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The impact of organizational climate on safety climate and individual behavior

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Abstract

Relatively little previous research has investigated the meechanisms by which safety climate affects safety behavior. The current study examined the effects of general organizational climate on safety climate and safety performance. As expected, general organizational climate exerted a significant impact on safety climate, and safety climate in turn was related to self-reports of compliance with safety regulations and procedures as well as participation in safety-related activities within the workplace. The effect of general organizational climate on safety performance was mediated by safety climate, while the effect of safety climate on safety performance was partially mediated by safety knowledge and motivation.

Keywords: Organizational climate; Safety climate; Safety performance

1. Introduction

In recent years, there has been a shift in emphasis within the safety literature, away from individual level factors that might be responsible for accidents and incidents, such as error or non-compliance with safety procedures, towards organizational factors, such as safety climate (eg. Reason, 1990). A key assumption of much of this literature is that the relationship between safety climate and system safety is at least partially mediated by individual safety behavior. However, surprisingly little is known about the mechanisms by which safety climate influences safety behaviors of individuals in organizations. Furthermore, relatively little is known about the

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factors that influence safety climate. The current paper examines the impact of general organizational climate on safety climate, and the impact of safety climate on the knowledge, motivation and performance of individuals in organizations.

2. Organizational climate and safety climate

Organizational climate is a multidimensional construct that encompasses a wide range of individual evaluations of the work environment (James and James, 1989). These evaluations may refer to general dimensions of the environment such as leadership, roles, and communication (James and McIntyre, 1996) or to specific dimensions such as the climate for safety or the climate for customer service. General perceptions of the organizational context can influence interactions among individuals (Griffin and Mathieu, 1997), attitudes toward organizational rewards (Griffin et al., 1995; Griffin, 1996) and affective responses to the work environment (Michela et al., 1995; Hart et al., 1996a). Perceptions of the general organizational climate develop as individuals attribute meaning to their organizational context based on the significance of the environment for individual values (James et al., 1990). Organizational climate, therefore, is thought to exert a strong impact on individual motivation to achieve work outcomes (Brown and Leigh, 1996). General organizational climate has also been found to influence knowledge and skills by increasing participation in activities such as training (Morrison et al., 1997).

Safety climate is a specific form of organizational climate, which describes individual perceptions of the value of safety in the work environment. A range of factors has been identified as being important components of safety climate. These factors include: management values (e.g. management concern for employee well-being), management and organizational practices (e.g. adequacy of training, provision of safety equipment, quality of safety management systems), communication, and employee involvement in workplace health and safety. A range of studies have demonstrated that these factors predict safety-related outcomes, such as accidents and incidents (e.g., Zohar, 1980; Brown and Holmes, 1986; Dedobbeleer and Beland, 1991; DeJoy, 1994; Niskanen, 1994; Hofmann and Stetzer, 1996).

No studies have investigated links between general organizational climate and specific safety climate. It is proposed that general organizational climate provides a context in which specific evaluations of the importance of safety are made. This means that the general organizational climate should predict specific safety climate (see Hypothesis 1). For example, if employees perceive that there is open communication in the organization, then they may also perceive that communication about safety is valued in the organization. Similarly, if employees perceive that the organization is supportive of their general welfare and well-being, they will be more likely to perceive that the organization values the safety of employees. These perceptions of the specific safety climate of the organization, in turn, are hypothesized to influence safety behavior. The following section describes a theory of safety performance that can be used to derive predictions regarding the impact of safety climate on safety behavior.

3. Safety performance

Neal and Griffin (1997) proposed a model of safety performance based on current theories of job performance (Borman and Motowidlo, 1993; Campbell et al., 1993). This model distinguishes between performance components, determinants of performance, and performance antecedents. The components of performance represent the major dimensions of task-relevant behaviors involved in a given job. The model incorporates two dimensions of safety performance: compliance and participation. Safety compliance involves adhering to safety procedures and carrying out work in a safe manner. Safety participation involves helping coworkers, promoting the safety program within the workplace, demonstrating initiative, and putting effort into improving safety in the workplace.

