Dual processes at work in a call centre: An application of the job demands – resources model

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This study among 477 employees working in the call centre of a Dutch telecom company (response 88%) examined the predictive validity of the job demands – resources (JD – R) model for self-reported absenteeism and turnover intentions. The central hypothesis was that job demands would be the most important predictors of absenteeism, through their relationship with health problems (i.e., exhaustion and Repetitive Strain Injury—RSI), whereas job resources would be the most important predictors of turnover intentions, through their relationship with involvement (i.e., organizational commitment and dedication). Results of a series of SEM analyses largely supported these dual processes. In the first *energy-driven* process, job demands (i.e., work pressure, computer problems, emotional demands, and changes in tasks) were the most important predictors of health problems, which, in turn, were related to sickness absence (duration and long-term absence). In the second *motivation-driven* process, job resources (i.e., social support, supervisory coaching, performance feedback and time control) were the only predictors of involvement, which, in turn, was related to turnover intentions. Additionally, job resources had a weak negative relationship with health problems, and health problems positively influenced turnover intentions. The application of the JD – R model as a human resource management tool in call centres as well as in other organizations is discussed.

A call centre can be defined as a work environment in which the main business is mediated by computer and telephone-based technologies that enable the efficient distribution of incoming calls (or allocation of outgoing calls) to available staff, and permit customer – employee interaction to occur simultaneously with use of display screen equipment and the instant access to, and inputting of, information (Holman, 2003).

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Organizations have benefited from call centres because it has enabled them to reduce the costs of existing functions, and to extend and improve customer service facilities. However, Holman (2003) has outlined that the benefits for call centre *employees* are less clear. He has argued and shown that, whereas some employees enjoy call centre work, for many it is demanding and stressful. Call centre operators use interactive display terminals during telephone calls and thus perform multiple-tasks with frequent interruptions. Furthermore, their jobs are characterized by repetitive movements, while complex information is processed. Meanwhile, communication skills and efficiency are expected. In addition, call centre employees often work in noisy environments under high time pressure, and their performance is usually monitored on line (Ferreira & Saldiva, 2002). Some scholars have even argued that call centre jobs are an expression of an advanced form of Taylorism (Knights & McCabe, 1998; Taylor & Bain, 1999). It is therefore not surprising that absenteeism and personnel turnover are important problems for many call centres (e.g., Michel, 2001), and represent significant disadvantages for organizations that use call centres.

Recent research in call centres has indeed shown that lack of job control, role stress, performance monitoring, inadequate coaching and training, emotional labour, and lack of team leader support can all lead to job stress—including depression, emotional exhaustion, and anxiety (e.g., De Ruyter, Wetzels, & Feinberg, 2001; Holman, Chissick, & Totterdell, 2002; Knights & McCabe, 1998; Taylor & Bain, 1999; Zapf, Vogt, Seifert, Mertini, & Isic, 1999). These studies are informative, since they all add to our knowledge regarding working conditions that may undermine well-being in call centres. The present study uses an overall theoretical framework of employee well-being—the job demands–resources (JD–R) model (Bakker, Demerouti, De Boer, & Schaufeli, 2003a; Bakker, Demerouti, Schaufeli, Taris, & Schreurs, 2003b; Demerouti, Bakker, Nachreiner, & Schaufeli, 2000, 2001)—to examine how different categories of working conditions in a Dutch call centre are related to self-reported sickness absenteeism and turnover intentions. The central tenet of the JD–R model is that job demands evoke an energy depletion process, whereas job resources induce a motivational process. As far as we know, previous call centres studies did not examine the concomitants of absenteeism and personnel turnover, although anecdotal evidence suggests that these employee behaviours pose important problems to call centres (see also Michel, 2001).

JOB DEMANDS–RESOURCES MODEL

The JD–R model is a heuristic model that specifies how health impairment and motivation or involvement in any organization may be produced by two

specific sets of working conditions. The first set concerns *job demands* that represent characteristics of the job that potentially evoke strain, in cases where they exceed the employee's adaptive capability. More specifically, job demands refer to those physical, social, or organizational aspects of the job that require sustained physical and/or psychological (i.e., cognitive or emotional) effort on the part of the employee and are therefore associated with certain physiological and/or psychological costs (e.g., exhaustion) (cf. Hockey, 1997). Although job demands are not necessarily negative, they may turn into job stressors when meeting those demands requires high effort from which the employee has not adequately recovered (Meijman & Mulder, 1998). Karasek's (1979) influential demands–control model uses a rather restricted definition of job demands that are mainly quantitative in nature, such as workload and time pressure. The JD–R model expands this view by proposing that several demanding characteristics of the working environment, including emotional demands, problems with the work equipment (i.e., computers) or changes in the task (see also Semmer, 1984; Semmer, Zapf, & Dunckel, 1995; Zapf et al., 1999), may lead to the impairment of health and consequently to absenteeism.

The second set of working conditions concerns the extent to which the job offers resources to individual employees. *Job resources* refer to those physical, psychological, social, or organizational aspects of the job that either/or: (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; (3) stimulate personal growth, learning, and development (Demerouti et al., 2001; Hacker, 1998). Hence resources are not only necessary to deal with job demands, but they also are important in their own right (Elsass & Veiga, 1997; Ganster & Fussilier, 1989; Hobfoll, 2001; Terry & Jimmieson, 1999). What we call job resources has been recognized by Kahn (1990) as characteristics of work situations that shape the degree to which people employ and express themselves physically, cognitively, and emotionally during role performance. In a similar vein, Hackman and Oldham (1980) refer to specific job characteristics with motivational potential. Such job characteristics foster so-called critical psychological states (e.g., meaningfulness), which—in their turn—drive people's attitudes and behaviours. Examples of job resources are time control, performance feedback, a supportive leader, and trusting relationships with colleagues.

