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DO HIGH JOB DEMANDS INCREASE INTRINSIC MOTIVATION OR FATIGUE OR BOTH? THE ROLE OF JOB CONTROL AND JOB SOCIAL SUPPORT

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In this study, we used Karasek's demand-control-support model to determine whether either job control or job social support or both can reduce signs of fatigue and simultaneously enhance intrinsic motivation among employees facing high job demands. Survey data on 555 nurses suggest that job control in particular reduces fatigue in highly demanding jobs, whereas high levels of instrumental support produce elevated levels of intrinsic motivation, regardless of the level of job control and job demands.

In order to become successful or even more successful, today's work organizations need to maximize the use of their employees' actual and potential skills. More than ever before, organizations in both the private and public sector are introducing new forms of work and organizational design and management, such as total quality management, lean production, and empowerment (Parker & Wall, 1998). These initiatives may enhance intrinsic motivation and inspire employees to learn and develop the skills they need to meet increasing job demands, but simultaneously the initiatives may raise levels of job strain and other negative health-related outcomes among employees, generating significant costs in terms of sickness, lost time, and low productivity (Parker & Sprigg, 1999; Theorell & Karasek, 1996). Building on the demand-control-support model (DCS model) developed by Karasek and his associates (Karasek, 1979; Karasek & Theorell, 1990), the present study examines job conditions that minimize job strain and maximize intrinsic motivation in highly demanding jobs. The interaction between job demands and control has been studied frequently with respect to job strain (e.g., Ganster & Fusilier, 1989; Karasek, 1979; Schaubroeck & Merritt, 1997; Theorell & Karasek, 1996; Wall, Jackson, Mullarkey, & Parker, 1996; Xie, 1996), but has been largely neglected with

respect to work motivation. Moreover, the role of job social support in the interaction between demands and control has drawn little empirical attention as far as job strain is concerned, and no empirical or theoretical attention with regard to intrinsic motivation (cf. Parker & Sprigg, 1999; Van der Doef & Maes, 1999). The present study contributes substantially to management theory and empirical knowledge by focusing on *intrinsic work motivation* and, more specifically, by examining the interaction between job demands, job control, and job social support on fatigue and intrinsic motivation simultaneously.

THEORY AND HYPOTHESES

Karasek's Initial Model: The Demand-Control Model

The central contention expressed in the demand-control model is that it is not high demands per se, but high demands in combination with a lack of control on the job, that are associated with high job strain. Karasek (1979) argued that in high-strain jobs—high-demand, low-control jobs—the high demands create arousal that cannot be transformed into action because employees lack control on the job. Instead, the arousal associated with high job demands will be directed internally with deleterious consequences, including fatigue and exhaustion. The results of recent studies using measures that focus on control itself rather than on a wide range of job properties, such as Karasek's (1979) decision latitude, have supported the moderating effect of job control on the association between high job demands and negative health-related outcomes (e.g., Marshall, Barnett, & Sayer, 1997; Van Yperen & Snijders, 2000; Wall et al., 1996).

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In addition, Karasek (1979) suggested that in active jobs—high-demand, high-control jobs—new behavior patterns will develop both on and off the job. Hence, we hypothesized that as job demands increase, enhancing job control may not only decrease strain but may also increase employees' intrinsic work motivation. Intrinsic motivation is the motivation to perform an activity for itself, in order to experience the pleasure and satisfaction inherent in the activity (Deci, Connell, & Ryan, 1989; Vallerand, 1997). Autonomy has been identified as a crucial determinant of intrinsic motivation (e.g., Hackman & Oldham, 1980). For example, Richer and Vallerand (1995) demonstrated that a controlling supervisory style, whether punitive or nonpunitive, had a detrimental effect on subordinates' intrinsic motivation. Providing employees with autonomy allows them to make certain choices and decisions about their work; these may concern how they plan their work (timing control) or the methods they use to carry out their work (method control). Karasek's (1979) demand-control model suggests that autonomy is particularly important for employees' intrinsic motivation when they find themselves in highly demanding jobs. However, little evidence is available showing that employees who face high job demands but perceive high job control are especially likely to be more intrinsically motivated, more productive, and engaged in learning activities to a higher extent (Parker & Sprigg, 1999; Theorell & Karasek, 1996).