The determinants of safety performance represent the factors directly responsible for individual differences in compliance and participation. Campbell et al. (1993) argue that there are only three determinants of individual difference in performance: knowledge, skill, and motivation. Several authors have criticized this assumption, arguing that there may be other determinants of performance. Hesketh and Neal (1999), for example, argue that situational factors can sometimes produce invidivual differences in performance. However, available evidence does suggest that knowledge, skill and motivation are important determinants of individual differences in performance across a wide range of contexts. Safety behavior, therefore, should be determined by knowledge and skills necessary for particular behaviors and by the motivation of individuals to perform the behaviors. Furthermore, knowledge, skill, and motivation should have differential effects on the different components of performance. It is expected that safety knowledge and skill should have a stronger relationship with compliance than with participation (see Hypotheses 2 and 3), while safety motivation should have a stronger relationship with participation than with compliance (see Hypotheses 4 and 5). An individual must understand how to perform work safely and have the skill to be able to do it in order to comply with safety procedures. However, safety knowledge and skill are likely to be less important for participatory activities, since these activities require more generic forms of knowledge and skill (termed "tacit knowledge" by Wagner and Sternberg, 1985). Motivation is likely to be more important for participation than for compliance, because participatory activities are frequently voluntary, whereas compliance is generally mandated.

Antecedents of performance include individual-level factors such as ability, experience and personality, as well as group and organizational factors, such as leadership, group norms, and climate. General organizational climate and safety climate, therefore, are classified as antecedents of safety performance. A key assumption of the Campbell et al. (1993) model is that the determinants of performance (knowledge, skill and motivation) must mediate the relationship between the antecedents and components of performance. The theory, therefore, predicts that knowledge, skill, motivation should mediate the relationship between safety climate and safety performance (see Hypotheses 6 and 7). Moreover, this suggests that sefety climate and safety behaviors mediate the relationship between general organizational climate and safety perofmance (see Hypothesis 8).

Neal and Griffin (1997) tested the model of safety performance using an archival data set. As expected, compliance and participation were found to form separate factors, and individual safety knowledge was found to mediate at least some of the relationships between safety climate and safety performance. Unfortunately, safety motivation was not assessed in the archival data set, and several dimensions of safety climate were found to have direct effects on safety performance. The current study assessed safety climate and performance in a hospital setting, and included measures of both safety knowledge and safety motivation. Measures of skill were not included. The theoretical model is shown in Fig. 1.

The following hypotheses were tested in the present study:

H1. Organizational climate predicts safety climate
H2. Knolwedge predicts both compliance and participation
H3. The relationship between knolwedge and compliance is stronger than the relationship between knowledge and participation
H4. Motivation predicts both compliance and participation.
H5. The relationship between motivation and participation is stronger than the relationship between motivation and compliance.
H6. Safety climate predicts both knowledge and motivation.
H7. Knowledge and motivation mediate the relationship between safety climate and safety performance.
H8. Safety climate, knowledge, and motivation mediate the relationship between organizational climate and safety performance.

4. Materials and methods

4.1. Sample

The sample consisted of 525 employees from 32 work groups in a large Australian hospital (response rate 56%). The participants' mean age was 40.1 years (SD 11.0) and 89% were female.

4.2. Measures

4.2.1. Organizational climate

Employees' perceptions about seven different aspects of their work environment (appraisal and recognition, goal congruency, role clarity, supportive leadership, participative decision making, professional growth, professional interaction) were assessed using 35 items from Hart et al. (1996b)'s Organizational Climate Scale. This scale is based on the components of the School Organizational Health Questionnaire (Hart et al., 2000) that were designed to assess the organizational factors that are common to most organizations. This questionnaire has been used to assess general organizational climate in a range of private and public sector organizations (e.g. Hart et al., 1997), and has been shown to have good discriminant validity from other related constructs such as organizational stressors (Hart et al., 1996a). Employees

