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On the psychological and motivational processes linking job characteristics to employee functioning: Insights from self-determination theory

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ABSTRACT

The aim of this study was to provide insight into the differential relationships between job characteristics (job demands and resources) and employee functioning by examining the psychological and motivational processes involved. Drawing on self-determination theory, we tested a model in which job demands are positively related to negative manifestations of employee functioning (psychological distress and psychosomatic complaints) through psychological need frustration and low-quality work motivation (controlled motivation), whereas job resources are positively related to positive manifestations of employee functioning (work engagement and job performance) through need satisfaction and high-quality work motivation (autonomous motivation). Data were collected from 699 Canadian nurses. Structural equation modelling (SEM) results support the proposed model: psychological needs and work motivation partially mediated the relationship between job characteristics and employee functioning. Specifically, job demands negatively predicted employee functioning (high distress and psychosomatic complaints, low engagement and performance) through need frustration and controlled motivation. In contrast, while positively predicting need satisfaction and negatively predicting need frustration, job resources fostered optimal work motivation (more autonomous and less controlled motivation) and employee functioning. The implications for self-determination theory (SDT) and research on occupational health and stress are discussed.

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Introduction

Employees who function optimally – with manifestations of well-being (e.g. work engagement and commitment) and few manifestations of ill-being (e.g. psychological distress and psychosomatic complaints) – translate into more productive and competitive organizations. Accordingly, organizations must find ways to foster, support, and maintain optimal functioning in employees. The emerging field of positive psychology (Seligman & Csikszentmihalyi, 2000) offers valuable insight into this issue: it offers a complementary

– more positive – view of employee functioning to that proposed in the job stress literature, which typically focuses on stressors that promote negative work experiences. However, more work is still needed to unite these approaches and examine whether they involve the same psychological and motivational processes.

A useful theoretical framework for investigating these processes is self-determination theory (self-determination theory (SDT), Deci & Ryan, 2008). SDT proposes that the work environment plays a key role in employee functioning by supporting (or not) employees' psychological needs (for autonomy, competence, and relatedness) and the quality of their work motivation. Specifically, positive work environment factors promote well-being by facilitating the satisfaction of employees' psychological needs and promoting high-quality work motivation (autonomous motivation). Conversely, negative work environment factors foster ill-being through lack of satisfaction of these needs and poor-quality work motivation (i.e. controlled motivation). SDT-based research has supported the role of psychological needs and work motivation as mechanisms liable to explain employees' functioning (e.g. Fernet, Austin, Trépanier, & Dussault, 2013; Fernet, Austin, & Vallerand, 2012; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008).

Nevertheless, scholars have not fully addressed the two proposed sequences simultaneously and in their entirety: the role of psychological needs and motivation in the relationship between work environment factors (positive and negative) and employee functioning (positive and negative manifestations). Moreover, while SDT assumes that negative work environment factors prevent the satisfaction of employees' psychological needs (e.g. "I do not feel related to others"), it has recently been proposed that these factors may be more damaging: they may actually *frustrate* these needs (e.g. "I feel rejected by others"; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013). Investigating basic psychological needs in terms of satisfaction and frustration – rather than in terms of satisfaction and lack of satisfaction – may provide a more nuanced understanding of the relationships work environment factors have with positive and negative manifestations of employee functioning. However, these differential relationships have yet to be simultaneously investigated in the workplace.

Accordingly, the aim of this SDT-based study was to examine how positive and negative work environment factors (job demands and resources) can promote either positive (work engagement and performance) or negative (psychological distress and psychosomatic complaints) manifestations of employee functioning by investigating their differential relationships to employees' psychological needs (satisfaction and frustration) and work motivation (autonomous and controlled). The ultimate goal is to contribute to the research on occupational health and stress as well as the SDT literature in at least three ways. First, by providing an in-depth understanding of the processes liable to simultaneously explain both positive and negative manifestations of employee functioning, this study may contribute to current models in the occupational health literature (e.g. job-demands resources model; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), which to date have argued for the independency of these processes (Schaufeli & Bakker, 2004). Second, by concurrently investigating positive and negative work environment factors, need satisfaction and frustration, work motivation (autonomous and controlled), as well as positive and negative manifestations of employee functioning, this study is the first to *simultaneously* investigate SDT's proposed sequences in the workplace in their entirety. Third and from a practical standpoint, by shedding light on the organizational

determinants of both positive and negative manifestations of employee functioning, this study aims to provide organizations with insight into ways of promoting well-being in employees while preventing stress and its associated costs.

Basic psychological needs

According to SDT, individuals have an inner tendency towards psychological growth and well-being insofar as their basic psychological needs are satisfied (Deci & Ryan, 2008). Three psychological needs are considered essential: autonomy, competence, and relatedness. Autonomy refers to acting with volition, self-endorsing one's behaviour, as well as perceiving that one's actions are congruent with one's values and interests (Deci & Ryan, 2000). Competence refers to expressing one's abilities, mastering one's environment, and attaining valued outcomes within it (Deci & Ryan, 2000). Relatedness refers to establishing and maintaining significant interpersonal relationships and feeling connected to others (Deci & Ryan, 2000).

Psychological needs, motivation, and functioning. According to SDT, the satisfaction of these basic psychological needs provides the necessary fuel for optimal motivation, and consequently positive psychological, behavioural, and developmental experiences (Deci & Ryan, 2008). SDT distinguishes between two qualitatively different forms of motivation (autonomous and controlled), which derive from the satisfaction or hindering of psychological needs. They differ in terms of the degree to which the value of an activity (e.g. work) is internalized: how that value is "taken in" and integrated with other aspects of the self, such as interests and values (Gagné & Deci, 2005).