Karasek's Expanded Model: The Demand-Control-Support Model

Johnson (1986) introduced the term "iso-strain" (that is, "isolation strain"), referring to jobs with high demands, low control, and low job social support, and showed that employees in high iso-strain jobs reported more heart disease, fatigue, and other health complaints. Drawing on Johnson's (1986) dissertation research, Karasek and Theorell (1990) argued that job social support may facilitate successful coping with high-strain jobs, preventing or buffering the potentially harmful effects of these kinds of jobs (cf. Cohen & Wills, 1985). However, in their recent review on the demand-control-support model, Van der Doef and Maes (1999) pointed out that a considerable number of studies have included measures of job demands, job control, and job social support, but only five have actually examined whether job social support buffered the impact of high-strain jobs. The results of these five studies are highly inconsistent and provide no conclusive evidence regarding Karasek and Theorell's (1990) prediction that job social support is a buffer.

In the present study, we assumed that social support buffers negative health-related outcomes only when it is well-matched with the stressful event in question (Cohen & Wills, 1985). Specifically, in the case of high job demands, only *instrumental support*, defined as help from others for getting the job done when things get tough, will be effective in preventing or reducing detrimental effects.

Hypotheses

Increasing job demands obviously produce fatigue and the need to recover (Van Yperen & Jansen, 2002). However, in contrast to employees in active jobs, employees who find themselves in high-strain jobs lack the job control that might allow them to recover during the working day. It may be difficult for them to recover completely in their off-work situations. Hence, signs of fatigue may accumulate and become more severe in high-strain jobs. As proposed in the demand-control-support model, these negative effects of a high-strain job may be most marked when levels of job social support are low.

Hypothesis 1. High job demands will be associated with greater fatigue when job control is low.

Hypothesis 2. High job demands will be associated with greater fatigue when both job control and job social support are low.

In methodological terms, a two-way interaction between job demands and job control was expected to affect fatigue (Hypothesis 1) and to be qualified by the three-way interaction between job demands, job control, and job social support (Hypothesis 2). We expected the hypothesized interaction between job demands and job control to occur when job social support is low.

From both a theoretical and a practical point of view, an interesting question is whether social support may not only buffer potentially harmful effects of high-strain jobs, but may also promote employees' intrinsic motivation in these kind of jobs. Feeling valued and supported by one's supervisor and colleagues obviously makes a work environment more pleasant and rewarding. Particularly in high-strain jobs, one of employees' most salient concerns is whether they get the job done. The perceived availability of instrumental support may elevate levels of intrinsic motivation because it enhances employees' confidence that the job will get done and facilitates perceptions of relatedness, that is, the feeling of being connected to others (e.g., Vallerand, 1997). In other words, we expected the per-

ceived availability of instrumental support to transform a high-demand, low-control job not only into a low-strain job (see Hypothesis 2), but also into a motivation-enhancing or active job.

Hypothesis 3. High job demands will be associated with greater intrinsic motivation when job control is high.

Hypothesis 4. High job demands will be associated with greater intrinsic motivation when job control or job social support or both are high.

Thus, also with regard to intrinsic motivation, we expected that the two-way interaction predicted by the demand-control model (Hypothesis 3) could be qualified by the three-way interaction between job demands, job control, and job social support. Specifically, the hypothesized interactive effect of job demands and job control on intrinsic motivation (Hypothesis 3) was expected when job social support is low.

METHODS

Sample and Procedures

The sample for this study was drawn from nurses who worked at specialized units for patients with different levels of mental deficiency, varying from those with moderate mental retardation (patients who could care for themselves to a certain extent) to those with profound mental retardation (patients who required total supervision and nursing care). Data were collected as part of a more general survey on safety, health, and well-being in the workplace. Meetings were organized to inform employees about the general purpose of the study and to emphasize that participation was voluntary and confidential. All the nurses employed in the organization received the questionnaire by regular mail, along with a letter that recapitulated the information given at the meetings. The response rate was 83 percent. Included in the final sample were 555 nurses who were gainfully employed half-time (50 percent of the workweek) or more. All nurses had completed a senior secondary or a higher vocational program, and 58 nurses (10.5 percent) had leadership tasks. The mean age of sample members was 35.5 years, and 68.8 percent were women.

