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Job Demands–Control–Support model and employee safety performance

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ABSTRACT

The aim of this study was to explore whether work characteristics (job demands, job control, social support) comprising Karasek and Theorell's (1990) Job Demands–Control–Support framework predict employee safety performance (safety compliance and safety participation; Neal and Griffin, 2006). We used cross-sectional data of self-reported work characteristics and employee safety performance from 280 healthcare staff (doctors, nurses, and administrative staff) from Emergency Departments of seven hospitals in the United Kingdom. We analyzed these data using a structural equation model that simultaneously regressed safety compliance and safety participation on the main effects of each of the aforementioned work characteristics, their two-way interactions, and the three-way interaction among them, while controlling for demographic, occupational, and organizational characteristics. Social support was positively related to safety compliance, and both job control and the two-way interaction between job control and social support were positively related to safety participation. How work design is related to employee safety performance remains an important area for research and provides insight into how organizations can improve workplace safety. The current findings emphasize the importance of the co-worker in promoting both safety compliance and safety participation.

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1. Introduction

While occupational health psychology has traditionally used workplace injuries as an indicator of safety failures, some research has begun to investigate more proximal and positive safety-related outcomes, such as the safety-related behaviors that precede and may prevent workplace injuries (e.g., Hofmann et al., 2003; Neal and Griffin, 2006; Turner et al., 2005). Consistent with Borman and Motowidlo's (1997) distinction between task and contextual work performance, Griffin and Neal (2000) have conceptualized two types of employee safety performance: safety compliance and safety participation. Safety compliance corresponds to task performance and includes such behaviors as adhering to safety regulations, wearing protective equipment, and reporting safety-related incidents. Safety participation is parallel to contextual performance and focuses on voluntary behaviors that make the workplace safer beyond prescribed safety precautions, including taking the initiative to conduct safety audits and helping co-workers who are working under risky conditions.

In comparison to other known determinants of safety compliance and safety participation, evidence of the predictive nature of

common work characteristics is limited (Christian et al., 2009). To date, research on work characteristics predicting employee safety performance has tended to focus on safety-specific determinants (e.g., availability of personal protective equipment; DeJoy et al., 2000; safety-specific control; Snyder et al., 2008) rather than more general work characteristics such as job demands, job control, and social support. Evidence of the relationship between work characteristics and employee safety performance tends to be restricted to individual work characteristics (e.g., job demands) on individual dimensions of employee safety performance (e.g., following safety rules) (Nahrgang et al., 2011).

The objective of this study is to investigate how three work characteristics (i.e., job demands, job control, and social support) simultaneously predict both safety compliance and safety participation. We ground our model in Karasek and Theorell's (1990) Job Demands–Control–Support framework, which traditionally examines the additive and interactive effects of these constructs in predicting various health outcomes, such as psychological strain, blood pressure, and cardiovascular disease (Parker et al., 2003). One of the limitations of existing data concerning Karasek and Theorell's (1990) model is the failure of many studies to test the complete model on multiple outcomes simultaneously (van der Doef and Maes, 1999). A key contribution of this paper is a complete test of Karasek and Theorell's (1990) model on a multiple dimensions of employee safety performance.

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Job demands are defined here as time-based constraints perceived by employees. For example, a highly demanding job would be characterized by employees feeling as if they had too little time to complete their work tasks. Job control is defined as the extent to which employees perceive that they have autonomy over the timing and methods of their work. Employees that can choose how they work and schedule job tasks in a way that make sense to them would be characterized as having high job control. Finally, social support is defined as the extent to which employees feel they can count on their colleagues for work-related assistance. Having co-workers who help employees complete their work tasks would characterize a job with high social support.

We next summarize existing research that has examined components of the Karasek and Theorell (1990) model on employee safety performance and formulate hypotheses and exploratory research questions for the current study.

