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A PRELIMINARY DEVELOPMENT AND VALIDATION OF A MEASURE OF SAFETY PERFORMANCE

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For my family in China.

致我的家人

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LIST OF ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
SC-RR	Safety Compliance – Reducing Risks
SC-PC	Safety Compliance – Protection and Communication
SPO	Safety Participation towards the Organization
SPI	Safety Participation towards Individuals
OCBO	Organizational Citizenship Behaviors towards the Organization
OCBI	Organizational Citizenship Behaviors towards Individuals
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
IRT	Item Response Theory

ABSTRACT

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Safety researchers have devoted extensive attention to safety performance behaviors. However, current safety performance models have yet to differentiate between safety citizenship behaviors directed towards the organization and those directed towards individuals. This might be a potential oversight, considering that citizenship behaviors targeted at different beneficiaries might be associated with different antecedents. As such, the purpose of the present study was to develop and validate a new safety performance scale. Items from existing measures formed the item pool and those tapping into the proposed dimensions were selected. Next, items were pilot tested using an online panel of 333 employees from various safety-related industries. A 4-factor structure emerged after exploratory factor analysis and the scale was further refined using reliability analysis and item response theory analysis. Finally, confirmatory factor analysis was conducted to replicate the factor structure using data from 137 employees. Theoretically related variables were correlated with the safety performance dimensions to establish the nomological network. Results supported the 4-factor structure of the new safety performance scale and construct validation hypotheses were largely supported. Implications, study limitations, and directions for future research are discussed.

CHAPTER 1. INTRODUCTION

1.1 Introduction

Occupational safety remains one of the greatest concerns for organizations across the world. The associated economic cost of workplace accidents is estimated to amount to 4% to 5% of gross domestic product (World Health Organization, 2008). In 2007, this accrued to over $550 billion economic losses in the United States (Bureau of Economic Analysis, 2008). Workplace accidents in 2012 resulted in 4,383 fatal work injuries and more than 3.0 million nonfatal occupational injuries and illnesses in the United States (Bureau of Labor Statistics, 2013). Beyond these high human and financial costs, workplace accidents are also associated with negative affective reactions from employees who are involved in, and/or witnessed accidents, which could further translate into increased turnover and impaired job performance (Barling, Kelloway, & Iverson, 2003).

The staggering cost of workplace safety issues justifies more academic effort devoted to safety issues in applied psychology and management research. One approach to safety research focuses on objective safety outcomes, including injuries and accidents. Although the inquiry into safety outcomes is valuable, there are several limitations to this approach. First, safety outcomes usually have a low base rate and skewed distributions (Zohar, 2000), which could pose difficulty for subsequent statistical analysis. Second, safety outcomes are subject to the influence of both individual factors and environmental

factors (Christian, Bradley, Wallace, & Burke, 2009). For example, factors such as situational constraints (e.g., hazardous work environments) could influence safety outcomes, but employees might have little control over these factors (Motowidlo, 2003). Last and perhaps most important, safety outcomes provide limited information about the actual behaviors that behavioral scientists are fundamentally interested in. Without an understanding of individual behaviors, researchers are further precluded from informing managerial interventions to improve workplace safety.

Given the limitations of merely focusing on safety outcomes, safety researchers have devoted extensive efforts to a better understanding of safety behaviors in the workplace in the past two decades. Safety researchers tend to decompose safety performance into a "task performance" factor and a "contextual performance" factor (Griffin & Neal, 2000; Neal, Griffin, & Hart, 2000), similar to the distinction in the job performance literature (Borman & Motowildo, 1993). Although this conceptualization has facilitated the scientific inquiry into safety behaviors, it has yet to recognize "contextual" safety performance targeted at different beneficiaries (i.e., the organization vs. coworkers). This might be a potential oversight, given that citizenship behaviors directed at different beneficiaries might have different antecedents (Halbesleben & Bowler, 2007). Revealing these distinct forms of safety citizenship behaviors will facilitate a more refined understanding of safety behaviors. As such, the purpose of the present study was to develop a new safety performance scale that differentiated safety citizenship behaviors targeted at the organization and those targeted at individuals. In the next sections, I will briefly review current safety performance models and re-conceptualize safety performance. I will then examine the relationships between safety

performance and theoretically related variables in an attempt to establish the nomological network of this construct.

1.2 Safety Performance Models

Several assumptions underlie the current conceptualizations of safety performance (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002). First, safety performance can be measured regarding the frequency that employees engage in these behaviors. Second, a multidimensional factor structure underlies safety behavior item covariance. Third, safety performance, as a construct, is distinguishable from its antecedents (e.g., safety knowledge and skill; Griffin & Neal, 2000) and safety outcomes (e.g., accidents; Christian, et al., 2009).

Grounded on these assumptions, several models of safety performance exist in the literature. Burke and colleagues (2002) defined general safety performance as "the actions or behaviors that individuals exhibit in almost all jobs to promote the health and safety of workers, clients, the public, and the environment" (p.432). The four factors that comprise their safety performance model include: (a) using personal protective equipment, (b) engaging in work practices to reduce risks, (c) communicating health and safety information, (d) exercising employee rights and responsibilities. Contrary to Burke and colleagues' (2002) focus on the prescribed safety-related behaviors, Hofmann, Morgeson, and Gerras (2003) explicitly emphasized safety citizenship behaviors as a form of content specific organizational citizenship. Their safety citizenship behavior model includes six highly correlated scales: helping (e.g., "helping teach safety procedures to new crew members"), voice (e.g., "making safety-related recommendations about work activities"), stewardship (e.g., "protecting fellow crew members from safety

hazards"), whistle-blowing (e.g., "explaining to other crew members that I will report safety violations"), civic virtue (e.g., "attending safety meetings"), and initiating safety-related change (e.g., "trying to improve safety procedures").