In conclusion, according to the JD–R model, two sets of working conditions may each evoke a different process. First, badly designed jobs or high job demands (e.g., work overload, emotional demands) may exhaust employees' mental and physical resources and may therefore lead to the depletion of energy (i.e., a state of exhaustion) and to health problems (e.g., Demerouti et al., 2000, 2001; Lee & Ashforth, 1996; Leiter, 1993) (*health*

impairment hypothesis). Second, the presence of adequate job resources reduces job demands, fosters goal accomplishment and stimulates personal growth and development. In turn, this may lead to a stronger involvement in terms of organizational commitment and dedication to one's work, and thus to a lower intention to leave the organization (*motivational hypothesis*). In fact, resources boost employees' motivation (cf. Antonovski, 1987; Hackman & Oldham, 1980).

HEALTH IMPAIRMENT PROCESS

According to the health impairment hypothesis, perceived job demands lead to job strain such as feelings of exhaustion and repetitive strain injury (RSI), which are, in turn, related to increased sickness absenteeism. *Exhaustion* refers to the depletion of mental resources, and particularly to the experience of severe fatigue. Thus call centre employees who are repeatedly exposed to high job demands are expected to develop feelings of exhaustion. RSI is something of a misnomer, as repetition is only one of many possible causes of injury, and many practitioners question the use of the term "strain" as this in itself is a vague term to describe injury caused by overexertion (Baird, 1996). Despite differences in description, Occupational Overuse Syndrome (OOS), Cumulative Trauma Disorder (CTD), and Work Related Upper Limb Disorder (WRULD) all refer to damage to the hand, arm, shoulder, or neck caused, or exacerbated by some aspect of the physical working situation. In reality, common usage has effectively transformed RSI from an acronym to a term in its own right, which is associated most often with pain in the wrist or forearm/elbow area. Many experts now use RSI to describe a particular variation of a WRULD condition (Baird, 1996).

The relationship between specific job demands (e.g., workload and emotional demands) and exhaustion has been reported by various studies on burnout, of which exhaustion is the core symptom (see Lee & Ashforth, 1996, for a meta-analysis). Moreover, research by Demerouti and her colleagues among different occupational groups shows that (self-reported and observed) job demands can have a strong impact on feelings of exhaustion (Demerouti et al., 2001; Demerouti, Bakker, & Bulters, in press). RSI is known to occur more often among employees who carry out repetitive tasks with their hands or arms and who work without rest breaks (Tyrer, 1994). Moreover, RSI occurs among computer workers and is associated with high quantitative demands and poor developmental possibilities (Jensen, Ryholt, Burr, Villadsen, & Christensen, 2002). This makes RSI particularly relevant for call centre jobs that are characterized by repetitive tasks using both telephone and computer. Furthermore, the incidence of RSI is increased in organiza-

tions with a poor working environment and with high levels of strain (Hopkins, 1990). Thus we expect that demanding aspects of the job will also be related to the experience of RSI, since experiencing high work pressure, emotional demands, and computer problems are constraints that force the employee to work nonstop and consequently to experience pain.

Furthermore, particularly the exhaustion component of burnout has consistently been related to absence duration or time lost measures, for example in studies among airline reservations personnel (Saxton, Phillips, & Blakeney, 1991) and nurses (Firth & Britton, 1989). Research on RSI and absenteeism is still lacking, but studies on musculoskeletal pain found strong positive relationships (e.g., Maentyselkae, Kumpusalo, Ahonen, & Takala, 2002). However, it should be noted that several meta-analytic studies on absenteeism show that job strain is but one of many variables accounting for employee absence behaviour, so we should not expect job strain and absenteeism to be strongly correlated (Beehr, 1995; Nicholson, 1993). Nevertheless, we expect that call centre employees' job demands will be related to sickness absenteeism through their impact on both exhaustion and RSI. In other words, we hypothesize that exhaustion and RSI will mediate the relationship between job demands and absenteeism (*Hypothesis 1*).

MOTIVATIONAL PROCESS

As previously noted, the motivational hypothesis assumes that job resources lead to involvement, which, in turn, is negatively related to turnover intentions. In the present study, we included two types of involvement: affective commitment and dedication. *Affective commitment* is most clearly an indicator of involvement at the level of the organization, and has been defined as "the strength of an individual's identification with an organization" (Mowday, Steers, & Porter, 1979, p. 226). *Dedication*, on the other hand, is more directly related to the job itself, and is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Thus whereas commitment refers to positive attitudes towards the organization, dedication refers to positive attitudes towards one's job.

Several studies have shown that job resources are important predictors of involvement. For example, Bakker et al. (2003a) showed that job resources such as autonomy and participation in decision making had strong positive relationships with different types of commitment. In addition, a recent meta-analysis has shown that job resources such as organizational support and transformational leadership are all related to affective commitment (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002). Less research has focused on

dedication as an outcome of job resources. Demerouti et al. (2001) found that (self-reported and observed) job resources, such as performance feedback, supervisor support, and job control, were the only predictors of dedication—they use the term (dis)engagement. In addition, Schaufeli and Bakker (in press) found evidence for a positive relationship between three job resources (performance feedback, social support, and supervisory coaching) and engagement (of which dedication is a core aspect) in four occupational groups. They used structural equation modelling to show that engagement (including dedication) is exclusively predicted by job resources, and that engagement is a mediator of the relationship between job resources and turnover intentions.

