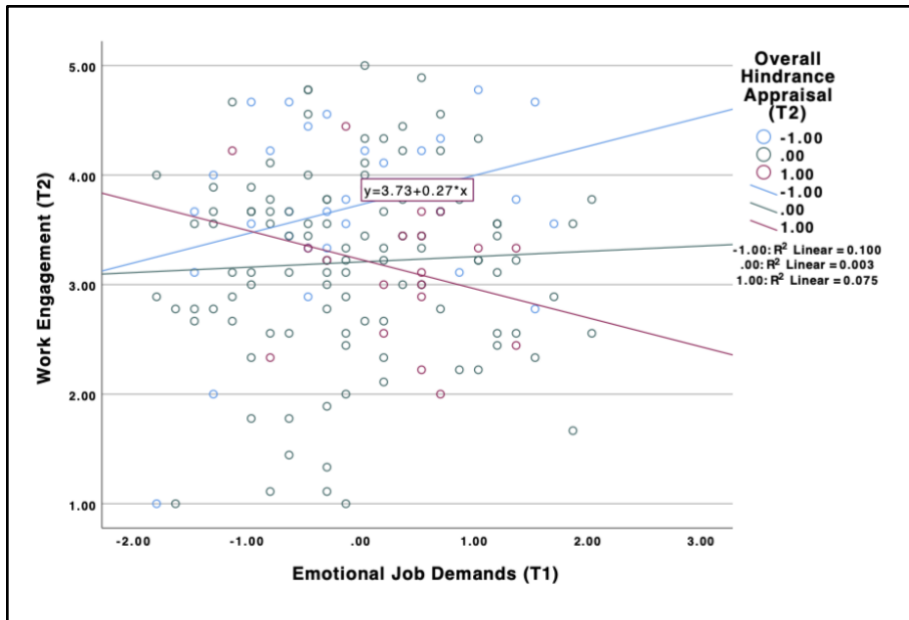


Figure 5. The interaction between overall hindrance appraisal and emotional demands on work engagement.

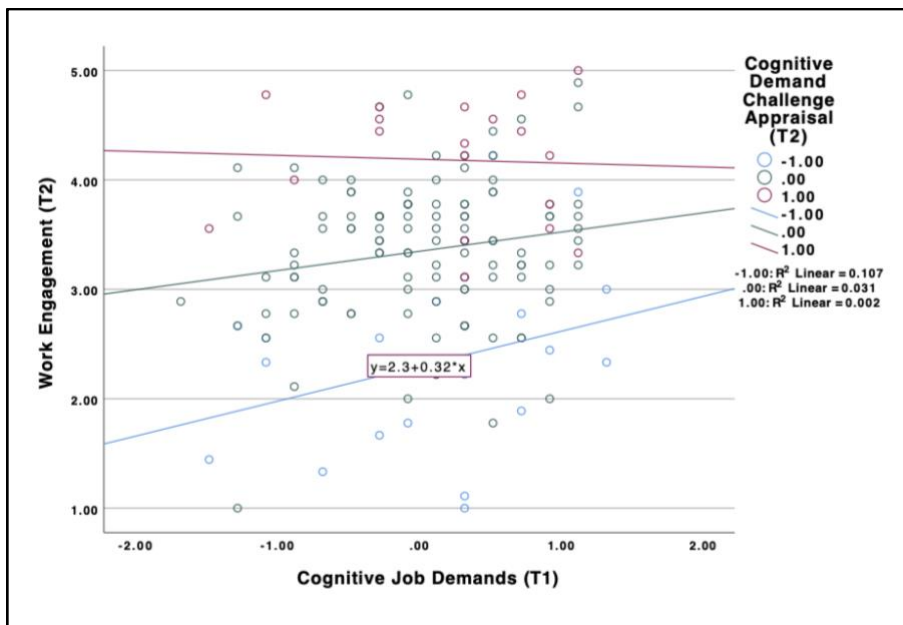


Figure 6. The interaction between challenge appraisals of cognitive demands and cognitive demands on work engagement.