On the one hand, feeling competent, volitional, and related to others at work facilitates the internalization of one's experiences at work and promotes autonomous motivation, which refers to acting out of a sense of choice and full-endorsement of one's behaviour. Specifically, autonomous motivation at work involves engaging freely in one's job for the inherent satisfaction (i.e. intrinsic motivation: "because I have fun doing my job") and/or because one identifies with its value or meaning (i.e. identified regulation: "because I believe my job is meaningful"). On the other hand, lack of basic need satisfaction hinders the internalization process and therefore promotes controlled motivation. Controlled motivation at work involves engaging in one's job because of external contingencies (i.e. external regulation: "for the salary") or internal pressures (i.e. introjected regulation: "to gain a sense of self-worth"). According to SDT, the two forms of motivation are distinctively associated with individual functioning: autonomous motivation is related to well-being, while controlled motivation is associated with maladaptive outcomes (i.e. ill-being; Deci & Ryan, 2008).

Many studies have empirically investigated the direct relationship between basic need satisfaction and individual functioning in various settings (e.g. sports, education and workplace; Deci & Ryan, 2008). In the workplace, employees' psychological need satisfaction has been positively associated with job satisfaction, work engagement, organizational commitment, and vitality (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). Yet, the role of work motivation as the underlying mechanism in the relationship between psychological need satisfaction and employee functioning has received little attention. Nevertheless, work motivation has been identified as an important predictor of employees' psychological and professional functioning. Indeed, autonomous

motivation has been associated with several indicators of well-being, including employees' occupational commitment (Fernet et al., 2012) and work performance (Kuvaas, 2009). Conversely, controlled motivation has been associated with negative outcomes, including burnout (Fernet et al., 2012).

To our knowledge, only three studies have investigated the relationship between basic need satisfaction, work motivation, and employee functioning (De Cooman, Stynen, Van den Broeck, Sels, & De Witte, 2013; Milyavskaya & Koestner, 2011; Richer, Blanchard, & Vallerand, 2002). However, these studies assessed motivation using either only autonomous motivation or an index of relative motivation (i.e. a single score for both autonomous and controlled motivation). Yet recent studies suggest that autonomous and controlled motivation are two separate concepts, distinctly related to individual functioning, and not opposite ends of a continuum (Fernet et al., 2012; Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). Assessing autonomous and controlled motivation separately would therefore increase our understanding of their distinct relationship to psychological needs and their relative impact on employee functioning. To date, no study has investigated these distinct roles.

The role of social contexts in employee functioning: need satisfaction versus need frustration. SDT also posits that the work environment plays a key role in promoting optimal employee motivation and functioning by facilitating the satisfaction of psychological needs. Accordingly, positive job characteristics (e.g. social and autonomy support) are likely to facilitate basic need satisfaction, which contributes to autonomous motivation and consequently optimal functioning. This assumption has been supported in past research (e.g. De Cooman et al., 2013; Gillet, Fouquereau, Forest, Brunault, & Colombat, 2012). For example, De Cooman et al. (2013) found that positive job characteristics (i.e. skill utilization and strategic impact) positively predicted the satisfaction of employees' psychological needs, which in turn positively predicted their work effort through autonomous motivation. Conversely, SDT posits that negative factors in the work environment are likely to lead to maladaptive outcomes (e.g. ill-being and suboptimal functioning) through lack of satisfaction of employees' psychological needs, which fosters controlled motivation. Yet this gloomier aspect of the work experience has received less attention. Nevertheless, a few studies have empirically investigated parts of this sequence in the workplace (Fernet et al., 2013; Gillet, Fouquereau, Forest, et al., 2012; Van den Broeck et al., 2008). For example, negative job characteristics (i.e. overload and role ambiguity) have been found to predict burnout through lack of need satisfaction (Fernet et al., 2013).

However, recent SDT-based studies in sport psychology (e.g. Balaguer et al., 2012; Bartholomew, Ntoumanis, Ryan et al., 2011) suggest that the mere lack of basic need satisfaction may inadequately represent how negative social factors intervene on employees' psychological needs. Bartholomew, Ntoumanis, Ryan et al. (2011) proposed that negative social environment factors (e.g. controlling behaviours or rude comments by the supervisor) may not only result in lack of basic need satisfaction (i.e. not feeling autonomous, competent, and related to others), they may result in the frustration of psychological needs (i.e. feeling oppressed, incompetent, and rejected at work). Need frustration would therefore better predict negative manifestations of functioning, because it is a more intense and negative experience. Indeed, unlike lack of need satisfaction, which may limit the opportunities to nurture employees' psychological needs, need frustration is likely to actually erode these necessary inner resources and thus lead to defensive and

maladapted behaviours (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013). Past research supports this claim. For example, need satisfaction has been found to positively predict vitality, while need frustration positively predicted symptoms of exhaustion (and negatively predicted vitality; Bartholomew, Ntoumanis, Ryan et al., 2011).

Only one study assessed need satisfaction and need frustration in the workplace. Gillet, Fouquereau, Forest, et al. (2012) found that support from the organization and supervisor positively predicted need satisfaction and negatively predicted need frustration, whereas controlling behaviour by the supervisor positively predicted need frustration and negatively predicted need satisfaction. Moreover, whereas need satisfaction positively predicted positive manifestations of employee functioning (work satisfaction, happiness, and self-realization), need frustration negatively predicted these outcomes. By investigating employee functioning through positive indicators only, Gillet, Fouquereau, Forest, et al.'s study (2012) offers little insight into the distinct role of need satisfaction and frustration in employees' overall functioning (i.e. both positive and negative manifestations). Moreover, their study focused on perceived support and controlling behaviours as antecedents of need satisfaction and frustration. However, other salient factors, including job characteristics, shape employees' experiences at work every day, and are therefore likely to act on employees' psychological needs, work motivation, and functioning (Bakker & Demerouti, 2007).