Measures

The measures of job demands, job control, and fatigue that we used were developed and validated by Van Veldhoven (1996) in his dissertation research. A four-point response scale (1 = "never," 2 = "some-

times," 3 = "often," 4 = "always") followed each item in the scales measuring job demands, job control, and job social support. For each respondent, we averaged the item scores of all measures into single indicators. The Appendix gives all the component items.

Job demands. The 11 items of the measure of quantitative job demands refer to the degree to which an employee has to work fast and hard, has a great deal to do, and has too little time (cf. Ganster & Fusilier, 1989). Cronbach's alpha was high at .90.

Job control. This focused measure of job control (Wall et al., 1996) consists of 11 items as well, including items referring to timing control and method control. Cronbach's alpha was .90. A validation check suggested by Parker and Sprigg (1999) revealed that nurses with leadership tasks reported more job control than those without leadership tasks ($\bar{x}_{\text{leader}} = 2.96$, s.d. = 0.49, and $\bar{x}_{\text{noleader}} = 2.68$, s.d. = 0.54; $t_{546} = 3.80$, $p < .001$).

Job social support. Karasek and Theorell defined social support at work as "overall levels of helpful social interaction available on the job from coworkers and supervisors" (1990: 69). In several studies, the correlations between supervisory and coworker support have been moderate to high, and separate analyses for these two sources of job support have revealed similar results (e.g., Fisher, 1985; Karasek, Triantis, & Chaudhry, 1982). Therefore, and for reasons of parsimony, we decided to use one combined, four-item measure of the perceived availability of instrumental support on the job. Cronbach's alpha was .80.

Fatigue. This 11-item measure reflects the extent to which employees feel fatigued at the end of a working day and have a need to recover. This measure is very similar to Karasek's (1979) indicator of mental strain, termed "exhaustion," that he used in his landmark study. Van Veldhoven (1996) demonstrated that this fatigue scale was strongly related to rumination, psychological health symptoms, and job strain. Respondents indicated on a two-point scale (1 = "no," and 2 = "yes") whether or not each item applied to them. For a scale composed of dichotomous items, the most appropriate index of internal consistency is the Kuder-Richardson formula 20 (KR-20; Nunnally & Bernstein, 1994). In the present sample, this equivalent to Cronbach's alpha was high at .87.

Intrinsic motivation. Intrinsic motivation was assessed with an adjusted version (that is, adapted to the context of the focal job here) of the Intrinsic Motivation Scale developed and validated by Vallerand and his associates (for a review, see Vallerand [1997]). This 12-item scale represents three types of intrinsic motivation: intrinsic motivation to know (items 1-4), to accomplish things (items

5–8), and to experience stimulation (items 9–12). Items were followed by a seven-point response scale, ranging from 1, “strongly disagree,” to 7, “strongly agree.” It is important to note that Vallerand and his associates typically used one index for intrinsic motivation by combining the three subscales (e.g., Richer & Vallerand, 1995; Vallerand, 1997) or by using an abridged version (e.g., Guay, Vallerand, & Blanchard, 2000). This procedure is parsimonious, but Vallerand and associates followed it primarily because their research indicated that the types of intrinsic motivation are not differently related to specific antecedents and consequences, including status as a high school dropout, positive emotions, effort, and perceived competence (Vallerand, 1997). Accordingly, we had no expectations about differing effects of job demands, job control, social support, and their interactions on the three subscales of intrinsic motivation, and for each respondent we averaged the scores on the 12 items representing the three highly correlated subscales (r 's > .56) into one single indicator of intrinsic motivation. Cronbach's alpha was .88.

