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Safety Climate and Safety Behaviour

by
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Abstract:

This paper provides an overview of a research program examining the antecedents and consequences of safety climate and safety behaviour. A model is presented identifying the linkages between safety climate, safety knowledge, safety motivation, and safety behaviour. Findings from a series of studies are reviewed that support the hypothesized linkages between safety climate and safety behaviour. Longitudinal analyses have examined the role of additional factors, such as general organisational climate, supportive leadership and conscientiousness as sources of stability and change in safety climate and safety behaviour. Further developments of the model, aimed at integrating safety behaviour into broader models of work effectiveness, are also discussed.

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1.   Introduction

Safety is a major concern for organisations, being the source of substantial direct and indirect costs. The National Occupational Health and Safety Commission has reported that in 1996–1997, there were 134,000 claims for work-related fatality, permanent disability, or serious temporary disability in Australia. More than one million working weeks were lost in 1996–1997 from recorded workers compensation claims, with the direct cost estimated at $4.9 billion. The indirect costs are thought to be substantially higher. Major disasters, such as the Longford gas explosion in Australia and Piper Alpha in the North Sea, have increased awareness of the importance of factors such as safety climate, and the long-term impact that these tragedies can have on organisations and the communities in which these organisations are based (Reason 1997). Consequently, there is an increasing recognition within industry of the need to manage safety on a proactive basis in order to improve safety for individuals at work and prevent significant financial loss (Frick, Jensen, Quinlan & Wilthagen 2000; Parker, Axtell & Turner 2001).

Until recently, relatively little attention had been paid to safety within the organisational behaviour literature. Although there is a substantial body of research focusing on concepts of safety climate and safety culture, the vast majority of this research was published in specialist safety journals (Griffin & Kabanoff 2001). The research has not been integrated with related constructs in organisational behaviour, and has tended to focus on issues surrounding the conceptualisation and operationalisation of safety climate or culture. For example, the literature has focused on the factor structure of safety climate measures, and the differences, if any, between safety climate and safety culture (Flin, Mearns, O'Conner & Bryden 2000; Hale 2000). Less progress has been made in understanding the mechanisms by which safety climate or safety culture affect safety behaviour, and the relationship between these constructs and other variables. For example, we know surprisingly little about factors that create safe working climates, and the impact that these climates have on individual behaviour. The current paper provides an overview of a research program that is examining the antecedents and consequences of safety behaviour at work. We are examining the impact of organisational factors, such as safety climate, general organisational climate and leadership, as well as individual differences in knowledge, skill, motivation, and personality. Furthermore, this work is examining the relationship between safety behaviour and other behaviours that contribute to effectiveness in the workplace, in order to produce an integrated model of work performance and effectiveness.

2.   Prior Safety Climate Research

The term *psychological climate* refers to individual perceptions of the work environment (James & James 1989). When these perceptions are shared by individuals within a work group or organisation, they are referred to as 'group climate' or 'organisational climate'. Aspects of the work environment typically assessed by climate measures include organisational policies, procedures, practices (Reichers & Schneider 1990). Specific types of climate reflect perceptions of different facets of the work environment, such as service (Schneider, White & Paul 1998), innovation (West & Anderson 1996), and safety (Griffin & Neal 2000a;

Zohar 1980). The term *safety climate*, therefore, refers to perceptions of policies, procedures, and practices relating to safety in the workplace. The term *safety culture*, on the other hand, refers to 'the attitudes, beliefs, and perceptions shared by natural groups as defining norms and values, which determine how they react in relation to risks and risk control systems' (Hale 2000). The concept of safety culture, therefore, is broader than safety climate, and incorporates a number of additional constructs, such as attitudes, values and behaviour.

To date, the safety climate literature has tended to focus on two major issues: the factor structure of safety climate, and the relationship between safety climate and outcome variables. A number of different measures of safety climate have been developed by researchers working in this field (e.g. Cox & Cheyne 2000; Hayes, Peranda, Smecko & Trask 1998; Zohar 1980). Unfortunately, these measures have produced a wide range of different factor structures, and there is currently no consensus regarding the key dimensions of safety climate. Regardless of the precise structure of safety climate, however, prior research has demonstrated that perceptions of safety climate are positively associated with safety compliance and negatively associated with accidents at the individual, group and organisational levels of analysis (Brown & Holmes 1986; Hayes, et al. 1998; Hofmann & Stetzer 1996; Rundmo 1994; Varonen & Mattila 2000; Zohar 2000).