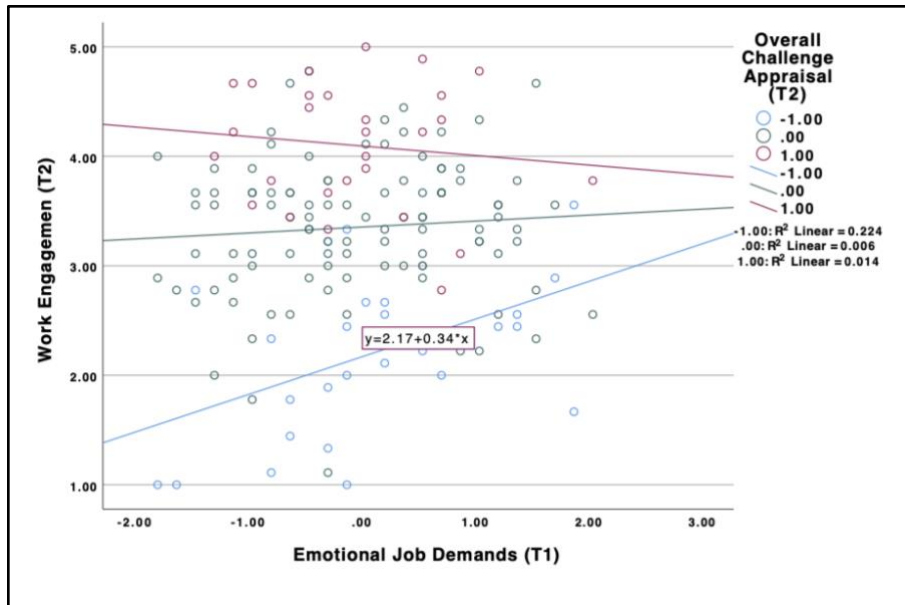


Figure 7. The interaction between overall challenge appraisals and emotional demands on work engagement.

Hypothesis 2: Psychological needs satisfaction moderates the demand-well-being relationship

Our second hypothesis was satisfaction of the psychological needs for autonomy, relatedness and competence moderate a) a positive relationship between job demands and employee emotional exhaustion and b) a negative relationship between job demands and employee engagement such that these relationships are weaker when basic needs satisfaction is high, and stronger when basic needs satisfaction is low. Results of these analyses are presented in Tables 8 and 9, below. Psychological needs satisfaction did not moderate the relationship between job demands and emotional exhaustion, therefore Hypothesis 2a was not supported. With regards to engagement, as can be seen in Tables 8 and 9 respectively, satisfaction of the need for relatedness significantly moderated the effect of cognitive job demands on engagement ($\beta = -.14, p = .0372$), while satisfaction of the need for autonomy ($\beta = -.18, p = .0286$) significantly moderated the effect of emotional job demands on engagement. Figures 8 and 9

below, display these interactions. Interestingly, the positive relationships between cognitive job demands and engagement, and between emotional job demands and engagement were weaker when relatedness and autonomy needs satisfaction were high, respectively. The need for competence did not significantly moderate any relationships. These results partially support the moderating role of basic needs satisfaction in the relationship between job demands and engagement, but the direction of relationships was not consistent with expectations. As such, Hypothesis 2b was partially supported.

Table 8. Regression results for the moderation of psychological needs satisfaction on the relationships between job demands and engagement.

(n= 154)				
Variables	Unstandardized Coefficients (<i>B</i>)	SE	<i>t</i>	<i>p</i>
Constant	3.24	.25	12.93	.0000
Cognitive Job Demands	.19	.08	2.58	.0108
Relatedness Needs Satisfaction	.45	.06	7.36	.0000
Interaction	-.14	.07	-2.10	.0372

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .3962$, $F(6, 147) = 16.0761^{**}$

** $p < .01$

Table 9. Regression results for the moderation of psychological needs satisfaction on the relationships between job demands and engagement.

Variables	(n= 154)			
	Unstandardized Coefficients (<i>B</i>)	SE	<i>t</i>	<i>p</i>
Constant	3.08	.25	12.33	.0000
Emotional Job Demands	.16	.06	2.58	.0108
Autonomy Needs Satisfaction	.70	.07	9.93	.0000
Interaction	-.18	.08	-2.21	.0286

Dependent Variable: Work Engagement. All predictors centered before analysis.