RESULTS

Correlations and Confirmatory Factor Analysis

Table 1 shows low to moderate correlations between the five constructs of our measurement model. The strongest associations were observed between job demands and job control ($r = -.34$), and between fatigue and job demands ($r = .43$) and job control ($r = -.32$). To test for common method variance, a potential problem for our analysis, and to help to establish the convergent and discriminant validity of our measures, we conducted a confirmatory factor analysis (CFA) with LISREL 8.50 (Jöreskog & Sörbom, 1996). Specifically, we tested our measurement model by comparing our five-factor (oblique) model (job demands, job control, job social support, fatigue, and intrinsic motiva-

tion) with two rival four-factor (oblique) specifications. In the two competing models, the job demands and job control items “loaded” on one factor, and the job demands and fatigue items loaded on one factor. As Kelloway (1998) noted, the quality of the fit of a theoretical model is based on both whether it provides a good absolute fit to the data and whether it fits better than competing models. As is typical in confirmatory factor analysis (Kelloway, 1998), the chi-square associated with our five-factor model was significant, as indicated by the normal-theory weighted least squares index ($\chi^2_{\text{NWLS}} [1,117] = 3,745.23, p < .01$). However, the root-mean-square error of approximation (RMSEA) of .07 was below the .08 cutoff value recommended by experts, and the standardized root-mean-square residual (SRMR) of .07 can be interpreted as indicating an acceptable fit to the data (e.g., Hu & Bentler, 1999). Even more importantly, our five-factor model provided a better fit to the data than did both plausible rival specifications. All the fit indexes of both competing four-factor models were worse (that is, larger) than those of our five-factor model ($\chi^2_{\text{NWLS}} [1,121] = 8,741.82, p < .01$; RMSEA = .11; SRMR = .09, and $\chi^2_{\text{NWLS}} [1,121] = 6,369.18, p < .01$; RMSEA = .09; SRMR = .08, respectively). In addition, another comparative index, Akaike's information criterion (AIC; Hu & Bentler, 1999) was better (that is, smaller) for our five-factor model than for either rival specification (AIC_{5-factor} = 3,961.23, AIC_{4-factorA} = 8,949.82, and AIC_{4-factorB} = 6,577.18, respectively). Together with the low to moderate correlations between the scales (see Table 1), these results indicate that the five scales of our measurement model represent concepts that are not only theoretically, but also empirically, distinguishable. Tests of other rival specifications, including those in which the subscales of intrinsic motivation and job social support loaded on separate factors, led to the same conclusion.

TABLE 1
Correlations, Means, and Standard Deviations^a

Variable	Mean	s.d.	1	2	3	4	5	6
1. Age	35.49	8.92						
2. Percent employed	0.82	0.17	.03					
3. Job demands	2.48	0.49	-.02	.07				
4. Job control	2.71	0.54	.27	.08	-.34			
5. Job social support	3.20	0.75	-.15	.02	-.18	.11		
6. Fatigue	1.36	0.30	-.08	.06	.43	-.32	-.23	
7. Intrinsic motivation	5.05	0.88	-.15	.04	-.06	.10	.24	-.14

^a $n = 555$. Correlations of .11 and above are significant at the .01 level (two-sided).

Test of the Hypotheses

To test our hypotheses, we conducted hierarchical regression analyses with fatigue and intrinsic motivation regressed on job demands, job control, job social support, and their interactions. To avoid multicollinearity between the predictors and the interaction terms, we centered the predictor variables around zero and multiplied them to form the interaction terms (Aiken & West, 1991). Age and percentage of gainfully employed working hours, and the categorical variables gender and whether or not leadership tasks were part of a nurse's job description (coded as dummy variables) were entered as covariates (see Table 2). Additional analyses were conducted to test the statistical significance of the simple slopes (Aiken & West, 1991).

