



The Demands-Control-Support model, locus of control and job dissatisfaction: a longitudinal study

ISABEL RODRÍGUEZ*, M. JESÚS BRAVO and
JOSÉ M. PEIRÓ

Department of Psychology, University of Valencia, Av. Blasco Ibañez 21, 46010
Valencia, Spain

WILMAR SCHAUFELI

Department of Social and Organizational Psychology, Faculty of Social Sciences,
University of Utrecht, Utrecht, The Netherlands

Keywords Job-Demands-Control model, Social support, Locus of control, Job stress

The Job-Demands-Control model (Karasek, 1979) has been widely studied in the job stress field, but the results obtained are frequently contradictory. Therefore, some investigations have expanded the model by including social support and personality characteristics such as locus of control. However, results obtained with these elaborated models have not been conclusive either. The present study sets out to integrate both types of expansions by simultaneously including social support at work and the employee's locus of control in a longitudinal multi-national study among 542 administrative personnel from Belgium, England, Spain, Italy and Israel. Hierarchical moderated multiple regression showed a significant 4-way interaction term (Demands \times Control \times Social support \times Locus of control) on the change in job dissatisfaction. This effect is qualified by the interaction between job demands and control only for an internal locus of control with high social support. Contrary to the prediction of the JDC model, which posits that high control has a buffering effect on job dissatisfaction, the study result indicates a damaging effect of excess control (perceived job control and high internal locus of control), specifically in high social support situations.

1. Introduction

One of the most widely studied theoretical approaches of job stress is the so-called Job-Demands-Control (JDC) model (Karasek, 1979; Karasek, and Theorell, 1990). The basic tenet of the JDC model is that job control or decision latitude is a crucial resource that moderates the potential negative effects of job stress. Hence, increasing employee's control prevents the occurrence of job strain, that is, job stress will not affect employee's physical and/or mental health when sufficient levels of control exist. In the past two decades numerous investigations on the JDC model have been carried out, but the results are contradictory (for recent reviews see De Jonge, and Kompier, 1997; Terry, and Jimmieson, 1999; Van der Doef, and Maes, 1999). Amongst others, the JDC model has been criticized

*Author for correspondence. e-mail Isabel.Rodriguez@uv.es

for being too simplistic (Baker, 1985; Hobfoll, 1988; Johnson, 1989; Parkes, 1991; Piltch, Walsh, Mangione, and Jennings, 1994). For instance, job control is just one of many potential psychosocial resources and Johnson (1986) has argued that social support plays a similar important role as job control in moderating the stressor (i.e. demands)-strain relationship. So the original JDC model was expanded by including social support. This revised so-called Job-Demands-Control-Support (JDCS) model was used to investigate cardiovascular disease (Johnson, and Hall, 1988; Johnson, Hall, and Theorell, 1989), somatic complaints and psychological strain (Andries, Kompier, and Smulders, 1996; De Jonge, Janssen, and Van Breukelen, 1996; Landsbergis, Schnall, Dietz, Friedman, and Pickering, 1992; Melamed, Kushnir, and Meir, 1991; Parkes, Mendham, and Von Rabenau, 1994; Schaubroeck, and Fink, 1998; Vahtera, Pentti, and Uutela, 1996). In addition, it has been pointed out that individual characteristics might play a role. For instance, Parkes (1991) argued that a possible explanation for the contradictory results of the JDC model is that individuals have different styles of adaptation to the job environment. She suggests that locus of control interacts with job demands and job control to predict job strain. Accordingly, some studies have expanded the JDC model by including locus of control (Daniels, and Guppy, 1994; Newton, and Keenan, 1990; Parkes, 1991).

The current study takes both previously mentioned criticisms into account by *simultaneously* incorporating into the original JDC model social support at work as well as the employee's locus of control. Next, the literature will be reviewed in greater detail for the JDC model and social support and locus of control

1.1. *The JDC model and social support*

The literature suggests that social support at work may either have a direct effect on the level of strains independent of the level of job stressors (Andries *et al.*, 1996; Loscocco, and Spitze, 1990; Parasuraman, Greenhaus, and Granrose, 1992; Payne, and Jones, 1987; Roxburgh, 1996) or a buffering effect by moderating the stressor-strain relationship (Beehr, King, and King, 1990; Cohen, and Wills, 1985; Greller, Parsons, and Mitchell, 1993; LaRocco, House, and French, 1980; Terry, Nielsen, and Perchard, 1993; Viswesvaran, Sanches, and Fisher, 1999). The stress-buffering hypothesis assumes that resources (i.e. social support of others) are effectively mobilized to counteract job stress so that negative consequences of job stress are prevented (Gore, 1985). Based on this reasoning and in accordance with the JDSC model of Johnson, and Hall (1988), it is expected that low support combined with high strain conditions (i.e. high demands and low control) will give rise to a decrease in mental health, relative to either low support and low strain conditions or high support and high strain conditions (*Hypothesis 1*).

Unfortunately, studies on the JDSC model, though limited, have not been unanimous in their results. As with the original JDC model, predicted results are obtained particularly with cardiovascular disease (Astrand, Hanson, and Isacson, 1989; Johnson, 1986; Johnson, and Hall, 1988; Johnson *et al.*, 1989), whereas for somatic complaints and psychological strain, results are contradictory. For instance, a study by Andries *et al.* (1996) claimed to support the JDSC model, they merely compared different combinations of the three variables and did not specifically test the 3-way multiplicative interaction term. However, the stress-buffering role of social support was not found in other studies (De Jonge *et al.*, 1996; Melamed *et al.*, 1991; Vahtera *et al.*, 1996). Furthermore, the results of the study by Parkes *et al.* (1994) were mixed, the model 'worked' for somatic symptoms but not for job satisfaction. Finally, Landsbergis *et al.* (1992) found a significant interaction between

demands, control and social support but did *not* replicate the expected stress-buffering effect of social support. The results of their study showed that in active jobs that are characterized by high demands and high control, poor social support was related to job dissatisfaction. However, contrary to expectations, in high-strain jobs that are characterized by high demands and low control, high support is related to job dissatisfaction. Similar results were found by Schaubroeck, and Fink (1998), who suggest that workers facing demanding job situations coupled with high control and low support, or low control and high support will tend to experience difficulties in coping because one key ingredient for successful coping (control or support) is missing. Employees in such jobs will also tend to make harmful internal attributions for their distress because they believe that they have the potential to cope with the situation although they fail to do so.

1.2 *The JDC model and locus of control*

Locus of control is the generalized belief that behavioural outcomes are under one's personal control (internal locus) rather than depending on outside forces, luck, or powerful others (external locus) (Rotter, 1966). According to Kahn, and Byosiere (1992) it is important to include the concept of locus of control in job stress research because it predicts that those with an internal locus of control are more likely to cope actively with job stress, whereas those with an external locus of control are more likely to refrain from action since they believe that changing the situation is beyond their power. Consequently, those with an internal locus in contrast to those with an external locus are expected to show higher levels of health and well-being when they are confronted with job stress. Moreover, and consistent with the previous reasoning, it has been argued that control is only likely to have a beneficial effect for individuals with an internal locus of control (Daniels, and Guppy, 1992; Frese, 1989; Kahn, and Byosiere, 1992; Parkes, 1989). In a similar vein, Parkes (1989) has pointed out that control is more likely to be perceived when objective control is high *and* the employee's locus of control is internal. Hence, it is expected that the stress-buffering effect of control will be exclusively observed in employees with an internal locus of control (*Hypothesis 2*).