Among the consequences of organizational commitment, withdrawal cognitions and behaviours are the most salient. Particularly affective commitment demonstrates substantial correlations with intentions to leave one's job (for meta-analyses, see Mathieu & Zajac, 1990; Meyer et al., 2002). In addition, affective commitment has been related to actual turnover (Mathieu & Zajac, 1990; Meyer et al., 2002). Evidence for a negative relationship between commitment and turnover intentions has also been found in the call centre study of De Ruyter et al. (2001). Taken together, we expect that committed and dedicated call centre employees will be less likely to look for another job. Specifically, we hypothesize that commitment and dedication will mediate the relationship between job resources and turnover intentions (*Hypothesis 2*). The two main hypotheses are graphically depicted in Figure 1 (see Results section, p. 408).[1]

Before testing these hypotheses, we want to explore differences between call centre employees in different job positions including operators, advisors, consultants, and supervisors. To this end, we compared their levels of job demands, job resources, health problems, involvement, self-reported absenteeism, and turnover intention. If such differences exist, they may be valuable in tracing specific job demands and resources responsible for health problems and involvement, respectively.

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[1] One may argue that also the interactions between job demands and resources are important (cf. Kahn & Byosiere, 1992). Such a view is consistent with the demand-control model (DCM; Karasek, 1979) and the effort–reward imbalance (ERI) model (Siegrist, 1996), and there is indeed some evidence for demands–resources interaction effects (Bakker et al., 2002, 2003b). In order to test whether the interaction between job demands and job resources may predict health problems and involvement in the present study, we followed the procedure for modelling latent interaction proposed by Dormann and Zapf (1999). The results showed that only one out of 16 possible job demands × resources interactions was significant. Employees with high emotional demands reported significantly higher levels of dedication when they had high time control than when they had low time control. Taken together, these findings suggest that high levels of job resources can only to a very limited degree mitigate the negative health effects of high job demands (see also Van der Doef & Maes, 1999).

METHOD

Participants and procedure

The study was conducted among 477 customer services employees working in the only call centre of a large Dutch telecom company (response = 88%). After meetings with the floor managers and the human resources department, it was agreed upon that all employees would have the possibility to fill out an electronic questionnaire (published on a secured website) during work time, in a silent, separate room. A newsletter and an email of the management announced to all employees that the questionnaire could be filled out. Employees on sickness absence received a paper-and-pencil questionnaire through surface mail at their home address. In total, 467 employees filled out the questionnaire online, and 10 sick employees filled out the paper-and-pencil version at home (total $N = 477$). The study population includes 205 males (43%) and 272 females (57%). Their mean age is 30 years ($SD = 8.80$), and the mean organizational tenure is 1 year ($SD = .83$).

The call centre under study is an in-built centre in a telecom company that takes care of incoming customer calls (inbound services). Four different types of job positions were represented in the sample: *Tele-Operators* ($n = 24$) are responsible for the provision of number information to the company's customers. Their tasks almost exclusively include the answering of the phone and the provision of information from a computerized database to customers about the sought-after numbers. *Tele-Advisors* ($n = 220$) are the first contact for customers who have questions or problems regarding the company's products and services. Their most important tasks include handling of incoming calls, writing down the question or complaint in a computer file, and referring this to the correct department. *Tele-Consultants* ($n = 130$) are responsible for analysing and solving the problems or complaints of customers, on the telephone as well as in writing. In addition to telephone contact with customers, they answer customers' questions. *Supervisors* ($n = 61$) are responsible for supporting, monitoring, and coaching a group of approximately 12 employees each. In addition, each supervisor has additional tasks on a project basis. Forty-two employees did not fill out their job position.

Measures

Job demands.   *Workload* was assessed with a five-item scale developed by Bakker et al. (2003b). The items refer to quantitative, demanding aspects of the job. An example item is: "My job requires working very hard". Items are scored on a 5-point Likert scale, ranging from (1)

"never" to (5) "always". Unless otherwise indicated, all following demands and resources used the same response categories. *Changes in the task* was measured with a scale developed by Van Veldhoven and Meijman (1994; see also Van Veldhoven, De Jonge, Broersen, Kompier, & Meijman, 2002). The scale includes eight items, such as "Do changes in your tasks pose difficulties to you?" *Emotional demands* were assessed with six of the seven items proposed by Van Veldhoven et al. (2002). An example item is: "Is your work emotionally demanding?" *Computer problems* was measured with two items, namely: "During your work, are you confronted with malfunctioning equipment (e.g., computers or printers)?" and "Are you confronted in your work with computer problems?" Both items were highly and positively related ($r = .70$, $p < .001$), and were summed to constitute one index for computer problems.

Job resources. *Social support* was measured with the three-item scale developed by Bakker et al. (2003b). An example item is: "Can you ask your colleagues for help if necessary?" *Coaching by the supervisor* was measured using a validated Dutch adaptation (Le Blanc, 1994) of Graen and Uhl-Bien's (1991) 12-item Leader–Member Exchange scale; e.g., "My supervisor uses his/her influence to help me solve my problems at work". *Performance feedback* was assessed with four items, based upon Karasek's (1985) job content instrument. For example: "I get information/feedback from my supervisor about how well I do my job". Finally, *Time control* was measured with a 5-item scale that we constructed ourselves, including "Within our call centre, there are sufficient possibilities for short breaks" (1 = totally disagree, 5 = totally agree). All responses were coded such that higher scores referred to higher job demands and more job resources, respectively.

