

Role clarity, work overload and organizational support: multilevel evidence of the importance of support

PAUL D. BLIESE

Department of Operational Stress Research, Walter Reed Army Institute of Research, Washington DC 20307, USA

CARL ANDREW CASTRO*

US Medical Research Unit—Europe, Medical Research Unit, CMR 442, APO, AE 09042–1030, USA

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The present study extended the demands–control–support model used in occupational stress research in two ways. First, it hypothesized that role clarity (i.e. role ambiguity), like control, would moderate the relationship between demands and psychological strain. Second, the study assessed support (from leaders) as a macro characteristic of the work–group environment. Data were drawn from a large study of US army soldiers, the study sample consisting of 1786 lower enlisted male soldiers. The inclusion of support as a work–group characteristic lead to a multilevel test of the model. A three–way multilevel interaction among work demands, role clarity and support was observed. As predicted, the relationship between demands and psychological strain was moderated by role clarity; however, this moderating relationship was found only when work–group support was high.

1. Introduction

Karasek's (1979) demand–control model (also known as the decision latitude model) has been highly influential in occupational stress research, and has provided the theoretical framework for numerous studies. The model is based upon a two-by-two matrix of Demand and Control. Within this matrix, high levels of negative strain are expected to occur when job control is low and work demands are high. In cases where demand is low and/or where control is high, the model predicts either low levels of negative strain or varying degrees of motivation. Thus, it is the interactive combination of high work demands and low job control that leads to detriments in well-being.

While the demands–control model has been highly influential, it has also been criticized for being too simplistic. That is, it potentially fails to include other factors that are presumably related to strain (Baker, 1985; Schaubroeck, and Merritt, 1997). One factor that is not considered in the demands–control model but which has repeatedly been shown to be related to strain is social support (Cassel, 1976; Cobb, 1976; Cohen, and Wills, 1985; George, Reed, Ballard, Colin, and Feilding, 1993; LaRocco, House, and French, 1980; Winnubst, and Schabracq, 1996). Thus, it is not surprising that the demands–control model has been modified to include social support. This modified model is typically referred to as

* Author for correspondence. e-mail: Carl.Castro@hbg.amedd.army.mil

the demands-control-support model (Johnson, 1989; Johnson, and Hall, 1988; Johnson, Hall, Stewart, Fredlund, and Thoerell, 1991).

The demands-control-support model is essentially a three-way interactive model. It proposes that the two-way interaction hypothesized by the demands-control model is further bounded by social support. Specifically, the model proposes that the moderating effects of control on the demand-strain relationship will be found *only* when support is high. Tests of the demand-control-support model have found evidence to suggest that the inclusion of support is an important extension of the demand-control model (Johnson, and Hall, 1988; Winnubst, and Schabracq, 1996). Johnson, and Hall (1988) found, for example, that the predicted interactive relationship between work control and job demands was evident *only* when social support from co-workers was present.

The current study extends the demand-control literature in two ways. First, we examine role clarity in lieu of control. Role clarity (i.e. role ambiguity) has been explored in literally hundreds of occupational stress studies (see meta-analyses by Abramis (1994) and by Jackson, and Schuler (1985)). We propose that the relationship between demands and strain will vary as a function of role clarity. That is, in cases where demands are high and role clarity is high negative strain should be minimal—employees may have considerable work to do, but they know *what* to do, and so negative strain is low. In contrast, in cases where demands are high and role clarity is low, one would expect high strain because not only do employees have a high work load, but also they are unclear about what they should be doing. One can think of the expected relationship between role clarity and demands as a situation where role clarity ameliorates the demand-strain relationship.

The second way in which we extend the demand-control literature is by modelling the effects of supervisory support as a shared group-level property. In other words, we consider supervisory support to be a contextual or environmental variable shared among group members; Jex, and Bliese (1999) give contextual analyses of collective efficacy. Most studies of support have focused on modelling how an individual's support influences his or her well-being. In contrast, we focus on how the levels of support within a group affect individual well-being. In this study, we focus specifically on support from supervisors because, while all forms of support are believed to be important, there is evidence to suggest that supervisory support is particularly important in terms of detrimental strain in occupational stress settings (Leather, Lawrence, Beale, Cox, and Dickson, 1998; Winnubst, and Schabracq, 1996).