2. Theoretical background

2.1. Job demands and employee safety performance

When employees face high job demands, they may ignore or work around safety procedures as they attempt to get the job done (Halbesleben, 2010). Evidence of the negative effect of job demands on safety compliance comes from a number of existing studies (e.g., Collinson, 1999; Hofmann and Stetzer, 1996). Predicting the relationship between job demands and safety participation is less clear cut. Consistent with the logic regarding safety compliance, it is possible that higher job demands will be associated with lower levels of safety participation, as employees might forego effortful behaviors to improve safety to ensure that work tasks get completed. In contrast, Fay and Sonnentag (2002) have shown that job demands may be related to greater generalized initiative-taking, as employees try to ensure that work conditions that generate high job demands in the first place do not re-occur. The implication for safety-related initiative-taking such as safety participation might be the same: in an effort to ensure safety, experiencing higher job demands may encourage employees to manage work in such a way to ensure that these job demands do not interfere with prevention-related safety activities. To test the direction of these relationships, we hypothesize that higher job demands will be related to lower safety compliance (Hypothesis 1; H1) and examine the relationship between job demands and safety participation as an exploratory research question.

2.2. Job control and employee safety performance

Despite the potentially opposing effects of job demands on safety compliance and safety participation, the design of work can provide employees with opportunity to prevent or manage job demands, such as in the form of job control (Hackman and Oldham, 1980). The evidence for the relationship between job control and safety compliance is mixed. For example, while Simard and Marchand (1997) found that job control was not a significant predictor of workgroups' compliance with safety procedures, Parker et al. (2001) found that job control was positively related to safety compliance. Evidence of job control as a predictor of safety participation is more consistent. Simard and Marchand (1995) demonstrated that job control positively influenced workgroups' propensity to take initiative on safety-related issues, and Geller et al. (1996) found that individuals' job control positively predicted actively caring for safety (operationalized as actions similar to safety participation). It would appear that employees with high job control have the opportunity to

get involved in safety tasks that fall outside of their formal job descriptions and serve to enhance the safety of the work environment more generally (Turner et al., 2005). Given the mixed evidence, we test the relationship between job control and safety compliance as an exploratory question, but hypothesize that job control will be related to higher safety participation (Hypothesis 2; H2).

2.3. Social support and employee safety performance

Research has shown that social support from organizational members can buffer negative workplace factors (Cohen and Wills, 1985). Social support can reflect a range of constructs, including emotional support (e.g., caring for and empathizing with someone), instrumental support (e.g., helping someone do their work), and structural support (e.g., the possibility that others can provide help) (Bowling et al., 2004). Forms of support are likely to vary with respect to the functional role of the support provider. For example, while a co-worker may provide emotional support, they are also in the best position to provide instrumental support in achieving work tasks.

In comparison to the findings concerning job demands and job control, evidence of instrumental social support as a determinant of both safety compliance and safety participation is clearer. Simard and Marchand (1997) showed that, in their sample of manufacturing teams, social support was the strongest predictor of safety compliance in an analysis of a range of predictors including supportive supervision. Similarly, both the Goldberg et al. (1991) and Tucker et al. (2008) studies show that higher support from co-workers increases the likelihood of taking action to improve workplace safety. Having support from others may provide social permission to comply with and participate in safety improvement activities, as well as relief from job demands so that these voluntary safety activities can take place. As a result, we hypothesize that social support will predict both higher safety compliance (Hypothesis 3; H3) and higher safety participation (Hypothesis 4; H4).

2.4. Interactions among job demands, job control, and social support on employee safety performance

Thus far, we have emphasized the potential effects of job demands, job control, and social support in predicting safety compliance and safety participation. As part of these arguments, however, we have speculated on the potential roles of job control and social support in minimizing job demands. In Karasek's (1979) original model, work characterized by high job demands and high job control (termed "active" work) provides challenging opportunities that promote mastery and encourage skill and knowledge acquisition. In contrast, a "relaxed" job (i.e., low job demands and high job control) does not provide employees with such intrinsic motivation. "High strain" jobs (i.e., high job demands and low job control) and "passive" jobs (i.e., low job demands and low job control) may overwhelm or underwhelm employees, respectively, in both cases discouraging a sense of mastery and skill use (Parker and Wall, 1998). Karasek and Theorell (1990) extended Karasek's original model, arguing that high social support among co-workers can promote a sense of identity and group cohesion when combined with the characteristics of an active job. As a result, in this study, we explore the two- and three-way interactions among job demands, job control, and social support on safety compliance and safety participation as exploratory research questions. The full model is presented in Fig. 1 with the four directional hypotheses (H1–H4) and exploratory research questions indicated with solid and dotted single-headed lines, respectively.