Health problems. *Exhaustion* was assessed using the Dutch version (Schaufeli & Van Dierendonck, 2000) of the Maslach Burnout Inventory— General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). The scale includes five items, such as: "I feel emotionally drained from my work" (0 = never, 6 = every day). *Repetitive strain injury* (RSI) was assessed with a recently developed 5-item scale (Bakker, 2001). The scale includes symptoms that are usually associated with RSI such as pain and stiffness in the wrist and forearm/elbow (Baird, 1996; Tyrer, 1994). Example items are: "During the last year, did you experience pain, a stiff feeling, or other discomfort in your arms, wrists, or elbows?" and "During the last year, did you experience a loss of power in your arms, hands, or fingers?" (1 = never, 5 = always).

Involvement. *Organizational commitment* refers to the relationship of employees to the organization in which they work. It is measured with six

items of Mowday et al.'s (1979) affective commitment scale, including: "I tell my friends and family that my organization is a pleasant organization to work for" (1 = totally disagree, 5 = totally agree).

Dedication is one of three subscales of the Utrecht Work Engagement Scale (Schaufeli et al., 2002). The subscale includes five items, and measures the extent to which employees are dedicated to their work, that is, how often they experience a sense of significance, enthusiasm, inspiration, pride, and challenge at their jobs. An example item is: "I am enthusiastic about my job" (0 = never, 6 = always).

Absenteeism was assessed with two items, namely: "During the past 12 months, how many working days did you not work because of ill health?" (absence duration) and "During the past 12 months, have you been sick longer than 2 weeks in a row one or more times?" (long-term absence). The average number of days that employees reported themselves sick was 12 days (SD = 19.49) during the preceding year, and 17.6% indicated that they had been sick for 2 weeks in a row. The two items were highly and positively related (r = .56, $p < .001$).

Turnover intention was assessed with the three-item scale of Schaufeli and Bakker (in press); e.g., "I intend to change jobs during the next year" (1 = completely disagree, 5 = completely agree). At the time of the study, the actual percentage of personnel turnover in the call centre was 22%.

Analyses

The model as displayed in Figure 1 on p. 408 (solid lines) was tested with structural equation modelling (SEM) analyses using the AMOS software package (Arbuckle, 1997). Maximum likelihood estimation methods were used and the covariance matrix of the scales/items was the input for the analysis. The goodness-of-fit of the model was evaluated using absolute and relative indices. The absolute goodness-of-fit indices calculated were the χ^2 goodness-of-fit statistic and the Root Mean Square Error of Approximation (RMSEA). Nonsignificant χ^2 values indicate that the hypothesized model fits the data, and RMSEA values smaller than or equal to .08 are indicative of an acceptable fit (Cudeck & Browne, 1993).

However, the χ^2 goodness-of-fit statistic is sensitive to sample size, so that the probability of rejecting the hypothesized model increases with increasing sample size. Therefore, as recommended by Marsh, Balla, and Hau (1996), we used three *relative* goodness-of-fit indices, namely the Non-Normed Fit Index, the Incremental Fit Index (IFI), and the Comparative Fit Index (CFI). For these relative fit-indices, as a rule of thumb, values of .90 or higher are considered as indicating a good fit (Hoyle, 1995).

The latent exogenous factors, job demands and job resources, were both operationalized by four exogenous observed variables each (see Figure 1). The manifest indicators of job demands were workload, emotional demands, changes in the task, and computer problems. Job resources were indicated by social support, coaching by the supervisor, performance feedback, and time control. In addition, the structural model includes two types of endogenous latent variables: (1) health problems and involvement as latent (mediator) variables, and (2) self-reported absenteeism and turnover intentions. The latent "health problems" factor was assessed by two observed variables, namely exhaustion and RSI, whereas the latent "involvement" factor was indicated by organizational commitment and dedication. Furthermore, the latent "self-reported absenteeism" factor included two indicators: absence duration and long-term absence. A single indicator operationalized turnover intention; we corrected for random measurement error by setting the random error variance of turnover intention equal to the product of its variance and the quantity one minus its internal consistency (Jöreskog & Sörbom, 1993). Additionally, the model included the following correlations: (1) among the latent factors job demands and job resources; (2) among the uniquenesses of the latent factors "health problems" and "involvement"; and (3) among the uniquenesses of the latent factors "self-reported absenteeism" and "turnover intentions". Using the chi-square difference test, this model was compared with several nested models that specify various alternative relationships (see Results section).

RESULTS

Descriptive statistics

Means, standard deviations, internal consistencies (Cronbach's alphas), and correlations among all study variables are presented in Table 1.

Differences between job positions

In order to explore differences between call centre employees in different job positions, we performed two MANOVAs with job position as the independent variable, and the model variables as the dependent variables. The first MANOVA included all job demands and resources as dependent variables, whereas the second included the intervening variables (exhaustion, RSI, commitment, and dedication), and the most distal outcome variables (absenteeism and turnover intentions) as the dependent variables. The results are presented in Tables 2 and 3.