Although our conceptual and methodological approach differs substantially from that of Johnson, and Hall (1988), we none the less expect to replicate the form of their results. That is, we expect to find that high role clarity will ameliorate the effects of high job demands on strain *only* in cases where individuals are members of groups with supportive leaders. Why might this interactive effect occur? We suggest that it occurs because in relative terms the main effect associated with support is more important than the interactive effect of role clarity (or control). If Johnson, and Hall (1988) had found that high control buffered work demands regardless of levels of support, it would have implied that the interactive effects of control were 'stronger' than the main effects of support. However, Johnson, and Hall (1988) actually found that the buffering effects of control were 'trumped' by low support—the buffering effects of control were lost when support was absent. This implies that a lack of support can overcome the buffering effects of control. Based on this logic, we expect to find that the buffering effects of role clarity on work demands will be present only when supervisory support is high. In other words, we do not think that high role clarity will be 'strong' enough to buffer high demands if supervisory support is absent. We can present these expectations in the form of a hypothesis with two parts:

Hypothesis 1. There will be a three-way multilevel interaction between role clarity, work demands and supervisory support.

(a) When supervisory support is high, high role clarity will 'buffer' the negative relationship between demands and strain.

(b) When supervisory support is low, buffering effects of high role clarity will *not* be present.

2. Method

2.1. Research sample

The data for this study are drawn from a large study of US army soldiers preparing for a training exercise. Questionnaire data assessing aspects of leadership climate, morale and well-being were collected in the summer of 1996. The study sample consisted of 1786 lower enlisted predominantly male (97%) soldiers in the rank of private or specialist from 53 company or company-sized elements in a Brigade Combat Team. Listwise deletion of missing data reduced the final study sample to 1538.

2.2. Measures

2.2.1. Demands and role clarity: Demands were measures obtained by using the role overload scale from the Michigan Organizational Assessment Questionnaire (MOAQ; Cammann, Fichman, Jenkins, and Klesh, 1983). A sample item is 'I have so much work to do, I cannot do everything well'. The three-item role overload scale has a reported reliability of .65 (Cammann *et al.*, 1983); however, in the current sample the scale had a Cronbach's α reliability estimate of .48. Throughout the remainder of this paper, we refer to the scale as a measure of 'work overload' rather than as 'role overload' to help to differentiate it from role clarity.

The role clarity scale was also a three-item scale taken from the MOAQ. A sample item is 'I know exactly what is expected of me on my job'. The reported reliability of this scale is .53 (Cammann *et al.*, 1983); but for the current sample the value of α was .66.

2.2.2. Organizational support: Measures of organizational support were created using soldiers' ratings of the support provided by the Non Commissioned Officers (NCOs) in their units. NCO social support (rather than Commissioned Officer support) was the focus of this study, because junior enlisted soldiers have more direct contact with NCOs than with officers. Support was measured using three items: (a) The NCOs in my unit are interested in my personal welfare; (b) The NCOs in my unit let soldiers know when they have done a good job; and (c) The NCOs in my unit are interested in what I think and how I feel about things. The Cronbach α estimate of reliability for the NCO support scale was .87. Note that measures of this nature have previously been labelled measures of vertical cohesion (Marlowe, 1986). The rationale for treating this measure as an assessment of social support is provided by Manning (1991) who argues convincingly that cohesion in the military is best conceptualized as a measure of social support.

In the analyses, organizational support from NCOs is treated as a contextual variable. In other words, NCO support is assumed to be a shared environmental variable that measurably differs across the 53 companies. To determine whether support reliably differed among the companies, we calculated the Intraclass Correlation Coefficient (2) or ICC(2). The ICC(2) estimates the degree to which group means can be reliably differentiated (Bliese, 2000). The ICC(2) value for NCO support was .71. This value indicates that the 53 companies could be reliably differentiated in terms of mean ratings of NCO support.