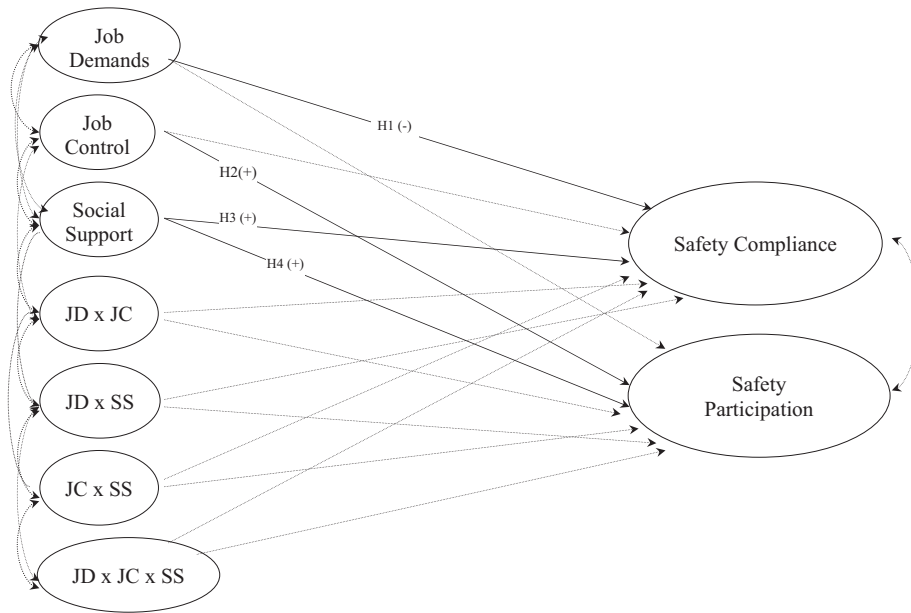


Fig. 1. Hypothesized model (Model 1a). Note: Solid lines represent hypothesized relationships (H1–H4). Signs in parentheses indicate direction of the relationship. Dotted structural lines are modeled and are exploratory research questions. Control variables are not included here for parsimony of presentation. JD, job demands; JC, job control; SS, social support.

3. Method

3.1. Sample and setting

Eight hundred and fifty-five questionnaires concerning work perceptions were distributed to emergency department personnel of seven hospitals in the United Kingdom as part of a larger survey looking at patient waiting-times. Two hundred and eighty employees (33% response rate), 78% of whom were female, returned completed questionnaires, with response rates varying across the seven hospitals ranging from 18% to 56%. The mean age of the sample was 38.75 years (median = 38, *SD* = 10.48) and their mean tenure in their emergency department was just below 6 years (median = 3.43, *SD* = 6.67). The work of emergency departments involves treating patients with acute and unexpected injuries and illnesses, some of which are life-threatening; as such, the nature of the work can be particularly demanding, fast-paced, benefiting from high levels of autonomy and support from co-workers to get tasks done.

In this health care sample, 52% of respondents were nurses, 22% were doctors, and 26% were reception staff. Median time worked in a typical working week was 37.5 h; 56.7% of respondents reported having a fixed term contract. Just under two-thirds of respondents (62.6%) had children, with 12.5% of respondents coming from a non-white ethnic group.

