



## The role of safety leadership and working conditions in safety performance in process industries



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### ABSTRACT

Previous research has shown the important role that employees play in improving the organisation's safety outcomes. This work analyses the effect of safety leadership and working conditions on employees' safety behaviours. For this purpose, the authors develop and test a structural equation model on a sample of 103 process industry organisations located in Spain. The results show that safety compliance is conditioned by work pressure, environmental conditions and occupational hazards, and co-worker support, while safety participation is conditioned by environmental conditions and occupational hazards, safety incentives, and co-worker support. The results also show that safety leadership has a negative effect on work pressure, and a positive effect on environmental conditions and occupational hazards and on safety incentives. This work offers guidelines to leaders in process industries about the behaviours and policies that they should adopt if they wish to improve their safety outcomes.

### 1. Introduction

Occupational accidents, injuries and illnesses are still serious problems in organisations (Ford and Tetrick, 2011). In Spain the incidence rate reached 3364.0 accidents in the workplace with days lost per 100,000 employees in 2016, up 3.44% on the previous year. For manufacturers the incidence rate was higher at 5204.7 (an annual growth rate of 5.01%). These rates show that despite previous efforts accidents are still happening in the process industries, with all the costs that this implies for the firms (Fernández-Muñiz et al., 2009).

Previous research shows that unsafe employee acts and human error play an important role in the generation of occupational accidents. Williamson and Feyer (1990) analyse occupational fatalities in Australia in the period 1982–1984 and find that 91% of the occupational fatalities involve behavioural factors (Seo, 2005). In the same line, Abu-Khader (2004) argues that human factors are critical to the success of process safety schemes in chemical plants, making employee behaviour a vital issue that must be included in risk assessment.

On the other hand, employee behaviour is influenced by the environment in which the individual is working (Abu-Khader, 2004). Anderson (2005) argues that although the immediate cause of accidents often involves human error, organisational and management factors are implicated in incidents across all industries.

Many authors consider effective safety leadership and a strong management commitment to safety a prerequisite for safe behaviour

among employees and improved safety performance (e.g., Anderson, 2005; Cohen, 1977; Donald and Canter, 1994; Flin et al., 2000; Hale et al., 1997; Hofmann et al., 1995; Niskanen, 1994; O'Dea and Flin, 2001; Simonds and Shafai-Sahrai, 1977; Smith et al., 1978; Zohar, 2000). But few studies suggest how leaders should interact with their subordinates to improve safety performance (Clarke and Ward, 2006), and apart from some work on transformational leadership, little is known about how leadership styles impact on safety outcomes (Kelloway et al., 2006).

In the current work the authors analyse the impact of safety leadership, via inspirational appeals (Clarke and Ward, 2006) and participative management (O'Dea and Flin, 2001), on safety performance in process industries, since process industries are high-risk industries and consequently safety critical organisations. The current authors also analyse the role that working conditions play in improving safety performance. Specifically, the authors analyse the role of work pressure, environmental conditions and occupational hazards, safety incentives and co-worker support.

Various authors stress the role of work pressure as an antecedent of unsafe behaviour (e.g., Brown et al., 2000; Hofmann and Stetzer, 1996; Seo, 2005), but their results are not conclusive. Other authors such as Parker et al. (2001) and Fernández-Muñiz et al. (2012) fail to find a significant relation between overload or pressure and safety behaviour. Moreover, most studies focus on work pressure's impact on unsafe behaviour, ignoring its effect on employees' involvement in voluntary

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safety-related activities. In this work, the authors analyse work pressure's impact not only on safety compliance, but also on safety participation and co-worker support.

No consensus exists about how environmental conditions and occupational hazards affect employee behaviour. Previous research suggests that hazardous work environments are associated with lower job satisfaction and organisational commitment and higher levels of task distraction (e.g., Jermier et al., 1989; McLain, 1995), which in turn lead to more unsafe acts and less involvement in safety activities. But other authors such as Tucker et al. (2008) argue that potential workplace hazards are unacceptable situations that can encourage employees to speak out to change unsafe working conditions. And Ford and Tetrick (2011) point to a lack of research analysing the influence of occupational hazards on safety compliance and safety participation.

Nor is the literature on the effect of incentives on motivation and performance conclusive. Some studies find that economic incentives can increase motivation and improve performance, but others fail to find an influence and some even find a negative relation (Mattson et al., 2014). Thus in the current work the authors aim to look more closely at the impact of safety incentives on employees' behaviour.

Finally, Chiaburu and Harrison (2008) consider that the research on co-workers' role in promoting safe behaviours among employees is inconclusive and call for more research. And Brondino et al. (2012) argue that despite their important influence on employees' behaviour, the literature tends to focus less on the co-workers than on the leaders.