The results of the regression analyses are presented in Table 2. Hypothesis 1 was that high job demands will be associated with greater fatigue when job control is low. The significant effect of the interaction of job demands and job control on fatigue (see Table 2) is plotted in Figure 1. As indicated by both significant simple slopes, nurses felt more fatigued at the end of the day when they perceived job demands to be higher. However, the significant two-way interaction indicates that the link between job demands and fatigue was stronger when job control was low. Indeed, additional tests of differences between the predicted values on fatigue (for this procedure, see Aiken and West [1991]) showed that the value in the low job control

group differed significantly from that in the high job control group when job demands were high ($b = -.19, p < .001$), whereas no significant difference between the two groups was observed in the case of low job demands ($b = -.04, n.s.$). Thus, support was found for Hypothesis 1, indicating that job control mitigates the negative effect of high job demands on fatigue. As shown in Table 2, the two-way interactive effect of job demands and job control on fatigue was not qualified by the three-way interaction between job demands, job control, and job social support. Hence, Hypothesis 2, which states that high job demands are associated with greater fatigue when both job control and job social support are low, was rejected.

Hypothesis 3 states that high job demands will be associated with greater intrinsic motivation when job control is high. Table 2 shows that the interaction between job demands and job control had no significant effect on intrinsic motivation, so Hypothesis 3 was rejected. Instead, we observed an unexpected two-way interaction between job demands and job social support, which could be qualified by the three-way interactive effect of job demands, job control, and job social support on intrinsic motivation. Hypothesis 4 states that high job demands will be associated with greater intrinsic motivation when job control or job social support or both are high. The observed three-way interaction (see Table 2) displayed in Figures 2a and 2b) revealed partial support for Hypothesis 4. Spe-

TABLE 2
Results of Regression Analyses^a

Step and Variable	Fatigue				Intrinsic Motivation			
	1	2	3	4	1	2	3	4
1. Gender	-.00	.02	.02	.02	-.02	-.02	-.02	-.03
Age	-.00	-.00	-.00	-.00	-.01**	-.01**	-.01**	-.01**
Percent employed	.14	.09	.09	.09	.20	.14	.17	.18
Leadership tasks	.03	.04	.03	.03	-.08	-.07	-.06	-.07
2. Job demands		.21***	.22***	.22***		.01	-.02	-.01
Job control		-.09***	-.10***	-.10***		.17*	.18*	.12
Job social support		-.08***	-.08***	-.08**		.31***	.32***	.25***
3. Job demands × job control			-.15***	-.15***			.19	.19
Job demands × job social support			-.02	.02			-.34**	-.30**
Job control × job social support			.00	.01			.02	-.01
4. Job demands × job control × job social support				.05				-.71**
R^2	.01	.25***	.27***	.27***	.02**	.08***	.10***	.12***
ΔR^2	.01	.24***	.02**	.00	.02**	.06***	.02**	.02**

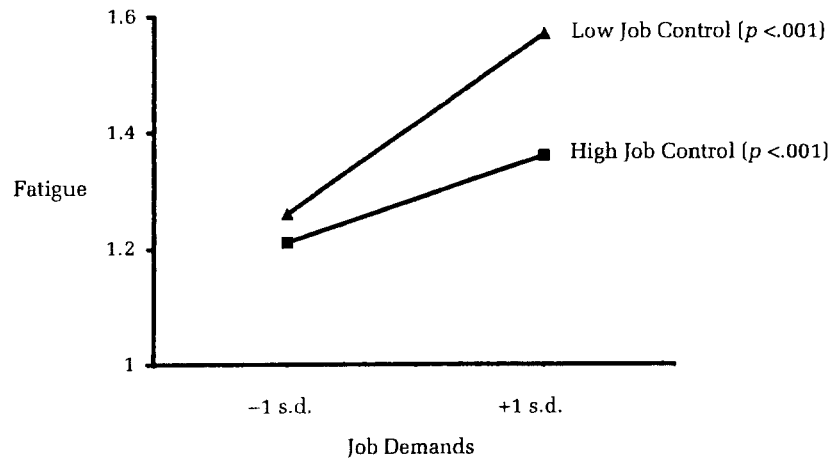
^a Unstandardized regression coefficients are shown. $n = 555$.

* $p < .05$

** $p < .01$

*** $p < .001$

FIGURE 1
Interactive Effect of Job Demands and Job Control on Fatigue



cifically, when job social support was low (Figure 2a), the observed pattern was in line with Karasek's (1979) demand-control model. Increasing job demands were accompanied by an increase in intrinsic motivation only when job control was high. The predicted value in the high job control group differed significantly from that in the low job control group when job demands were high ($b = .43, p < .001$), whereas the difference between the two groups was not significant when job demands were low ($b = -.18, n.s.$).