3.2. Measures

3.2.1. Job demands

Job demands were measured using a six item scale from Caplan (1971) (example item: “I don’t have enough time to carry out my work”), with higher scores reflecting higher job demands. Responses ranged on a 5-point Likert-type coding from “Not at all” (1) to “A great deal” (5). Internal consistency (α) is 0.90

3.2.2. Job control

Job control was measured using six items from Jackson et al. (1993) (example item: “To what extent do you plan your own

work?”), with higher scores reflecting higher job control. Responses ranged on a 5-point Likert-type coding from “Not at all” (1) to “A great deal” (5). Internal consistency (α) is 0.88

3.2.3. Social support

Social support was measured using a four item scale from Haynes et al. (1999) (example item: “You can count on colleague back-up at work”), with higher scores reflecting higher social support. Responses ranged on a 5-point Likert-type coding from “Not at all” (1) to “A great deal” (5). Internal consistency (α) is 0.90

3.2.4. Safety compliance

Safety compliance was measured via three items adapted from Griffin and Neal (2000) (example item: “I always carry out my work in a safe manner”), with higher scores reflecting higher safety compliance. The response coding was of 5-point Likert-type, ranging from “Strongly disagree” (1) to “Strongly agree” (5). Internal consistency (α) is 0.65

3.2.5. Safety participation

Safety participation was measured with four items adapted from Griffin and Neal (2000) (example item: “I voluntarily carry out tasks or activities that help to improve safety”), with higher scores reflecting higher safety participation. Responses ranged on a 5-point Likert-type coding from “Strongly disagree” (1) to “Strongly agree” (5). Internal consistency (α) is 0.85.

3.2.6. Background variables

Alongside distinct occupational groups (two dummy variables for three occupation groups) and hospital membership (six dummy variables for seven hospitals), a further set of demographic and occupational characteristics were also collected and coded: gender (male = 1, female = 0), having children (yes = 1, no = 0), hours worked in a typical working week, contract type (fixed term = 1, open-ended = 0), tenure within the department (in years), and self-declared ethnic group (white = 1, non-white = 0).

3.3. Analytic approach

The first stage of the analysis involved testing the measurement of the key predictor and outcome scales via a confirmatory factor analysis. We proposed a five-factor model, using a combination of incremental and absolute fit indices (i.e., comparative fit index [CFI], root mean square error of approximation [RMSEA], and standardized root mean square residual [SRMR]) and the respective guidelines suggested by Hu and Bentler (1998) to assess model fit. While acknowledging the difficulty of designating specific cut-offs, Hu and Bentler suggest values close to or greater than 0.95 for the CFI, and less than 0.08 and 0.06 for the SRMR and RMSEA, respectively. We also calculated the internal consistency reliability of each set of items (Cronbach's alpha statistic).

This measurement model was then extended to a structural equation model. The extension was not seamless in that, rather than using the five emergent factors in the model, the factors comprising job demands, job control, and social support were each replaced by an observed scale mean score (the unweighted average of their respective sets of items). This was conducted due to the limitations of our parameter-to-sample size ratio and the need to estimate interactions between these factors as well as their main effects. However, the outcomes (i.e., safety compliance and safety participation) remained constructed as factors. We also included potentially confounding effects of hospital, occupation, tenure, gender, having children, contract type, ethnic group, and hours worked as observed variables.

We initially fitted a 'full' model, containing the three-way interaction between job control, job demands, social support, the three two-way interactions between these three constructs, and all three main effects as predictors of both safety compliance and safety participation factors. We then fitted a series of competing constrained models. The first three respectively constrained to zero the path(s) from the three-way interaction term to safety compliance, to safety participation, and then to both outcomes simultaneously. The fit of each, given by the model chi-square statistic, was tested against the full model using a chi-square difference test, with the resulting loss of fit (or lack of) indicating the impact of the three-way interaction term upon each and then both safety factors. A similar series of constraints and tests was then applied to the three two-way interactions, to investigate their combined impact upon safety compliance and safety participation. Finally, the main effect of job control upon safety compliance was also fixed equal to zero and model fit again compared against the preceding best model. The 95% level of statistical significance was applied throughout. Path coefficients from the resultant best fitting model were then examined, with one-tailed tests applied for the four directional hypotheses and two-tailed tests used for the exploratory research questions.