Although in those studies on the JDC model that include locus of control significant interactions are found between demands, control and locus, results are not conclusive. For instance, some studies indeed observed that the moderator effect of control was exclusively found in those with an internal locus of control (Daniels, and Guppy, 1994; Vahtera *et al.*, 1996). In fact, Daniels, and Guppy (1994) found that the JDC model only 'works' as expected for those with an internal locus of control, whereas for those with an external locus of control the results showed an inverse buffering effect of control. Vahtera *et al.* (1996) expanded the JDC model by including sense of coherence (a concept similar to locus of control) in predicting sickness absence spells. Although the results depended on gender they, in general, seem to support the model for internal locus of control. However, in contrast, in two studies carried out by Parkes (1991), the JDC model only 'works' for an external locus of control, and because of this the author points out the need for taking into account locus of control in the JDC model.

1.3. *The JDC model, social support and locus of control*

Given the evidence on the effect of job control, Kasl (1989) recommends that future studies explore the interaction of control with other dimensions, such as social support or locus of control. Several authors suggest the exploration of relations and interactions

between the different variables that affect the job demands-psychological strain relationship. Job control, social support and intrapersonal control beliefs such as locus of control are among such variables, they are resources that may interact to promote or inhibit resistance to stress (Holahan, and Moos, 1990, cf. Vahtera *et al.*, 1996). So, use of higher-order interactions can help to explain equivocal results such as those obtained with the introduction of locus of control or social support in the JDC model.

In a similar vein, Parkes (1991, p. 309) states that

further research is needed to clarify the extent to which social support and locus of control overlap as moderators of stress-outcome relations in general, and as moderators of demand-discretion effects in particular

Although several studies have analysed second-order interactions, to date *no* study has simultaneously considered higher order interactions between job demands, job control, social support, and locus of control. For instance, significant interaction effects have been found of locus of control, social support and stressors on well-being. More specifically, it appeared that the buffering effect of social support occurs, basically, for those with an internal locus of control (Cummins, 1989, Fusilier, Ganster, Mayes, and Bronston, 1987, Lefcourt, Martin, and Saleh, 1984; Sandler, and Lakey, 1982).

However, these studies did *not* include job control and, in addition, they refer to life stressful events rather than to job stress. Two studies do include control and were carried out in a work setting. Nevertheless, neither of them has explicitly tested the 4-way interaction between job demands, job control, locus of control, and social support. The first study is the longitudinal investigation by Daniels, and Guppy (1994). Their results showed a significant 3-way interaction between job demands, locus of control, and social support. Those with internal locus of control with high social support were less likely to have decreased their psychological well-being when experiencing the effects of higher levels of demands. In addition, they found another interesting result: a 'floor' effect for the external locus of control with low social support, that is, an external locus of control and low social support was related to poor well-being, independently of the level of job demands. The second study tested a modified JDC model in which social support and sense of coherence were expected to modify the interaction between demands and job control (Vahtera *et al.*, 1996). It was found that in employees who work in active jobs and who have a strong sense of coherence (related to internal locus) and experience a high level of support have less sickness spells than those in active jobs with a weak sense of coherence and low level of support. Unfortunately, these results are based on cross-sectional data and higher-order interactions were not tested. Nevertheless, these studies show the interrelation between the four variables of interest: demands, control, social support, and locus of control.

In short, the JDCS model predicts a stress-buffering effect of social support. On the other hand, an internal locus of control seems to make a more effective use of both the received support (Cummins, 1989; Fusilier *et al.*, 1987; Sandler, and Lakey, 1982) and control (Daniels, 1992, Phares, 1976). Therefore, we expect that the JDC model will 'work' with high social support and internal locus, that is to say, control will have a more beneficial effect when social support is high and when the employee has an internal locus (*Hypothesis 3*)

1.4. *The present study*

Four issues need further clarification. First, since distress is related to age (Blanchard-Fields, and Friedt, 1988; Dodd-McCue, and Wright, 1996; Sevastos, Smith, and Cordery, 1992)

as well as to gender (Banks, and Jackson, 1982, Jick, and Mitz, 1985, Warr, and Jackson, 1983), the present study controls for these demographic variables that may act as confounders

Second, one of the criticisms of Karasek's research on the JDC model is that he used heterogeneous samples that come from different occupations and, therefore, the results may have been confounded by socioeconomic status (Sheffield, Dobbie, and Carroll, 1994) In order to control for this potential confounding effect, the ideal sample should be homogeneous as far as occupation is concerned. The present study takes this into consideration by including a homogeneous sample.

Third, as Brief, Butcher, George, and Link (1993) note, different facets of mental health may be differentially affected by different personality factors, situational circumstances, and their interaction. Original tests of the model (Karasek, 1979) found that decision latitude, demands, and their interaction were related to exhaustion, depression, and life and *job dissatisfaction*. However, Warr (1987) states that job factors are likely to have a greater significance to job-related mental health, such as job satisfaction, than to context-free mental health, which concerns life in general. On this issue, Melamed *et al* (1991) point out that job dissatisfaction is widely used as a marker of psychological stress. In fact, the main measure of job-related well-being used to test the job demand-control (-support) model is job satisfaction (Van der Doef, and Maes, 1999) Therefore, this study uses job satisfaction as an indicator of job-related mental health

Finally, Beehr, and Newman (1978) suggested the use of longitudinal designs because they are superior to cross-sectional designs when it comes to testing causal relations. Despite the fact that the use of longitudinal designs is a common suggestion in discussions of many papers (Carayon, 1993, Ganster, 1989; Johnson, 1989; Kasl, 1978, Martocchio, and O'Leary, 1989, Piltch *et al*, 1994), it is only rarely adopted (Carayon, Yang, and Lim, 1995, Daniels, and Guppy, 1994, Parkes, 1991; Parkes *et al.*, 1994). The present study uses a longitudinal design.

In summary, the aim of the present study is to test longitudinally an expanded JDC model, which incorporates social support and locus of control. More specifically three hypotheses are tested

- (1) *Hypothesis 1* Low support combined with high strain conditions gives rise to an increase in job dissatisfaction compared to either low support and low strain conditions or high support and high strain (Demands \times Control \times Social support interaction)
- (2) *Hypothesis 2* The stress-buffering effect of control is exclusively observed in employees with an internal locus of control (Demands \times Control \times Locus of control interaction).
- (3) *Hypothesis 3*. Job control has a more beneficial effect when social support is high and when the employee has an internal locus compared to the remaining conditions (Demands \times Control \times Social support \times Locus of control interaction).

2. Method

2.1. Design

The data used in the present study were collected as part of a larger longitudinal international project that investigated the early work role developmental period, the 'Work of Youth Socialization' (WOSY) project (WOSY International Research Group, 1989a). The WOSY project conceives of work role development as systematic, organized and successive changes

(and stability) in youth, including work values and experiences, behavioural strategies, and work outcomes (Feij, Whitely, Peiró, and Taris, 1995, Touzard, 1992).

The WOSY project used a three-wave panel. At Time 1, the participants were employed for 3 to 9 months in their first full-time employment, which coincides with the common probationary period in Europe. This criterion is consistent with work and organizational psychology research that indicates that such a period is necessary for behaviours, preferences and performance to stabilize (Katz, 1982). Time 2 data were collected 9–12 months later, and Time 3 outcome was assessed about 2 years after the initial assessment.