Another safety model (Griffin & Neal, 2000; Neal et al., 2000) incorporates both the mandated component and the voluntary citizenship component of safety behaviors. In this model, safety performance was conceptualized as a two-dimensional construct: safety compliance and safety participation. Safety compliance refers to the core safety activities that individuals engage in to maintain safety (Griffin & Neal, 2000). An example of safety compliance behaviors is using the correct safety procedures for carrying out one's job. Safety participation refers to behaviors that may not directly contribute to but do help to promote safety (Griffin & Neal, 2000). An example of safety participation behaviors is making safety suggestions. While safety compliance is usually mandated by the organization, safety participation usually falls outside of the work role.

In developing this safety performance model, Griffin and Neal (2000) explicitly referenced the distinction between task performance and contextual performance in general job performance research (Borman & Motowildo, 1993). This conceptualization recognized distinctive types of safety behaviors and facilitated subsequent safety research (Christian et al., 2009; Clarke, 2006, 2012; Cullen & Hammer, 2007; Ford & Tetrick, 2011; Fugas, Meliá, & Silva, 2011; Inness, Turner, Barling, & Stride, 2010; Marchand, Simard, Carpentier-Roy, & Ouellet, 1998; Snyder, Krauss, Chen, Finlinson, & Huang, 2011). Having briefly reviewed current safety performance models, I now turn to the deficiency of current conceptualizations and then propose an updated conceptualization of safety performance.

1.3 Safety Performance: A Re-conceptualization

While the two-component safety performance model (Griffin & Neal, 2000; Neal et al. 2000) has been a useful guide to safety research, there exists the possibility that some finer distinctions between safety behaviors are yet unexamined. Specifically, safety participation, as a type of content specific helping behavior, might have different beneficiaries, as suggested by relevant research in general job performance. To illustrate, employees' helping behaviors directed towards the organization (i.e., organizational citizenship behavior towards the organization; OCBO) and those directed towards coworkers (i.e., organizational citizenship behavior towards individuals; OCBI) have been empirically distinguished (Lee & Allen, 2002; McNeely & Meglino, 1994; Williams & Anderson, 1991). Importantly, OCBI and OCBO are associated with distinctive psychological mechanisms (Halbesleben & Bowler, 2007; Lee & Allen, 2002; McNeely & Meglino, 1994; Williams & Anderson, 1991). Therefore, revealing different forms of organizational citizenship behaviors laid the ground for a more refined examination into work behaviors.

As a content specific citizenship behavior that pertains to safety, safety participation behaviors might have different beneficiaries as well. For example, among the dimensions of safety citizenship role definition by Hofmann and colleagues (2003), *voice* (e.g., "making safety-related recommendations about work activities") and *civic virtue* (e.g., "attending safety meetings") appear to tap into citizenship behavior towards the organization whereas *helping* (e.g., "helping teach safety procedures to new crew members") and *stewardship* (e.g., "protecting fellow crew members from safety hazards") lean towards citizenship behavior towards individuals. To illustrate, "making safety-

related recommendations" (an item from *voice*) can be considered as citizenship behavior targeted towards the organization and "helping other individuals to make sure they perform their work safely" (an item from *helping*) is an example of citizenship behavior towards individuals. In other words, safety participation might be further distinguished into safety participation towards individuals and safety participation towards the organization.

More importantly, safety participation towards the organization (SPO) and safety participation towards individuals (SPI) might be associated with different antecedents. Social exchange theory (Blau, 1964; Cropanzano & Mitchell, 2005) suggests that individuals are motivated to reciprocate people from whom they receive benefit. Purposeful behavior theory (Barrick, Mount, & Li, 2013) also predicts that different motivation orientations are associated with citizenship behaviors targeted at different beneficiaries. For example, Halbesleben and Bowler (2007) found that employees who were motivated to maintain good interpersonal relationships were more likely to engage in citizenship behaviors towards individuals (i.e., coworkers). Those who were more concerned with their status and power, by comparison, chose to display organizational citizenship behaviors targeted towards the organization. Disentangling these distinctive forms of safety citizenship behaviors and their associated psychological mechanisms holds promise to advance the understanding of helping behaviors in the workplace. Following a similar vein, differentiating potential safety participation dimensions presents an opportunity to offer a more refined analysis of safety behaviors, which has yet to receive attention in safety research. Such scientific scrutiny might further translate

into enhanced workplace safety and employee well-being, along with reduced number of injuries and accidents and their associated economic outcomes.

