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Q3 Is there agreement between worker self and supervisor assessment of 2 worker safety performance? An examination in the construction industry

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ABSTRACT

Introduction: Individual safety performance (behavior) critically influences safety outcomes in high-risk workplaces. Compared to the study of generic work performance on different measurements, few studies have investigated different measurements of safety performance, typically relying on employees' self-reflection of their safety behavior. This research aims to address this limitation by including worker self-reflection and other (i.e., supervisor) assessment of two worker safety performance dimensions, safety compliance and safety participation. *Method:* A sample of 105 workers and 17 supervisors in 17 groups in the Chinese construction industry participated in this study. Comparisons were made between worker compliance and participation in each measurement, and between workers' and supervisors' assessment of workers' compliance and participation. Multilevel modeling was adopted to test the moderating effects on the worker self-reflection and supervisor-assessment relationship by group safety climate and the work experience of supervisors. *Results:* Higher levels of safety compliance than participation were found for self-reflection and supervisor assessment. The discrepancy between the two measurements in each safety performance dimension was significant. The work experience of supervisors attenuated the discrepancy between self- and supervisor-assessment of compliance. Contrary to our expectations, the moderating effect of group safety climate was not supported. *Conclusions:* The discrepancy between worker self- and supervisor-assessment of worker safety performance, thus, suggests the importance of including alternative measurements of safety performance in addition to self-reflection. Lower levels of participation behavior in both raters suggest more research on the motivators of participatory behavior. *Practical applications* The discrepancy between different raters can lead to negative reactions of rates, suggesting that managers should be aware of that difference. Assigning experienced supervisors as raters can be effective at mitigating interrater discrepancy and conflicts in the assessment of compliance behavior.

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1. Introduction

Unsafe behavior of frontline workers is considered as a direct, critical factor contributing to workplace injuries and accidents across diverse high-risk industries (Christian, Bradley, Wallace, & Burke, 2009; Heinrich, Petersen, & Roos, 1950; Kvalheim & Dahl, 2016; Luo et al., 2017; Shappell & Wiegmann, 2000). As indicated by Griffin and Neal (2000), safety behavior of employees reflects their performance relevant to safety. Based on work performance theory (Borman & Motowidlo, 1993), two components of safety behavior (performance) are established, namely, safety compliance and safety participation.

Safety compliance corresponds to task performance and refers to "the core activities that individuals need to carry out to maintain workplace safety" (Griffin & Neal, 2000, p. 349). These behaviors include activities such as adhering to safety norms and wearing personal protective equipment. *Safety participation* corresponds to contextual performance and refers to "behaviors that do not directly contribute to an individual's personal safety but that do help to develop an environment that supports safety" (Griffin & Neal, 2000, p. 349). These behaviors include activities such as participating in voluntary programs for improving workplace safety, helping co-workers with safety-related issues, and demonstrating initiative. In high-risk industries that are characterized with high uncertainty of adverse conditions, both compliance and participation behavior of workers are critical to safety management (Didla, Mearns, & Flin, 2009).

Effort has been devoted to exploring factors that influence the demonstration of these two kinds of safety performance (e.g., Clarke,

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2006; Dearmond, Smith, Wilson, Chen, & Cigularov, 2011; Guo, Yiu, & González, 2016; Hoffmeister et al., 2014; Neal & Griffin, 2006; Zhang & Wu, 2014). These studies have provided valuable information about the mechanisms through which safety compliance and participation can be encouraged; however, one criticism of the previous literature is the single use of employees' self-reflected safety behavior (Griffin & Hu, 2013; Jiang & Probst, 2016; Xia, Wang, Griffin, Wu, & Liu, 2017). Advantages of embracing different measurement methods, such as providing additional information and reducing common method bias, have been acknowledged in multiple assessment domains (Harris & Schaubroeck, 1988; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Differing from the relatively high level of self-other agreement in the assessment of personality and psychopathological syndromes (Mattila-Evenden, Svanborg, Gustavsson, & Åsberg, 1996; Watson, Hubbard, & Wiese, 2000), in the case of work performance assessment, the larger discrepancies between self- and other-assessment have been widely reported (Heidemeier & Moser, 2009). Furthermore, single usage of self-reported work performance can be problematic in certain cases, for example, when assessment is used for performance evaluation and promotion (Thornton, 1980). Different measurement methods for work performance have long been discussed, however, specific attention to various measurements of individual safety performance has remained limited.

To address the above limitation, this research includes both worker self-reflection and other (i.e., supervisor) assessment of worker safety compliance and participation. Specifically, the objectives of this study include exploring: (a) difference between levels of worker safety compliance and participation in each measurement; (b) discrepancy between self-reflection of workers and assessment by supervisors concerning worker safety compliance and participation; and (c) moderating effects on the worker self-supervisor discrepancy by group safety climate and the work experience of supervisors. Safety climate has been considered crucial to accident prevention in construction (Li, Ji, Yuan, & Han, 2017; Lingard, Cooke, & Blismas, 2012; Zhang, Li, Fang, & Wu, 2017). Safety climate contains multiple dimensions that can vary across different industries (Zohar, 2010). In this study, we examine group safety climate with the supervisor safety climate dimension (e.g., "Enforces safety rules;" Hayes, Perander, Smecko, & Trask, 1998). This dimension was used because many studies have demonstrated that supervisors are most influential in shaping subordinates' safety performance in the current research setting, the construction industry (Fang, Wu, & Wu, 2015; Lingard et al., 2012; Zhang et al., 2017).