Job characteristics, psychological needs, motivation and employee functioning. Job characteristics can be grouped into two broad categories: job demands and resources. Job demands refer to negatively valued aspects of the job that require considerable effort and are therefore associated with significant psychological and physical costs (Bakker & Demerouti, 2007; Schaufeli & Taris, 2014). Job demands can be emotional (e.g. being constantly confronted with patients' problems and suffering), cognitive (e.g. concentrating for long periods of time) or physical (e.g. repeatedly lifting heavy objects). Conversely, job resources are positively valued aspects of the job that reduce the strenuous nature of job demands, facilitate goal achievement and performance, and/or stimulate personal growth and development (Schaufeli & Bakker, 2004; Schaufeli & Taris, 2014). For example, employees may receive social support from colleagues (emotional resources) and performance feedback from the supervisor (cognitive resources). Past research has shown that job characteristics distinctively relate to employee functioning by acting on basic need satisfaction and work motivation (Fernet et al., 2012, 2013; Van den Broeck et al., 2008). For example, Van den Broeck et al. (2008) found that job demands negatively predicted need satisfaction while job resources positively predicted need satisfaction. Need satisfaction was consequently found to negatively predict symptoms of exhaustion and to positively predict symptoms of vigour. More recently, Fernet et al. (2012) found that job resources positively predicted autonomous motivation and negatively predicted controlled motivation over time. In addition, autonomous motivation negatively predicted exhaustion and positively predicted occupational commitment, while controlled motivation positively predicted exhaustion over time.

As the research presented above shows, the relationship between job characteristics (job demands and resources) and need satisfaction is relatively well established. However, research has yet to investigate the distinct relationship between job characteristics and psychological needs in terms of frustration. Taxing job characteristics (job demands) would potentially result in the frustration of employees' psychological needs, rather

than simply lack of satisfaction. For example, work overload or excessive time constraints, which impede task accomplishment, may not only prevent employees from feeling volitional and competent at work, they are likely to make them feel oppressed and inept. Moreover, employees confronted with conflicting relationships with co-workers may not only feel unrelated to others, they could also feel rejected at work. In addition, no study has investigated the role of motivation as a mechanism liable to explain the differential role of need satisfaction and frustration in predicting employee functioning. It has been proposed that the frustration of psychological needs leads to compensatory motives (e.g. controlling regulatory styles, rigid behaviour) which can result in substantial psychological costs (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013). Unfortunately, this proposition has yet to be empirically validated in the workplace.

The present study

The aim of the present study was to explore how job characteristics (job demands and resources) are distinctively related to employee functioning by investigating the underlying psychological and motivational processes involved. In light of the theoretical and empirical evidence presented above, we propose a model based on SDT in which job demands are related to negative manifestations of employee functioning (psychological distress and psychosomatic complaints) through need frustration and controlled motivation and in which job resources are related to positive manifestations of employee functioning (work engagement and performance) through need satisfaction and autonomous motivation. The proposed model (Figure 1) is based on the following hypotheses:

Hypothesis 1: Job demands will be positively related to need frustration.

Hypothesis 2: Job resources will be positively related to need satisfaction.

Hypothesis 3: Need frustration will be positively related to controlled motivation.

Hypothesis 4: Need satisfaction will be positively related to autonomous motivation.

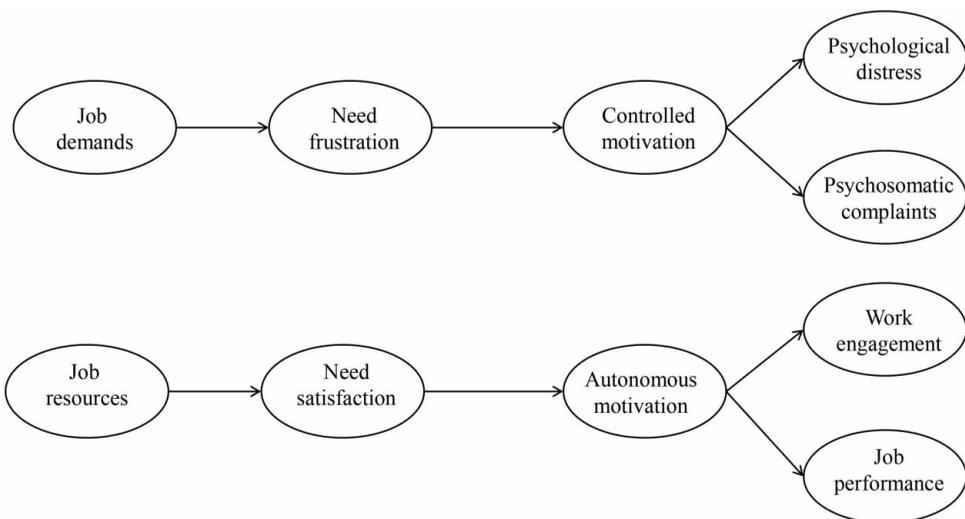


Figure 1. The proposed model.

Hypothesis 5: Controlled motivation will be positively related to negative manifestations of employee functioning (psychological distress and psychosomatic complaints).

Hypothesis 6: Autonomous motivation will be positively related to positive manifestations of employee functioning (work engagement and job performance).

Furthermore, the proposed model predicts that psychological needs and work motivation are mechanisms by which job characteristics (job demands and resources) are distinctively related to employee functioning (positive and negative manifestations).

Hypothesis 7: Need frustration will mediate the relationship between job demands and controlled motivation.

Hypothesis 8: Need satisfaction will mediate the relationship between job resources and autonomous motivation.

Hypothesis 9: Controlled motivation will mediate the relationship between need frustration and negative manifestations of employee functioning.

Hypothesis 10: Autonomous motivation will mediate the relationship between need satisfaction and positive manifestations of employee functioning.

Moreover, given that little research has investigated the simultaneous interplay between positive and negative job characteristics, psychological needs (satisfaction and frustration), work motivation (autonomous and controlled) and positive and negative manifestations of functioning in the workplace, we explored potential cross-links (e.g. job resources to need frustration, need satisfaction to controlled motivation, autonomous motivation to psychological distress) in order to obtain a better understanding of the mechanisms through which job characteristics relate to employee functioning (Vansteenkiste & Ryan, 2013).

The proposed model is tested among an organizational group that is receiving growing attention from occupational health researchers: nurses. The increasingly stressful nature of their work has left nurses particularly vulnerable to work-related health problems (e.g. diminished performance, psychological distress; Gelsema et al., 2006; Paquet, Courcy, Lavoie-Tremblay, Gagnon, & Maillet, 2012). It therefore appears important to better understand the psychological and motivational processes through which factors present in nurses' work environment can either promote or impede their optimal functioning.