2.2.3. *Psychological strain*: Psychological strain was assessed using the 53-item General Severity Index (GSI) of the Brief Symptom Inventory (BSI; Derogatis, and Melisaratos, 1983). The BSI has received considerable psychometric testing (Boulet, and Boss, 1991). The Cronbach's α estimate for the GSI was .97 in the study sample.

2.3. *Analytic strategy*

Multilevel random coefficient modelling was used to test the hypothesis. This form of statistical analysis allows one to model cross-level interactions—that is, to test how contextual factors such as NCO support are related to individual-level relationships (Bryk, and Raudenbush, 1992; Kreft, and De Leeuw, 1998).

There were three steps involved in testing our hypothesis. In Step 1 we regressed psychological strain on (a) role clarity, (b) work overload, (c) the role clarity-work overload interaction, and (d) the main-effect for organizational support. This model had a random term only for the intercept, and provided a baseline model that contained all of the parameters of interest *except* those involving cross-level interactions. In Step 2 we compared the baseline model from Step 1 to a model that contained a random effect for the role clarity-work overload slope. This allowed us to test whether the role clarity-work overload interaction term significantly varied across the 53 companies. Step 3 involved testing whether there was a significant cross-level interaction between organizational support and the role clarity-work overload interaction. This last step constituted a three-way multilevel interaction and allowed us to test our hypothesis. In the analyses, all variables were grand-mean centred to facilitate model estimation (Bryk, and Raudenbush, 1992). The analyses were done using the linear mixed effects (lme) routine for S-PLUS (Pinheiro, and Bates, 1998).

3. Results

The results from Step 1 of the analysis are presented in table 1. Notice that work overload and role clarity were significantly related to individual reports of psychological strain. As expected, work overload was positively related to psychological strain while role clarity was negatively related to psychological strain. Also as expected, NCO support was negatively related to psychological strain. As a contextual or level 2 variable, one would interpret this result as providing evidence that army companies with high NCO support had, on average, lower levels of psychological strain than did companies with low NCO

Table 1. Baseline Model predicting psychological strain.

Variable	Value	Standard error	z-value	p
<i>Level 1 unconditional model</i>				
Intercept	.649	.022	29.959	.001
Work overload	.133	.018	7.347	.001
Role clarity	-.145	.018	-8.251	.001
Work Overload \times Role Clarity	.006	.015	.373	.709
<i>Level 2 model</i>				
NCO support (intercept)	-.042	.021	-2.042	.041

Table 2. Cross-level Interaction predicting psychological strain.

Variable	Value	Standard error	z-value	p
<i>Level 1 unconditional model</i>				
Intercept	.646	.020	31.792	.001
Work overload	.140	.018	7.705	.001
Role clarity	-.144	.018	-8.115	.001
Work Overload × Role Clarity	-.008	.017	-.456	.648
<i>Level 2 model</i>				
NCO support (intercept)	-.054	.020	-2.692	.007
NCO Support × Work Overload (slope)	.005	.019	.263	.793
NCO Support × Role Clarity (slope)	.019	.016	1.170	.242
NCO Support × Work Overload × Role Clarity (slope)	-.030	.015	-1.965	.049

support. An important finding associated with the Step 1 analyses is that the interaction between work overload and role clarity was not significant ($p = .709$).

Step 2 of the analyses was conducted to determine whether the form of the interaction between work overload and role clarity significantly varied across groups. One reason why the Step 1 analysis might have failed to find a significant interaction between role clarity and work overload is that the form of the interaction might vary across groups. Step 2 was conducted to test whether there was significant variation in the interaction across groups. In Step 2, the Step 1 model *without* a random effect for the role clarity-work overload slope was contrasted with a model that *did* include a random effect for the role clarity-work overload slope (Kreft, and De Leeuw, 1998). The difference in the fit between the two models, tested via the deviances (i.e. Likelihood ratios), revealed that the model *with* a random effect for the role clarity-work overload slope 'fitted' the data significantly better than a model without the random effect (Likelihood ratio = 5.55, $p = .062$). (The actual value of p is smaller than .062 as this test is slightly conservative (D. Bates, personal communication).) In summary, Step 2 indicates that the role clarity-work overload slope significantly varied across the 53 companies.