As such, I propose a more refined structure of safety performance, which includes safety compliance, SPO, and SPI. Before different dimensions of safety performance are delineated, it is important to note that safety performance, although extensively studied, has rarely been clearly defined (Burke et al., 2002; Griffin & Neal, 2000). However, a precise definition is an integral part of scale development (Cabrera-Nguyen, 2010). Herein I draw on Motowidlo's (2003) definition of job performance to conceptualize safety performance. Safety performance is defined as the total expected value of the relevant behaviors that individuals engage in over a standard period of time to maintain and promote workplace safety (Griffin & Neal, 2000; Motowidlo, 2003). Following Motowidlo (2003), safety performance is conceptualized as a property of individual behaviors rather than outcomes (e.g., accidents). Given that safety performance is a safety-specific domain of job performance (Christian et al., 2009), its expected value is primarily concerned with workplace safety. In other words, behaviors that pertain to *other* job aspects (e.g., production) do not fall into the realm of *safety* performance. It is also important to recognize that the assumptions underlying previous safety performance models (Burke et al., 2002) still hold in the current conceptualization and measurement of safety performance, such that (a) safety performance is scalable on frequency; (b) its indicators will covary in a meaningful way to yield a stable multifactor structure; (c) it can be differentiated from its antecedents and outcomes.

Safety performance is composed of three dimensions, safety compliance, SPO, and SPI. Safety compliance refers to the in-role activities that employees need to engage

in to maintain workplace safety (Clarke, 2006; Griffin & Neal, 2000; Neal et al., 2000). These activities are part of the organizational efforts to control work behavior and defend against accidents and injuries (Reason, Parker & Lawton, 1998). SPO is defined as extra-role behaviors that employees voluntarily carry out to promote safety and benefit the organization (Griffin & Neal, 2000; McNeely & Meglino, 1994; Neal et al., 2000). From the performer's viewpoint, SPO is intended only to benefit the organization (McNeely & Meglino, 1994). Although it could be argued that other employees will benefit from this type of behavior as well, this should be seen as a by-product of SPO. By comparison, SPI is the voluntary, extra-role work behaviors that are intended only to benefit other individuals (Griffin & Neal, 2000; McNeely & Meglino, 1994; Neal et al., 2000). Likewise, the primary focus of SPI is to promote the safety of other individuals, though the overall workplace safety might be enhanced as well.

To further explicate the way safety performance and its dimensions are defined, it is important to note that the definitions of safety performance dimensions are closely tied to the conceptualization of safety performance. Specifically, safety compliance deals with *in-role* behaviors that support and *maintain* workplace safety. SPO involves *extra-role* activities that *promote workplace* safety whereas SPI refers to *extra-role* behaviors that *promote* the safety of *other individuals*. Whereas the failure to engage in safety compliance might lead to increased risks or the actual happening of accidents (i.e., "fail to maintain"), refusing to help the organization or other individuals has a less obvious and direct impact on safety (i.e., "fail to promote").

1.4 Construct Validation

Now that I have proposed an updated conceptualization of safety performance, I will turn to a discussion of the nomological network of safety performance dimensions. Examining the relationships between safety performance dimensions and related variables helps establish its construct validity (Hinkin, 1998). More importantly, different patterns of relationships with antecedents will justify the differentiation between SPI and SPO.

1.4.1 Safety Consciousness

Safety consciousness deals with a general awareness of safety matters and a specific set of safety knowledge (Barling, Loughlin, & Kelloway, 2002). Similar to the role of knowledge as a determinant of job performance (Salgado, Viswesvaran, & Ones, 2001), safety consciousness is an important antecedent to safety behaviors (Christian et al., 2009; Griffin & Neal, 2000; Neal et al., 2000). Given the prescriptive nature of safety compliance, knowing how to comply with safety procedures will be positively related to the actual compliance (Christian et al., 2009; Griffin & Neal, 2000). Although volitional safety behaviors such as SPO and SPI might be less subject to the influence of safety consciousness (Clarke, 2006), evidence suggests that safety knowledge can still predict safety participation (Griffin & Neal, 2000; Neal et al., 2000). Accordingly, I propose:

Hypothesis 1: Safety consciousness will be positively related to safety compliance (1a), safety participation towards the organization (1b), and safety participation towards individuals (1c).

1.4.2 Safety Climate

Safety climate is defined as the individual perception about policies, practices, and procedures regarding safety issues that employees learn from supervisory practices (Griffin & Neal, 2000; Neal et al., 2000; Zohar, 2000, 2003). A positive safety climate could signal the importance of safety behaviors and raise the awareness of safety issues, thus enhancing employees' motivation to comply with safety procedures, practices, and policies (Clarke, 2006; Zohar, 2000). Moreover, supervisors' commitment to safety also showcases their concern for employee well-being (Clarke, 2006). Accordingly, employees might feel motivated to reciprocate by engaging in safety-related citizenship behaviors (Blau, 1964; Hofmann et al., 2003). As such, safety climate might be related to higher levels of safety performance.

Hypothesis 2: Safety climate will be positively related to safety compliance (2a), safety participation towards the organization (2b), and safety participation towards individuals (2c).

1.4.3 Procedural Justice

Procedural justice refers to the extent to which the processes that lead to important decisions regarding outcomes are deemed to be fair (Colquitt, 2001). Consistent with social exchange theory (Blau 1964; Cropanzano & Mitchell, 2005), employees are likely to reciprocate the fair treatment they receive from the organization by voluntarily helping the organization. For example, procedural justice has been shown to be associated with OCBO (McNeely & Meglino, 1994; Moorman, Blakely, & Niehoff, 1998). As an extension of this relationship to safety citizenship behaviors (Hofmann et al., 2003), procedural justice might be related to higher levels of SPO. Given the compelling

theoretical reason, the major focus is to substantiate the relationship between procedural justice and SPO, leaving the relationships with safety compliance and SPI to exploratory analysis. Therefore, I propose:

Hypothesis 3: Procedural justice will be positively related to safety participation towards the organization.