Method

Participants and procedure

This study was conducted in nurses working in the public healthcare sector in the province of Quebec, Canada and members of the *Ordre des Infirmières et des Infirmiers du Québec* (OIIQ; Quebec nursing association). Nurses received a letter at home to explain the general purpose of the study (i.e. examine workplace factors associated with well-being in the nursing profession), and to invite them to complete an online questionnaire. A total of 699 nurses completed the questionnaire (52.83% response rate). This sample is fairly representative of the overall demographic characteristics of the members of the OIIQ. Participants' mean age was 43.97 years ($SD = 10.51$; versus 43.00 years for members of the OIIQ) and the majority of participants were female (90.4%; versus 89.7% for members of the OIIQ). More than two-thirds of the sample worked full-time (67.6%), which is slightly more than overall members of the OIIQ (60%).

Table 1. Means, standard deviations and correlations between variables.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Job demands	3.12	0.58	–								
2. Job resources	3.61	0.64	–.55	–							
3. Need frustration	2.19	0.68	.43	–.53	–						
4. Need satisfaction	3.83	0.55	–.34	.53	–.76	–					
5. Controlled motivation	2.58	0.98	.15	–.08	.22	–.16	–				
6. Autonomous motivation	5.40	0.96	–.10	.32	–.39	.47	.05	–			
7. Psychological distress	1.68	0.74	.42	–.37	.57	–.51	.23	–.26	–		
8. Psychosomatic complaints	1.78	1.26	.44	–.36	.42	–.33	.10	–.15	.57	–	
9. Work engagement	4.81	1.15	–.35	.44	–.54	.52	–.14	.59	–.45	–.37	–
10. Job performance	6.08	0.76	–.09	.21	–.32	.39	–.03	.29	–.22	–.16	.38

Note: Correlations of .08–.10 are significant at $p < .05$; correlations of .10 and higher are significant at $p < .01$.

Measures

All measures were administered in French. Means, standard deviations, and correlations of all measures are presented in Table 1. To determine measure reliability, Hancock's coefficient (coefficient H ; Hancock & Mueller, 2001) was calculated from standardized factor loadings and used to estimate the stability of the latent constructs across multiple observed variables. Values equal to or greater than .70 are considered satisfactory (Hancock & Mueller, 2001).

Job characteristics. An adapted version of the DISC 2.0 questionnaire (Van de Ven, Vlerick, & De Jonge, 2008) was used to assess cognitive, emotional, and physical job demands and resources. Sample items for *job demands* are, "I have to solve work-related problems within a limited time frame" (cognitive; 5 items; coefficient $H = .82$), "I have to do a lot of emotionally draining work" (emotional; 6 items; coefficient $H = .82$), and "I have to perform a lot of physically strenuous tasks to carry out my job" (physical; 5 items; coefficient $H = .93$). Sample items for *job resources* are, "I have the opportunity to take a mental break when tasks require a lot of concentration" (cognitive; 5 items; coefficient $H = .79$), "I get emotional support from others when a tough situation occurs at work" (emotional; 5 items; coefficient $H = .92$), and "I can use adequate technical equipment to accomplish physically strenuous tasks" (physical; 5 items; coefficient $H = .86$). Participants were asked to rate on a five-point scale ranging from 1 (*never*) to 5 (*almost always*) the frequency with which they experienced the situations depicted in the items. Job demands and resources were operationalized by the mean scores of the corresponding cognitive, emotional, and physical subscales.

Need satisfaction. The Work-Related Basic Need Satisfaction scale (Van den Broeck et al., 2010) was used to assess need satisfaction. This 16-item scale measures satisfaction of the need for autonomy (e.g. "I feel free to do my job the way I think it could best be done"; 6 items; coefficient $H = .84$), competence (e.g. "I am good at the things I do in my job"; 4 items; coefficient $H = .93$), and relatedness (e.g. "At work, I feel part of a group"; 6 items; coefficient $H = .83$). Participants indicated the extent to which they agreed with the statements on a five-point scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). Mean scores of the three subscales were used as indicators of the latent construct of need satisfaction.

Need frustration. The French adapted version of the Psychological Need Thwarting Scale (Bartholomew, Ntoumanis, Ryan et al., 2011) was used to assess need frustration (Gillet, Fouquereau, Lequeur, Bigot, & Mokounokolo, 2012). This scale measures the

frustration of the need for autonomy (e.g. “I feel forced to follow decisions made for me”; 3 items; coefficient $H = .83$), competence (e.g. “There are times when I am told things that make me feel incompetent”; 3 items; coefficient $H = .86$), and relatedness (e.g. “I feel I am rejected by those around me”; 3 items; coefficient $H = .83$). On a five-point scale from 1 (*totally disagree*) to 5 (*totally agree*), participants indicated the extent to which they agreed with the statements regarding their experiences at work. In their validation study, Bartholomew, Ntoumanis, Ryan et al. (2011) used exploratory factor analysis to show that need frustration and need satisfaction were independent factors. In the present study, mean scores of the three subscales were used as indicators of the latent construct of need frustration.

Work motivation. The Multidimensional Work Motivation Scale (Gagné et al., in press) was used to assess autonomous and controlled motivation. On a seven-point scale from 1 (*not at all for this reason*) to 7 (*exactly for this reason*), participants rated their main reasons for performing their job. Four motivational dimensions were assessed: external regulation (3 items; $H = .79$; e.g. “Because I risk losing my job if I don’t put enough effort into it”), introjected regulation (2 items; $H = .73$; e.g. “Because otherwise, I would be ashamed of myself”), identified regulation (3 items; $H = .71$; e.g. “Because this job has a personal significance for me”), and intrinsic motivation (3 items; $H = .89$; e.g. “Because my work is stimulating”). Mean scores of the identified regulation and intrinsic motivation subscales were used as indicators of the latent construct of autonomous motivation, and mean scores of the external and introjected regulation subscales were used as indicators of the latent construct of controlled motivation.