$R^2 = .4414$, $F(6, 147) = 19.3568^{**}$

** $p < .01$

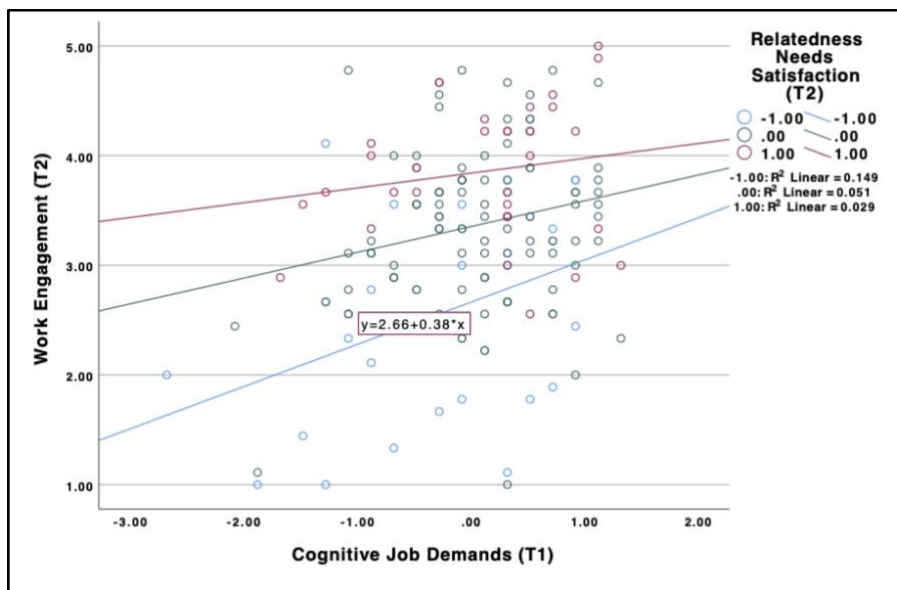


Figure 8. Interaction between need for relatedness and cognitive job demands on engagement

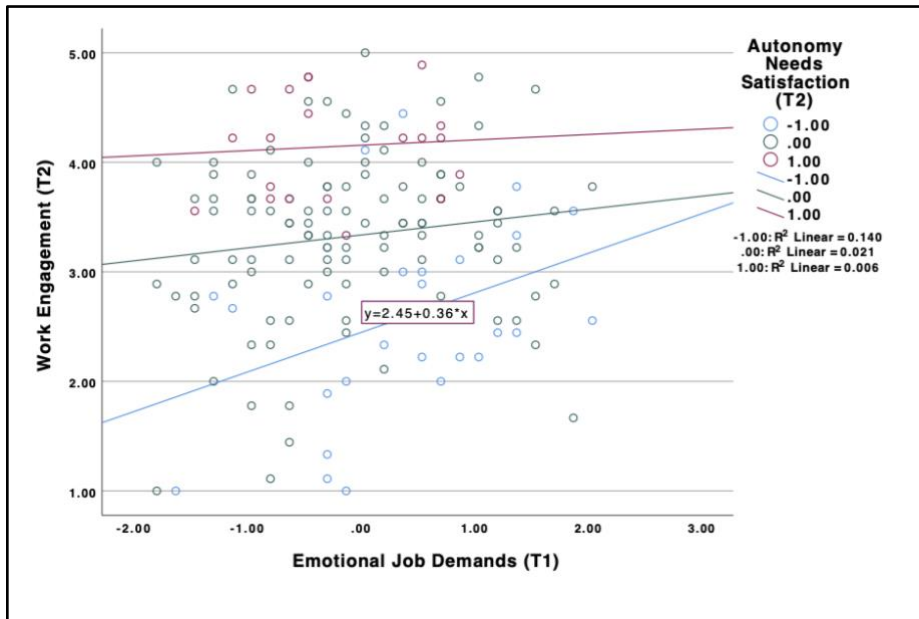


Figure 9. Interaction between need for autonomy and emotional job demands on engagement