1.4.4 Coworker Incivility

Coworker incivility refers to low-intensity deviant behaviors from coworkers that might be interpreted as rude and discourteous (Andersson & Pearson, 1999). Since individuals are motivated to reciprocate in their social exchange with different parties (Blau, 1964; Cropanzano & Mitchell, 2005), the treatment they receive from coworkers might further influence their behaviors towards coworkers (Penny & Spector, 2005). Specifically, individuals facing coworker incivility are prone to negative emotions (Sakurai & Jex, 2012), which makes it less likely for them to help other people with safety-related issues (Lee & Allen, 2002). As a result, mistreatment from coworkers might translate into lower levels of helping behaviors from the incivility target (Cropanzano & Mitchell, 2005). Likewise, herein the primary focus is the relationship between coworker incivility and SPI. As such, we propose:

Hypothesis 4: Coworker incivility will be negatively related to safety participation towards individuals.

1.4.5 Motivation Orientation

Motivation orientation refers to the basic goals that regulate the arousal, direction, intensity, and persistence of personal behavior (Barrick, Stewart, & Piotrowski, 2002; Mitchell, 1997). Drawn from McClelland's (1965) three learned needs, a general

framework composed of three motivational orientations has been developed (Barrick et al., 2002). Specifically, achievement striving refers to one's orientation to accomplish tasks as a means of expressing individual preferences and fulfilling the need for competence. Communion striving concerns gaining acceptance in interpersonal relationships. Status striving motivates individuals to gain power and dominance within a hierarchical group. Consistent with the purposeful behavior theory (Barrick et al., 2013), purposeful goal striving (i.e., motivation orientation) motivates employees to engage in different work behaviors. Specifically, achievement striving is strongly related to in-role behaviors (Halbesleben & Bowler, 2007). Communion striving is primarily associated with OCBO whereas status striving is strongly related to OCBI (Halbesleben & Bowler, 2007).

In a similar vein, a similar pattern is expected between motivation orientation and safety performance dimensions. Achievement striving is associated with the priming of self-interest goals (Brewer & Gardner, 1996). To the extent that safety compliance is required and recognized by the organization, individuals high on achievement striving should feel motivated to strive for higher levels of safety compliance (Halbesleben & Bowler, 2007). SPO represents a specific set of citizenship behaviors targeted at the organization. Given its voluntary nature, helping behaviors targeted at the organization might be conducted with an intention of impression management (Barrick et al., 2013; Bolino, 1999). Specifically, employees who demonstrate these behaviors might be perceived as superior organizational citizens than others (Rioux & Penner, 2001). As such, people high on status striving might be motivated to engage in SPO to improve their status over other employees (Chiaburu & Carpenter, 2013; Halbesleben & Bowler,

2007). SPI is a specific set of helping behaviors that primarily target other individuals in the workplace. People with communion striving orientation are motivated to gain acceptance and get along with others (Barrick et al., 2002). Helping others with safety issues provides such an opportunity to secure their social relationships (Chiaburu, Marinova, & Lim, 2007). As such, communion striving is expected to relate to greater levels of SPI (Chiaburu et al., 2007; Halbesleben & Bowler, 2007; McNeely & Meglino, 1994). As such, the following predictions are proposed:

Hypothesis 5: Achievement striving will be positively related to safety compliance.

Hypothesis 6: Status striving will be positively related to safety participation towards the organization.

Hypothesis 7: Communion striving will be positively related to safety participation towards individuals.

1.4.6 General Job Performance

Although safety researchers have generally agreed that safety performance is a specific domain of job performance (Christian et al., 2009), few studies actually examined the relationship between job performance and safety performance. To the extent that it taps into a specific set of work behaviors that maintain and promote workplace safety, safety performance should be moderately related to general job performance. In other words, when employees engage in task performance and organizational citizenship behaviors, they might need to attend to more aspects of their work than safety. Given the small to moderate overlap in the behavioral domain between the two performance constructs, only moderate relationships between job performance

dimensions (i.e., task performance, OCBO, OCBI) and safety performance dimensions (i.e., safety compliance, SPO, SPI) are expected.

Hypothesis 8: Task performance will be positively related to safety compliance (8a), safety participation towards the organization (8b), and safety participation towards individuals (8c).

Hypothesis 9: Organizational citizenship behavior towards the organization will be positively related to safety compliance (9a), safety participation towards the organization (9b), and safety participation towards individuals (9c).

Hypothesis 10: Organizational citizenship behavior towards individuals will be positively related to safety compliance (10a), safety participation towards the organization (10b), and safety participation towards individuals (10c).

1.4.7 Safety Performance

To provide evidence regarding the convergent validity of the new safety performance scale, the original safety performance scale (Griffin & Neal, 2000; Neal et al., 2000; Neal & Griffin, 2006) is also examined in the nomological network. As stated earlier, the original safety performance scale has two dimensions, safety compliance and safety participation. The dimensions of the new safety performance scale are expected to relate to safety compliance and safety participation, as measured by the original scale.