Psychological distress. The Kessler Psychological Distress Scale (K10; Kessler et al., 2002) was used to assess psychological distress. This 10-item scale ($H = .94$) provides a global measure of psychological distress based on anxiety and depressive symptoms experienced in the past month. On a five-point scale from 1 (*never*) to 5 (*very often*), participants indicated the frequency with which they had experienced different feelings in the past month (e.g. “I felt nervous”). Given the relatively large number of items contained in the K10, two parcels were created by pairing higher- with lower-loading items and were used as indicators of the latent construct of psychological distress (Little, Cunningham, Shahar, & Widaman, 2002).

Psychosomatic complaints. Psychosomatic complaints were assessed using an eight-item ($H = .82$) instrument adapted from Knäuper, Rabiau, Cohen, and Patriciu (2004). Participants rated on a seven-point scale from 1 (*never*) to 7 (*almost always*) how often they experienced specific physical symptoms (e.g. “headaches,” “chest pains”). Two parcels were created by pairing higher- with lower-loading items and used as indicators of the latent construct of psychosomatic complaints.

Work engagement. The vigour subscale of the short version of the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006) was used to assess work engagement. This three-item subscale ($H = .90$; e.g. “At work I feel like I am bursting with energy”) measures employees’ energy and mental resilience at work (Schaufeli & Bakker, 2004). On a scale from 1 (*never*) to 7 (*every day*) participants indicated how often they experienced these feelings at work. Each item was used as an indicator of the latent construct of work engagement.

Job performance. An adapted version of the in-role performance subscale (Williams & Anderson, 1991) was used to assess job performance (4 items; $H = .93$). Participants

indicated on a seven-point scale from 1 (*do not agree at all*) to 7 (*very strongly agree*) the extent to which they agreed with the statements regarding their performance at work (e.g. “I adequately complete the tasks that are assigned to me”). Each item was used as an indicator of the latent construct of job performance.

Statistical analyses

To test the proposed model, structural equation modelling (SEM) was performed using *Mplus* (Muthén & Muthén, 2012). Models were tested with standardized coefficients obtained by maximum likelihood estimation. Model fit was assessed using four indices: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA) and its confidence interval (CI), as well as the Standardized Root Mean Square Residual (SRMR). For the CFI and TLI, values of .90 and higher indicate an acceptable data fit (Hoyle, 1995). For the RMSEA and SRMR, values below .08 indicate a relatively good data fit (Hu & Bentler, 1999).

Results

Preliminary analyses

A measurement model (Model 1) was tested, in which the observed variables loaded on their respective latent factor. This model provided a satisfactory fit to the data: $\chi^2 = 6093.06$ ($df = 3888$); CFI = .89; TLI = .88; RMSEA = .037 [CI = .035–.039]; SRMR = .06. Next, to confirm that need satisfaction and need frustration are distinct constructs – and not opposite ends of the same concept – two models were tested and compared. Model 2a (M2a) included two second-order factors: (1) need satisfaction with three first-order factors: autonomy, competence, and relatedness; and (2) need frustration with three first-order factors: autonomy, competence, and relatedness ($\chi^2 = 767.86$ ($df = 265$); CFI = .92; TLI = .91; RMSEA = .057 [CI = .053–.062]; SRMR = .07). Model 2b (M2b) included three second-order factors: (1) need for autonomy, (2) need for competence, and (3) need for relatedness. Each second-order factor was represented by two first-order factors regrouping the corresponding need satisfaction and frustration items ($\chi^2 = 805.92$ ($df = 263$); CFI = .91; TLI = .91; RMSEA = .060 [CI = .055–.064]; SRMR = .10). Results show that M2a provides a significantly better data fit than M2b ($\Delta\chi^2[df = 2] = -27.15$, *ns.*). It was thus concluded that need satisfaction and need frustration are best represented as distinct constructs. A MANOVA was then performed to verify whether the model variables differed according to significant background variables in nurses (gender, experience, and job status). As no significant differences were found, demographic characteristics were excluded from further analysis.

Model testing

A first structural model (Model 3; M3) was tested to verify our hypotheses (i.e. proposed model). M3 included an indirect link from job demands to negative manifestations of employee functioning (psychological distress and psychosomatic complaints) through need frustration and controlled motivation as well as an indirect link from job resources

to positive manifestations of employee functioning (work engagement and job performance) through need satisfaction and autonomous motivation. In this model as well as in all subsequent models, several covariances were allowed. Job demands and resources of the same nature (i.e. cognitive, physical, and emotional) were allowed to covary. For each psychological need, a covariance between its “frustration” and “satisfaction” indicator was allowed (e.g. need for competence frustration with need for competence satisfaction). Finally, autonomous and controlled motivation were allowed to covary as well as the four manifestations of employee functioning.

M3 did not provide a particularly good fit to the data: $\chi^2 = 1155.08$ ($df = 301$); CFI = .88; TLI = .86; RMSEA = .069 [CI = .065–.074]; SRMR = .08. A subsequent model (Model 4; M4) was thus tested in order to investigate whether adding cross-links would significantly improve the model fit. Specifically, M4 consisted of M3 (i.e. the proposed model) with eight additional cross-links: demands to need satisfaction, resources to need frustration, need satisfaction to controlled motivation, need frustration to autonomous motivation, controlled motivation to positive manifestations of employee functioning, and autonomous motivation to negative manifestations of employee functioning. The results indicated that M4 provided a satisfactory fit to the data ($\chi^2 = 996.57$ ($df = 293$); CFI = .90; TLI = .88; RMSEA = .064 [CI = .060–.068]; SRMR = .07) and revealed several significant cross-links: job resources to need frustration (negative relationship), controlled motivation to work engagement and job performance (negative relationships). Moreover, results indicated that M4 provided a significantly better fit to the data than M3 ($\Delta\chi^2 [df = 8] = 144.83$, $p < .01$).