4. Results

4.1. Measurement model

The quality of the five-factor measurement model expected to underlie these scales (i.e., job demands, job control, social support, safety compliance, and safety participation) was tested using confirmatory factor analysis. The fit to the data was satisfactory, with $\chi^2 = 402$ on 220 df, CFI = 0.948, RMSEA = 0.054, SRMR = 0.055. The factors were clearly distinct, sharing weak to medium correlations at most ($|\gamma| < 0.350$); for each factor, the reliability of the distinct set of items underlying it indicated satisfactory internal consistency. The five-factor model yielded a significantly better fit than a four-factor alternative in which safety compliance and safety participation were combined to form a single factor, and job demands, job control, and social support were each represented

by their own factor ($\chi^2 = 574$ on 224 df, CFI = 0.902, RMSEA = 0.075, SRMR = 0.075; $\Delta\chi^2 = 172$, $\Delta df = 4$, $p < 0.001$). As all the measures were self-report, we also tested the goodness-of-fit of a single factor model to test for mono-method bias (Podsakoff and Organ, 1986), which likewise yielded a substantially weaker fit than the 5-factor model; $\chi^2 = 2830$ on 230 df, CFI = 0.263, RMSEA = 0.201, SRMR = 0.208.

4.2. Structural equation models

Zero-order correlations, sample means, standard deviations, and internal consistency alphas for the study variables and selected background variables appear in Table 1.

The measurement model was then extended to a series of structural equation models as described above. Tests between competing models are detailed in Table 2. The testing sequence began with the full model (Model 1a in Table 2, illustrated in Fig. 1), which yielded a satisfactory fit to the data ($\chi^2 = 171$ on 118 df, CFI = 0.941, RMSEA = 0.040, SRMR = 0.027). This model explained 32.2% of the variability in safety compliance and 25.1% of that in safety participation. Of the competing models, Models 1b, 1c, and 2a, which constrained just the effects of each, then both of the paths from the three-way interaction to zero, did not offer a significantly worse fit than Model 1a (e.g., Model 2a: $\chi^2 = 173$ on 120 df, CFI = 0.942, RMSEA = 0.040, SRMR = 0.027; $\Delta\chi^2 = 2$, $\Delta df = 2$, $p > 0.05$), and the decrease in the variance explained was minimal (e.g. Model 2a: safety compliance by 0.1%, safety participation by 0.2%). However, the removal of the predictive effects of the set of two-way interactions upon safety participation (Model 2b) did result in a significant decrease in model fit whether or not the interaction effects upon safety compliance were present (e.g., Model 2b vs. Model 2a; $\Delta\chi^2 = 8$, $\Delta df = 3$, $p < 0.05$; Model 3 vs. Model 2c; $\Delta\chi^2 = 9$, $\Delta df = 3$, $p < 0.05$). Only or also removing the effects upon safety compliance (Models 2c, 3) did not significantly decrease model fit. Retaining the effects of the two-way interactions upon participation but further removing the main effect of job control upon safety compliance did not significantly decrease model fit (Model 4; $\chi^2 = 180$ on 124 df, CFI = 0.939, RMSEA = 0.040, SRMR = 0.029; vs. Model 2c $\Delta\chi^2 = 1$, $\Delta df = 1$, $p > 0.05$).

We found no evidence that higher job demands were likely to result in lower safety compliance (H1: from standardized path coefficients from Model 4; Beta = -0.073 , $z = -1.100$, $p > 0.05$), failing to support Hypothesis 1. The hypothesized link (H2) between job control and safety participation indicated that job control was positively related to safety participation (Beta = 0.186, $z = 3.221$, $p < 0.01$). Consistent with H3, the results of this model show that higher social support is associated with higher safety compliance (Beta = 0.146, $z = 2.229$, $p < 0.05$). Although the estimated coefficient was also positive, there was no evidence to support a non-zero relationship between social support and safety participation (H4; Beta = 0.101, $z = 1.577$, $p > 0.05$).

In terms of the exploratory research questions, the tests of competing models described above only gave support for the existence of interaction effects upon safety participation. The coefficients from Model 4 (given in Table 3) indicate that this effect is primarily through the interaction between job control and social support, the only one to yield a unique significant path coefficient, which positively predicted safety participation (Beta = 0.167, $z = 2.881$, $p < 0.05$). The positive coefficient indicates that the effect of job control on safety participation was enhanced by increased social support (see Fig. 2).

