Disentangling the roles of safety climate and safety culture: Multi-level effects on the relationship between supervisor enforcement and safety compliance

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ABSTRACT

Despite increasing attention to contextual effects on the relationship between supervisor enforcement and employee safety compliance, no study has yet explored the conjoint influence exerted simultaneously by organizational safety climate and safety culture. The present study seeks to address this literature shortcoming. We first begin by briefly discussing the theoretical distinctions between safety climate and culture and the rationale for examining these together. Next, using survey data collected from 1342 employees in 32 Italian organizations, we found that employee-level supervisor enforcement, organizational-level safety climate, and autocratic, bureaucratic, and technocratic safety culture dimensions all predicted individual-level safety compliance behaviors. However, the cross-level moderating effect of safety climate was bounded by certain safety culture dimensions, such that safety climate moderated the supervisor enforcement-compliance relationship only under the clan-patronage culture dimension. Additionally, the autocratic and bureaucratic culture dimensions attenuated the relationship between supervisor enforcement and compliance. Finally, when testing the effects of technocratic safety culture and cooperative safety culture, neither safety culture nor climate moderated the relationship between supervisor enforcement and safety compliance. The results suggest a complex relationship between organizational safety culture and safety climate, indicating that organizations with particular safety cultures may be more likely to develop more (or less) positive safety climates. Moreover, employee safety compliance is a function of supervisor safety leadership, as well as the safety climate and safety culture dimensions prevalent within the organization.

1. Introduction

Lack of workplace safety can adversely affect workers' lives, represents a social cost through an increase of health and social security demands, and causes disruptions to production and/or negative publicity for businesses and organisations (European Commission, 2011). A 2006 report from the International Labor Organization (ILO) estimates that the total costs of work-related accidents and ill-health equate to approximately 4% of the worlds Gross Domestic Product (ILO, 2006). Within Italy alone, more than 500,000 workers are injured annually (Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro-INAIL [National Institute for Insurance against Accidents at Work], 2014). As a

result, the European Occupational Safety & Health Administration (EU-OSHA, 2002) is concerned about these costs for Europe and has prioritised the need to develop knowledge of the economic and social costs arising from such safety failures and how best to prevent such failures. Similarly, according to the US Occupational Safety & Health Administration (OSHA), the direct costs of work-related injuries and illnesses include workers' compensation payments, medical expenses, and costs for legal services, whereas indirect costs include training replacement employees, accident investigation and implementation of corrective measures, lost productivity, repairs of damaged equipment and property, and costs associated with lower employee morale and absenteeism.

In addition to relying on prevention through design, advanced ergonomics and personal protective equipment, a growing body of literature conducted largely by occupational and organizational researchers has increasingly focused on the influence of supervisor- and organizational-level psychosocial variables on employee safety

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performance and outcomes (e.g., Christian et al., 2009; Clarke, 2006). Specifically, a great deal of attention has been paid to the contextual effects of organizational safety culture and safety climate. Unfortunately, despite the advances that have occurred since Zohar's (1980) seminal article on safety climate, there has been pervasive and persistent conflation of the terms safety culture and safety climate which has hindered our understanding of how these contextual variables might jointly influence employee safety outcomes.

Specifically, there has been a lack of clear theoretical and measurement distinctions between safety climate and culture constructs among scientists and practitioners alike. Indeed, as noted by other scholars, the two terms are often used interchangeably (Cox and Flin, 1998; Guldenmund, 2007; Mearns and Flin, 1999; Yule, 2003). Therefore, the purpose of our study is to briefly describe the theoretical differences between safety climate and safety culture and empirically test their relationships with and purported effects on employee safety compliance. We use a multilevel modelling approach to test our model by investigating the extent to which the relationship between supervisor enforcement and employee safety compliance is moderated by organizational-level safety climate and safety culture. By examining the conjoint influence exerted simultaneously by organizational climate and culture, we hope to gain a better understanding of the relationship between these two important constructs and identify subsequent implications for science and practice.

Fig. 1 illustrates the empirical model and hypotheses to be tested positing that at the individual-level employee safety compliance is influenced by supervisor enforcement. However, we also propose that this relationship is moderated by both organizational safety climate and safety culture (which are also expected to exert direct main effects on compliance). In positing this model, we do not intend to imply that these are the only individual and contextual variables that influence safety behavior. However, the model does seek to address a literature shortcoming by investigating the simultaneous and multilevel moderating roles of safety climate and culture on the supervisor enforcement-compliance relationship.