Next, given that research based on the JD-R model has often found job demands to be directly linked to employee ill-being and job resources linked to well-being (e.g. Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011; Xanthopoulou, Bakker, Heuven, Demerouti, & Schaufeli, 2008), we investigated whether adding direct links from job demands to negative manifestations of employee functioning and from job resources to positive manifestations of employee functioning would significantly improve the model fit. Two links significantly improved the fit of M4: job demands to psychological distress and psychosomatic complaints. A subsequent model (Model 5; M5) consisting of M4 with these two additional links was tested. This model provided a satisfactory fit to the data ($\chi^2 = 979.18$ ($df = 291$); CFI = .91; TLI = .89; RMSEA = .063 [CI = .059–.068]; SRMR = .07). All fit indices indicate an acceptable data fit (with the exception of the TLI [.89] which was slightly under the .90 threshold). Chi-square comparisons also revealed that M5 provided a significantly better fit to the data than M4 ($\Delta\chi^2 [df = 2] = 18.92$, $p < .01$). It was therefore concluded that M5 was the best fitting model.

As can be seen in Figure 2, job demands positively predict need frustration and job resources positively predict need satisfaction, supporting Hypotheses 1 and 2. In addition, job resources negatively predict need frustration, whereas job demands are unrelated to need satisfaction. Furthermore, job demands are positively and directly linked to psychological distress and psychosomatic complaints. In line with Hypotheses 3 and 4, need frustration positively predicts controlled motivation, while need satisfaction positively predicts autonomous motivation. Need frustration is unrelated to autonomous motivation and need satisfaction is unrelated to controlled motivation. Controlled motivation positively predicts both negative manifestations of employee functioning (psychological distress and psychosomatic complaints), supporting Hypothesis 5. Controlled motivation also

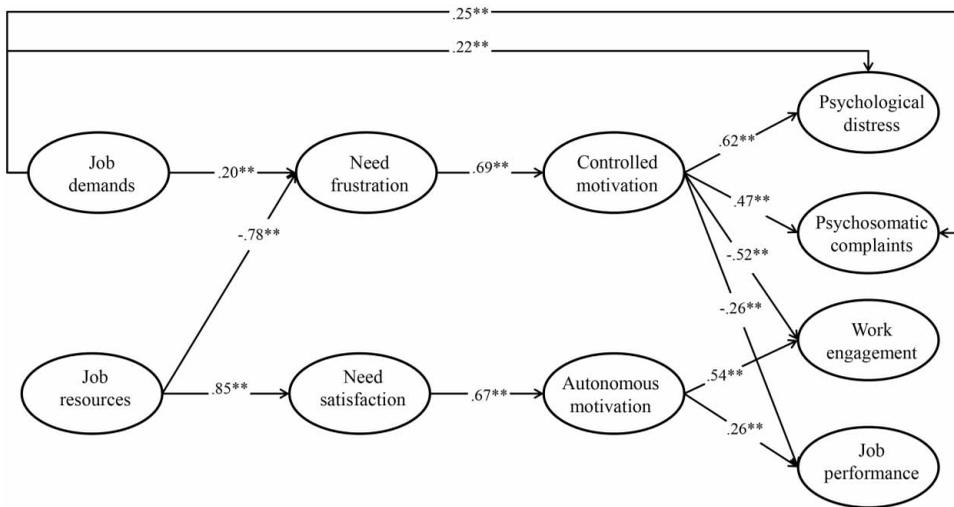


Figure 2. The final model; ** $p < .001$. Significant covariances were: emotional demands-resources = $-.43$, need for autonomy satisfaction-frustration = $-.56$, need for relatedness satisfaction-frustration = $-.41$, need for competence satisfaction-frustration = $-.30$, psychological distress-psychosomatic complaints = $.30$.

negatively predicts positive manifestations of employee functioning (work engagement and job performance). Autonomous motivation significantly and positively predicts work engagement and job performance, supporting Hypothesis 6, and is unrelated to negative manifestations of employee functioning.

To more formally test the mediating paths proposed in the final model, 95% confidence intervals were computed from 1000 bootstrap samples (MacKinnon, Lockwood, & Williams, 2004). Statistical mediation (i.e. statistical indirect effects; Stone-Romero & Rosopa, 2007) is considered significant when confidence intervals exclude zero. Table 2 shows significant statistical indirect effects of job demands on controlled motivation through need frustration and statistical indirect effects of job resources on autonomous motivation through need satisfaction, supporting Hypotheses 7 and 8. Results also indicate that controlled motivation significantly mediates the relationship between need frustration

Table 2. Statistical mediation of the relationship between job characteristics and employee functioning through psychological needs and work motivation.

Antecedent	Mediator	Outcome	Point Estimate	SE	95% CI	
					Lower	Upper
Job demands	Need frustration	Controlled motivation	.146*	.047	.069	.224
Job resources	Need frustration	Controlled motivation	-.660*	.053	-.746	-.573
Job resources	Need satisfaction	Autonomous motivation	.523*	.041	.456	.590
Need frustration	Controlled motivation	Psychological distress	.683*	.033	.629	.736
Need frustration	Controlled motivation	Psychosomatic complaints	.555*	.052	.470	.640
Need frustration	Controlled motivation	Work engagement	-.421*	.049	-.502	-.340
Need frustration	Controlled motivation	Job performance	-.196*	.059	-.293	-.100
Need frustration	Autonomous motivation	Work engagement	.310*	.040	.243	.376
Need frustration	Autonomous motivation	Job performance	.152*	.035	.095	.210

Note: CI, confidence interval; SE, standard error.

* $p < .001$.

and negative manifestations of employee functioning, while autonomous motivation significantly mediates the relationship between need satisfaction and positive manifestations of employee functioning, supporting Hypotheses 9 and 10. Furthermore, there is an indirect relationship between job resources and controlled motivation through need frustration and an indirect relationship between need frustration and positive manifestations of employee functioning through controlled motivation. Taken together, these results suggest that psychological needs and work motivation play distinct mediating roles in the relationship between job characteristics and employee functioning.