Some limitations of current approaches to safety climate can be identified. First, many of the safety climate measures that have been used confound climate with attitudes and behaviour. For example, many safety climate measures include questions assessing whether the respondent is involved in safety activities (e.g. Cox & Cheyne 2000; Dedobbeleer & Beland 1991). Our approach defines employee involvement activities as safety behaviours, which are distinct from perceptions of safety climate in an organisation. A number of measures also include questions assessing individual attitudes, such as fatalism, personal responsibility for safety, and skepticism (Mearns, Flin, Gordon & Fleming 1998; Niskanen 1994; Williamson, Feyer, Cairns & Biancotti 1997; Varonen & Mattila 2000). Our approach differentiates attitudes both from individual behaviours and from perceptions of safety climate. Although measures of attitudes, behaviour, and climate have conceptual similarities, we argue that meaningful relationships among these constructs will be obscured if they are combined into a single global measure.

Second, the safety climate literature has been dominated by cross-sectional studies. To our knowledge, no studies have examined the link between safety climate and safety behaviour or accidents over time. Finally, relatively little is known about the contribution of other organisational factors to safety climate and safety behaviour. For example, current research provides relatively little insight into the factors that help to create and maintain safe working climates, or the way in which environmental factors may interact with individual differences.

3. A Model of Safety Climate and Safety Behaviour

Our research has focused on the development of a model of safety climate and safety behaviour that draws on existing theories of work performance (Borman & Motowidlo 1993; Campbell, Gasser & Oswald 1996; Neal & Griffin 1997; Neal & Griffin 1999). This model makes a distinction between the components, determinants and antecedents of performance (see fig. 1).

Figure 1

**Summary of Relationship Among Antecedents, Determinants and
Components of Safety Performance**

The components of performance represent the behaviours that individuals perform at work. Drawing on Borman and Motowidlo's (1993) definition of task and contextual performance, we differentiate between two types of safety behaviour: safety compliance and safety participation. The term *safety compliance* is used to describe the core activities that need to be carried out by individuals to maintain workplace safety. These behaviours include adhering to standard work procedures and wearing personal protective equipment. The term *safety participation* is used to describe behaviours that do not directly contribute to an individual's personal safety, but which do help to develop an environment that supports safety. These behaviours include activities such as participating in voluntary safety activities, helping coworkers with safety-related issues, and attending safety meetings.

The determinants of performance represent factors that are directly responsible for individual differences in behaviour. Campbell et al. (1996) have argued that there are only three determinants of individual differences in performance: knowledge, skill and motivation. If an individual does not have sufficient knowledge and skill to comply with safety regulations or participate in safety activities, then she or he will not be capable of performing these actions. If the individual does not have sufficient motivation to comply with safety regulations or participate in safety activities, then she or he will not choose to carry out these actions.

The antecedents of performance represent the factors that affect behaviour through their effects on knowledge, skill and motivation. There is a wide range of individual and environmental factors that are known to affect work behaviour, including ability, personality, and organisational climate (Neal & Griffin 1999). This model suggests that safety climate is one of many potential antecedents of safety behaviour. Other factors that are likely to be important include supportive leadership and conscientiousness. Barling and Zacharatos (1999) have argued that leadership is one of the critical organisational determinants of safety. Leaders are argued to play an important role in shaping the safety climate within an organisation, and motivating employees to perform their tasks safely (see also Hofmann & Morgeson 1999; Zohar 2000). Conscientiousness has been found to be an important predictor of a wide range of employee behaviours, including both task

and contextual performance (e.g. Barrick, Stewart & Piotrowski 2002; Borman, Penner, Allen & Motowidlo 2001). For these reasons, we would expect that conscientiousness would also predict safety compliance and participation.

4.   Research Program Investigating the Model

The model of safety climate and safety performance presented in figure 1 has been tested in a number of contexts. Two separate studies have demonstrated that perceptions of safety climate can be differentiated from perceptions of knowledge and motivation, and from self-reported safety compliance and participation (Griffin & Neal 2000a; Neal, Griffin & Hart 2000). Furthermore, these studies have demonstrated that knowledge and motivation mediate the relationship between safety climate and self-reported safety compliance and participation. Neal et al. (2000) also demonstrated that perceptions of safety climate were correlated with perceptions of general psychological climate, and that safety climate mediated the relationship between general psychological climate and safety behaviour. These findings suggest that general psychological climate provides a context in which individuals evaluate the safety of their work environment.