We unexpectedly found rather high levels of intrinsic motivation in less demanding jobs when job social support was high. As shown in Figure 2b, intrinsic motivation was particularly high among participants who perceived low job demands combined with high job control and high job social support. When job demands were low, the predicted value in the high job control group differed significantly from that in the low job control group ($b = .24, p < .05$). When perceived job demands were high, there was no difference between the values in the two groups ($b = .00, n.s.$). Rather than promoting intrinsic motivation, the perceived availability of job social support seems to stabilize intrinsic motivation at a rather high level as job demands increase. Exploratory hierarchical regression analyses with either supervisory support or coworker support (assessed with our two-item subscales) revealed similar results. Furthermore, unlike earlier studies (for a review, see Van der Doef and Maes [1999]), our study showed no evidence of gender-related effects in the relationships identified.

DISCUSSION

The key question in the present study is whether either job control or social support or both can

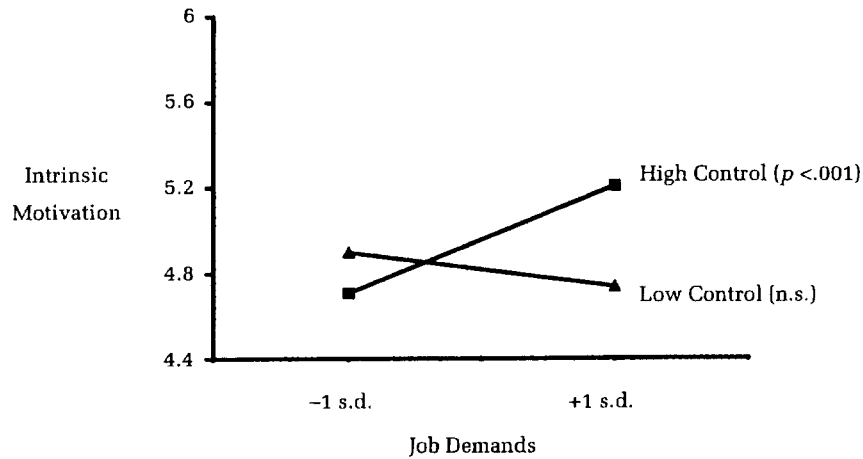
prevent employees facing high job demands from becoming fatigued and exhausted; a further question was whether these two job conditions can enhance intrinsic motivation. Overall, the pattern of results suggests that as job demands increase, high job control is needed to limit fatigue, whereas either high job control or high job social support is needed to enhance intrinsic work motivation.

Limitations

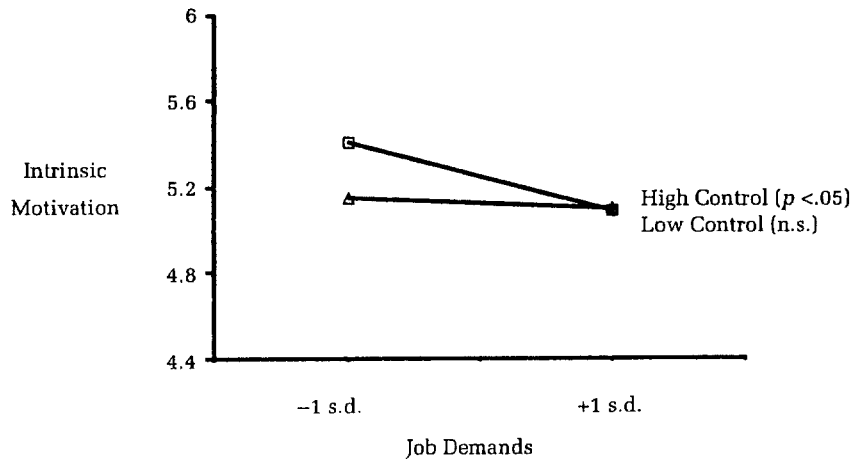
The reliance on self-report measures may be considered a limitation of the present study. For example, self-reports of job demands generally reflect variance arising from true variability in objective job demands and from employees' subjective assessments. Hence, we do not know how much variability in actual job demands there really was in the present sample, in which there was relatively little variation in job requirements. Moreover, the rather strong link between job demands and fatigue may be partly a consequence of common method variance and of the job demands measure including items that tap an affective component (for instance, "working hard and fast," "too little time") that is shared with the fatigue measure (Wall et al., 1996). Self-report measures ignore the shared variance of incumbents, producing overestimations of stressor-strain relationships, whereas "objective" measures and ratings by nonincumbents ignore individual variance, which leads to underestimation of these relationships (VanYperen & Snijders, 2000). It should be noted, however, that confirmatory factor analyses supported the convergent and discriminant validity of our measures (cf. VanYperen & Janssen, 2002). Furthermore, there is no theoretical reason to expect an interaction owing to common