Discussion

Based on SDT, we proposed a model that would provide insight into the differential relationships between job characteristics (job demands and resources) and employee functioning (positive and negative manifestations) by investigating the role of psychological needs (satisfaction and frustration) and work motivation (autonomous and controlled) in these relationships. The model proposed that job demands promote negative manifestations of employee functioning (psychological distress and psychosomatic complaints) through psychological need frustration and low-quality work motivation (controlled motivation), whereas job resources promote positive manifestations of employee functioning (work engagement and job performance) through need satisfaction and high-quality work motivation (autonomous motivation). Results from SEM largely support this model: by being distinctively related to employees' psychological and motivational experiences at work, job demands and resources play a significant role in employee functioning at work. Moreover, results show that job resources not only promote need satisfaction, they also prevent need frustration. As such, these positive resources play a particularly salient role in promoting optimal employee functioning (more positive manifestations and less negative manifestations).

Theoretical contributions

Job characteristics and psychological needs. By investigating the relationship between job characteristics and psychological needs in terms of job demands and job resources on the one hand and need satisfaction and need frustration on the other hand, our study provides new insights into how different aspects of the work environment are distinctively related to employees' psychological experiences at work. Aligned with SDT assumptions (Deci & Ryan, 2008) and past research in the workplace (e.g. Fernet et al., 2013; Van den Broeck et al., 2008), our results indicate that positive factors in the work environment (job resources) promote basic need satisfaction. This suggests that because they facilitate task accomplishment, personal growth, and development (Bakker & Demerouti, 2007), job resources (e.g. performance feedback, job control) foster employees' sense of competence and volition. Furthermore, work environments in which employees have opportunities to discuss meaningful experiences with supervisors and colleagues appear to promote a sense of connectedness at work.

Our results also provide a nuanced perspective on SDT's proposition that negative social factors are harmful because they result in lack of basic need satisfaction. Indeed, our results – in line with recent work in sport psychology (e.g. Balaguer et al., 2012;

Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011) – suggest that negative work environment factors may actually be more damaging, because they frustrate employees' psychological needs. It therefore appears that the taxing nature of job demands, whether cognitive, physical, and/or emotional, render employees more vulnerable to feelings of oppression and entrapment in situations that they perceive as undesirable. Moreover, given that job demands reduce the likelihood of achieving successes and accomplishments, they seem to lower employees' self-appraisals of their abilities. Furthermore, either directly (e.g. through conflicting relationships with colleagues) or indirectly (e.g. through working conditions that prevent employees from engaging in social interactions), job demands appear to promote feelings of loneliness and isolation at work.

Interestingly, our results show that job resources are doubly beneficial as they positively predict the satisfaction of employees' psychological needs *and* negatively predict the frustration of these needs. Conversely, job demands predict need frustration only. These results are similar to those obtained by Bartholomew, Ntoumanis, Ryan, Bosch et al. (2011), who found that autonomy support by coaches positively predicted need satisfaction and negatively predicted need frustration in athletes, whereas coaches' controlling behaviours accounted for need frustration only. This supports the argument that need satisfaction and need frustration are not opposite sides of the same coin given that they are not predicted by the same antecedents. This proposition is further supported by our confirmatory factor analysis results, revealing that need satisfaction and need frustration are best represented as distinct concepts.

Psychological needs and work motivation. Another contribution of this study is the investigation of work motivation as a mechanism liable to explain the differential role of need satisfaction and need frustration in the prediction of employee functioning. Whereas past studies have proposed that need frustration promotes suboptimal functioning through rigid and controlled regulations (e.g. Bartholomew, Ntoumanis, Ryan, Bosch et al., 2011), no study had empirically investigated this issue. Our results indicate that when employees' psychological needs are satisfied, they can more fully internalize their work experiences. As a result, their work becomes congruent with their personal values and interests (autonomous motivation). Conversely, need frustration appears to hinder the internalization of employees' work experiences, so that they accomplish their work not because they deem it important or pleasant, but because they feel obligated (controlled motivation). The fact that need frustration positively predicts controlled motivation echoes the proposition that when needs are frustrated, individuals seek to fulfil their needs in compensatory ways (Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013). Thus, when psychological needs are frustrated by work environment factors (e.g. work overload limits goal achievement, resulting in feelings of incompetence and inadequacy), employees may attempt to satisfy their unfulfilled needs using other external sources (e.g. obtain the supervisor's approval and recognition) in order to compensate. Therefore, by limiting employees' psychological resources, need frustration appears to render employees more vulnerable to internal and external contingencies, which hamper the internalization process and result in controlled motivation.

Interestingly, our results indicate that need satisfaction predicts autonomous motivation only (need satisfaction is unrelated to controlled motivation), whereas need frustration predicts controlled motivation only (need frustration is unrelated to autonomous motivation). These results further support the claim that need satisfaction and frustration are distinct concepts with distinct motivational outcomes.

Quality of work motivation and its relationship to employee functioning. This study supports the need to investigate work motivation in terms of quality – rather than solely quantity – in order to obtain a more precise understanding of its relationship to employee functioning, as proposed by SDT (Deci & Ryan, 2008). Our results indicate that the underlying reasons for employees to perform their work are associated with distinct psychological and work-related experiences. Specifically, when employees freely engage in their work out of a sense of pleasure and choice (autonomous motivation), they feel more vigorous at work (work engagement) and accomplish their tasks better (job performance). These results align with the notion that autonomous motivation, which is fully self-endorsed, sparks interest, promotes energy maintenance and enhancement (vitality and vigour; Grant, Nurmohamed, Ashford, & Dekas, 2011; Ryan & Deci, 2008), and orients the deployment of this energy towards meaningful and purposeful actions (job performance; Ryan & Deci, 2008).

Conversely, our results show that controlled motivation is particularly harmful for employee functioning. It not only makes employees more vulnerable to significant psychological costs (symptoms of psychological distress and psychosomatic complaints), it also prevents employees from enjoying positive psychological and professional experiences (work engagement and job performance). On the one hand, this suggests that the feeling of pressure and obligation that drives employees who exhibit controlled motivation requires a considerable investment of resources, which will likely lead to energy depletion (e.g. distress, psychosomatic complaints, and low work engagement; Ryan & Deci, 2008). On the other hand, given that controlled motivation derives from an inadequate internalization of work goals and values, it renders employees less willing to fully invest themselves in their work and perform optimally (Grant, 2008; Grant et al., 2011). The fact that controlled motivation predicted poor job performance is especially worrisome, given the vocational setting in which the present study was conducted: the nursing profession. For nurses, poor job performance can have serious consequences, as it may translate into low-quality patient care and serious clinical errors. Future studies could investigate the differential relationships between both types of motivation and other critical outcomes in the nursing profession, such as turnover (Lavoie-Tremblay, Paquet, Marchionni, & Drevniok, 2011).