DISCUSSION

In the present study we aimed to explain the positive and negative effects of job demands on employee wellbeing and answer calls to investigate the role of demand appraisals and basic needs satisfaction in the Job Demands-Resources framework. Based on transactional stress theory, the JD-R framework and the challenge-hindrance framework, we proposed a model where job demand appraisals interacted with job demands to predict emotional exhaustion and work engagement. The existing research on demand appraisals has yielded mixed results and the use of different measurement tools of appraisal from one study to the next makes the results difficult to compare. Therefore, we included six different measurements of appraisal used in previous research.

At the same time, we aimed to expand the incorporation of SDT into the JD-R model by investigating whether basic needs satisfaction can explain different effects of job demands by moderating relationships between job demands and well-being outcomes. We focused on basic needs satisfaction and appraisals as moderators because both have been used to theoretically explain the underlying mechanism of positive and negative effects of job demands. We found support for including job demand appraisals in the health-impairment process and the motivational process of the JD-R, and found support only for including psychological needs satisfaction in the motivational process.

Job Demand Appraisals

In line with previous JD-R research, we found job demands to be positively related to emotional exhaustion. We did not expect to find job demands to predict greater engagement; such positive relationships have at times been found in prior research (e.g., Cavanaugh et al., 2000; Crawford et al., 2010), which has led scholars to call for refinements of the JD-R framework, namely to account for the challenging or hindering nature of demands (e.g., Lesener et al., 2019). While previous research has used appraisals to explain how job demands affect well-being (e.g., Searle & Auton, 2015; Tuckey et al., 2015; Webster et al., 2011), this study suggests appraisals may play an important role in explaining job demands' relationship with positive and negative well-being outcomes.

Specifically, marginally significant or significant results suggest that when hindrance appraisals are high, the positive relationship between job demands and emotional exhaustion is stronger, and the (otherwise positive) relationship between job demands and engagement becomes negative. As such, hindrance appraisals may enhance the negative impact of job demands on emotional exhaustion, and may even reverse the potential benefits of job demands

with regards to greater engagement. Based on these results, hindrance appraisals may be especially detrimental to individual well-being.

With regards to challenge appraisals, this study's results, although contrary to expectations, are particularly interesting. Indeed, employees' appraisal of demands as challenging did not buffer the positive relationship between job demands and emotional exhaustion. Moreover, the positive relationship between job demands and engagement was *weaker* when demands were appraised as challenging because engagement stayed high at both high and low job demands when appraised as challenging. In the present study, this meant that low job demands resulted in low engagement and high job demands promoted high engagement. Therefore, this study's results suggest challenge appraisals may, in fact, not be especially beneficial to employee well-being. Results point to the complexity of the challenge-hindrance framework, and the possibility that job demands may promote feelings of purpose and dedication without being challenging job demands.

However, interestingly, the one other study of which we are aware which examined the moderating role of appraisals by Li et al. (2020) yielded different results. In line with the current study's results, these authors found challenge appraisals had a direct positive relationship to engagement. However, unlike the present study, the authors found some evidence that challenge appraisals could at times buffer the positive relationship between job demands and emotional exhaustion, but did not find a moderating effect on the relationship between job demands and engagement. They reasoned that hindrance appraisals do not "add much and will not impact [employees'] wellbeing, since employees who consider demands as hindrances just see their demands for what they are." There are multiple possibilities for our differing results.

Firstly, both the samples in Li et al. and the present study were multi-occupational and consisted mainly of white-collar workers, however there is a cultural difference: the Li et al. sample consisted of Chinese workers while the current study's sample was multicultural. A recent meta-analysis by Rattrie et al. (2020) found that cultural differences can affect the job demands-burnout and job demands-engagement relationships. For example, cultural differences in perceived workload can affect levels of job dissatisfaction and turnover intentions (Yang et al., 2012). Their findings suggest that the cultural homogeneity in Li et al.'s sample and the cultural heterogeneity in the present study may be causing different results.