A number of control variables were statistically significant predictors of employee safety performance. Nurses reported higher safety compliance and safety participation (Betas = 0.189 and 0.280, $p < 0.05$, respectively) than administrative staff, with doctors

Table 1
Descriptive statistics, zero-order correlations, and scale reliabilities (listwise $N = 263$).

Variable	<i>M</i>	<i>SD</i>	α	1	2	3	4	5	6	7
Gender	0.22	0.42	–							
Age (in years)	38.75	10.48	–	–0.04						
Tenure (in years)	5.78	6.67	–	–0.07	0.55**					
Job demands	2.68	0.99	0.90	0.12*	0.01	–0.01				
Job control	3.14	0.94	0.88	0.06	0.08	0.21**	0.03			
Social support	3.69	0.89	0.90	–0.09	0.02	0.07	–0.22**	0.19**		
Safety compliance	4.20	0.54	0.65	–0.07	–0.04	0.01	–0.08	–0.06	0.09	
Safety Participation	3.40	0.74	0.85	0.09	0.04	0.04	0.08	0.22**	0.15	0.22**

Note: Control variables (with the exception of age and gender) are not included here for the sake of parsimony of presentation, but appear in Table 3 for sake of completeness. Gender: 1 = male; 0 = female.

* $p < 0.05$ (two-tailed test).

** $p < 0.01$ (two-tailed test).

Table 2
Competing structural equation models for predicting safety compliance and safety participation.

Model	χ^2 , <i>df</i>	$\Delta\chi^2$, Δdf	CFI	RMSEA	SRMR	SC R^2	SP R^2
1a. 'Full': three-way interaction, all 2-way interactions and main effects of JD, JC, SS upon both SC and SP	171, 118	–	0.941	0.040	0.027	0.322	0.251
1b. Three-way interaction only has non-zero effect upon SC	172, 119	(test vs. 1a) 1, 1	0.941	0.040	0.027	0.321	0.249
1c. Three-way interaction only has non-zero effect upon SP	172, 119	(test vs. 1a) 1, 1	0.941	0.040	0.027	0.321	0.250
2a. Two-way interactions and main effects of JD, JC, SS upon both SC and SP, no 3-way effects	173, 120	(test vs. 1a) 2, 2	0.942	0.040	0.027	0.321	0.249
2b. Two-way interactions have non-zero effect upon SC only, no 3-way effects	181, 123	(test vs. 2a) 8, 3*	0.936	0.041	0.030	0.320	0.223
2c. Two-way interactions have non-zero effect upon SP only, no 3-way effects	179, 123	(test vs. 2a) 6, 3	0.939	0.040	0.029	0.298	0.248
3. Main effects of JD, JC, SS upon both outcomes, no 3-way or 2-way effects	188, 126	(test vs. 2b) 7, 3 (test vs. 2c) 9, 3*	0.932	0.042	0.031	0.297	0.223
4. Two-way interactions and main effects of JD, JC, SS upon SP; main effects of JD, SS only upon SC	180, 124	(test vs. 2c) 1, 1	0.939	0.040	0.029	0.296	0.246

Note: $N = 280$. JD, job demands, JC, job control, SS, social support, SC, safety compliance, SP, safety participation.

* $p < 0.05$ (two-tailed test).

reporting the lowest average level of safety compliance among the three occupational groups. Those working in fixed term contracts reported less safety participation than open-contract employees. Finally, employees self-describing their ethnicity as white reported both lower safety compliance and lower safety participation than employees self-describing as non-white.

5. Discussion

5.1. Summary of findings

This study shows that different additive and multiplicative combinations of job demands, job control, and social support

Table 3
Standardised path coefficients for prediction of safety compliance and safety participation from job demands, job control, and social support (Model 4).