Hypothesis 11: Safety compliance, as measured by the original scale, will be positively related to safety compliance (11a), safety participation towards the organization (11b), and safety participation towards individuals (11c).

Hypothesis 12: Safety participation, as measured by the original scale, will be positively related to safety compliance (12a), safety participation towards the organization (12b), and safety participation towards individuals (12c).

The expected relationships among variables are summarized in Table 1. The scale was developed and validated through three stages: In Stage I, current safety performance measures were compiled and items were selected from this pool to represent the three dimensions of safety performance (i.e., safety compliance, SPO, and SPI). In Stage II, data was collected from a sample of employees working in six safety-relevant industries. Exploratory factor analysis (EFA), reliability analysis, and item response theory (IRT) analysis were conducted to determine the factor structure and further refine the scale. In Stage III, confirmatory factor analysis (CFA) was conducted to assess the factor structure established in Stage II. Theoretically related variables were correlated with the new safety performance dimensions to establish the nomological network.

CHAPTER 2. STAGE II: ITEM GENERATION

2.1 Method

As numerous safety performance measures exist in the literature, their items formed the item pool for the present study. A modified top-down approach was adopted such that items clearly tapping into each of the three proposed dimensions were retained. Specifically, items from the Safety Performance Scale (Neal & Griffin, 2006), the Safety Citizenship Role Definition Scale (Hofmann et al., 2003), the General Safety Performance Scale (Burke et al., 2002), the Workarounds Scale (Halbesleben, 2010), the Work Safety Scale (Hayes, Perander, Smecko, & Trask, 1998), the Safety Working Scale (Parker, Axtell, & Turner, 2001), and another Safety Performance Scale (Snyder et al., 2011) were examined in terms of relevance with the proposed dimensions of safety performance (safety compliance, SPO, and SPI). In selecting items, the goal was to develop a general measure of safety performance that could be applied across jobs. Accordingly, items about safety behaviors in a specific industry were dropped because of its limited generalizability across industries (e.g., “practice safe spill handling procedures” from Burke et al., 2002). In light of accumulating evidence that negatively-worded items could hinder the psychometric properties of scales (Merritt, 2012; Roszkowski & Soven, 2010; Sliter & Zickar, 2013; Stewart & Frye, 2004; Vautier & Pohl, 2009; Woods, 2006),

they were not selected from the item pool (e.g., “I do not follow safety rules that I think are unnecessary” from Hayes et al., 1998).

This item selection and modification process resulted in 16 items for safety compliance, 10 items for SPO, and 10 items for SPI (see Table 2). As over-inclusiveness is recommended when selecting items (Loevinger, 1957; Reise, Waller, & Comrey, 2000), no further attempts were made to reduce the number of the initial items.

CHAPTER 3. STAGE II: PILOT TESTING

3.1 Method

3.1.1 Participants

Participants were recruited through Amazon's Mechanical Turk (MTurk; https://www.mturk.com), a website where requesters (e.g., researchers) can post Human Intelligence Tasks (HITs; e.g., survey links) and workers (e.g., respondents) from various industries can get paid for completing tasks (e.g., survey links) they sign up for. MTurk has been shown to be a reliable source of high quality data with low cost (Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012). Specifically, Mturk can help researchers access a diverse population—both in terms of demographics and occupation—which is in line with the objectives of the present study.

In order to target the population of interest (i.e., employees working in safety-critical industries), potential participants were instructed to take a short qualification survey to see if they were eligible for the study. Participants would need to be at least 18 years old and had been working in a safety-relevant industry for at least three months in the United States. The list of safety-relevant industries were compiled by crosschecking the industries with the greatest number of fatal occupational injuries (Bureau of Labor Statistics, 2013) and the most studied industries in safety literature. The industries of interest included construction, health care, manufacturing/processing, transportation,

mining, and administrative and waste services. These six industries were presented with six other industries in the qualification question. Participants who chose safety-relevant industries were instructed to go on to the actual survey, whereas those who chose other industries were told that they did not qualify for the study.

These three qualification questions (i.e., age, industry, and tenure in the current industry) were repeated at the end of the *actual* study survey in an attempt to validate the responses in the qualification survey. Participants who answered inconsistently across the qualification survey and the study survey received a disqualification notification and their responses were marked as invalid and deleted from the database.

A total of 400 completed responses from people who passed both the qualification survey and the qualification items (i.e., age, industry, and tenure) in the study survey were received. Pilot testing suggested that the minimal time to complete the survey would be 5 min. Therefore, surveys with completion time less than 5 min were eliminated (n = 13). It is important to note that the inclusion of these cases did not change the pattern of relationships in the subsequent analysis. Deleting responses with overly short completion time and responses with too many missing values resulted in a final sample size of 333. There were more males (57.1%) than females (42.6%) in the sample. The sample was primarily White/Caucasian (79.6%) and most of the participants (87.7%) held a college degree or higher. The average age of participants was 33.9 years old (*SD* = 11.1). In terms of industry distribution, participants were working in the construction industry (22.8%), the health care industry (36.3%), and the manufacturing/processing industry (26.4%). Others were from transportation (9.0%), mining (1.2%), and administrative and

waste services (4.2%) industries. Their average tenure in the current organization was 5.2 years (*SD* = 5.2) and their work hours each week on average was 42.4 hours (*SD* = 10.1).

