



# Improving safety climate and behavior through a multifaceted intervention: Results from a field experiment



Babette Bronkhorst<sup>a,\*</sup>, Lars Tummers<sup>b</sup>, Bram Steijn<sup>a</sup>

<sup>a</sup> Erasmus University Rotterdam, Erasmus School of Social and Behavioural Sciences, Department of Public Administration & Sociology, Burgemeester Oudlaan 50, 3000 DR Rotterdam, The Netherlands

<sup>b</sup> Utrecht University, Utrecht School of Governance, Bijlhouwerstraat 6, 3511 ZC Utrecht, The Netherlands

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## ABSTRACT

Interventions aimed at increasing priority for employee safety could lead to better safety climate and safety behavior of employees. However, current studies reporting on safety climate interventions lack diversity in contexts and settings, they focus mainly on supervisors and do not take into account the implementation process of the intervention. We aim to add to the safety literature by testing the effects of a multifaceted safety climate intervention using a field experimental design. We analyzed data of 520 health care employees in five organizations and studied the effects of the implementation process. Results showed that safety climate and behavior scores were significantly higher at post-intervention among the intervention group as compared to the control group, while there were no differences pre-intervention. Results also showed that within the intervention group, employees who experienced more positive changes to work procedures and positive attitudes and actions of their supervisor towards the intervention experienced higher post-intervention safety climate and safety behavior. This study presents a new, multifaceted safety climate intervention strategy that can be useful for improving safety climate and safety behavior. It also shows the importance of the implementation process when conducting safety climate interventions.

## 1. Introduction

The occupational health and safety literature has identified many factors that contribute to health and safety in the workplace (Hofmann et al., 2017). One of the factors that received a lot of attention is the safety climate concept. Several studies have shown that safety climate plays an important role in workplace health and safety outcomes of employees, mainly through its influence on safety behavior (Christian et al., 2009; Clarke, 2010). Given the amount of correlational evidence regarding the relationship between safety climate and safety behavior, the number of intervention studies is surprising. Yet intervention studies are important for establishing causal relationships between safety climate and safety behavior, studying the improvement and implementation of changes in safety climate and a better collaboration between researchers and practitioners to increase our understanding of the safety climate concept in theory and practice (Kristensen, 2005).

Indeed, a handful of studies have tested the effects of an intervention on employees' perceptions of safety climate and safety outcomes such as safety behavior, safety knowledge, safety violations, and safety leadership (Zohar, 2002; Zohar and Luria, 2003; Zohar and Polachek,

2014; Nielsen, 2014; Mullen and Kelloway, 2009; Von Thiele Schwarz et al., 2016; Kines et al., 2010; Naveh and Katz-Navon, 2015). Nevertheless, these studies leave three important gaps in our knowledge on safety climate improvement.

First, the interventions in these studies were primarily focused on changing supervisory interaction with employees, which is in line with the emphasis that is placed on the pivotal role of direct supervisors in relation to safety climate (Zohar, 2002; Zohar and Luria, 2003). However, notwithstanding this importance, the influence of other safety agents such as (co)workers and senior managers has also been stressed in the safety literature (Chiaburu and Harrison, 2008; McGonagle et al., 2014; Zohar, 2014). Over the years, research has examined the multifaceted nature of the safety climate concept and proved that it references multiple levels in the organizational hierarchy (e.g. Zohar and Luria, 2005), including senior management and coworkers (Yule et al., 2006; Brondino et al., 2012). However, senior managers' priority for safety and coworkers safety norms have not (or only marginally) been included in safety climate interventions.

Second, the current safety climate intervention studies were mostly located in industrial settings (such as metal processing, construction,

\* Corresponding author.

E-mail addresses: [bronkhorst@essb.eur.nl](mailto:bronkhorst@essb.eur.nl) (B. Bronkhorst), [l.g.tummers@uu.nl](mailto:l.g.tummers@uu.nl) (L. Tummers), [steijn@essb.eur.nl](mailto:steijn@essb.eur.nl) (B. Steijn).

and manufacturing) with a focus on physical accidents and hazards. As the targets of safety climate perceptions are context-dependent (Zohar, 2010), these interventions may not provide the most optimal leverage points for safety climate improvement in other organizational contexts (for instance self-managing teams, emphasis on teamwork) and types of safety risks and hazards (for instance psychological health and safety risks). Since health and safety issues are relevant to a wide range of organizations and industries, it is important to investigate the effects of safety climate interventions across various settings.

The third gap is that previous safety climate intervention studies were mainly concerned with the effects of the intervention itself on safety outcomes, ignoring the implementation process of the intervention and its influence on the intervention effects. Addressing the conditions under which interventions are likely to be most effective is needed to achieve more valid evaluations of safety climate interventions (Pedersen et al., 2012; Nielsen, 2013). Authors such as Randall and colleagues (Randall et al., 2009; Randall and Nielsen, 2012) argue that including information on the implementation process could provide some protection against the threat of Type III error. That is, concluding the intervention is ineffective when it is in fact the faulty implementation that leads to failure (Dobson and Cook, 1980).