Predictor	Safety compliance		Safety participation	
	Beta	SE	Beta	SE
Occupational group dummy: nurse vs. ref cat = Admin	0.189*	0.075	0.280**	0.070
Occupational group dummy: doctor vs. ref cat = Admin	–0.320**	0.090	–0.015	0.084
Site dummy 1: site 1 (vs. ref cat = site 7)	–0.189†	0.087	0.007	0.084
Site dummy 2: site 2 (vs. ref cat = site 7)	–0.057	0.083	0.096	0.078
Site dummy 3: site 3 (vs. ref cat = site 7)	–0.144	0.094	0.076	0.088
Site dummy 4: site 4 (vs. ref cat = site 7)	–0.066	0.087	0.095	0.082
Site dummy 5: site 5 (vs. ref cat = site 7)	–0.148	0.091	–0.046	0.086
Site dummy 6: site 6 (vs. ref cat = site 7)	–0.231**	0.080	–0.001	0.076
Gender (male vs. ref cat female)	0.046	0.076	0.017	0.072
Do you have children (yes vs. ref cat no)	–0.083	0.069	0.094	0.066
Hours worked in typical week	0.007	0.073	0.044	0.069
Contract type: fixed term vs. ref cat: open-ended	–0.131	0.064	–0.196**	0.061
Tenure in A&E dept (years)	0.117	0.065	0.001	0.062
Ethnic background (white vs. ref cat: non-white)	–0.267**	0.071	–0.179**	0.067
Job control (standardized)			0.186**	0.058
Social support (standardized)	0.146*	0.066	0.101	0.064
Job demands (standardized)	–0.073	0.066	0.084	0.062
Job control \times social support			0.167**	0.058
Job control \times job demands			0.085	0.061
Social support \times job demands			0.028	0.061

Note: $N = 280$. Ref cat, reference category; Admin, administrative staff.

* $p < 0.05$

** $p < 0.01$.

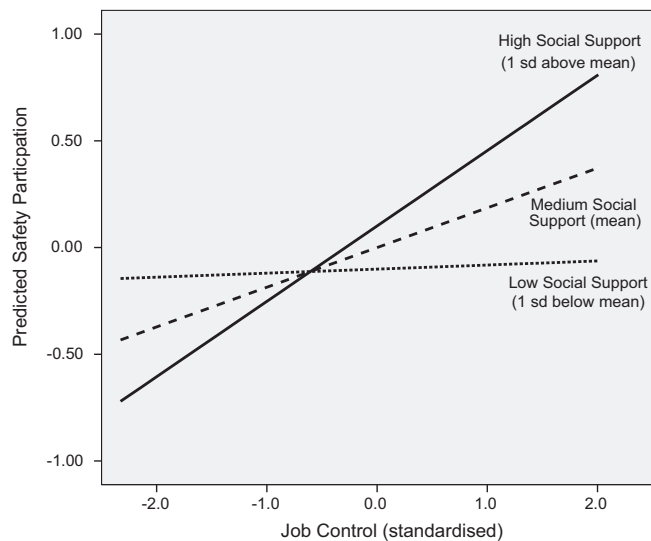


Fig. 2. The moderating effect of social support on the relationship between job control and safety participation.

– the full components of Karasek and Theorell's (1990) Job Demands–Control–Support framework – predict safety participation and safety compliance. The main effect of job control on safety participation (H2) and the interaction between job control and social support (exploratory research question) were positively related to safety participation. That is, having the opportunity (job control) in combination with a supportive work environment (social support) is likely to result in a heightened propensity to undertake activities that promote workplace safety (safety participation). Additionally, having a supportive work environment (social support) was positively related to higher safety compliance (H3). These latter findings offer evidence of a 'team-based' approach to health care which is related to overall improved outcomes such as continuity of care and patient satisfaction (Campbell et al., 2001). The current results hold a number of control variables constant, some of which (i.e., occupational group, contingent nature of employment, ethnic group) explained variance in employee safety performance over-and-above the focal work characteristics investigated here.