TABLE 1
Means, standard deviations, internal consistencies (Cronbach's alpha—on diagonal in italics), and correlations between the model variables
(*N* = 477)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Job demands																	
1 Workload	3.36	0.73	*.76*														
2 Emotional demands	2.24	0.60	.28	*.74*													
3 Changes in tasks	2.45	0.66	.44	.29	*.82*												
4 Computer problems	3.18	0.86	.20	.15	.24	—											
Job resources																	
5 Colleague support	3.85	0.81	−.04	−.07	−.08	.03	*.72*										
6 Supervisory coaching	3.17	0.86	−.03	.03	−.22	−.05	.47	*.82*									
7 Performance feedback	2.66	0.85	.08	−.01	−.12	−.11	.30	.63	*.83*								
8 Time control	3.23	0.79	.00	−.29	−.08	−.06	.20	.18	.23	*.68*							
Health problems																	
9 Exhaustion	1.64	1.27	.24	.30	.20	.14	−.25	−.17	−.18	−.13	*.85*						
10 RSI	1.88	0.81	.19	.13	.23	.18	−.13	−.10	−.08	−.06	.31	*.89*					
Involvement																	
11 Commitment	3.35	0.68	−.07	−.11	−.17	−.09	.28	.36	.38	.22	−.36	−.18	*.84*				
12 Dedication	4.13	1.57	.16	−.03	−.07	−.03	.27	.34	.38	.21	−.32	−.15	.64	*.90*			
Behaviour																	
13 Long-term absence	12.13	19.49	.02	−.01	.07	.03	−.06	−.02	−.05	.06	.13	.17	.02	−.05	—		
14 Absence duration	0.18	0.38	.06	.01	.15	.02	−.04	.02	−.02	.03	.07	.23	−.00	−.05	.56	—	
15 Turnover intentions	2.76	0.98	.07	.16	.18	.11	−.21	−.29	−.27	−.26	.35	.18	−.60	−.52	−.02	.01	*.81*

All correlations ⩾ .10 are significant; $r \geqslant .12$, $p < .01$; $.10 \leqslant r \leqslant .11$, $p < .05$.

TABLE 2
Results of MANOVA: Comparison of job demands and resources for four groups of call centre employees

Variable	Teleoperators (N = 24)	Teleadvisors (N = 220)	Teleconsultants (N = 130)	Supervisors (N = 61)	Univariate F
Job demands					
Workload	2.99	3.06	3.62	3.87	35.89***
Emotional demands	2.13	2.35	2.25	2.24	1.73
Changes in tasks	1.96	2.23	2.75	2.79	32.79***
Computer problems	2.27	3.18	3.27	3.27	10.55***
Job resources					
Social support	4.07	3.77	3.93	3.82	1.66
Supervisory coaching	3.37	3.20	3.05	3.34	2.17
Performance feedback	2.92	2.64	2.53	3.02	5.88***
Time control	3.22	2.97	3.57	3.20	16.48***

*** $p < .001$.

TABLE 3
Results of MANOVA: Comparison of well-being and outcomes for four groups of call centre employees

Variable	Teleoperators (N = 24)	Teleadvisors (N = 220)	Teleconsultants (N = 130)	Supervisors (N = 61)	Univariate F
Exhaustion	1.74	1.61	1.75	1.40	1.06
RSI	1.89	1.79	2.09	1.68	4.95**
Dedication	3.43	3.74	4.24	5.42	22.07***
Commitment	3.31	3.32	3.27	3.66	4.83**
Turnover intention	2.99	2.86	2.70	2.44	3.23*
Long-term absence	9.63	11.12	16.28	8.29	3.23*
Absence duration	12,5%	15,0%	27,7%	13,1%	4.38**

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

The MANOVA on the working conditions (job demands and resources) resulted in a multivariate significant effect, $F(24) = 11.95$, $p < .001$. As can be seen in Table 2, several univariate effects are significant, namely for the job demands "workload', "changes in tasks", and "computer problems", and for the job resources "performance feedback" and "time control". Teleconsultants and supervisors score relatively high on each of the three job demands for which a significant univariate effect is found. These two groups differ regarding performance feedback: Supervisors receive more feedback than teleconsultants.

The second MANOVA with the intervening and outcome variables as the dependent variables resulted in a multivariate significant effect as well, $F(21) = 4.93$, $p < .001$. As can be seen in Table 3, all univariate effects are

significant, except for exhaustion. Consistent with the findings regarding the working conditions, teleconsultants report the highest scores on exhaustion and RSI complaints, and they report most sickness absence. Teleoperators report the lowest score on dedication and the highest score on turnover intention. Finally, although supervisors do not differ from the three other groups regarding their feelings of exhaustion, they report less RSI complaints, and are more strongly involved in their job and the organization (higher scores on dedication and commitment). Consistently, they also report the lowest sickness absenteeism, and they are least inclined to search for alternative jobs.

Model testing

Results of the SEM analysis showed that the proposed model (displayed in Figure 1) did *not* fit adequately to the data, $\chi^2(84) = 297.55$, GFI = .92, AGFI = .89, IFI = .88, NNFI = .85, CFI = .88, RMSEA = .07. Inspection of the modification indices revealed that this lack of fit between the model and the data was mainly due to a covariation between the measurement errors of "emotional demands" and "time control". The existence of an additional variable that is not included in the model may be responsible for such an error correlation (De Jonge, Dormann, Janssen, Dollard, Landeweerd, & Nijhuis, 2001), and this correlation is necessary in order to explain the outcome variables more fully (MacCallum, Wegener, Uchino, & Fabrigar, 1993). The statistical explanation for this correlation is that items with comparable rating scales often have measurement errors that are correlated (Byrne, 1989). A theoretical explanation could be that having time control may alleviate the frequency of emotional demands.

The revised model (called the "basic dual process model"—M1), including this covariation, shows a reasonable fit to the data (see first row in Table 4). All fit indices have values higher than .90 (except for the NNFI), and the RMSEA is .07. Importantly, all working conditions had significant loadings on the intended job demands and resources latent factors, and the direction of the relationships in the model were as predicted. The coefficient of the path from job demands to health problems was positive and significant ($\beta = .60$, $t = 6.94$, $p < .01$), and the coefficient of the path from job resources to involvement was highly positive and significant as well ($\beta = .52$, $t = 8.83$, $p < .01$). Furthermore, health problems had a positive relationship with self-reported absenteeism ($\beta = .25$, $t = 3.11$, $p < .01$), while involvement had a strong negative relationship with turnover intentions ($\beta = -.77$, $t = 13.79$, $p < .01$).