All data were obtained through self-report measures. The same questionnaire has been used at all times in the form of an individual interview. Interviews were conducted at the home of the subject by trained graduate psychology students. The interview schedule was developed through a series of pilot studies conducted in each country. In these pilot studies, the selected questions and scales were evaluated with respect to their applicability for the population in question and their reliability (for further details on the questionnaire and procedures, see Whitely, Peiró, and Sarchielli (1992) and WOSY International Research Group (1989b).

In the present study, only data from the final two waves were employed. The reason for this is that we were interested in predicting the change in job dissatisfaction between T2 and T3, after the young employees have been in their first jobs for at least 1 year. Research suggests that possible effects of role stress (our indicator of job demands; see later) occur in later periods of the work socialization process (Whitely, Dougherty, and Dreher, 1992).

Changes in job dissatisfaction—the dependent variable in our study—have been studied by controlling for T2 baseline levels when performing regression analyses with T3 levels of job dissatisfaction.

2.2. Sample

The cross-national character of the investigation means that the conditions that define the sample have been elaborated with meticulous detail, so that they are similar in all participant countries, assuring in this way the comparability of the outcomes. So, the sample is not intended to be representative of either national or regional labour forces, but it is a target group that allows the work role development to be analysed more clearly.

The sample was composed of naive users or operators of complex information systems (office technology) who were in their first full-time employment. The sample was standardized in all countries in terms of kinds of occupations to include or exclude. So, the group consisted of youth beginning employment in office automation at T1, and their jobs were mainly concerned with dealing with data. The group included job titles such as word processor operators, typists, micro or mini computer operators, clerks, and other data processing machine operators. Note that it excluded more complex jobs such as software writers and computer science personnel. Respondents may work in public or private organizations.

Respondents were approached via vocational training schools or by employers. A total of 1351 young employees were interviewed at Time 1, 72% and 60% of the Time 1 sample were followed up at Time 2 ($N=973$) and Time 3 ($N=814$), respectively. Complete data were available for 542 respondents at all three assessments, these respondents make up the sample in the present study.

Participants who provided complete data at all points in time differed from those who

failed to provide complete data at Time 3. Results from the *t*-tests showed that the former group reported higher job demands ($t=7.423, p<.01$), lower control ($t=19.216, p<.001$), lower support from supervisors and co-workers ($t=7.331, p<.01$), a more external locus ($t=57.205, p<.001$) and lower job satisfaction ($t=6.822, p<.01$) than the latter group at T1. In other words, the drop-outs scored more positive on all variables concerned, which leaves a relatively less 'positive' group for testing our hypotheses.

So, the sample in the present study was composed of 171 men (31.6%) and 371 women (68.4%). Ages ranged from 18 to 36 years (mean=22.6 years; SD=3.1 years). The participants came from five countries: Belgium ($N=92$; 17%), England ($N=134$; 25%), Spain ($N=123$; 23%), Italy ($N=134$, 25%), and Israel ($N=59$, 11%).

2.3. Measures

2.3.1. *Sociodemographic variables*: Age was measured in years and gender was codified as a dummy variable (0=female, 1=male).

2.3.2. *Job demands*: These have been assessed using a well-validated 5-item scale of role conflict (Rizzo, House, and Lirtzman, 1970), whose content is rather similar to the original job demands concept used by Karasek (1979) (e.g. 'On my job, I can't satisfy everybody at the same time', 'I never seem to have enough time to get everything done on my job') and has been used in several studies to operationalize job demands (Sargent, and Terry, 1998; Schaubroeck, and Fink, 1998; Westman, 1992). Respondents are asked to rate their present job on a 5-point Likert scale ranging from 1=not applicable to 5=very much applicable.

2.3.3. *Job control*: Job control has been measured by the Autonomy in Decision Making scale developed by the WOSY International Research Team (1989b). Its content refers to the 'decision authority', one of the two components of the 'decision latitude' concept used by Karasek (1979). The scale consisted of three items about the autonomy of the subject who has to decide what to do in his/her work (tasks and responsibilities), the way to do his/her work (procedures or methods) and the timing or the sequence in which to do his/her work (tasks or assignments). The items have a 5-point Likert answering format, ranging from 1=never to 5=very at all.

2.3.4. *Social support at work*: Perceptions of work-related social support were assessed using a 6-item scale derived from the Supervisor and Co-worker Relation scales, from the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, and Lofquist, 1965). The scale consisted of six, 5-point items with a Likert answering format, ranging from 1=not applicable to 5=very much applicable. The first four items refer to the relationships with the supervisor (e.g. 'My supervisor provides me with helpful advice on how to do my work tasks'), whereas the last two items refer to the relationships with the co-workers (e.g. 'My co-workers have taught me how to cope with pressures or conflicting demands in my job'). A total score was calculated from all six items.

2.3.5. *Locus of control*: This has been measured by a unidimensional scale adapted to work situations, according to the suggestion of Spector (1988), developed by the WOSY International Research Team (1989b). Respondents were asked to indicate the extent to which they agree with five statements about work and employment (e.g. 'Being successful at work is just a matter of luck'). The items had a 5-point response scale, ranging from 1=strongly disagree to 5=strongly agree. High scores represent externality.

2.3.6. *Job dissatisfaction*: Job dissatisfaction was measured by a 5-item scale derived from the Minnesota Satisfaction Questionnaire (Weiss *et al.*, 1965). The items have a 5-point Likert answering format, ranging from 1 = not satisfied to 5 = extremely satisfied. Four items stem from and focus on specific facets of the job, such as salary, security, friendly relationships with co-workers, and the competence of the supervisor in making decisions. The fifth item refers to the general job satisfaction. A total score was calculated from the five items where high scores represent high job dissatisfaction. Job dissatisfaction was assessed at Time 2 and Time 3

2.4. *Data analysis procedure*

Moderated multiple regression was the main statistical technique used in this study. To test for interaction terms, we developed a hierarchical regression model in which the independent variables were entered in a predetermined sequence so that 'terms of lower order are partialled from those of higher order and not vice versa' (Cohen, 1978). Interaction terms were entered after main effects (Cohen, and Cohen, 1983). The interaction is carried by the product of all constituent variables (Cohen, and Cohen, 1983). Following suggestions made by several authors (Cohen, and Cohen, 1983; Cronbach, 1987; Finney, Mitchell, Cronkite, and Moos, 1984; Jaccard, Turrisi, and Wan, 1990), centred scores (deviations from the mean) have been used as a means of addressing the problem of multicollinearity. Since tolerance indexes in all the cases are higher than .65, multicollinearity should not be considered to be a problem.

The longitudinal design of the present study has enabled the authors to follow the method recommended by several authors for analysing change in most non-experimental studies (Cohen, and Cohen, 1983; Finkel, 1995; Markus, 1979). The Time 2 outcome scores were entered as a first step predictor. So, initial levels of job dissatisfaction have been controlled for. Such a design serves to strengthen the argument that predictor variables play a causal role in relation to changes in job dissatisfaction (Cohen, and Cohen, 1983; Finkel, 1995; Kasl, 1987; Plewis, 1985).

3. Results

3.1. *Preliminary analyses*

The correlations among the variables and their respective means, standard deviations and reliabilities (Cronbach's α) are shown in table 1.

Except for job dissatisfaction at T2 and locus of control, all values of α meet the criterion of .70 (Nunnally, 1978).

The results show a significant positive correlation between age and job demands, job dissatisfaction and gender (the men are older than the women). Likewise, there exists a significant negative correlation between age and social support and a significant positive correlation between support and job control. Moreover, compared to women men experience more job demands (role conflict) and more job control.