Two of the four hypotheses proposed in this study were not supported. First, there was no significant relationship between job demands and safety compliance (H1). One possibility is that job demands impinge on safety compliance when job demands are quite high. For example, health care practitioners and support staff are required to respond to patient care needs in critical care situations (e.g., road traffic trauma), which result in practitioners focused on providing care quickly and effectively with little thought to safety compliance (Mark et al., 2007; Shindual-Rothschild et al., 1996). In other words, patient care may take precedent over other non-urgent factors. In the time-critical environment of emergency departments when life-saving actions are required, it may be that "short cuts" are taken in safety compliance on certain occasions. In addition, the mean level of job demands reported in the sample was moderate ($M=2.68$, $SD=0.99$) and the mean level of safety compliance was high ($M=4.20$, $SD=0.54$). Previous evidence of a statistically significant relationship between job demands and safety compliance may reflect different distributions, a more reliable measure of safety compliance, or both. Second, although the main effect of social support on safety participation was not significant (H4), the presence of higher job control in presence of higher social support promoted safety participation.

5.2. Implications for theory and practice

There are several implications of the study findings for organizations. First, perceptions of an instrumentally supportive work environment – that is, an environment in which you can count on colleagues to help you with work problems, difficult tasks, and 'back you up' when necessary – is a positive determinant of employee safety performance, and therefore related to compliance with safety rules and an enabler of safety participation. This is especially relevant in high pressure work environments, such as emergency departments, where time critical and potentially life-saving demands may exist in opposition to needs for employee safety. Existing safety climate research has accentuated the importance of employee perceptions of organizational concern for safety (e.g., Zohar, 1980) and in particular the support of supervisors in promoting safety (e.g., Zohar, 2000); however, there has been less attention paid to the social support of co-workers as an enabler of safety behavior (Carroll and Turner, 2008). Hospitals offer an excellent venue from which to examine this phenomenon as the very nature of being a health care provider requires participation in a care team (Campbell et al., 2001). For example, a paramedic who is required to wear particular protective clothing at an accident scene may remove this to have better access to a severely-injured patient. This activity may not be safety-critical if a co-worker paramedic takes the role of protecting the attending paramedic watching out for dangers that they may encounter when insufficiently protected. These types of behaviors may be learned when observing experienced professionals and adopting similar behaviors when they are adequately supported.

Beyond the formal predictions of the study, a number of control variables (i.e., nature of employment contract, ethnic group, occupational group) were related to employee safety performance and may have implications for organizations. A social identity based perspective (e.g., Hogg and Terry, 2000) suggests that those with organizational status (e.g., doctors) may exert less effort in terms of safety if they feel they already 'belong', whereas those in minority categories (the out-group) may variously exert less effort if they feel marginalized, or alternatively more of an effort in an attempt to fit in. The current study cannot test these possible mechanisms, but are suggestive of social identity dynamics as determinants of employee safety performance.

5.3. Study limitations and future research

There are several limitations of the current study worth noting. First, these findings are based on cross-sectional data. As a result, characterizing job control and social support as determinants of employee safety performance needs to remain cautionary as causal relationships cannot be established. It is possible, for example, that promoting safety through various extra-role activities (e.g., voluntary safety audits) may create higher perceptions of job control, rather than vice versa. Second, the response rate in this study was modest (33%), thus the extent to which the final model reflects the experience of the population of health care workers in these hospitals or the National Health Service more generally remains uncertain. Third, all variables used in this study are self-reports.

Future research needs to assess work characteristics and employee safety performance over multiple time periods and using multiple data sources to help establish the temporal ordering, the direction of these relationships, and to separate the substantive relationships from common method variance. In addition, there is the need to investigate in more detail what aspects of job control and social support are important for safety in various contexts. The opportunity to examine the interaction between high job control and high social support is highlighted in this sample because of the potentially demanding work faced by emergency departments.

Contrasting the findings of health care teams working in critical care vs. non-critical care environments will offer additional ways to examine the role of time and care urgency as a factor in employee safety performance.

In conclusion, in the hospitals participating in this study, social support was found to predict safety compliance, job control was found to predict safety participation, and the combination of job control and social support was found to predict safety participation. These data provide further evidence of the importance of work design in promoting employee safety.

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