In order to test the alternative hypothesis that job demands are also related to involvement, and that job resources are also related to health problems, we included both diagonal paths in the model (partial cross-link

model 1—M2). Compared to the previous model, adding both paths resulted in a significant improvement of the fit between model and data, M1 – M2; $\Delta\chi^2(2) = 15.02$, $p < .01$. However, only job resources showed a significant and negative relationship with health problems ($\beta = -.25$, $t = 3.66$, $p < .01$). Importantly, this relationship was significantly lower than the relationship between job resources and involvement (critical ratio for difference $= -8.53$, $p < .01$; see Arbuckle, 1997). Consistently, the model in which the paths from job resources to involvement and to health problems were constrained to be equal was significantly worse than M2, $\Delta\chi^2(1) = 79.84$, $p < .001$.

In an alternative model (partial cross-link model 2—M3), we included the additional paths from health problems to turnover intentions and from involvement to self-reported absenteeism. These two additional paths also increased model fit, M2 – M3; $\Delta\chi^2(2) = 11.85$, $p < .01$. This was due to the fact that the coefficient of the path from health problems to turnover intentions reached significance ($\beta = .18$, $t = 2.57$, $p < .01$). However, in line with the JD – R model, the relationship between involvement and turnover intentions was significantly stronger than the relationship between health impairment and turnover intentions (critical ratio for difference = 8.77, $p < .01$). Consistently, the model in which the paths from health problems to self-reported absenteeism as well as to turnover intention were constrained to be equal was significantly worse than M3, $\Delta\chi^2(1) = 14.50$, $p < .001$.

The third alternative model included additional *direct* relationships between job demands and self-reported absenteeism and between job resources and turnover intentions (partial mediation model—M4), while the fourth alternative model included all paths of the previous models together with the cross paths from job demands to turnover intentions and from job resources to self-reported absenteeism (full cross-link model—5). The inclusion of these additional paths did *not* lead to an improvement of the model (see also Table 4), M3 – M4: $\Delta\chi^2(2) = 3.35$, n.s.; M4 – M5: $\Delta\chi^2(2) = 2.00$, n.s. Moreover, the coefficients of all additional paths were nonsignificant. It can be concluded that involvement fully mediated the relationships between job resources and turnover intentions. Health problems acted as a conditional variable in the relationship between job demands and absenteeism (see Discussion section).

In sum, this series of SEM analyses shows that the proposed JD – R model with dual processes fits well to the data, even though we found two additional paths that were not predicted. Accordingly, job demands are the most important predictors of health problems (i.e., exhaustion and RSI), which, in turn, predict self-reported absenteeism. In contrast, job resources are the most important predictors of involvement (i.e., commitment and dedication), which, in turn, predicts (reduced) turnover intentions. In

TABLE 4
Goodness-of-fit indices of the alternative models ($N = 477$)

Model	χ^2	df^a	GFI	AGFI	IFI	NNFI	CFI	RMSEA	Model comparisons	$\Delta\chi^2$	Δdf
M1. Basic dual processes model	248.67	83	.94	.91	.91	.88	.90	.07			
M2. Partial cross-link model 1	233.65	81	.94	.91	.91	.89	.91	.06	M1 − M2	15.02	2
M3. Partial cross-link model 2	221.80	79	.94	.91	.92	.89	.92	.06	M2 − M3	11.85	2
M4. Partial mediation model	218.45	77	.94	.91	.92	.90	.92	.06	M3 − M4	3.35	2
M5. Full cross-link model	216.45	75	.94	.91	.92	.89	.92	.06	M4 − M5	2.00	2
M6. Final model	226.61	81	.94	.91	.92	.89	.92	.06			
Null model	1838.24	105	.58	.53	—	—	—	.19	—	—	—

χ^2 = chi-square; df = degrees of freedom; GFI = goodness-of-fit index; IFI = incremental fit index; NNFI = Non-normed fit index; CFI = comparative fit index; RMSEA = root mean square error of approximation; $\Delta\chi^2$ = chi-square difference; Δdf = difference in degrees of freedom. [a]All models are significant at $p < .001$.
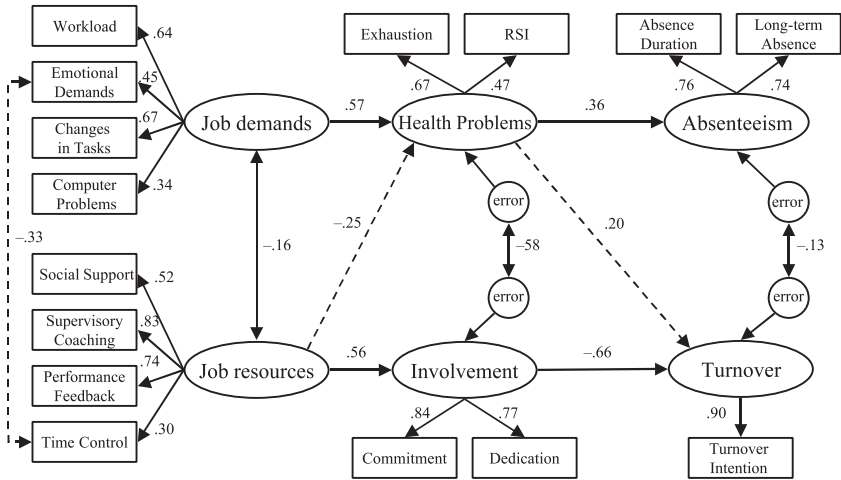
Figure 1. Maximum likelihood estimates for the final JD–R model (M6, see Table 4), $N = 477$. All factor loadings and path coefficients are significant at the $p < .05$ level. Solid lines represent hypothesized paths.

addition, we found that job resources also had a small but significant, negative relationship with health problems, which, in turn, made a unique contribution to explaining variance in turnover intentions. These relationships are included in the final model, which is displayed graphically in Figure 1. In total, the JD–R model explained 9% of the variance in self-reported absenteeism and 60% of the variance in turnover intentions. Hence, SEM analyses generally supported the hypothesized dual processes of energy depletion and motivation among call centre employees.