In relation to job dissatisfaction, the correlations indicate that the higher job demands, the lower control, the lower social support, and the more external locus of control, the higher is job dissatisfaction.

Finally, the correlation between the level of job dissatisfaction at T2 and at T3 is also significant, showing considerable test-retest reliability of stability across time.

Table 1 Descriptive statistics of the study variables (reliability on the diagonal of the correlation matrix)

	Mean	SD	1	2	3	4	5	6	7	8
1 Age (years)	22.63	3.08	—							
2 Gender	—	—	.09*	—						
3 Demands	2.50	.88	.15**	.16**	(.80)					
4 Control	3.71	.84	-.04	.10*	.03	(.77)				
5 Social support	3.00	.80	-.15**	-.01	-.02	.21**	(.75)			
6 Locus	2.57	.53	-.03	-.01	.06	-.07	-.03	(.52)		
7. Job dissatisfaction (T2)	2.71	.64	.12**	-.01	.13**	-.14**	-.26**	.07	(.65)	
8 Job dissatisfaction (T3)	2.71	.66	.15**	.00	.20**	-.23**	-.48**	.10*	.51**	(.72)

Gender 0 = female, 1 = male

* $p < .05$, ** $p < .01$

3.2. Hypothesis testing

In order to test the three hypotheses stated, we carried out a moderated hierarchical regression analysis where the interactions between the variables concerned are entered: Job demands \times Control \times Social support (hypothesis 1), Job demands \times Control \times Locus of control (hypothesis 2) and Job demands \times Control \times Social support \times Locus of control (hypothesis 3). Likewise, because of the moderate internal consistency of the measurement of locus of control used, some supplementary analyses have been conducted by using the latent variable derived from the items in the locus of control scale, to attempt to correct for measurement error. That is, factor scores resulting from a principal components analysis have been used in the moderated regression. The results obtained with these scores were similar to those obtained in the standard moderated regression. The results are shown in table 2.

First, it can be noted that job dissatisfaction at T2, job demands, control and social support significantly predict job dissatisfaction at T3. Increases in job demands, decreases in control and decreases in social support increase job dissatisfaction. These significant main effects are consistent with the JDCS model.

Second, hypothesis 1 and hypothesis 2 are not supported by the data. The interaction between job demands, control and social support is not significant, therefore it is not corroborated that low support combined with high strain conditions gives rise to an increase in job dissatisfaction compared to either low support and low strain conditions or high support and high strain (hypothesis 1). In a similar vein, the interaction between job demands, control and locus of control is not significant; therefore the assumption that the stress-buffering effect of control is exclusively observed in employees with an internal locus of control (hypothesis 2) is not corroborated. However, the results do show a significant interaction between job demands, control, social support and locus of control ($p \leq .05$). In order to clarify the nature of the interaction effects, a graphical representation is presented in figure 1. Independent regression lines have been plotted to represent the relationship between job demands and the change in job dissatisfaction, taking values of control, social support and locus of control of 1 SD above and below the mean (figure 1).

Table 2. Results for the demands-control-social support-locus model.

Source	R^2 increment	F	β
Job dissatisfaction at Time 2	265	194.95***	39***
Age†			.01
Gender	009	3.33	-.03
Job demands†			.11***
Control	.040	15.63***	-.06*
Social support†			-.29***
Locus of control	.111	51.54***	.07
Job demands × Control†			.05
Job demands × Social support			-.05
Job demands × Locus of control			.03
Control × Social support			.01
Control × Locus of control			-.07
Social support × Locus of control	.011	1.71	-.08
Job demands × Control × Social support†			.27
Job demands × Control × Locus			-.03
Job demands × Social support × Locus			.08
Control × Social support × Locus	003	< 1	.02
Job demands × Control × Support × Locus†	.005	4.70*	-.11*
Overall R^2	444	23.21***	

β are the unstandardized regression coefficients from the final stage of the regression analysis

† Indicates a new step in the hierarchical analysis

Results do not change when country is controlled for

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

First, a clear main effect of social support appears. A high social support gives rise to a decrease in job dissatisfaction in all conditions.

However, the relationship between the other variables concerned depends on the level of social support. When social support is low, there is no interaction between demands, control and locus of control, indicating additive effects only: the regression lines in figure 1 are practically parallel. Increases in job demands, decreases in control and an external locus of control increase job dissatisfaction. Besides, there is a 'ceiling' effect; employees with low social support, external locus, and low control are those who have the highest job dissatisfaction.

On the other hand, when social support is high, the relationship between demands and control depends on the locus of control. The relationship is additive for external people. In this case, both high job demands and low control produce an increase in job dissatisfaction. For those with an internal locus of control there is an interaction between job demands and control. However, this interaction is opposite to that predicted by the JDC model. When job demands increase, increases in job control give rise to increases in job dissatisfaction, while low job control has a beneficial effect. Therefore, these results do not support hypothesis 3, which states that job control has a more beneficial effect when social support is high and when employees have an internal locus compared to the remaining conditions.

4. Discussion

The JDC model has generated numerous investigations, which have found contradictory results. Likewise, the model has been criticized for several reasons. One of the most

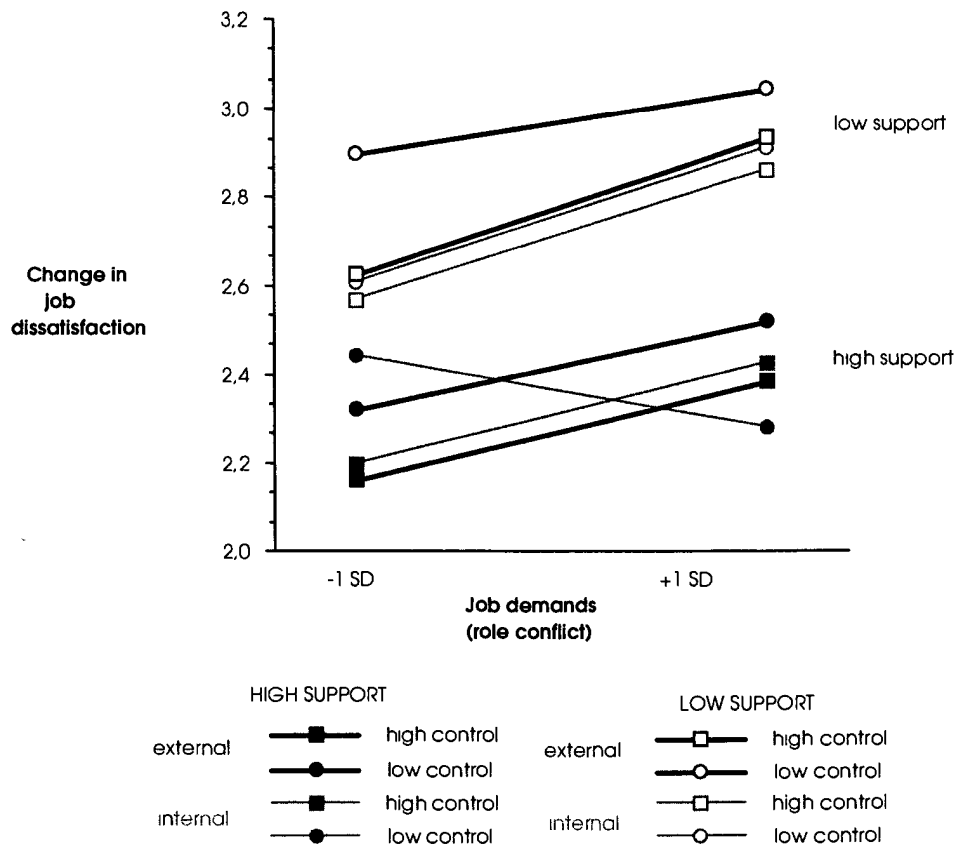


Figure 1 Regression slopes of job demands upon job dissatisfaction contingent upon control, social support and locus of control

common criticisms is that it is too simplistic (Baker, 1985; Hobfoll, 1988; Johnson, 1989, Parkes, 1991; Piltch *et al*, 1994). In order to tackle this problem of excessive simplification, several authors have expanded the original model to include social support (Johnson, and Hall, 1988, Johnson *et al*, 1989; Landsbergis *et al.*, 1992), or locus of control (Daniels, and Guppy, 1994; Newton, and Keenan, 1990; Parkes, 1991).