The final step tested whether NCO support was a significant predictor of the variation in the role clarity-work overload slope. The results for Step 3 are presented in table 2. Recall that the focus in this step is on the three-way cross-level interaction between NCO support, role clarity and work overload. In testing this interaction, however, we also included the two-way interactions between (a) NCO support and role clarity, and (b) NCO support and work overload. This was done since it is customary to test for all two-way effects prior to testing for three-way effects. In support of hypothesis 1, notice in table 2 that the three-way interaction between NCO support, role clarity and work overload was significant. This suggests that levels of NCO support in a group are related to the role clarity-work overload slope. Subsequent tests revealed that the contextual variable, NCO support, 'explained' 55% of the variance in the role clarity-work overload slope.

Figure 1 presents the form of the three-way interaction. Notice that in figure 1(a) (cases where groups report high support from the NCO leadership) there is an interaction between work overload and role clarity such that high role clarity ameliorates the negative effects of high work overload. The form of this interaction supports hypothesis 1(a). In cases where groups report low levels of support from the NCO leadership (figure 1(b)) there is no noticeable interaction between role clarity and work overload. This supports hypothesis 1(b).

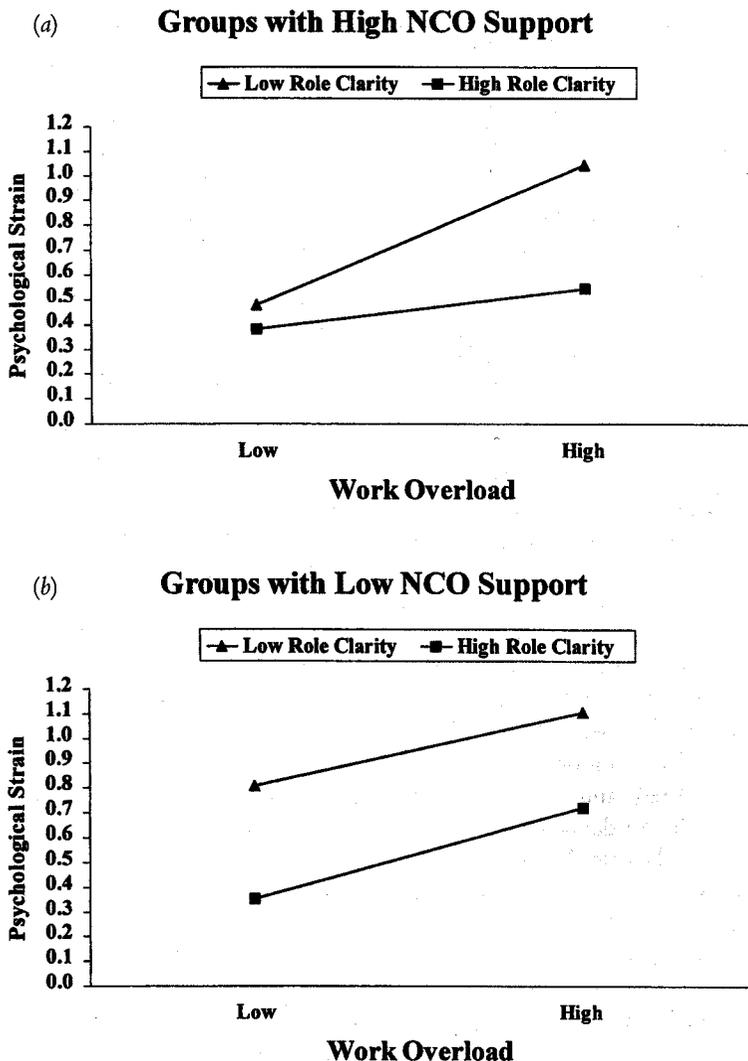


Figure 1. Relationship between role clarity, work overload and psychological distress when (a) NCO support is high, and (b) NCO support is low.