3.1.2 Procedure

Participants were asked to think about the way they performed their jobs in the past three months and view the 36 pilot items. The pilot items were assembled in four blocks, with each block containing approximately 9 items. The order of each item within the block and the order of the four blocks were fully randomized. They were instructed to rate how often they engaged in the safety behavior as indicated by each item using a 7-point Likert scale ranging from *never* (0) to *always* (6). Using a frequency scale is consistent with the underlying assumptions of safety performance measurement (Burke et al., 2002). This frequency scale has been adopted in other well-established job performance measures (e.g., Lee & Allen, 2002). Though not the focus of the current stage, related variables including safety consciousness, coworker incivility, procedural justice, and motivation orientation were also measured. They were part of the efforts to validate the construct and will be discussed in Stage III: construct validation.

At the end of the survey, participants were given a specific code to submit to Mturk, after which the requester could see the code and approve those tasks with the correct code via Mturk. Participants who did not pass the three qualification questions at the end of the survey were not able to see the code (i.e., they were given a disqualification message instead). Upon the approval of their HITs, participants received $1 through Mturk as compensation.

3.2 Results

EFA was conducted to determine the factor structure of the items and eliminate the items that did not clearly load on any factors or had cross-loadings on multiple factors. Specifically, principal axis factoring and promax rotation with Kaiser normalization were used since the factors were expected to relate to each other (e.g., Griffin & Neal, 2000). Factors were retained if a) they had an eigenvalue greater than 1, b) they were located prior to the point where eigenvalues descended in a linear trend, and c) at least three items with factor loadings greater or equal to .30 loaded on them (Cabrera-Nguyen, 2010; Reise et al., 2000; Streiner, 1994). Four factors clearly met the retention criteria and were retained for further analyses. Two items from SPI loaded on the fifth factor and were eliminated from the analysis.

In the next step, items were closely examined for retention. Items with cross-loadings greater than .30 were eliminated (Costello & Osborne, 2005). Specifically, elimination started with the greatest cross-loading and EFA was rerun after each round of item deletion. Throughout the iterative process, 3 items (2 items from safety compliance and 1 item from SPI) were taken out, leaving 31 items being retained. Four factors emerged such that items from SPO (10 items) and SPI (7 items) formed two factors whereas items underlying safety compliance were broken into two factors.

A close examination of respective items under each of these two factors revealed that the first safety compliance factor (7 items) concerns work practices that are directly aimed at reducing risks while the second safety compliance factor (7 items) involves appropriate use of protective equipment and communication of safety-related issues. These two factors corresponded well with Burke and colleagues' (2002) general safety

performance scale such that the first safety compliance dimension was similar to "engaging in work practices to reduce risks" and the second safety compliance dimension involves both "using personal protective equipment" and "communicating health and safety information". For the sake of brevity, the first safety compliance factor was named "safety compliance – reducing risks" (SC-RR) and the second one was "safety compliance – protection and communication" (SC-PC). As such, these two finer dimensions, although not theorized *a priori*, offered a more accurate understanding of safety compliance. Since they were subsumed within safety compliance, the study hypotheses involving safety compliance in Stage III (i.e., construct validation) should still be applicable to both of the dimensions. Taken together, there were four dimensions in the new safety performance scale: safety compliance – reducing risks (SC-RR), safety compliance – protection and communication (SC-PC), safety participation towards the organization (SPO), and safety participation towards individuals (SPI). The scale items and their factor loadings are presented in Table 3. The scale items ended up loading on their proposed dimensions. The four factors explained 62.61% of the total variance (SC-RR 9.46%; SC-PC 3.59%; SPO 46.97%; SPI 2.59%).

Next, internal consistency reliability was estimated such that Cronbach's alpha (Cronbach, 1951) was computed for each subscale, along with the alpha value when each item was deleted. Only one item from SC-RR would result in an increase of .01 in alpha if deleted. Therefore, it was eliminated from the subscale. The alpha values for the four subscales were as follows: SC-RR (6 items), α = .89; SC-PC (7 items), α = .90; SPO (10 items), α = .94; SPI (7 items), α = .93.

Finally, IRT analysis was conducted to further refine the scale. Specifically, difficulty, discrimination, and information for each item were estimated. Discrimination (*a*) refers to the power of an item to differentiate people with different trait levels, with higher values representing more discrimination power. The difficulty parameter (*b*) indicates the trait level at which a person is as likely to endorse as to reject an item (i.e., a 50% chance). In the case of a polytomous scale with *k* response options, there are *k-1* thresholds where a person chooses between one option (e.g., "*strongly disagree*") to the next option (e.g., "*disagree*"). Therefore, each item has *k-1 b* parameters, with each *b* parameter capturing the likelihood of a person with a certain trait level endorsing one option over another adjacent option. Accordingly, there were six *b* parameters in the present study for each item since there were seven response options. In cases where one of the seven options was not endorsed by any participant, there would be five *b* parameters. The guessing parameter (*c*) models the situation when examinees can systematically rule out other options and endorse the correct answer. However, in the present study, it was not a concern and thus not estimated. Theta (Θ) indicates the location of an item or a person on the trait continuum. Its distribution is standard normal such that a positive value represents a trait level above the mean, zero value suggests an average standing, and a negative value indicates a trait level below the mean. For example, a person scoring 1 on the SPO subscale is one standard deviation above the average level of SPO. Information that an item provides refers to how well the item can predict the trait level. It is generally desirable that an item could provide information across a broad range of theta. Information that an item provides along the continuum of

theta and between Θ = -3 and Θ = 3 was estimated. Item information curves were also graphically presented to show where on the trait continuum an item was most predictive.