However, results from both expanded models are also equivocal. Several authors have suggested the exploration of relations and interaction between the different variables which affect the job demands-psychological strain relationship (Kasl, 1989; Parkes, 1991; Van der Doef, and Maes, 1999), such as job control, social support and locus of control. However, as far as we know, no study has simultaneously explored the interactions between these variables, although they could help to explain the equivocal results obtained.

Based on a review of the literature, three hypotheses have been formulated and empirically tested. First, low support combined with high strain conditions gives rise to an increase of job dissatisfaction compared to either low support and low strain conditions or high support and high strain. Second, the stress-buffering effect of control is exclusively observed in employees with an internal locus of control. Finally, job control has a more beneficial effect when social support is high and when the employee has an internal locus compared to the remaining conditions.

Although job-demands, job control, and social support showed the expected main effects, their interaction was *not* significant (hypothesis 1), which supports the results by DeJonge *et al.* (1996), Melamed *et al.* (1991) and Vahtera *et al.* (1996). Parkes *et al.* (1994) did not find a significant interaction for job satisfaction, although the JDCS model significantly predicted somatic symptoms. However, the present results are opposite to those of Andries *et al.* (1996), but these authors did not test the mathematical interaction. Likewise, Landsbergis *et al.* (1992) and Schaubroeck, and Fink (1998) found a significant effect of such interaction but some results were opposite to those predicted by the JDCS model. As DeJonge *et al.* (1996) suggest, the model should be expanded in a new direction. They suppose that the fact that personality characteristics are ignored in the JDCS model may confound the relationship between job conditions and job strain. In a similar vein, Parkes *et al.* (1994) suggest that further research, incorporating personality factors, such as locus of control, would be valuable in extending their findings.

The job demands-job control-locus of control interaction was *not* significant either (hypothesis 2). These results are opposite to those found by Daniels, and Guppy (1994), Parkes (1991) and Vahtera *et al.* (1996). However, whereas Daniels, and Guppy (1994) and Vahtera *et al.* (1996) found that the JDC model 'worked' for those with an internal locus of control, Parkes (1991) found that it 'worked' for those with an external locus of control. Alternatively, it is possible that the conflicting findings could be due to an important psychosocial characteristic (i.e. social support) that has been ignored. As Parkes (1994) points out, personality-stressor interactions may also be moderated by further psychosocial variables, such as social support. So, Lefcourt *et al.* (1984) suggest that interaction between social support and locus of control is one of the more reliable findings that may help to clarify the role that locus of control plays in determining how persons react to stress. Parkes (1991) suggests that further research is needed to clarify the extent to which social support and locus of control overlap as moderators of stress-outcome relations in general and as moderators of demand-discretion effects in particular.

These conjunctive moderator effects have been studied in the present study and the results show indeed a significant interaction between job demands, job control, social support and locus of control, but not in the same way as stated in hypothesis 3. It seems that in job environments with poor support, job demands, job control and locus of control have additive effects. So, a 'ceiling effect' has been found: employees with the highest job dissatisfaction are those with low social support, low job control and an external locus, that is to say, employees with little social support, low job control and who hardly believe in their ability to control their job environment.

Results are different for job environments with high social support, the relationship between job demands and control being dependent on locus of control. For external loci of control the relationship is additive. However, for internal loci of control, a significant interaction was observed between job demands and control that is opposite to that predicted by the JDC model. When job demands increase, increases in control gave rise to higher job dissatisfaction, whereas low control has a beneficial effect. These results suggest a detrimental impact on job satisfaction of experiencing an excess of control in one's job. Furthermore, since social support may provide a means of changing the environment, social support can be argued to represent, in some circumstances, an aspect of control, which may be obtained by requesting and/or receiving help from others (Daniels, and Guppy, 1994). Accordingly, the highest level of control is observed when social support and perceived control are high and when, in addition, employees believe that they have the ability to control their job environment (internal locus). If, in spite of this, demands

remain high, then this experience has a negative effect because 'too much control, relative to abilities, promotes threatening feelings of personal incompetence' (Bazerman, 1982, cf. Schaubroeck, and Fink, 1998, p. 190) and therefore it could increase job dissatisfaction. In a somewhat similar vein, De Rijk, LeBlanc, Schaufeli, and de Jonge (1998) found that a misfit between the experiences level of job control and individual coping style intensified the stress-enhancing experience of job demands.

A second issue is interesting to note and although the amount of variance explained is small (0.5%) this does not deny the theoretical relevance of the results and it does not mean that the interaction effect has little substantive significance (Frese, and Zapf, 1988; Wall, Jackson, Mullarkey, and Parker, 1996). The size of effect is attenuated by measurement error and this is greatly exacerbated when variables are multiplied together to form a cross-product term as required to test interactions in regression analysis (Aiken, and West, 1991, cf. Wall *et al.*, 1996). In spite of it, the interaction shows significant effects. Moreover, despite that, because of sampling bias, restriction of range on the independent variables might have occurred, it is noteworthy that many expected results were obtained.

The results obtained acquire greater relevance if the longitudinal character of the study is taken into account. Few studies about this issue have used a longitudinal methodology (Daniels, and Guppy, 1994; Parkes, 1991, Parkes *et al.*, 1994) and it is especially important because it not only allows identification of the relationship between variables but also it explains the change in the dependent variable. So, baseline job dissatisfaction levels were controlled prior to examining the extent to which the predictive model explained T3 job dissatisfaction. This strengthens the argument that the variables concerned play a causal role in relation to changes in job dissatisfaction.

In conclusion, our results support the basic tenet that the JDC model is too simplistic to adequately explain the job satisfaction of workers. The assumption of Karasek (1979) that giving job control to workers will prevent negative consequences of stress is not supported by the present results. The stress process is very complex and includes a lot of variables, some of them, such as locus of control and social support, have been analysed in the present study. This increasing complexity of the model suggests that research on stress would benefit from a new approach. However, the results from our study show that locus of control and social support play a significant role in bringing about the beneficial or detrimental effect of control at work. This result is important from a theoretical view but likewise it has practical repercussions in order to design intervention strategies to prevent and manage job stress. Interventions can be carried out at an organizational or individual level (Quick, Quick, Nelson, and Hurrell, 1997). The former consists of changing work conditions so that they are less harmful for workers. The second focus on increasing the resistance of people to work stressors. Organizational psychologists have traditionally tried to reduce the effects of stress more than the presence of stressors at work. As a consequence, the main focus of interventions has been on people instead of on job context (Kahn, and Byosiere, 1992; Peiró, and Salvador, 1993, Quick *et al.*, 1997). However, these authors point out that it is necessary to emphasize interventions at an organizational level that foster primary prevention, thus using strategies to reduce stressors is critical. On this issue, our results point out that increasing control is not always an effective way to prevent the harmful outcomes of job stress. In fact, individual difference moderators, as locus of control, suggest that organizational interventions do not produce uniformly positive effects (see the review by Briner, and Reynolds, 1999). In sum, the moderator role of locus of control, together with the fact that social support seems to have a beneficial effect for job satisfaction, suggests that a micro approach has to be considered in addition to macro interventions. Therefore managers should be trained to be sensitive to local or individual reactions to work conditions.