Second, diverging results could be due to different methods of measuring appraisals. As was recently pointed out, when it comes to investigating the challenge-hindrane framework, “there is no consensus on the best way to measure primary appraisals. Some studies measure employees' challenge and hindrance appraisals of every single stressor separately (e.g., Liu & Li, 2018; Webster et al., 2011), while others follow a global approach to measuring challenge and hindrance appraisals of job stressors in general using a multi-item scale (e.g., LePine et al., 2016; Prem et al., 2017; Tuckey et al., 2015)” (Ma et al., 2021, p. 5). Some studies, including Li et al. (2020), have used hypothetical framing asking respondents to imagine an employee with certain job characteristics and then appraise those characteristics. We chose not to use hypothetical framing because it could reflect the respondents' personality or hypothetical reactions instead of their reality, and rather used global and specific (cognitive or emotional demands) measurements of challenge and hindrance appraisals, as described above. In sum, the lack of consensus regarding measurement tools makes it difficult to compare results across studies. Nevertheless, these intriguing and diverging results suggest the need for more research on the role of challenge appraisals, in particular, in relationships between job demands and employee well-being.

Basic Needs Satisfaction

With regards to basic needs satisfaction, this study's findings do not support a moderating role of satisfied psychological needs on the relationship between job demands and emotional exhaustion. However, looking at engagement, we found a significant moderating effect, with satisfied needs for autonomy and relatedness weakening the positive relationship between job demands and work engagement. One possible explanation for this effect is that when employees perceive their psychological needs for autonomy and relatedness to be satisfied at work, perceiving higher levels of demands is less impactful on how engaged they are in their jobs. When needs are not satisfied, perceiving high levels of cognitive or emotional job demands may be promoting higher engagement as employees feel needed by or useful to colleagues, clients, or the organization. In other words, similar to challenge appraisals, satisfied basic psychological needs may be necessary for job characteristics to promote engagement by creating a sense of purpose.

This study is the first, to our knowledge, to have examined the moderating role of basic needs satisfaction on relationships between job demands and employee well-being. Indeed, previous research had examined the moderating role of self-determined motivation (e.g., Fernet et al., 2004; Trépanier et al., 2013) on relationships between job demands and well-being, and relationships between needs satisfaction and well-being (e.g., Fernet et al., 2013; Van den Broeck et al., 2008). Only one other study to our knowledge investigated how psychological needs satisfaction could interact with job demands in predicting outcomes, which in that case were turnover intentions (Boudrias et al., 2020). Boudrias et al. (2020) found that the satisfied need for autonomy moderated the demands-turnover intention relationship, and the satisfied need for competence partially moderated it such that psychological needs satisfaction buffered a

positive relationship between job demands and turnover intention. Focusing on well-being, the present study suggests the moderating role of psychological needs may depend on the outcome studied.

Theoretical Contributions

The present study contributes to the literature first by investigating job demand appraisals as moderators of the job demands-well-being relationship. Previous research has investigated the direct effect and mediating effects of job demand appraisals, but the present study advances transactional stress theory and the challenge hindrance framework by studying appraisals in the way that more closely follows the theory. Secondly, the findings here contribute to the JD-R literature by partially explaining job demands' relationship with positive and negative well-being outcomes. Previous research theorized that employees are sometimes experiencing greater work engagement in the face of increased job demands because they view the demands as challenging. Our results point to the differentiating role of hindrance appraisals more than challenge appraisals. Hindrance appraisals interacted with job demands to affect both engagement and emotional exhaustion while challenge appraisals only moderated the effects of job demands on engagement. Also, it appears that appraising demands as challenging is not necessary for high engagement, suggesting that other factors may likely play a role.

The results in the present study support a more complex theory of appraisals than is currently discussed in the literature. The fact that engagement still increased with greater job demands in the case of low challenge appraisals suggests that job demands can be positive in the eyes of an employee without necessarily being appraised as challenging. This result was found with the challenge appraisal of both cognitive job demands and emotional job demands indicating that the complexity lies in the theory rather than in measurement.