Researchers have extensively discussed and empirically investigated the concepts of culture and climate (cf., Ashkanasy et al., 2010; Cooper et al., 2001; House et al., 2004); yet, this study represents the first attempt to empirically test their conjoint and simultaneous contributions to the understanding of employee safety. In doing so, we hope to provide a complementary approach to ongoing research, which has tended to alternatively focus on either safety culture or safety climate. Moreover, our empirical results may have important theoretical and practical implications, given the emphasis that is placed on developing effective means of improving employee compliance and reducing workplace injuries.

We begin our review of this literature by examining the importance of focusing on the individual-level relationship between supervisor enforcement and safety compliance. We next briefly define and delineate the constructs of organizational safety climate and safety culture, and consider how these organizational-level variables might influence the individual-level relationship between supervisor enforcement and safety compliance.

2. The relationship between supervisor enforcement and safety compliance

Although workplace injuries and accidents are the ultimate endpoints in the causal chain typically examined by workplace safety researchers, such variables tend to be (fortunately) low base rate phenomena. However, contemporary models of workplace safety (e.g., Brondino et al., 2012) highlight the important role of safety performance as precursors to these important workplace outcomes. While Griffin and Neal (2000) argued that safety performance includes both safety compliance and safety participation, safety participation refers to discretionary behaviors such as helping co-workers improve safety in the workplace (i.e, safety citizenship behaviors), whereas safety compliance includes the core compliance-related activities to maintain safety, such as wearing personal protective equipment (Neal et al., 2000). Hence, *safety compliance* can be defined as the extent to which employees adhere to safety procedures and carry out their work tasks according to prescribed safety rules, regulations, and policies (Neal et al., 2000). A recent meta-analysis by Nahrgang et al. (2011) found that safety compliance was more strongly correlated with workplace accidents and injuries (corrected $r = -0.20$), as well as other adverse safety-related events (corrected $r = -0.49$), compared to the relationship between safety participation and these two outcomes (corrected $r = -0.08$ and corrected $r = -0.32$, respectively). Therefore, we chose to focus on safety compliance as our dependent variable of interest, rather than safety participation.

There is considerable research evidence indicating the importance of supervisor safety-specific behaviors in predicting employee safety compliance and safety-related outcomes (see Hofmann and Morgeson, 2004 for a review). For example, according to Zohar (2003), *enacted organizational safety policies* refer to the actual implementation and execution of safety procedures and practices among supervisors and employees. In other words, actions speak louder than words when determining safety's true prominence within an organization. In keeping with this idea, Probst and Brubaker (2001) proposed that *extrinsic safety motivation* (i.e., *supervisor enforcement*) would be related to employee safety compliance at work. Extrinsic safety motivation involves the perceptions of supervisor enforcement of safety policies, including the extent to which supervisors provide praise for safety compliance and punish for non-compliance. They found that employees who had low extrinsic safety motivation (i.e., supervisors who failed to enforce safety policies) had lower levels of safety compliance and were more likely to experience injuries and accidents at work. Thus, this aspect of enacted safety policy was shown to influence safety outcomes. More recently, Fugas et al. (2012) focused on a combination of cognitive and social mechanisms, finding that supervisors' injunctive safety norms and perceived behavioral control predict workers' compliance safety behaviors. Indeed, a subsequent meta-analysis by Clarke (2013) found that transactional safety leadership (i.e., a focus on supervisor enforcement) was more predictive of safety compliance than transformational leadership (which tended to be more related to discretionary safety behaviors).

In keeping with these findings, we expect that:

Hypothesis 1 (replication): Greater supervisor safety enforcement will be related to higher levels of employee safety compliance.

In addition to proposing a direct relationship between supervisor enforcement and safety compliance, we also expect that the organizational safety culture and organizational safety climate will moderate this relationship. Before developing specific hypotheses regarding these relationships, it is important to briefly clarify the theoretical and practical distinctions between safety climate and safety culture, particularly as these terms are often used interchangeably in the literature and in practice. **3. Safety Culture and Safety Climate**

In the realm of safety studies, despite a general agreement among scholars that climate and culture are different concepts, multiple often-overlapping definitions of the two constructs have been put forth in the literature. As a result, safety climate and safety culture are often confused in theory and practice despite having distinct etymology (Cox and Flin, 1998). Furthermore, according to Yule (2003), a review of the definitions of safety culture and safety