On the other hand, the present study has several limitations that contribute to clarify their scope and offer suggestions for future studies

First, this study was designed to analyse specific groups instead of being a representative sample. The use of a specific occupational group has the advantage of avoiding the confounding effects of occupational differences but it has the disadvantage that results cannot be generalized to other occupations. Therefore, replication of these results in several different occupational groups is necessary

Second, all measurements used are self-reports, which raises questions about the common method variance. However, both main and interactive effects have been assessed and whereas the former may be due to the effects of method, the interactive relationships cannot be easily attributed to method variance. As pointed out by Wall *et al.* (1996), the impact of common method variance would be to inflate the main effects at a cost to the detection of interaction effects. In spite of this, it would be important to use multimethod measurements. Investigations are needed which combine self-report measurements of control and more objective measures in order to study effects of work conditions that objectively differ in terms of control (Parkes, 1989).

Third, several researchers (Brief, Burke, George, Robinson, and Webster, 1988; Payne, 1988) have recommended that negative affectivity should be controlled in job stress research because of the correlation between this and other variables. However, Spector, Zapf, Chen, and Frese (2000, p. 91) disagree that controlling for negative affectivity is a proper strategy, 'because there is the danger of actually subtracting true variance from the stressor-strain relations'. On the other hand, some studies have shown that negative affectivity does not account for the relation between job stressors and job satisfaction (Moyle, 1995, Schaubroeck, Ganster, and Fox, 1992). Hence, we believe that it is unlikely that controlling for negative affectivity would have influenced the study results.

Fourth, it is necessary to consider the relatively low internal consistency of the measurement of locus of control used. However, despite its moderate consistency, it gives indications of relevant perceptions of control and points to the importance of taking into account such variables in studies about stress.

Nevertheless, the present study emphasized the importance of analysing several moderators simultaneously. As higher-order interactions are difficult to replicate, other studies are needed to establish the validity and generalizability of our findings. Finally, our study points to the fruitfulness of considering more complex models of job stress, whereby individual and organizational variables are studied simultaneously.

Acknowledgements

The contribution of Wilmar Schaufeli to this paper was supported by a grant from the Spanish Ministry of Education and Culture (#SAB1998-0206). The authors would like to thank the anonymous reviewers for their helpful comments. The WOSY International Research Team is composed of the following researchers: Prof. P. Coetsier and Prof. R. Claes (Univ. Gent, Belgium), Prof. A. Lancry and Prof. H. Touzard (Univ. Paris, France), Prof. J. Feij (Univ. Amsterdam, The Netherlands), Prof. I. Harpaz (Univ. Haifa, Israel), Prof. G. Sarchielli and Prof. M. Depolo (Univ. Trent and Bologna, Italy), Prof. J. Correia Jesuino (Univ. Lisbon, Portugal), Prof. M. Banks and Prof. B. Parkinson (Univ. Sheffield, UK), Prof. A. Ruíz Quintanilla (Technical Univ. of Berlin, Germany), Prof. W. Whitely (Univ. Oklahoma, USA) and Prof. J. M. Peiró (Univ. Valencia, Spain).

References

- AIKEN, L., & WEST, S. G. (1991) *Multiple Regression Testing and Interpreting Interactions*. Newbury Park, CA Sage
- ANDRIES, F., KOMPIER, M. A. J., & SMULDERS, P. G. W. (1996) Do you think that your health or safety are at risk because of your work? A large European study on psychological and physical work demands. *Work and Stress*, 10, 104–118
- ASTRAND, N. E., HANSON, B. S., & ISACSON, S. O. (1989) Job demands, job decision latitude, job support and social network factors as predictors of mortality in a Swedish pulp and paper company. *British Journal of Industrial Medicine*, 46, 334–340
- BAKER, D. B. (1985) The study of stress at work. *American Review of Public Health*, 6, 367–381
- BANKS, M. H., & JACKSON, P. R. (1982) Unemployment and risk of minor psychiatric disorder in young people. Cross-sectional and longitudinal evidence. *Psychological Medicine*, 12, 789–798
- BAZERMAN, M. H. (1982) Impact of personal control on performance: Is added control always beneficial? *Journal of Applied Psychology*, 67, 472–479
- BEEHR, T. A., KING, L. A., & KING, D. W. (1990) Social support and occupational stress: Talking to supervisors. *Journal of Vocational Behavior*, 36, 61–81
- BEEHR, T. A., & NEWMAN, J. E. (1978) Job stress, employee health and organizational effectiveness: A facet analysis, model, and literature review. *Personnel Psychology*, 31, 665–699
- BLANCHARD-FIELDS, F., & FRIEDT, L. (1988) Age as a moderator of the relation between three dimensions of satisfaction and sex role. *Sex Roles*, 18, 759–768.
- BRIEF, A. P., BUTCHER, A. H., GEORGE, J. M., & LINK, K. E. (1993) Integrating bottom-up and top-down theories of subjective well-being: The case of health. *Journal of Personality and Social Psychology*, 64, 646–653
- BRIEF, A. P., BURKE, M. J., GEORGE, J. M., ROBINSON, B., & WEBSTER, J. (1988) Should negative affectivity remain an unmeasured variable in the study of job stress? *Journal of Applied Psychology*, 73, 193–198
- BRINER, R. B., & REYNOLDS, S. (1999) The costs, benefits, and limitations of organizational level stress interventions. *Journal of Organizational Behavior*, 20, 647–664
- CARAYON, P. (1993) A longitudinal study of job design and worker strain: Preliminary results. In J. C. Quick, L. R. Murphy, & J. J. Hurrell (Eds.), *Stress and Well-Being at Work* (pp. 19–32). Washington, DC: American Psychological Association
- CARAYON, P., YANG, C. L., & LIM, S. Y. (1995) Examining the relationship between job design and worker strain over time in a sample of office workers. *Ergonomics*, 38, 1199–1211
- COHEN, J. (1978) Partialled products are interactions, partialled powers are curve components. *Psychological Bulletin*, 85, 858–866
- COHEN, J., & COHEN, P. (1983) *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Hillsdale, NJ: Erlbaum
- COHEN, S., & WILLS, T. A. (1985) Stress, social support and the buffering hypothesis. *Psychological Bulletin*, 98, 310–357
- CRONBACH, L. J. (1987) Statistical tests for moderator variables: Flaws in analysis recently proposed. *Psychological Bulletin*, 102, 414–417
- CUMMINS, R. (1989) Locus of control and social support: Clarifiers of the relationships between job stress and job satisfaction. *Journal of Applied Social Psychology*, 19, 772–788
- DANIELS, K. (1992). *Occupational Stress and Control: Implications for Employee Well-being*. Unpublished Ph.D. thesis, Cranfield Institute of Technology, Surrey
- DANIELS, K., & GUPPY, A. (1992) Control, information-seeking preferences, occupational stressors and psychological well-being. *Work and Stress*, 6, 347–353
- DANIELS, K., & GUPPY, A. (1994) Occupational stress, social support, job control, and psychological well-being. *Human Relations*, 47, 1523–1544
- DE JONGE, J., JANSSEN, P. P. M., & VAN BREUKELEN, G. J. P. (1996). Testing the demand-control-support model among health-care professionals: A structural equation model. *Work and Stress*, 10, 209–224
- DE JONGE, J., & KOMPIER, M. A. J. (1997) A critical examination of the demand-control-support model from a work psychological perspective. *International Journal of Stress Management*, 4, 235–258.
- DE RIJK, A., LE BLANC, P. M., SCHAUFELI, W. B., & DE JONGE, J. (1998) Active coping and need for control as moderators of the job demand-control model: Effects on burnout. *Journal of Occupational and Organizational Psychology*, 71, 1–18