Turning to psychological needs satisfaction, the present study contributes to the existing literature by examining the moderating role of each psychological need: autonomy, relatedness, and competence. The present study adds to the theory of SDT and JD-R because results suggest that work engagement is still possible in the face of high job demands and unsatisfied needs. This may be due to compensation of other job characteristics – something that could be explored in the future. Furthermore, the findings here suggest that relatedness needs satisfaction may complement the effects of cognitive job demands perhaps because cognitive job demands are satisfying the needs for autonomy or competence through a direct pathway. The same may be true for emotional job demands and autonomy needs satisfaction.

While previous research had found that self-determined motivation (which results from all three psychological needs being satisfied) can moderate the demands-distress relationship (Trépanier et al., 2013), our findings suggest that individual satisfied psychological needs do not moderate the similar demands-emotional exhaustion relationship. Another possibility is that psychological needs must be satisfied *and* job resources must be present. Indeed, previous SDT and JD-R research has found that self-determined motivation buffers the negative effects of high job demands on wellbeing when job control is present (Fernet et al., 2004). Future research is needed to better understand the role of basic needs satisfaction in these relationships.

Practical Implications

This study has implications for practice. Firstly, given that hindrance appraisals appear to amplify the negative relationship between job demands and emotional exhaustion and reverse an otherwise positive relationship between job demands and engagement, it would be beneficial to both employer and employee to be aware of the presence of hindrance appraisals, and attempt to reduce the perception of such appraisals. For instance, by making managers aware of the

importance of framing job characteristics as opportunities for growth and development, employers may be able to promote a challenge appraisal mindset. Secondly, appraisals may also be a useful measurement for employers to assess employees' experiences before the symptoms of emotional exhaustion set in. A possible implementation would be short surveys for employees to gauge their outlook on job characteristics and whether they appraise them as challenges, opportunities for growth, or as hindrances, roadblocks that frustrate them. Thirdly, given the results that job demands can themselves promote work engagement, employers may want to take note of job demands and characteristics that their employees find engaging, even if the characteristics are not viewed as positive challenges. The same is relevant for psychological needs satisfaction; in the cases where it may not be possible to satisfy psychological needs, it may be worth noting other job characteristics of the job may compensate, and help keep employees engaged.

Limitations and Future Research

The present study had several limitations. First, as the sample size was relatively small, it would be beneficial for future research to investigate the moderating role of appraisals and basic needs satisfaction in a larger sample. Results which were marginally significant, for instance, may have reached significance with a larger sample size. Second, we were not able to establish causation with the current study design. The present study was time-lagged, with two surveys separated by a three-week interval. This design mitigates to some extent concerns of common-method variance, but does not allow us to establish causation. Additionally, the current design may explain the positive relationship found here between job demands and work engagement, as suggested by previous reviews (Bakker and Demerouti, 2017). Future research could aim to replicate this study's findings using a longitudinal design. Future research could also expand on

previous work investigating the curvilinear relationships between demands, appraisals, and well-being. A third limitation is the fact that our sample was diverse in terms of occupations and countries. The heterogeneity could be a strength in terms of generalizability, however, previous research has shown that there are differences in motivation, engagement, and burnout between occupations, industries (Hu et al., 2011; Korunka et al., 2009), and cultures (Rattrie et al., 2020). It would be useful for future research to focus their sample on a specific industry or to investigate cultural differences in appraisals and the JD-R framework.

There are multiple other avenues for future research. In addition to the ones mentioned earlier in the discussion, more research is needed to establish the best method of measuring appraisals. Past studies have used a wide variety of measurement methods for appraisals, such as vignettes, global appraisals, and specific appraisals, and each method often has an adapted version of multiple scales. The use of such different measurements may have been hindering the progression of the challenge-hindrance framework, and the field would greatly benefit from a consensus. Another avenue for research is cultural differences in appraisals. Given the cultural differences found in burnout and other effects of job demands, it may be worthwhile for future research investigating the challenge-hindrance framework to take cultural differences into account.