This research will contribute to the measurement of safety behavior by providing empirical evidence of the degree to which worker self- and supervisor-assessment of worker safety behavior are distinct. If these two measurements are different, then alternative measurements of safety performance warrants consideration in addition to the traditional self-reflection. Furthermore, self-other discrepancy can bring negative reactions, such as the targets' negative beliefs about the accuracy and usefulness of assessment (Brett & Atwater, 2001) and their reduced willingness to participate in career planning (Wohlers, Hall, & London, 1993). Thus, it is both theoretically and practically relevant to explore factors that will influence the distinction between self- and supervisor-assessment. Previous general performance research has mainly focused on moderators related to personal factors, job characteristics, and features of scales (Conway & Huffcutt, 1997; Harris & Schaubroeck, 1988; Heidemeier & Moser, 2009; Mabe & West, 1982). We instead focus on group-level moderators related to work practices, namely, safety climate at the group level and the work experience of supervisors. This is meaningful because both safety climate and work experience can be practical interventions from practitioners to mitigate judgment gaps between raters within a group. In contrast, personal psychological factors such as social desirability are difficult to control in practice; characteristics of jobs such as job types are also difficult to change if practical; and scales and instruments seem to be of little relevance in mitigating the actual

discrepancy between raters. Safety performance is one type of work performance (Griffin & Neal, 2000), thus, the current examination of self-supervisor assessment of safety performance can also add knowledge to the literature on measurement of general work performance.

Another contribution of this research is the implications of the results for the construction industry, in terms of the research of safety behavior and safety climate. This sector is a high risk industry worldwide (Aminbakhsh, Gunduz, & Sonmez, 2013; Chen, McCabe, & Hyatt, 2017; Health and Safety Executive, 2014; Murie, 2007). Similar with other sectors, unsafe behavior of construction workers, who constitute a large proportion of the workforce in the entire industry, is a major contributor to injuries and accidents (Lingard & Rowlinson, 2005; Patel & Jha, 2016). However, safety compliance and participation have received relatively little attention in construction research, with its major application in healthcare and manufacturing sectors (Dearmond et al., 2011). In the research of generic safety climate, safety climate has been considered as a multilevel construct (Huang, Lee, McFadden, Rineer, & Robertson, 2017; Zohar, 2008, 2010); the supervisor safety dimension investigated in this study should be treated as a group-level property (Guo et al., 2016). However, most safety climate research in construction focuses on psychological safety climate (Shen, Tuuli, Xia, Koh, & Rowlinson, 2015), a property at the individual level. Thus, drawing on generic safety research, this study will add to safety climate research specific to construction by treating safety climate as a group-level property. Also, for the first time group safety climate is investigated as a moderator of the relationship between self- and supervisor-assessed performance, thereby contributing to safety climate research in general.

2. Theoretical backgrounds and hypotheses development

2.1. Worker safety compliance versus safety participation

Safety compliance and participation are related but inherently two distinct dimensions of work performance relevant to safety (Neal & Griffin, 2006). Consistent with task performance, safety compliance is related to in-role, formal requirements of employees' performance concerning safety, which can directly improve employees' personal health and safety; on the contrary, consistent with contextual performance, safety participation is often not specified in formal job requirements (e.g., formal contracts) and involves discretionary behaviors on the part of an employee (Didla et al., 2009; Hofmann, Morgeson, & Gerras, 2003). Safety participation behavior can support overall safety in the organization, but its positive impact on workers' personal safety is indirect and indefinite (Griffin & Neal, 2000). Most empirical studies have indicated that employees perform higher levels of compliance than participatory behaviors (e.g., Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2014; Griffin & Hu, 2013; Hoffmeister et al., 2014; Neal & Griffin, 2006).

This may be attributed to mandatory and, hence, specified requirements for compliance behavior, which make compliance activities easy to be understood and then undertaken by employees. However, participatory activities are informal and, thus, without clear performance requirements. In addition, the behaviors related to compliance are expected and normally monitored by safety supervisors in high-risk workplaces, while participatory activities are voluntary and discretionary. This may increase the likelihood of an employee to undertake safety compliance behaviors, rather than participation activities. Finally, compliance to safety rules brings direct benefits to personal health and safety, and also means guaranteed salaries, while violating rules indicates failure to fulfill of job requirements and thus usually leads to reduction in salaries. In contrast, although safety participation activities can contribute to overall safety in the organization, their benefits for the employees themselves tend to be indirect and ambiguous (Griffin & Neal, 2000). That is, employees are likely to demonstrate more compliance activities than participatory ones for their personal safety and incomes. Given the above three reasons, we propose that, regardless

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