FIGURE 2
Interactive Effect of Job Demands, Job Control, and Job Social Support on Intrinsic Motivation^a

(2a) Low Job Social Support



(2b) High Job Social Support



^a Low job social support reflects a value of 1 s.d. below the mean. High job social support reflects a value of 1 s.d. above the mean.

method variance (Xie, 1996). To the contrary, common method variance reduces the likelihood of detecting interaction effects (Wall et al., 1996). Indeed, previous studies employing self-report measures have shown considerable support for the additive effects of both variables, but less for the interactive effect between job demands and job control (Van der Doef & Maes, 1999). Also, it has to be noted that it is not possible to make causal inferences because our data are cross-sectional. Finally, it is obvious that Karasek's (1979) two-factor model, even expanded with job social support as a third factor, is not comprehensive enough to completely explain fatigue and intrinsic motivation at work. In future research, the explanation of the occurrence of these job outcomes might be improved by including variables such as goal orienta-

tion (VanYperen & Janssen, 2002), perceived ability-job fit (Xie, 1996), self-efficacy (Schaubroeck & Merritt, 1997; VanYperen & Snijders, 2000), fairness perceptions (Janssen, 2001), and proactive personality (Parker & Sprigg, 1999). The moderating role of individual difference variables may also explain the inconsistent findings of tests of the demand-control model in previous studies (Parker & Sprigg, 1999; Schaubroeck & Merritt, 1997; Xie, 1996).

Theoretical Contributions

Karasek's (1979) demand-control model is generally recognized as providing an appealing theoretical basis for stress research in organizational science. As Xie (1996) noted, however, there has been

relatively little theoretical development of the model. An exception is the formulation of the dynamic version of the model, according to which job strain inhibits work motivation and work motivation inhibits job strain (Karasek & Theorell, 1990; Theorell & Karasek, 1996). The significant but low correlation ($r = -.14$, Table 1) between intrinsic motivation and fatigue observed in the present study is, however, in line with the fact that no earlier studies suggest that these two variables strongly affect each other (Parker & Sprigg, 1999). One of the theoretical contributions of the present study is that it provides further empirical evidence for the basic tenets of Karasek's (1979) initial demand-control model with regard to the buffering effect of job control on job strain. More importantly, the present study contributes to the theoretical development of the demand-control-support model by providing preliminary evidence for one of its basic, but largely neglected, tenets. Specifically, the findings suggest that as job demands increase, enhancing job control may lead to elevated levels of intrinsic motivation, but only when job social support is low. Unexpectedly, our findings suggest that increasing job social support is the most effective way to enhance intrinsic motivation, regardless of job demands and job control. Note that we are dealing here with the *perceived availability* of instrumental support, which may help nurses to deal with high job demands without their receiving actual help from others (Cohen & Wills, 1985). Receiving *actual help* may reduce feelings of autonomy and lower one's perceived competence and, consequently, it may lead to a decline in an employee's intrinsic work motivation (Deci et al., 1989; Vallerand, 1997).