This paper aims to fill these gaps by testing the effects of a multifaceted safety climate intervention and its implementation process in the health care sector. The multifaceted safety climate intervention incorporates different safety climate agents to improve safety climate and safety behavior, including senior managers, supervisors, and employees. We must note that our safety climate intervention is not focused on patient safety climate, but on employee safety climate in health care (that is, the climate concerning health and safety of health care employees). Unless stated otherwise, the term ‘safety climate’ in our study thus always refers to employee safety and not to patient safety. The study is guided by two main research questions: (1) “Does a multifaceted safety climate intervention improve safety climate and safety behavior?” and (2) “Under which conditions does a multifaceted safety climate intervention improve safety climate and behavior?” To answer these questions, we conducted a field experiment with a pretest-posttest control group design among 520 employees working in five health care organizations.

### 1.1. Improving safety climate

Safety climate refers to the perceptions employees have of the policies, procedures and practices concerning safety within the organization (Zohar, 1980). In one of the first papers on safety climate, Zohar (1980) points to the informative function of the concept regarding the relative importance of safety versus other competing task domains (such as productivity or cost-reduction). The safety climate concept therefore reflects the priority of employee health and safety compared to other priorities within the organization (Zohar, 2008). Thus, an intervention to improve safety climate should explicitly signal to employees that workplace health and safety is a priority in the organization and that behaviors that improve this are expected. Despite the fact that many researchers follow Zohar’s (1980, 2008) conceptualization of safety climate, there is not much consensus on the clarification of the concept in terms of its operationalization or dimensionality (Flin et al., 2000; Zohar and Luria, 2005). This makes it difficult to pinpoint specific intervention targets that will demonstrate the priority of health and safety over other demands. However, some common themes within the literature have emerged (Flin et al., 2000; Bronkhorst et al., 2015), which provide important leverage points that can be used to improve safety climate perceptions. We will discuss three of these common themes.

#### 1.1.1. Senior management priority for safety

One of the key dimensions of safety climate is management commitment to safety (Flin et al., 2000). As organizations are hierarchical

in structure, employees will form perceptions of management commitment at multiple organizational levels. Zohar and Luria (2005) argue that safety climate can be meaningfully constructed at the group level and at the organizational level, so as to reflect supervisors’ and senior management’s influence on safety. The role of senior management in establishing organizational priorities and allocating resources is one of the reasons this safety agent is generally acknowledged as the main influencer of safety climate (Flin et al., 2000; Bosak et al., 2013). By using their power over time, money and people, senior managers are able to show the relative importance of safety within the organization. However, there are only a handful of studies including senior management in their safety climate intervention. Zohar and Luria (2003) for instance include higher-level managers by providing them with summary information about safety-related interaction between supervisors and employees, and instructed them to share this information with subordinate supervisors. The intervention tested by Nielsen (2014) included the CEO in staff meetings where he informed employees about the company’s safety status. Similarly, Naveh and Katz-Navon (2015) asked senior management to send a support letter to all employees backing the organization’s vision about safety. In all three studies, senior management’s priority for safety is demonstrated through a top-down, one-sided information exchange.

A different approach to modify senior management priority for safety has been developed in the related field of patient safety climate through so-called ‘Leadership WalkRounds’ or management safety rounds. These were first introduced in 1999 by the Institute for Healthcare Improvement and conceptualized by Frankel et al. (2003) as a tool to improve management commitment to safety by providing an informal method for senior managers to talk about patient safety issues with employees. In contrast to the way senior management was included in the safety climate interventions described above, leadership safety rounds provide two-way interaction between senior managers and employees. This facilitates a learning process and increases employees’ participation opportunities (Luria and Morag, 2012). Empirical research has shown that leadership safety rounds have positive effects on patient safety climate and reinforces patient safety as a priority within the organization (Singer and Tucker, 2014; Thomas et al., 2005). To our knowledge, there is only one study that investigated leadership rounds for employee safety, namely Luria and Morag (2012). They examined the introduction of a ‘safety management by walking around’ intervention using a case study method. Although the authors did not study its effects on safety climate, their results showed that safety rounds increased and improved interaction between managers and employees about safety. Based on their experience, these authors argue that “such an intervention should highlight for employees the importance of the safety facet relative to other organizational facets” (2012: 256). Attempts to increase perceived senior management priority for safety by introducing safety rounds thus seem promising.

#### 1.1.2. Supervisor commitment to safety

Supervisors play a pivotal role in showing employees the priority of safety, as they inform them on the kinds of behavior that are valued and supported in the workplace (Zohar, 2002). The daily interaction between employees and management is therefore considered as one of the building blocks of safety climate. Not surprisingly, most of the safety climate intervention studies are primarily focused on increasing perceptions of supervisor commitment to safety. Zohar (2002), Zohar and Luria (2003), Zohar and Polachek (2014), and Kines et al. (2010) all tested whether providing coaching and feedback information to supervisors on their daily messages improved employees’ perceptions of the priority of safety. Overall, the results from these studies showed that the coaching and feedback changed the type of messages employees perceived from their supervisors (i.e. more safety-related messages), which is indicative of a modified priority for safety. In turn, this resulted in changes in safety climate and other safety outcomes such as safety behavior and safety audit levels.

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