The *ltm* package in R (Rizopoulos, 2006) was utilized to estimate item parameters using the graded response model (GRM), which is appropriate in the case of ordinary polytomous data (Samejima, 1997). Following previous scale development research (Sliter, 2013), each facet was analyzed separately to meet the unidimensionality assumption of GRM. The goal of IRT analysis was to find the items that had high discrimination values and provided a broad coverage along the theta continuum. Items were compared against each other and items that were inferior to others in terms of both discrimination and information were considered for elimination. Item-level fit was also inspected to identify potential lack-of-fit between items. Items that demonstrate consistent lack-of-fit with other items were considered for deletion from the scale. After each item was deleted, the IRT analyses were rerun.

Item parameter estimates are presented in Table 4 and item information curves are illustrated in Figure 1. 10 items were eliminated: 1 item from SC-RR, 2 items from SC-PC, 5 items from SPO, and 2 items from SPI. These items had either low discrimination values or demonstrated poor marginal fit with other items. Deleting these items left five items in each of the four subscales. Item information curves (See Figure 1) suggest that the four subscales provided rich information across a broad range of Θ.

As a final note, a careful comparison suggests items that were dropped were largely redundant with the items that were kept in the scale. Therefore, the deletion of items did not result in significant reduction in content validity of the new safety performance scale.

CHAPTER 4. STAGE III: CONSTRUCT VALIDATION

4.1 Method

4.1.1 Participants

Mturk workers who participated in Stage II were contacted two months later to take part in the validation study. Of the participants who participated in Stage II, 137 complete responses were returned (response rate = 41.1%). Independent t-test revealed no significant differences in any of the four safety performance dimensions between people who only participated in Time 1 study and those who also took the Time 2 survey. There were more males (59.1%) than females (40.9%) in the sample. In terms of ethnicity, the sample was primarily White/Caucasion (76.6%) and most of the participants (86.1%) held a college degree or higher. The average age was 35.7 years old (*SD* = 12.8). Most participants were from the construction industry (19.7%), the health care industry (37.2%), the manufacturing/processing industry (29.9%), and the transportation industry (11.7%). Their average tenure in the current organization was 5.8 years (*SD* = 6.2) and their average work hours each week was 41.5 hours (*SD* = 11.5).

4.1.2 Procedure

Similar to Stage II, participants were instructed to take an online survey, at the end of which they were given another code. Once they submitted the correct code, their HITs (i.e., the survey) were approved and they received $1 as compensation. To

encourage participants to answer the questions to the best of their capability, $0.50 was awarded as a bonus to those who completed the survey without too many missing values. In the online survey, the order of each scale in the survey and the order of each item in the scale were randomized in attempt to reduce the systematic influence of response fatigue. The qualification questions (i.e., age, industry, tenure) were repeated and participants who failed to pass the eligibility questions were not able to proceed. Moreover, their responses at Stage II were also marked as invalid and not included in subsequent analysis.

4.1.3 Measures

Some variables in the nomological network were measured in the pilot testing survey two months before the validation study (i.e., Stage II), which could reduce the influence of common method variance (Podsakoff, MacKenzie, & Podsakoff, 2012). These variables include: safety consciousness, motivation orientation, coworker incivility, and procedural justice. In the following sections, Time 1 refers to the pilot testing at Stage II whereas Time 2 is when the current validation study was conducted (i.e., Stage III). The time lapse between Time 1 and Time 2 was thus two months. Other variables, including safety climate, general job performance, the original safety performance scale, and the newly developed safety performance scale, were measured at Time 2.

4.1.3.1 Safety Consciousness (Time 1)

Safety consciousness was measured using a seven-item scale (Barling et al., 2002; α = .81). Participants were asked to rate the degree to which they agreed with each

statement on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). An example item is “I am well aware of the safety risks involved in my job.”

4.1.3.2 Safety Climate (Time 2)

Safety climate was measured with the ten-item scale (α = .87) developed by Zohar (2000). Participants were asked to rate the degree to which they agreed with each statement on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). An example item is “My supervisor approaches workers during work to discuss safety issues.”

4.1.3.3 Procedural Justice (Time 1)

Procedural justice was measured using the seven-item scale (α = .93) developed by Spranger, Colarelli, Dimmotakis, Jacob, and Arvey (2012). Participants were asked the extent to which the procedures in the organization were designed as procedurally fair on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). An example item is “procedures in my organization are designed to collect accurate information necessary for making decisions.”

4.1.3.4 Coworker Incivility (Time 1)

Coworker incivility was measured using the seven-item scale (α = .90) developed by Cortina, Magley, Williams, and Langhout (2001). Participants were asked to indicate the frequency on which they experienced coworker incivility in the past three months on a five-point scale ranging from *never* (1) to *very often* (5). An example item is “During the past three months, have you been in a situation where any of your coworkers put you down and was condescending to you?”