Griffin and Neal (2000a) also examined the hierarchical structure of safety climate perceptions. James and James (1989) argue that individuals evaluate specific features of their work environment in terms of their personal values and the significance of those features for their overall well being. According to this argument, perceptions of different facets of the work environment should load onto a common higher order factor. Griffin and Neal (2000a), therefore, argued that the different dimensions of safety climate should be conceptualised as first-order factors, which in turn should load onto a higher-order factor. The first order factors should reflect perceptions of safety-related policies, procedures and practices, while the higher-order factor should reflect the extent to which employees believe that safety is valued in the organisation. As predicted, Griffin and Neal (2000a) found that questions assessing perceptions of management values, safety communication, safety practices, safety training and safety equipment loaded onto five separate first-order factors, which in turn loaded onto a higher order factor. This hierarchical model provides a basis for resolving many of the discrepancies in reported factor structures for safety climate measures. The items used in the various safety climate measures differ in their level of specificity. Some measures include items that assess perceptions of specific policies, practices and procedures, whereas other measures include items that assess more global perceptions of safety climate. The hierarchical model developed by Griffin and Neal (2000a) suggests that measures that include items that assess perceptions of specific policies, procedures and practices should produce a larger number of factors than measures that provide indicators of the global value placed on safety in the workplace.

The longitudinal research program conducted by the authors continues to examine the relationships among safety climate, safety behaviour and range of individual and organisational factors. Over the previous five years, the research program has investigated links with organisational measures of overall climate and supportive leadership. Further work has examined the role of individual measures of commitment, conscientiousness, and extraversion, and the organisational outcomes of workplace accidents. The longitudinal design supports the aim of

identifying the sources of stability and change in safety-related factors, and identifying the direction of causation for the observed relationships. Based on the overall model of safety (Neal & Griffin 1997; Neal & Griffin 1998; Griffin & Neal 2000a), research papers have reported a variety of longitudinal relationships among the key factors. Supportive leadership has been found to exert a lagged effect on safety climate, whereas conscientiousness has been found to exert a lagged effect on safety motivation, compliance and participation (Griffin, Burley & Neal 2000). Additionally, safety compliance and participation have been found to have a lagged effect on accidents at the group level of analysis (Griffin & Neal 2000b).

Measurement issues play a key role in the implementation of the research program. Testing a comprehensive model of safety climate and behaviour requires the collection of data from multiple sources and multiple levels of analysis. Integrating multiple data sources in a field setting requires coordination among a variety of organisational stakeholders whose understanding and commitment to the research is essential for ongoing success (Griffin, Hart & Wilson-Evered 2000). Furthermore, data collected at the individual, group, and organisation levels requires appropriate modelling procedures that address the multilevel structure of the data (Hofmann, Griffin & Gavin 2000; Griffin, Mathieu & Jacobs 2001).

5.　　**Implications and Further Developments**

Our model of safety climate and safety behaviour has a number of implications for practice. One of the major implications relates to the way in which practitioners think about the determinants of safety. In the past, safety interventions have tended to focus on increasing compliance with safety regulations. An implicit assumption that is often made is that compliance problems are caused by poor safety attitudes. For this reason, many of the safety programs that are implemented in industry have used techniques such as feedback and incentives to change the instrumentality or valence of noncompliance. Our model suggests that managers should think about participation as well as compliance, and identify the antecedents and determinants of these behaviours. If an organisation has a problem with poor compliance or participation, then it is important to understand why, and target the intervention to the particular set of antecedents and determinants that are sustaining the problem (Neal & Griffin, in press). For example, if the problem is caused by a lack of knowledge or skill, then this suggests that the manager should focus on training, and possibly selection. If the problem is caused by motivation, then there is a broad range of individual and environmental factors that could be the cause of the problem, including leadership, climate and work design, as well as individual attitudes or personality. Furthermore, if a manager is trying to change one particular behaviour, then she or he needs to consider how that intervention will affect other safety behaviours. For example, if she or he is trying to make employees more motivated to comply with safety procedures, then it is important to evaluate whether the intervention will adversely affect motivation to engage in participatory safety activities. Feedback and incentive systems that focus on compliance run the risk of reducing the valence or instrumentality of participation.

The research program described above is being integrated with a related program investigating individual performance and organisational effectiveness. This latter project aims to provide a more comprehensive map of the individual

behaviours that constitute effective performance in organisations (Neal & Griffin 1999). In addition to distinguishing task and contextual performance (Griffin, Neal, & Neale 2000), the project is developing a model that differentiates individual behaviours in terms of the level of analysis at which the behaviour is observed and the kind of change that results from the behaviour (Griffin, Parker & Neal 2001). Safety is an important part of this model. Like customer service behaviours, which have received a great deal of attention in recent years, safety behaviours can be considered a specific domain of performance. Organisational factors such as organisational values (Maierhofer, Griffin & Sheehan 2000; Maierhofer, Kabanoff, & Griffin 2002) are being linked to safety outcomes as part of a broader model of work performance. Integrating safety into a more comprehensive model of performance is a further step on the path to bringing the topic of safety into mainstream organisational behaviour research.

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