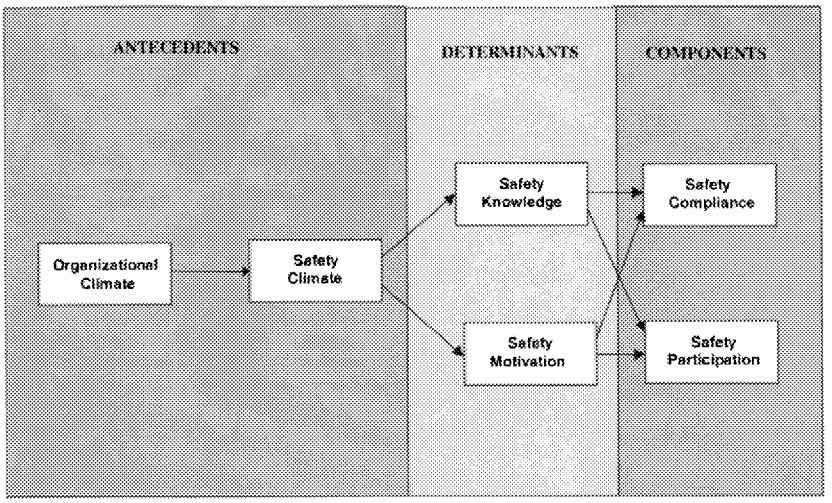

Fig. 1. Hypothesized relationships among constructs.

were asked to rate the extent to which each item (e.g. "My work objectives are always well defined", "There is good communication between groups in this workplace", and "This workplace has a clearly stated set of goals and objectives") described their workplace on a five-point scale ranging from "strongly disagree" to "strongly agree". Confirmatory factor analyses showed that the seven separate dimensions could be aggregated at a second-order level to provide an overall index of general organizational climate ($\alpha = 0.94$).

4.2.2. Safety climate

Sixteen items assessed perceptions of safety within a hospital setting, including management values, communication, training, and safety systems ($\alpha = 0.93$). Example items 'Management is concerned for the safety of employees", and "There is open communication about safety issues within this workplace". Employees responded on a five-point scale ranging from "Strongly Agree" (1) to "Strongly Disagree" (5).

4.2.3. Determinants of safety performance

Four items assessed knowledge about safety practices and procedures ($\alpha = 0.90$). Example items are "I know how to perform my job in a safe manner", and "I know how to maintain or improve workplace health and safety". Four items assessed individual motivation to perform safety-related activities procedures ($\alpha = 0.93$). Example item are "I believe that workplace health and safety is an important issue", and "I feel that it is important to maintain safety at all times".

4.2.4. Components of safety performance

Four items assessed compliance with safety procedures ($\alpha = 0.94$). Example items are "I use the correct safety procedures for carrying out my job", and "I ensure the highest levels of safety when I carry out my job". Four items assessed the extent to

Table 1
Correlations among all measures in the study

	M	SD	1	2	3	4	5	6
1. General climate	3.20	0.68	*0.94*					
2. Safety climate	3.75	0.76	0.52	*0.93*				
3. Safety knowledge	4.20	0.68	0.20	0.52	*0.90*			
4. Safety motivation	4.55	0.60	0.21	0.40	0.65	*0.93*		
5. Safety compliance	4.45	0.65	0.23	0.42	0.68	0.75	*0.94*	
6. Safety participation	3.89	0.86	0.19	0.47	0.55	0.53	0.54	*0.89*

which individuals participated in safety-related activities ($\alpha = 0.89$). Example item are "I voluntarily carry out tasks or activities that help to improve workplace safety", and "I help my coworkers when they are working under risky or hazardous conditions".

Means, standard deviations, coefficients alpha and correlations among all the scales are reported in Table 1.

5. Results

Hypotheses 1–7 were investigated using structural equation modeling (SEM) procedures. Scale scores were used to assess each construct depicted in Fig. 1 and error variances were estimated by multiplying the scale variance by one minus the scale reliability. Goodness of fit of the various models was judged in terms of Joreskog and Sorbom's (1989) Goodness of Fit Index (GFT), the Non-normed Fit Index (NNFI; Bentler and Bonnett, 1980) and the Comparative Fit Index (CFI; Bentler, 1990). The CFI is recommended as the best approximation of the population value for a single model (Medsker et al., 1994). The NNFI is recommended as an index that takes account of the parsimony of the estimated parameters (Medsker et al., 1994).