DISCUSSION

The present study used the job demands–resources (JD–R) model (Bakker et al., 2003a, 2003b; Demerouti et al., 2000, 2001) to examine how different categories of working conditions—job demands and job resources—are related to absenteeism and turnover intentions among call centre employees. Our theoretical framework was successful in revealing two different processes responsible for absenteeism and turnover intentions in call centres. The first process can best be described as an *energy depletion* process starting with high job demands, which lead to health problems and, consequently, to longer periods of absence. The second process is *motivational* in nature, and starts with job resources. Call centre employees who can draw upon job resources such as social support from colleagues and performance feedback feel more dedicated to their work and more

committed to their organization, and, consequently, are less inclined to leave the organization.

These findings integrate and expand previous studies, in which moderate support was found for the idea that employees who experience job stress are absent longer (e.g., Firth & Britton, 1989; Saxton et al., 1991), and for the notion that employees low in organizational commitment are more inclined to look for an alternative employer (Mathieu & Zajac, 1990; Meyer et al., 2002). Note, however, that we used a cross-sectional design, and that the present study does not provide evidence for causal relationships between the model variables. The proposed links between working conditions, well-being, and outcomes (sickness absence and turnover intentions) thus need to be tested using a more rigorous design before we can conclude what the exact order of the variables is. On the positive side, the model tested in our study is one of the few that incorporates individually assessed job characteristics, stress reactions, and work-related attitudes for the explanation of different organizational outcomes. The specific findings will be discussed in more detail below.

Dual processes at work in a call centre

Results provided support for the hypothesized dual processes, although health problems did not act as a pure mediator. Job demands (i.e., work overload, changes in the task, emotional demands, and computer problems) were the most important predictors of call centre employees' levels of exhaustion and RSI. The latter two indicators of health problems, in turn, were the only predictors of absence duration and long-term absence (positive relationships). Job resources (i.e., social support by colleagues, supervisory coaching, performance feedback, and time control) were unique predictors of commitment and dedication (positive relationship), and indirectly of turnover intentions (negative relationship). Because the correlational analysis revealed that job demands were *not* significantly related to the two absenteeism measures, exhaustion and RSI did not act as pure mediators. Instead, they seem to act as so-called *conditional* variables: If job demands lead to health problems, then absenteeism may follow. In contrast, all job resources were significantly related to turnover intentions, which means that involvement (commitment and dedication) acted as a pure mediator between job resources and turnover intentions.

Alternative models, including direct paths from job demands and job resources to absenteeism and turnover intentions, did not fit better to the data than the proposed JD – R model. However, analyses of cross-links between both processes revealed two paths that were not predicted: the path from job resources to health problems, and from health problems to turnover intentions. Although the coefficients of these paths were

significantly lower than the proposed paths, it is warranted to elaborate on these findings. First of all, an increase in job resources coincided with a small decrease in health problems. This suggests that some resources may directly prevent energy-depletion. Indeed, previous research has, for instance, shown that social support *may* play such a role (Lee & Ashforth, 1996). Second, the relationship between health problems and turnover intentions, over and above the impact of involvement, has been reported in the literature as well. For example, Schaufeli and Enzmann (1998, p. 90) calculated a metacorrelation between exhaustion and intention to quit across 13 studies and found a weighted population effect size of .45, indicating that both constructs share 20% of their variance. For RSI complaints, the relationship with turnover intentions is still unknown. Nevertheless, Schaufeli and Enzmann's finding suggests that health problems or job strain may directly result in psychological (and eventually physical) withdrawal (see also Schaufeli & Bakker, in press).

   Taken together, these findings among call centre employees replicate and expand previous findings with the JD–R model among other occupational groups, showing that job demands are the most important predictors of absence duration among production personnel (Bakker et al., 2003a) and of in-role performance among human service professionals (Bakker, Demerouti, & Verbeke, 2003c), through their relationship with job strain variables. In contrast, in these previous studies, job resources were the most important predictors of short spells and extra-role performance, through their impact on motivational variables. Furthermore, in their study among air traffic controllers, human service professionals, and production workers, Demerouti et al. (2001) found unique relationships between job demands and fatigue and between job resources and disengagement, even when using independent observers' ratings of job demands and resources. In addition, evidence for relationships between exhaustion and absenteeism, and between commitment and turnover (intentions) has been found in several other studies (for overviews, see Johns, 1997; Schaufeli & Enzmann, 1998). Thus the underlying processes of energy depletion and motivation do not seem to differ between call centre employees and employees in other professions. Yet, the specific job demands and job resources may differ to some extent, which also applies to the present study, since we found that computer problems and time control were particularly relevant for this occupational group.

   The current findings also emphasize the differences between the JD–R model on the one hand, and classic models such as the job characteristics model (JCM; Hackman & Oldham, 1980) and the demand–control model (DCM; Karasek, 1979). Whereas the JD–R model simultaneously investigates the roots of job stress and work motivation, the JCM focuses primarily on job resources and work motivation (even though absenteeism is

also included as an outcome variable). In addition, whereas the DCM mainly concentrates on the combination of high job demands (mainly workload and time pressure) and low autonomy as a possible cause of job stress and reduced motivation, the JD – R model goes one step further and proposes that many different demands and resources may influence employee well-being.