4. Discussion

This research was designed to extend Karasek's demand-control model (1979) and the demand-control-support model of Johnson and colleagues (Johnson, 1989; Johnson, and Hall, 1988; Johnson *et al.*, 1991) in two ways. First, we proposed that role clarity, which has been examined in literally hundreds of studies, would function similarly to control in its relationship with demand and negative strain. Specifically, we expected that high role clarity (like high control) would 'buffer' the negative effects of high work overload. Second, as an extension and replication of the demand-control-support model, we expected that the buffering effects of high role clarity would be evident *only* when organizational support from leaders was high. In testing the effects of organizational support, we measured and modelled the effects of support as a shared environmental variable rather than relying upon individual reports of support. In other words, we built a multilevel model that explicitly included contextual effects (Bliese, and Jex, 1999).

The results of our analyses confirmed our predictions: high role clarity did ameliorate the effects of high work overload, *but only* in groups where there was supportive leadership. These findings have two significant implications. One is that role clarity and control may share important theoretical and conceptual similarities. The second is that contextual variables play a strong, but often unexamined, role in occupational stress research. Both of these implications are addressed below.

In testing Karasek's model (1979), the variable 'control' has been measured in a variety of ways. The original conceptualization of the term was 'job decision latitude', which suggested control over judgement in conducting and carrying out job tasks. Not surprisingly, in many cases control has been measured in terms of perceptions of whether or not one is able to participate in important decisions. Clearly the concept of 'role clarity' differs from that of 'job decision latitude'. Low decision latitude suggests that an individual is restrained or unable to participate in important decisions. In contrast, low role clarity suggests that an individual does not know what actions should be performed (even if he or she has the latitude to do so).

While these situations are different, there is also an important similarity. Namely, in both cases, the employee is restricted in his or her ability to have an effective impact on the work situation. If we assume that the beneficial effect of high decision latitude develops as a product of the ability to effectively modify one's environment, then role clarity and decision latitude become quite similar. That is, they both measure one's ability to have an effective impact on one's environment.

Clearly, additional work of integrating role clarity and decision latitude into work stress models needs to be conducted; none the less, the results of this study suggest that role clarity and decision latitude act similarly in terms of their relationship with job demands. Specifically, in cases where job demands are high, both high role clarity and high decision latitude help individuals to cope with those demands.

The present research also demonstrates the utility of integrating contextual social factors into models of occupational stress. In the current study, groups that had low social support from the NCO leadership were fundamentally different from groups that had high NCO leadership support. Among other things, this finding supports the idea that social support from supervisors is particularly important in occupational settings (Leather *et al.*, 1998; Winnubst, and Schabracq, 1996) and further supports the notion that the addition of support to the demand-control model by Johnson and colleagues is an important contribution to the occupational stress literature (Johnson, 1989; Johnson, and Hall, 1988; Johnson *et al.*, 1991). We believe that the findings help to establish the contextual boundary conditions under which one might find moderating effects associated with control and role clarity. Clearly control and role clarity can have a buffering effect on work demands; however, we believe that the results of this paper help to demonstrate that the buffering effects are relatively unimportant in the face of a contextual effect of low leadership support.

In addition, the research has also demonstrated how one can model the effects of contextual factors in occupational stress research. Recall that social support from NCO leadership was an aggregate variable—it reflected the averaged perceptions of *all* of the group members. One can argue that this aggregate measure is a better and more reliable rating of the social context than any single rating (Bliese, 2000). The value of this aggregate measure was clearly demonstrated in terms of its importance in the relationship between role clarity and work overload.

This type of aggregate variable potentially opens up important possibilities in occupational stress modelling. Aggregate ratings of constructs such as support from leadership allow one to assess the contextual work environment in ways that cannot be

done by relying merely on individual-level variables. As occupational stress research develops in complexity, it is clearly important to consider how social and contextual variables will be integrated into research and theory. This paper provides one such example.

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