- DODD-McCUE, D., & WRIGHT, G. B. (1996) Men, women, and attitudinal commitment: The effects of workplace experiences and socialization. *Human Relations*, 49, 1065-1091
- FEIJ, J. A., WHITELEY, W. T., PEIRÓ, J. M., & TARIS, T. W. (1995) The development of career-enhancing strategies and content innovation: A longitudinal study of new workers. *Journal of Vocational Behavior*, 46, 231-256
- FINKEL, S. E. (1995) *Causal Analysis with Panel Data*. Newbury Park, CA: Sage.
- FINNEY, J. W., MITCHELL, R. E., CRONKITE, R. C., & MOOS, R. H. (1984) Methodological issues in estimating main and interactive effects: Examples from coping/social support and stress field. *Journal of Health and Social Behaviour*, 25, 85-98
- FRESE, M. (1989) Theoretical models of control and health. In S. L. Sauter, J. J. Hurrell, & C. L. Cooper (Eds.), *Job Control and Worker Health* (pp. 107-128). Chichester: Wiley
- FRESE, M., & ZAPF, D. (1988) Methodological issues in the study of work stress: Objective versus subjective measurement of work stress and the question of longitudinal studies. In C. L. Cooper, & E. Payne (Eds.), *Causes, Coping, Consequences of Stress at Work* (pp. 375-412). Chichester: Wiley
- FUSILIER, M. R., GANSTER, D. C., MAYES, B. T., & BRONSTON, T. (1987). Effects of social support, locus of control and role stress on health. *Journal of Management*, 13, 517-528
- GANSTER, D. C. (1989). Worker control and well-being: A review of research in the workplace. In S. L. Sauter, J. J. Hurrell, & C. L. Cooper (Eds.), *Job Control and Worker Health* (pp. 3-23). Chichester: Wiley
- GORE, S. (1985). Social support and styles of coping with stress. In S. Cohen, & S. L. Syme (Eds.), *Social Support and Health* (pp. 263-278). Orlando, FL: Academic Press
- GRELLER, M. M., PARSONS, C. K., & MITCHELL, D. R. D. (1993) Additive effects and beyond: Occupational stressors and social buffers in a police organization. In J. C. Quick, L. R. Murphy, & J. J. Hurrell (Eds.), *Stress and Well-Being at Work* (pp. 33-47). Washington, DC: American Psychological Association
- HOLAHAN, C. J., & MOOS, R. H. (1990) Life stressors, resistance factors and improved psychological functioning: An extension of the stress resistance paradigm. *Journal of Personality and Social Psychology*, 58, 909-917
- HOBFOLL, S. E. (1988) *The Ecology of Stress*. New York: Hemisphere
- JACCARD, J., TURRISI, R., & WAN, C. K. (1990). *Interaction Effects in Multiple Regression*. Newbury Park, CA: Sage
- JICK, T. D., & MITZ, L. F. (1985) Sex differences in work stress. *Academy of Management Review*, 10, 408-420
- JOHNSON, J. V. (1986) The impact of workplace and social support, job demands and work control upon cardiovascular disease in Sweden. Unpublished Ph.D. thesis, Department of Psychology, University of Stockholm [ISSN 0283-3670]
- JOHNSON, J. V. (1989). Control, collectivity and the psychosocial environment. In S. L. Sauter, J. J. Hurrell, & C. L. Cooper (Eds.), *Job Control and Worker Health* (pp. 55-74). Chichester: Wiley
- JOHNSON, J. V., & HALL, E. M. (1988) Job strain, workplace social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish Working population. *American Journal of Public Health*, 78, 1336-1342.
- JOHNSON, J. V., HALL, E. M., & THEORELL, T. (1989) Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population. *Scandinavian Journal of Work, Environment and Health*, 15, 271-279
- KAHN, R. L., & BYOSIERE, P. (1992) Stress in organizations. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology* (2nd ed., pp. 571-650). Palo Alto, CA: Consulting Psychologists Press
- KARASEK, R. A. (1979). Job demands, job decision latitude and mental strain. Implications for job redesign. *Administrative Science Quarterly*, 24, 285-308.
- KARASEK, R. A., & THEORELL, T. (1990) *Healthy Work. Stress, Productivity and the Reconstruction of Working Life*. New York: Basic Books
- KASL, S. V. (1978) Epidemiological contributions to the study of work stress. In C. L. Cooper, & R. Payne (Eds.), *Stress at Work* (pp. 3-48). New York: Wiley
- KASL, S. V. (1987) Methodologies in stress and health: Past difficulties, present dilemmas, future directions. In S. V. Kasl, & C. L. Cooper (Eds.), *Stress and Health: Issues in Research Methodology* (pp. 307-318). Chichester: Wiley