We also explored differences between call centre employees in different job positions. The results showed that employees in the different job positions differed regarding their demands and resources, their health problems and involvement, and regarding their absenteeism and turnover intentions. Particularly teleconsultants and supervisors scored relatively high on three job demands: "workload", "changes in tasks", and "computer problems". Teleconsultants reported the highest scores on RSI complaints, and they had been most often absent for longer time periods. Teleoperators reported the lowest score on dedication and the highest score on turnover intention. Finally, although supervisors did not differ from the other groups (their subordinates) regarding their feelings of exhaustion, they reported less RSI complaints, and were stronger involved in their job and the organization (higher scores on dedication and commitment). Consistently, they also reported the lowest sickness absenteeism, and they were least inclined to search for alternative jobs. Such information can be used in practice to optimize call centre employees' working conditions, by developing interventions that are tailor-made to the specific job positions.

Limitations

Like most studies, the present research has limitations as well. First, the measurement of the model variables was based solely on self-reports, which increases the possibility that the relationships between, for example, job demands and resources on the one hand, and health problems and involvement on the other hand might be due to common method variance. Therefore, some scholars (e.g., Brief, Burke, George, Robinson, & Webster, 1988; Payne, 1988) have argued that we should control for negative affectivity (NA; Watson & Clark, 1984) in job stress research (see Spector, Zapf, Chen, & Frese, 2000, for a different view). NA may bias self-reports of working conditions and job strains, and controlling for NA in a cross-sectional study may deal with a possible confounding of independent and dependent variables. The present study did not include a measure of NA, but we were able to use a measure of "general job satisfaction" as a proxy to control for NA. Thus in an additional SEM analysis, this measure was included in the final JD – R model, and covariations with each of the model variables were allowed. The results showed that the satisfaction measure did *not* have a substantial influence on the proposed relationships in the JD – R

model, although the strength of some of the proposed relationships was slightly reduced. Interestingly, the cross paths from job resources to health problems, and from health problems to turnover intentions, became nonsignificant. Taken together, these findings suggest that the affective state of the participants did lead to a slight overestimation of the strength of the relationships in the JD–R model, but that controlling for affect did not produce different findings; instead, we found more evidence for the JD–R model, since the cross links proved to become nonsignificant. Nevertheless, future research should ideally use other sources of information as well, such as company registrations of absenteeism and personnel turnover.

A second limitation of the present study is that we could only include self-reports of absenteeism instead of personnel records of absenteeism in order to maintain respondent anonymity and confidentiality. In addition, since the telecom organization started its business only a few years before, the personnel department was not functioning optimally, and consequently, absenteeism records were not kept adequately. Johns (1994) has shown that such practice is far from uncommon. On the basis of the available validity coefficients of previous studies, he calculated that the sample-size weighted estimate of the correlation between self-reported absenteeism and records-based measures was .64. Although this validity coefficient is not perfect, it does show that self-reports generally mirror reality. In addition, Spector (1987) has shown that in 20 out of 20 correlations with various measures of commitment and job characteristics, self-report-based and records-based absence measures revealed no significant differences.

Practical implications and suggestions for future research

Despite these limitations, the present findings may have important implications for organizational practice within call centres. First and foremost, our study suggests that different organizational outcomes are the result of two different processes. This underlines the importance of a systematic distinction between reasons for absenteeism and personnel turnover by human resource managers. Results clearly suggest that, in order to decrease absenteeism, specific countermeasures have to be taken regarding the working environment. Specifically, in order to reduce or prevent exhaustion and the risk of RSI and consequently *absenteeism*, specific job demands (in the present study: work overload, emotional demands, changes in tasks, and computers problems) should be reduced or optimized. In addition, in order to increase involvement and lower *turnover intentions*, the availability of job resources (in this study: social support, supervisory coaching, time control, and performance feedback) should be considered. Schaufeli and Enzmann (1998) have described several interven-

tions at the organizational level that can be used to attain this, including job redesign, job coaching, and organizational development programmes.

Our study was restricted to the examination of four specific job demands and four specific resources. At the heart of Demerouti et al.'s (2001) JD–R model lies the assumption that, whereas every organization may have its own specific characteristics, these factors can still be classified in two general categories (i.e., job demands and job resources). Future studies should examine a broader range of demands and resources, potentially related to absenteeism and withdrawal from work in a similar way. Ideally, research with the JD–R model starts with a qualitative analysis, including organizational document research and explorative interviews with job incumbents from different layers of the organization (representatives from management, staff, shop floor). Such an analysis can reveal a wide range of potentially relevant job demands and resources, which can then be examined quantitatively by including these constructs in a questionnaire. Thus a task of researchers and practitioners is to uncover the specific constellations of job demands and job resources that are prevalent in specific job types, since this may facilitate primary and secondary workplace interventions.

Although the JD–R model was originally constructed for examining the causes of burnout at the organizational level, recently, we have successfully developed a computerized tool that may be used at the individual, employee level. Specifically, using the internet as a medium, employees can fill out the electronic questionnaire and they receive individual feedback about their own levels of job strain and its causes in terms of histograms and short written descriptions. The most extreme cases also receive advice about contacting occupational health professionals, their human resources departments, or the like. The information can be used by those willing to begin conversations with management, a company doctor, or a therapist. This can be the start of individual job (re)design and for changing suboptimal working conditions into a healthier workplace.

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