



Modelling antecedents of safety compliance: Incorporating theory from the technological acceptance model



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ABSTRACT

Research into the technology acceptance model (TAM) and safety performance was used to develop a model in which perceived organizational and supervisor support for safety affect employees' compliance with a risk-awareness safety procedure via cognitive–motivational mechanisms. Cross-sectional survey data were collected from 374 employees of a large Australian mining company. Results of path analysis show that both perceived organizational safety support and perceived supervisor safety support influenced compliance with the risk-awareness procedure, although through different cognitive–motivational processes. Perceived organizational safety support was significantly associated with compliance via perceived usefulness of the risk-awareness procedure. On the other hand, perceived supervisor safety support was significantly related to compliance via safety motivation. The implications for theory and practice are discussed.

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1. Introduction

Compliance with safety rules and procedures is an important dimension of an individual's safety performance. A great deal of evidence confirms that compliance is associated with fewer accidents and injuries (e.g. Neal and Griffin, 2006). Violation of existing rules and procedures is considered one of the most important factors that contribute to accidents (O'Dea and Flin, 2001). Despite increasing awareness of the harm that can result from non-compliance, failure to follow rules and procedures is frequently identified as a factor in injury investigations and remains a major concern for hazardous industries (Hale and Borys, 2013; Hopkins, 2011). Therefore, it is important to improve our understanding of the factors that might influence individual compliance with rules and procedures.

To date, the most common psychological approach to safety compliance is represented by Christian et al. (2009) integrative model and meta-analysis of safety performance. Within this approach, safety motivation and knowledge are proximal determinants of safety compliance and a range of individual and situational factors operate as distal determinants of compliance. We

expand this model by considering how individuals' perceptions of a safety rule or procedure influence compliance behaviour beyond the effect of safety motivation. Drawing on the technology acceptance model (TAM, Davis, 1989), we propose and test a model in which an expanded set of cognitive–motivational factors are proximally related to safety compliance. These three cognitive–motivational factors, in turn, are shaped by the more distal factors of supervisor and organizational support. A summary representation of the model is presented in Fig. 1.

This study goes beyond previous research in three ways. First, it extends the cognitive–motivational factors that are associated with individuals' compliance with a safety procedure. Second, we differentiate two different sources of safety support, namely, organization safety support, and supervisor safety support; and explore how they might affect safety compliance via different cognitive–motivational factors. Third, in this study, we focus on one particular safety procedure rather than all the safety rules and procedures that individuals might work with in their jobs. The very broad range of possible rules and procedures applicable to hazardous environments means that it is very difficult to control for substantive differences. Although we limit our study to a specific safety procedure, it allows us to control for other differences that arise when multiple rules and procedures are studied. By investigating the psychological processes that underpin compliance with a safety procedure, we help organizations to identify strategies to promote compliance across similar activities.

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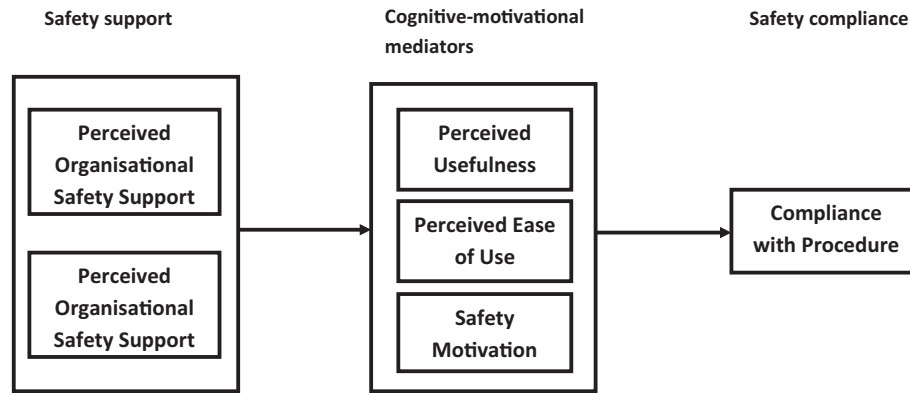


Fig. 1. Theoretical model.