Self-determination theory. This study makes several contributions to the SDT literature. First, it highlights the relevance of considering psychological need frustration as a distinct concept when investigating the interplay between negative work environment factors, psychological needs, and employee functioning. Some previous studies have conceptualized need frustration through lack of need satisfaction (i.e. reversed need satisfaction scores; e.g. Vander Elst, Van den Broeck, De Witte, & De Cuyper, 2012). However, our results suggest that this conceptualization might be inadequate to reflect employees' psychological experiences at work. Indeed, our results suggest that “*not* feeling volitional, competent, and related” is not the equivalent of “feeling oppressed, incapable, and isolated.” These appear to be distinct psychological experiences deriving from different antecedents and resulting in different motivational, psychological, and professional outcomes.

Second, our study contributes to the relatively sparse knowledge on the organizational antecedents of need satisfaction and frustration. To date, much emphasis has been placed on the relationship between autonomy-supportive behaviours by others at work and employees' psychological needs (e.g. Gillet, Fouquereau, Forest, et al., 2012). The present

study's results highlight the relevance of extending the investigative scope to account for work-related aspects of the work environment. Indeed, our results, in conjunction with those of a few other studies that have investigated the relationship between job demands, resources, and need satisfaction (e.g. Fernet et al., 2013; Van den Broeck et al., 2008), illustrate that job characteristics that are either taxing (demands) or positive (resources) play a meaningful role in employees' psychological and professional functioning by distinctively shaping psychological experiences at work. Whereas job demands render employees more vulnerable to psychological costs by fostering perceptions of oppression, isolation, and incompetence, job resources promote psychological gains by preventing these perceptions and promoting a sense of volition, capability, and connectedness.

Third, our results provide further evidence that autonomous and controlled motivations are not mirror-image opposites (Koestner et al., 2008): the two types of motivation show a distinct relationship with employee functioning. Specifically, autonomous motivation relates to positive outcomes only (work engagement and job performance), whereas controlled motivation limits these positive outcomes and promotes negative ones (psychological distress and psychosomatic complaints). Thus, future studies investigating work motivation would benefit from investigating such concept through its two distinct forms instead of using a relative index, as in previous studies (e.g. Milyavskaya & Koestner, 2011; Richer et al., 2002).

Limitations and future research

Although this study provides valuable insight into the role of psychological needs and work motivation in the differential relationships between job characteristics and employee functioning, some limitations should be mentioned. First, the cross-sectional design precludes drawing conclusions about causal relationships between the variables. For example, it is possible that employees' psychological functioning (e.g. psychological distress) acts upon how they perceive their work environment (job demands and resources). However, there is much empirical support in the SDT literature (Deci & Ryan, 2000, 2008) for the present study's proposed sequence: social context → needs and motivation → functioning. Future studies could validate the proposed model using a longitudinal research design.

Second, because the data were self-reported, common method bias may have tainted the results. However, several procedural precautions were taken in order to minimize this bias. For example, the data was obtained through a general data collection (i.e. investigating workplace factors associated with well-being in the nursing profession). Therefore, many variables unrelated to the present study were measured and mixed with the present study's variables. This strategy offered both proximal (i.e. physically distancing the measures utilized in the present study) and psychological (i.e. reducing participants' focus on the study's key variables) separation which can reduce participants' tendency to use previous answers to respond to subsequent questions (Podsakoff, MacKenzie, & Podsakoff, 2012). Moreover, given the nature of most of the variables of interest (psychological experiences and states such as need satisfaction/ frustration and work engagement), investigating these variables with methods other than self-reports would have been difficult, and possibly less accurate (Spector, 2006). Nonetheless, future studies could use objective measures for some of the studied variables, including job characteristics and performance (e.g.

peer and supervisor ratings), along with other indicators of employee functioning (e.g. physiological indicators of stress) to improve the validity of the proposed model.

Third, because this study was conducted in nurses working in the province of Quebec, Canada, other studies are needed to validate our model in nurses working in other Canadian provinces as well as in other countries. Future studies are also encouraged to validate our model in other occupational groups.

Practical implications and conclusion

Our results suggest that positive and negative manifestations of employee functioning do not derive from the same antecedents. They thus provide insight into ways to (1) promote optimal functioning in employees and (2) reduce manifestations of suboptimal functioning. First, the results indicate that, by fostering need frustration and controlled motivation, job demands are harmful to employee functioning. Therefore, organizations could seek to reduce these taxing job characteristics as much as possible. For example, they could aim to reduce employee workloads and clarify job roles and mandates in order to reduce role ambiguities and conflicts. However, it might be difficult, if not impossible, to eliminate all job demands, especially in certain high-strain occupational sectors in which many aspects of the job are inherently demanding. For example, nurses are often confronted with patients whose problems are likely to affect them emotionally (e.g. patients with incurable diseases). Therefore, providing additional resources to these employees is likely to be beneficial. Job resources were found to facilitate optimal employee functioning by promoting need satisfaction and autonomous motivation. Our results also indicate that by preventing need frustration, job resources minimize the risks of psychological costs (e.g. psychological distress). Because managers can have a significant effect on how employees perceive job characteristics (Piccolo & Colquitt, 2006), organizations are also encouraged to promote positive managerial practices (e.g. transformational leadership). These practices may also be beneficial because they can promote high-quality work motivation and optimal employee functioning (e.g. performance, organizational citizenship behaviour; Piccolo & Colquitt, 2006). Overall, the results of the present study show that by intervening on both positive and negative job characteristics, organizations can play a key role in shaping employees' psychological and motivational experiences at work, resulting consequently in a healthy, engaged and high-performing workforce.

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