- KASL, S V (1989) An epidemiological perspective on the role of control in health In S L Sauter, J J Hurrell, & C L Cooper (Eds), *Job Control and Worker Health* (pp. 161–190). Chichester Wiley
- KATZ, R (1982) Managing careers The influence of job and group longevities In R Katz (Ed), *Career Issues in Human Resource Management* (pp. 154–181) Englewood Cliffs, NJ: Prentice-Hall.
- LANDSBERGIS, P. A., SCHNALL, P L, DIETZ, D., FRIEDMAN, R., & PICKERING, T G (1992). The patterning of psychological attributes and distress by job strain and social support in a sample of working men. *Journal of Behavioral Medicine*, 15, 379–405.
- LAROCOCCO, J. M., HOUSE, J S, & FRENCH, J R (1980) Social support, occupational stress, and health *Journal of Health and Social Behavior*, 21, 202–218
- LEFCOURT, H. M., MARTIN, R. A., & SALEH, W. E (1984) Locus of control and social support Interactive moderators of stress *Journal of Personality and Social Psychology*, 47, 378–389
- LOSCOCOCCO, K A., & SPITZE, G (1990) Working conditions, social support and the well-being of female and male factory workers. *Journal of Health and Social Behavior*, 31, 313–327.
- MARKUS, G. B (1979). *Analysing Panel Data* Beverly Hills, CA Sage
- MARTOCCHIO, J J, & O'LEARY, A M (1989) Sex differences in occupational stress. A meta-analytic review *Journal of Applied Psychology*, 74, 495–501
- MELAMED, S, KUSHNIR, T, & MEIR, E I. (1991) Attenuating the impact of job demands. Additive and interactive effects of perceived control and social support *Journal of Vocational Behavior*, 39, 40–53
- MOYLE, P (1995) The role of negative affectivity in the stress process Tests of alternative methods. *Journal of Organizational Behavior*, 16, 647–668
- NEWTON, T J, & KEENAN, A (1990) The moderating effect of the type A behavior pattern and locus of control upon the relationship between change in job demands and change in psychological strain *Human Relations*, 43, 1229–1255
- NUNALLY, J. C (1978) *Psychometric Theory* New York: McGraw-Hill.
- PARASURAMAN, S, GREENHAUS, J H, & GRANROSE, C S (1992) Role stressors, social support, and well-being among two-career couples *Journal of Organizational Behavior*, 13, 339–356
- PARKES, K R (1989) Personal control in an occupational context In A Steptoe, & A Appels (Eds), *Stress, Personal Control and Health* (pp 21–47) Chichester Wiley
- PARKES, K R. (1991) Locus of control as a moderator: An explanation for additive versus interactive findings in the demand-discretion model of work stress? *British Journal of Psychology*, 82, 291–312
- PARKES, K R (1994). Personality and coping as moderators of work stress processes: Models, methods and measures. *Work and Stress*, 8, 110–129
- PARKES, K R, MENDHAM, C A, & VON RABENAU, C (1994). Social support and the demand-discretion model of job stress Tests of additive and interactive effects in two samples *Journal of Vocational Behavior*, 44, 91–113
- PAYNE, R. (1988). A longitudinal study of the psychological well-being of unemployed men and the mediating effect of neuroticism *Human Relations*, 41, 119–138.
- PAYNE, R L., & JONES, J G (1987) Measurement and methodological issues in social support In S. Kasl, & C L Cooper (Eds), *Stress and Health Issues in Research Methodology* (pp 167–205). Chichester. Wiley
- PEIRÓ, J M, & SALVADOR, A (1993) *El control del estrés laboral* Madrid Eudema.
- PHARES, E J. (1976) *Locus of Control in Personality* Morristown, NJ General Learning Press
- PILTCH, C. A., WALSH, D C, MANGIONE, T W., & JENNINGS, S E (1994) Gender, work, and mental distress in an industrial labor force: An expansion of Karasek's job strain model In G P Keita, & J J Hurrell (Eds.), *Job Stress in a Changing Workforce: Investigating Gender, Diversity and Family Issues* (pp 39–54) Washington, DC: American Psychological Association.
- PLEWIS, I (1985) *Analysing Change Measurement and Explanation using Longitudinal Data* New York Wiley
- QUICK, J. C., QUICK, J D, NELSON, D. L., & HURRELL, J. J (1997) *Preventive Stress Management in Organizations* Washington, DC. American Psychological Association
- RIZZO, J R., HOUSE, R. J., & LIRTZMAN, S I. (1970). Role conflict and ambiguity in complex organizations *Administrative Science Quarterly*, 15, 150–163
- ROTTER, J. (1966) Generalized expectancies for internal vs external control of reinforcement *Psychological Monographs*, 80, 1–28.

- ROXBURGH, S (1996) Gender differences in work and well-being: Effects of exposure and vulnerability *Journal of Health and Social Behavior*, 37, 265–277
- SANDLER, I N, & LAKEY, B (1982) Locus of control as a stress moderator: The role of control perceptions and social support *American Journal of Community Psychology*, 10, 65–80
- SARGENT, L D, & TERRY, D J. (1998) The effects of work control and job demands on employee adjustment and work performance *Journal of Occupational and Organizational Psychology*, 71, 219–236.
- SCHAUBROECK, J, & FINK, L S (1998) Facilitating and inhibiting effects of job control and social support on stress outcomes and role behavior: A contingency model *Journal of Organizational Behavior*, 19, 167–195.
- SCHAUBROECK, J, GANSTER, D C, & FOX, M L (1992) Dispositional affect and work-related stress *Journal of Applied Psychology*, 77, 322–335
- SEVASTOS, P, SMITH, L., & CORDERY, J. L (1992) Evidence on the reliability and construct validity of Warr's (1990) well-being and mental health measures *Journal of Occupational and Organizational Psychology*, 65, 33–49
- SHEFFIELD, D, DOBBIE, D., & CARROLL, D. (1994) Stress, social support and psychological and physical well-being in secondary school teachers *Work and Stress*, 8, 235–243.
- SPECTOR, P E (1988) Development of the work locus of control scale *Journal of Occupational Psychology*, 61, 335–340
- SPECTOR, P E, ZAPP, D, CHEN, P Y, & FRESE, M (2000) Why negative affectivity should not be controlled in job stress research: Don't throw out the baby with the bath water *Journal of Organizational Behavior*, 21, 79–95
- TERRY, D J, & JIMMIESON, N. L (1999) Work control and employee well-being: A decade review. *International Review of Industrial and Organizational Psychology*, 14, 95–148.
- TERRY, D J, NIELSEN, M, & PERCHARD, L (1993). Effects of work stress on psychological well-being and job satisfaction: The stress-buffering role of social support. *Australian Journal of Psychology*, 45, 168–175
- TOUZARD, H (co-ord) (1992) Work socialization of youth *Revue Internationale de Psychologie Sociale (monograph)*, 5, 1
- VAHTERA, J., PENTTI, J, & UTELA, A. (1996). The effect of objective job demands on registered sickness absence spells, do personal, social and job-related resources act as moderators? *Work and Stress*, 10, 286–308.
- VAN DER DOEF, M, & MAES, S. (1999) The Job Demand-Control(-Support) Model and psychological well-being: A review of 20 years of empirical research. *Work and Stress*, 13, 87–114.
- VISWESVARAN, C., SANCHES, J I, & FISHER, J (1999) The role of social support in the process of work stress: A meta-analysis *Journal of Vocational Behavior*, 54, 314–334.
- WALL, T D, JACKSON, P R., MULLARKEY, S, & PARKER, S K (1996) The demands-control model of job strain: A more specific test *Journal of Occupational and Organizational Psychology*, 69, 153–166
- WARR, P B (1987) *Work, Unemployment and Mental Health* Oxford: Clarendon Press
- WARR, P B, & JACKSON, P. R. (1983) Self-esteem and unemployment among young workers *Le Travail Humain*, 46, 355–366
- WEISS, D J, DAWIS, R. V, ENGLAND, G W., & LOFQUIST, L H. (1965) Construct validation studies of the Minnesota Importance Questionnaire *Minnesota Studies in Vocational Rehabilitation*, Series nr XVIII Minneapolis: University of Minnesota Industrial Relations Center
- WESTMAN, M. (1992) Moderating effect of decision latitude on stress-strain relationships: Does organizational level matter? *Journal of Organizational Behavior*, 13, 713–722
- WHITELY, W, DOUGHERTY, T W, & DREHER, G F (1992) Correlates of career-oriented mentoring for early career managers and professionals *Journal of Organizational Behavior*, 13, 141–154
- WHITELY, W, PEIRÓ, J M, & SARCHIELLI, G (1992) Work socialization of youth: theoretical framework, research methodology and potential implications *Revue Internationale de Psychologie Sociale*, 1, 9–35.
- WOSY INTERNATIONAL RESEARCH GROUP (1989a) Socialización laboral del joven: Un estudio transnacional *Papeles del Psicólogo*, 39/40, 32–35
- WOSY INTERNATIONAL RESEARCH GROUP (1989b) *Interview Schedule of the Work Socialization of Youth Study* Gent: Laboratorium voor Sociopsychologie van het Bedrijfsleven en voor Testontwikkeling, University of Ghent