Thus in this paper the authors intend to shed light on the antecedents of safety performance in process industries. Subsequently, they offer leaders guidelines about the behaviours they should follow and the policies they should implement in order to reduce unsafe acts among employees and increase effective employee involvement in safety activities and hence ultimately improve safety outcomes.

## 2. Conceptual framework

### 2.1. Employee safety performance

Borman and Motowidlo (1993) identify two major components of job performance: task performance and contextual performance. Task performance refers to patterns of behaviour directly involved in the production of goods and services or activities providing indirect support to the organisation's core technical process (Kahya, 2007). It includes activities formally recognised as part of employees' jobs. Contextual performance can be understood as individuals' efforts that are not directly related to their main task function but are important in configuring the organisational, social and psychological context in which this function is carried out.

Griffin and Neal (2000) see safety performance as an aspect of work performance and propose a model of safety performance based on theories of job performance (Borman and Motowidlo, 1993; Campbell et al., 1993). They identify two components of safety performance: safety compliance and safety participation. Safety compliance refers to the core safety activities that employees must carry out to maintain workplace safety, such as following safety rules and procedures and using personal protective equipment (PPE) properly (Griffin and Neal, 2000). Safety compliance includes employee behaviours that improve their own personal health and safety and that could be considered part of the employee's work role.

Safety participation, on the other hand, refers to behaviours that do not directly improve workplace safety but help to create an atmosphere that supports safety, such as voluntary participation in safety activities or attendance at safety meetings (Griffin and Neal, 2000). Safety participation includes behaviours that support the organisation's objectives and goals in this area (Vinodkumar and Bhasi, 2010), and therefore, involves a greater voluntary element than safety compliance, including behaviours that go beyond the employee's formal role, in other words organisational citizenship behaviours (Clarke, 2006).

### 2.2. Safety leadership

Cohen (1977) finds that the factors most frequently contributing to the success of safety programmes in organisations are management's commitment to safety, top managers' frequent, informal visits to the workplace and daily contact between supervisors and line workers. Later research stresses the important role the leaders play in improving employees' safety behaviour and safety outcomes (Cooper and Phillips, 2004; Hofmann and Morgeson, 1999; Hofmann et al., 1995, 2003; Kelloway et al., 2006; Martínez-Córcoles et al., 2011; Wu, 2005; Wu et al., 2008; Zohar, 1980, 2002). Safety leadership can be defined as the process of interaction between leaders and followers, through which leaders could exert their influence on followers to achieve organisational safety goals under the circumstances of organisational and individual factors (Wu, 2005).

Barling et al. (2002) contribute by introducing the transformational leadership concept in the field of workplace safety. Safety-specific transformational leadership requires managers' personal commitment to, and active interest in, occupational safety and employee well-being.

For Clarke and Ward (2006), the transformational leadership style includes inspirational appeals, which use emotional language to achieve employee commitment by transforming their value system to realign it with organisational objectives. But good words are not enough to modify employees' behaviours; visible acts from the managers are also necessary.

Management behaviours related to safety can be included in the term participative management (O'Dea and Flin, 2001). Participative management incorporates a series of interrelated activities such as managers' personal involvement in safety activities and frequent, informal communication between employees and management. Managers can demonstrate this personal involvement by attending and contributing to safety seminars and training courses, participating in safety inspections, and/or regularly visiting the workplace to enquire about working conditions.

Hofmann and Morgeson (1999) suggest that employees are more likely to maintain a safe behaviour when they feel that their organisation supports them and when they enjoy high-quality relationships with their leaders (Eid et al., 2012). When managers and supervisors behave in a way that shows a sincere concern for employees' safety, the latter tend to feel more supported in their concern for safety (Tucker et al., 2008). Consequently, and using social exchange theory (Blau, 1964), when employees perceive that their employer values and supports them, an implicit obligation is generated among the employees that creates a future reciprocity of benefit to the organisation (DeJoy et al., 2004). In other words, through the norm of reciprocity (Gouldner, 1960), when the employees are treated well by others they feel obliged to return the favour. Thus when managers or supervisors demonstrate their commitment to safety and their concern for employees' well-being, the employees will be willing to reward their organisation by complying with the safety procedures and expanding their role to include organisational citizenship behaviours (Clarke, 2006; Hofmann et al., 2003), in other words, behaviours that improve the organisation's overall safety (Clarke and Ward, 2006; Inness et al., 2010). With this, the authors propose their first hypotheses:

**Hypothesis 1a.** Safety leadership, via inspirational appeals and participative management, has a direct, positive effect on safety compliance.

**Hypothesis 1b.** Safety leadership, via inspirational appeals and participative management, has a direct, positive effect on safety participation.

### 2.3. Working conditions

Following Demerouti et al.'s (2001) model, Nahrgang et al. (2011) categorise working conditions in the context of workplace safety as job

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