Managerial Implications

The present study significantly improves academic knowledge about when high job demands tend to maximize intrinsic motivation and when the same job demands tend to escalate levels of job strain. A managerial implication of the pattern of findings is that work redesign interventions should include measures to provide employees the autonomy to manage the higher job demands associated with the redesign, so that job strain can be prevented and intrinsic motivation can be enhanced (e.g., Parker & Wall, 1998). Examples of ways to provide autonomy include giving groups of nurses discretion over day-to-day operational decisions as well as input into the running of their groups; rearranging production work to allow workers to influence their own working situations, work methods, and pace; and giving airline reservation clerks

authority to deal with special requests formerly referred to supervisors and to quote complex fares formerly referred to specialists. A key contribution of the present study is our finding suggesting that the perceived availability of instrumental support on the job may produce elevated levels of intrinsic work motivation, regardless of the level of job demands and job control. Hence, a priority of managers should be to teach employees about the helping potential of support systems within their organizations. For example, Heaney, Price, and Rafferty (1995) conducted a field experiment among human service workers to help to develop the skills and concepts necessary for enhancing and making fuller use of their existing social relationships. By mapping and diagnosing the strengths and weaknesses of their own social networks, participants in the experimental group explored how social support from others might help solve problems at work. Further, they worked on refining the interpersonal skills associated with exchanging social support with others, including clarifying misunderstandings, providing constructive feedback, and asking for help from others. Results indicated, among other things, that the intervention enhanced a positive work team climate. In conclusion, by enhancing job control and job social support rather than reducing job demands and sacrificing productivity, it seems possible to reduce job strain and to keep employees intrinsically motivated to do their highly demanding jobs.

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APPENDIX

Job demands. (1) Do you have to work fast? (2) Do you have too much work to do? (3) Do you have to work extra hard to finish a task? (4) Do you work under time pressure? (5) Do you have to rush? (6) Can you do your work in comfort? (reversed item) (7) Do you have to deal with a backlog at work? (8) Do you have too little work? (reversed item) (9) Do you have problems with the pace of work? (10) Do you have problems with the workload? (11) Do you wish you could work at an easier pace?

Job control. (1) Can you choose the methods to use in carrying out your work? (2) Do you plan your own work? (3) Do you set your own pace? (4) Can you vary how you do your work? (5) On your job, do you have the freedom to take a break whenever you wish to? (6) Do you decide on the order in which you do things? (7) Do you decide when to finish a piece of work? (8) Do you have full authority in determining how much time you spend on particular tasks? (9) Can you decide how to go about

getting your job done? (10) Does your job allow you to organize your work by yourself? (11) Do you have full authority in determining the content of your work?

Job social support. (1) Can you rely upon your immediate supervisor when things get tough at work? (2) If necessary, can you ask your immediate supervisor for help? (3) Can you rely upon your co-workers when things get tough at work? (4) If necessary, can you ask your co-workers for help?

Fatigue. (1) I find it difficult to relax at the end of a working day. (2) At the end of a working day, I feel really fatigued. (3) Due to my job, I feel rather exhausted at the end of a working day. (4) I mostly feel rather fit after dinner. (reversed item) (5) I usually do not calm down until my second day off. (6) After work, it takes effort to concentrate in my spare time. (7) When I just come home, I have little interest in other people. (8) In general, it takes me more than an hour to recover completely after work. (9) When I come home, they must leave me alone for a while. (10) After a working day, I frequently feel too fatigued to engage in any other activity. (11) During the last stage of a working day, I often feel too fatigued to perform well.

Intrinsic motivation. General stem: "Why do you do this job?" (1) For the pleasure it gives me to know more about my job. (2) For the pleasure of doing new things in my job. (3) For the pleasure I feel while learning new things in my job. (4) For the pleasure of developing new skills in my job. (5) Because I feel a lot of personal

satisfaction while mastering certain difficult job skills. (6) For the pleasure I feel while improving some of my weak points on the job. (7) For the satisfaction I experience while I am perfecting my job skills. (8) For the satisfaction I feel while overcoming certain difficulties in my job. (9) Because I feel pleasant in my job. (10) For the excitement I feel when I am really involved in my job. (11) For the intense pleasure I feel while I am doing the tasks that I like. (12) Because I like the feeling of being totally immersed in my job.



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