In addition to culture, it would be interesting to investigate which personal or job characteristics can promote challenge or hindrance appraisals. For example, Trépanier et al. (2013) found that autonomous motivation buffered the negative impact of high demands; the authors hypothesized autonomous motivation (i.e., satisfied psychological needs) is a “key personal resource which leads employees to appraise demanding aspects of their job as challenges” (p. 101). Furthermore, the transactional stress theory posits that the availability of

job resources should promote greater challenge appraisals of job demands because employees should feel more capable of handling the high demands.

Turning to needs satisfaction, it would be beneficial for future research to investigate the interaction between satisfied psychological needs, job demands, and job resources. Previous research has found that work motivation and job resources such as job control can interact to affect burnout (Parker et al., 2010; Trépanier et al., 2020). Building on this previous research and on the current study's findings that certain psychological needs affect the demands-engagement relationship, it would be worthwhile to investigate if certain job resources are useful in the demands-wellbeing relationship in combination with specific psychological needs. This would be especially helpful to practitioners who are looking to maximize the potential benefits of job resources or job demands.

Conclusion

This study's findings provide some support for the role of appraisals and needs satisfaction as moderators of the relationship between job demands and well-being. While more research is needed to better understand the complexity of this moderating role, we hope this study has provided useful insights which will inform further development of the challenge versus hindrance appraisals distinction, the Job Demands-Resources framework, and self-determination theory.

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APPENDIX – Questionnaire

Summary of scales		
Block	Authors	# items
1. Demographic information	N/A	12
2. Job demands	DISQ 2.0 (De Jonge et al., 2007)	16
3. Appraisals	Appraisal (Searle and Auton, 2015) Overall Appraisal (LePine et al., 2016)	8 4 6
4. Basic needs satisfaction	Work-Related Basic Need Satisfaction scale (Van den Broeck et al., 2010)	14
5. Emotional exhaustion	Emotional Exhaustion Scale (Maslach & Jackson, 1981)	5
6. Engagement	Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003)	9
7. Negative affectivity	PANAS (Watson, Clark, & Tellegen, 1988)	11
Total		101

BLOCK 1: Demographic Information

The questions in this section are designed to learn a bit more about you. All information will remain confidential.

1. What is your gender? (Select all that apply: "Woman", "Man", "Non-Binary (including but not limited to: agender, bigender, genderfluid, genderqueer, non-binary, two-spirit)" "prefer not to disclose")
2. What is your age? (scroll list from 18 to over 75)
3. Are you employed full-time (35h/week or more) or part-time at this organization? (PT or FT)
4. What is your current job title? (free text)
5. How long have you been working at your current organization? (scroll list)
6. How long have you been working for your current supervisor? (scroll list)
7. How long have you been part of your current work team? (scroll list)

TI only

8. What is the highest education degree you completed? (scroll list)
9. Currently, are you a manager or an employee? (check boxes)
(Piping) If manager, how many employees do you currently supervise? (scroll list)
(Piping) How long have you been in a leadership position? (scroll list)
10. In what industry does your company operate? (scroll list, If other free text)

11. How many people make up your current organization? (scroll list with brackets: 1-50, 51-100., 101-250, 250-500, over 500)
12. How many people make up your current work team? (scroll list with brackets: 1-10, 11-20, 21-40, over 40)

BLOCK 2: Job demands

DISQ 2.0 (De Jonge et al., 2007)

Please rate the frequency with which you experience the situations depicted in the following items from 1 (“never”) to 5 (“almost always”).

1. I have to make complex decisions at work.
2. I need to display high levels of concentration and precision at work.
3. I have to solve work-related problems within a limited time frame.
4. I have to remember many things simultaneously.
5. I have to do a lot of mentally taxing work
6. I have to deal with people (e.g. clients, colleagues or supervisors) who have unrealistic expectations.
7. I have to control my emotions to complete tasks within a limited time frame.
8. I have to deal with people (e.g. clients, colleagues or supervisors) whose problems touch me emotionally.