1.1. Safety compliance

Based on Borman and Motowidlo's (1993) differentiation of task and contextual work performance, Griffin and Neal (2000) distinguished safety compliance and safety participation as two distinct aspects of safety performance. Safety compliance refers to core safety tasks individuals carry out to maintain workplace safety, including compliance with the organization's safety rules and procedures and wearing personal protective equipment. Safety participation refers to employees' voluntary participation in safety activities which aim to contribute to a supportive safety environment, such as attending safety meetings, or putting in extra effort to promote safety programs. Despite their conceptual differences, the current safety performance literature suggests that a single psychological pathway underpins both dimensions of safety performance. Drawing on the climate (Brown and Leigh, 1996) and performance literature (Campbell et al., 1993), Griffin and Neal (2000) proposed that safety participation and safety compliance are influenced by an individual's safety motivation, defined as an individual's willingness to exert effort to behave safely, which in turn is influenced by the organization's safety climate. Based on this model of safety performance, Christian et al. (2009) proposed and meta-analytically tested an integrative model of safety performance, in which safety performance is determined by proximal person factors of safety motivation and safety knowledge, which in turn are predicted by more distal person and situational factors.

While these studies provided useful insights into the understanding of safety performance, this single psychological pathway approach to safety performance has its limitations. Given the different nature of these two performance dimensions, it is reasonable to expect that safety compliance and safety participation should have distinct antecedents, as is the case for task and contextual performance (Motowidlo and Vanscoter, 1994). Indeed, despite the ample empirical support for this motivation-performance relationship, researchers have also gradually realised that the two dimensions of safety performance seem to be related to different psychological processes. For example, in a meta-analysis, Clarke (2006) showed that safety participation had a stronger relationship with the known antecedents of safety performance. Similarly, Neal and Griffin (2006) found safety motivation had a significant lagged effect on safety participation but not safety compliance. In other words, the psychological factors that influence safety compliance are less well understood. While safety motivation is an important psychological factor that influences safety compliance, it is important to consider other cognitive factors which drive people's compliance with procedure.

1.2. Perceived usefulness and perceived ease of use as antecedents of safety compliance

In this study, we draw on the technological acceptance model (TAM, Davis, 1989) to develop a broader set of cognitive-motivational antecedents to safety compliance. TAM was developed to understand the acceptance and usage of information technology. Davis (1989) proposed that when a new technology system is introduced, individuals' acceptance and usage of the system are determined by two perceptions of the technology: perceived usefulness and perceived ease of use. Perceived usefulness is defined as the degree to which individuals perceive that the use of the system can improve their job performance (Davis, 1989). Upon the encounter of an information technology system, individuals use a mental representation to assess the match between their work goals and the outcome of using the system. Together, these matching processes contribute to the formation of an overall judgment about the system's utility value for an individuals' job performance. TAM suggests that individuals are more likely to accept and use a system when they perceive the system to be useful in terms of increasing their job performance. Indeed, perceived usefulness has been found to be the most influential predictor of an individual's intention to use technology, and of actual usage behaviour (Davis, 1989; Hong and Tam, 2006; Venkatesh and Davis, 2000; Venkatesh and Bala, 2008).

We propose that perceived usefulness is also an important predictor of compliance with safety procedures. While information technology is often introduced by organizations to achieve productivity goals, safety rules and procedures are introduced to achieve safety goals. In other words, both safety rules and procedures and information technology can be seen as instrumental in guiding how employees achieve organizational goals. Therefore, we argue that compliance with safety procedures also involves a judgement process in which individuals assess the likelihood that following a rule or procedure will help them achieve a desired safety outcome.

We use the term "perceived usefulness" to describe the extent to which individuals believe that following a safety rule or procedure can help them to achieve their safety goals. We expect that individuals who perceive that following a safety rule or procedure is useful are more likely to comply voluntarily with the safety rule or procedure. On the other hand, if employees perceive a rule or procedure to be unhelpful or unimportant for their safety, they are more likely to break the rule or take short-cuts. Supporting this view, Borys (2009) found in his pioneering ethnographic study that a risk-analysis procedure, which involves going through a checklist to identify potential risk and hazards in one's work environment, was often ignored or not completed properly by workers in a

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