The results of this analysis are presented in Table 2. First, the hypothetical model depicted in Fig. 1 was estimated. Next, a partially saturated model was estimated with direct paths from organizational climate to compliance and participation. This model did not provide a significantly better fit than the hypothetical model

Table 2
Comparison of alternative models[a]

	df	χ^2	GFI	SRMR	CFI	NNFI
Hypothesized model	6	34.05	0.98	0.02	0.98	0.95
Direct paths from organizational climate to performance	4	31.37	0.98	0.03	0.98	0.92
Direct paths from safety climate to performance	4	10.58	0.99	0.02	0.99	0.98
Final model	5	11.86	0.99	0.02	0.99	0.98

[a] GFI, Goodnes of Fit Index; SRMR, Square Root Mean Residual; CFI, Comparative Fit Index; NNFI, Non-normed Fit Index.

[$\Delta\chi^2(2) = 2.68$, $P > 0.05$]. A model was then estimated with direct paths from safety climate to compliance and participation. This model did provide a significantly better fit than the hypothetical model [$\Delta\chi^2(2) = 23.47$, $P < 0.001$] indicating that the hypothetical model did not contain sufficient paths to account for all of the covariation between safety climate and the two safety performance measures. A final model was estimated after inspecting the path coefficients obtained from the second alternative model. The path from safety climate to safety participation was statistically significant in this model. The final model, comprising the hypothetical model plus this additional path, was not statistically different from the second partially saturated model [$\Delta\chi^2(2) = 1.28$, $P > 0.05$]. The standardized path coefficients from the final model are presented in Fig. 2.

In summary, the results supported key components of the proposed model. Hypothesis 1 predicted that organizational climate would predict safety climate. This hypothesis was supported. Hypotheses 2 and 4 proposed that knowledge and motivation would predict compliance and participation. Both these hypotheses were supported. Hypothesis 3 predicted that the relationship between knowledge and compliance would be stronger than the relationship between knowledge and participation. This hypothesis was supported. Hypothesis 5 predicted that the relationship between motivation and participation would be stronger than the relationship between motivation and compliance. This hypothesis was not supported. In fact, the relationship between motivation and compliance was stronger than the relationship between motivation and participation. Hypothesis 6 predicted that safety climate would influence both knowledge and motivation. This hypothesis was supported. Hypothesis 7 predicted that knowledge and motivation would mediate the relationship between safety climate and safety performance. This hypothesis was partially supported. Contrary to expectations, there was a significant direct path between safety climate and participation. The final hypothesis predicted that safety climate, knowledge, and motivation would mediate the relationship between organizational climate and safety performance. This hypothesis was also supported.

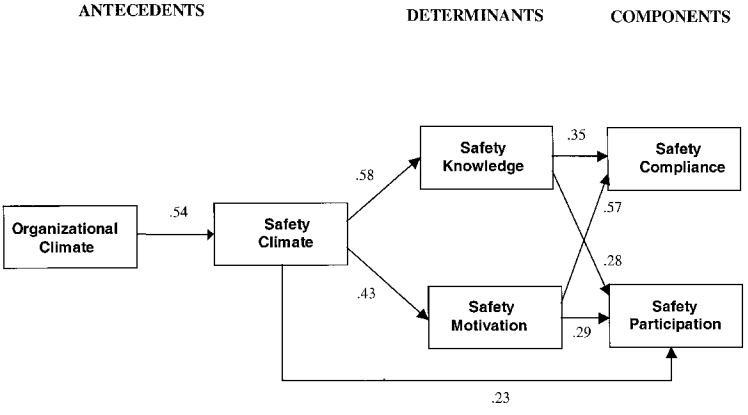

Fig. 2. Final model from structural equation modeling (SEM) analysis.