9. I have to deal with people (e.g. clients, colleagues or supervisors) who get easily angered towards me.
10. I have to do a lot of emotionally draining work.
11. I have to display emotions (e.g. towards clients, colleagues or supervisors) that are inconsistent with my current feelings
12. I have to perform a lot of physically strenuous tasks to carry out my job.
13. I have to bend and/or stretch a lot at work.
14. I have to work in uncomfortable or impractical postures to do my work.
15. I have to lift or move heavy persons or objects (more than 10 kg).
16. I have to perform physical activity in a quick and continuous fashion.

BLOCK 3: Appraisals

Appraisal (Searle and Auton, 2015)

These days at your job, have you experienced any mentally taxing work? For example, complex decision making, time pressure, or displaying high concentration or precision.

Never

Seldom

Sometimes

Often

Almost always

Think about the amount of mentally taxing work you are experiencing these days at work, such as complex decision making, time pressure, or displaying high concentration or precision.

Please now assess how this mentally taxing work is likely to affect you.

Scale from 1 (strongly disagree) to 5 (strongly agree).

1. It/they will help me to learn a lot
2. It/they will make the experience educational
3. It/they will show me I can do something new
4. It/they will keep me focused on doing well
5. It/they will hinder any achievements I might have
6. It/they will restrict my capabilities
7. It/they will limit how well I can do
8. It/they will prevent me from mastering difficult aspects of the work

Overall Appraisal (LePine et al., 2016)

Please indicate the extent to which you agree with each statement.

1 “strongly disagree” to 5 “strongly agree.”

1. Working to fulfill the demands of my job helps to improve my personal growth and well-being
2. I feel the demands of my job challenge me to achieve personal goals and accomplishment
3. In general, I feel that my job promotes my personal accomplishment
4. Working to fulfill the demands of my job thwarts my personal growth and well-being

5. I feel the demands of my job constrain my achievement of personal goals and development
6. In general, I feel that my job hinders my personal accomplishment

BLOCK 4: Basic needs satisfaction

Van den Broeck et al. 2015

The following statements aim to tap into your personal experiences at work. Please indicate the extent to which you agree with each statement. 1 (“Strongly disagree”) to 5 (“Strongly agree”).

Need for autonomy

1. I feel like I can be myself at my job
2. At work, I often feel like I have to follow other people’s commands (R)
3. If I could choose, I would do things at work differently (R)
4. The tasks I have to do at work are in line with what I really want to do
5. I feel free to do my job the way I think it could best be done
6. In my job, I feel forced to do things I do not want to do (R)

Need for competence

1. I really master my tasks at my job
2. I feel competent at my job
3. I am good at the things I do in my job
4. I have the feeling that I can even accomplish the most difficult tasks at work

Need for relatedness

1. I don't really feel connected with other people at my job (R)
2. At work, I feel part of a group
3. I don't really mix with other people at my job (R)
4. At work, I can talk with people about things that really matter to me
5. I often feel alone when I am with my colleagues (R)
6. Some people I work with are close friends of mine

BLOCK 5: Emotional exhaustion

Emotional Exhaustion Scale (Maslach & Jackson, 1981)

Please indicate the extent to which you agree with each statement from 1 (“never”) to 5 (“everyday”).

1. I feel emotionally drained from my work.
2. I feel used up at the end of the workday
3. I feel fatigued when I get up in the morning and have to face another day on the job.
4. I feel frustrated by my job.
5. I feel like I'm at the end of my rope.

BLOCK 6: Engagement

Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003)

The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job, from 0 (“never”) to 4 (“everyday”).

1. At my work, I feel bursting with energy
2. At my job, I feel strong and vigorous
3. I am enthusiastic about my job
4. My job inspires me
5. When I get up in the morning, I feel like going to work
6. I feel happy when I am working intensely
7. I am proud of the work that I do
8. I am immersed in my work
9. I get carried away when I’m working

BLOCK 7: Negative affectivity

PANAS (Watson, Clark, & Tellegen, 1988)

Please indicate the extent you feel this way, in general, from (1) Very slightly or not at all to

(5) Extremely.

1. Distressed
2. Upset
3. Guilty

4. Scared
5. Hostile
6. Irritable
7. Ashamed
8. Nervous
9. Jittery
10. Active
11. Afraid