4.1.3.5 Motivation Orientation (Time 1)

Motivation orientation was measured using the 31-item scale developed by Barrick et al. (2002). Accomplishment striving included eleven items (α = .89) and communion striving was measured by nine items (α = .88). Four out of the eleven items from the status striving subscale were not applicable and thus status striving was measured using the remaining seven items (α = .92). Example items include: "I often consider how I can get more work done" (accomplishment striving); "I often compare my work accomplishments against coworkers' accomplishments" (status striving); "I focus my attention on getting along with others at work" (communion striving). Participants were asked to rate the degree to which they agreed with each statement on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5).

4.1.3.6 General Job Performance (Time 2)

Task performance was measured using the in-role behavior scale (α = .79) developed by Williams and Anderson (1991). An example item is "I adequately complete assigned duties." Organizational citizenship behaviors towards the organization (OCBO; α = .90) and towards individuals (OCBI; α = .90) were measured using the scale developed by Lee and Allen (2002). There were eight items for each dimension. Example items include "I attend functions that are not required but that help the organizational image" (OCBO) and "I help others who have been absent" (OCBI). Participants were asked to indicate how often they engaged in each behavior in the past two months using a seven-point scale ranging from *never* (1) to *always* (7).

4.1.3.7 Safety Performance (Time 2)

In the original safety performance scale (Neal & Griffin, 2006), participants were asked to rate the degree to which they agreed with each statement on a five-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). Safety compliance (α = .90) and safety participation (α = .83) were both measured using five items. An example item for safety compliance is "I ensure the highest levels of safety when I carry out my job" and an example item for safety participation is "I promote the safety program within the organization."

In the newly developed safety performance scale, participants were asked to indicate how often they engaged in each behavior in the past two months using a seven-point scale ranging from *never* (0) to *always* (6). There were five items in each dimension (i.e., SC-RR, α = .89; SC-PC, α = .89; SPO, α = 90; SPI, α = 91).

4.2 Results

CFA was conducted to determine if the four-factor structure in Stage II could be replicated. As suggested by Jackson, Gillaspy, and Purc-Stephenson (2009), alternative models were developed to compete against the four-factor model of safety performance. The proposed model (i.e., the 4-factor model) where SC-RR, SC-PC, SPO, and SPI were treated as four latent variables was fitted to the data first. In the next step, four alternative models were tested. In the first alternative model (i.e., the 3-factor model *a*), items from SPO and SPI loaded on the same latent variable whereas items from SC-RR and SC-PC still loaded on their respective latent variables. In the second alternative model (i.e., 3-factor model *b*), items from SC-RR and SC-PC loaded on the same latent variable while items from SPO and SPI loaded on their respective latent variables. In the third

alternative model (i.e., 2-factor model), safety compliance items from SC-RR and SC-PC loaded on one latent variable whereas safety participation items from SPO and SPI loaded on the other latent variable. In the last alternative model (i.e., 1-factor model), every item loaded directly on the same latent variable.

Fit indices and degrees of freedom for all models are reported in Table 5. Chi square (χ^2), ratio of the chi-square value to degrees of freedom (χ^2/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), Bollen's incremental fit index (IFI; also called Bollen's delta 2), and Tucker-Lewis index (TLI) were estimated for each model. As shown in Table 5, the hypothesized model fitted the data well. Specifically, the χ^2/df (1.92), RMSEA (.08), CFI (.93), IFI (.93), and TLI (.92) showed acceptable model fit (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999). Moreover, this model provided a superior fit than the alternative models in terms of fit indices. Chi-square test also showed that the four-factor model provided a significantly better fit than the other four alternative models.

Next, the nomological network was established by correlating safety performance dimensions with theoretically related variables. The descriptive statistics of these variables (i.e., reliability estimate, mean, and *SD*) and correlations between study variables are displayed in Table 6. Construct validation hypotheses were largely supported. Consistent with Hypothesis 1, safety consciousness was positively related to SC-RR ($r = .49$, $p < .01$), SC-PC ($r = .52$, $p < .01$), SPO ($r = .33$, $p < .01$), and SPI ($r = .44$, $p < .01$). Hypothesis 2, that safety climate will be positively related to safety performance dimensions, was also supported. SC-RR ($r = .48$, $p < .01$), SC-PC ($r = .34$, $p < .01$), SPO ($r = .32$, $p < .01$), and SPI ($r = .35$, $p < .01$) were positively related to safety

climate. Procedural justice was positively related to SPO (r = .25, p < .01), thus lending support to Hypothesis 3. Hypothesis 4, that coworker incivility will be negatively related to SPI, was not supported (r = -.03, p > .05). Hypotheses 5 was partially supported such that achievement striving was positively related to SC-RR (r = .28, p < .01) but the positive relationship between achievement striving and SC-PC was not significant (r = .14, p > .05). Hypothesis 6, that status striving will be positively related to SPO, was not supported (r = .14, p > .05). Hypothesis 7, that communion striving will be positively related to SPI, did not receive support (r = .16, p > .05).

Hypothesis 8 was partially supported in that task performance was positively related to SC-RR (r = .57, p < .01), SC-PC (r = .43, p < .01), and SPI (r = .31, p < .01) but the relationship with SPO did not reach significance (r = .13, p > .05). Hypothesis 9 was fully supported such that OCBO was positively related to SC-RR (r = .53, p < .01), SC-PC (r = .53, p < .01), SPO (r = .66, p < .01), and SPI (r = .63, p < .01). Consistent with Hypothesis 10, OCBI was also positively related to SC-RR (r = .47, p < .01), SC-PC (r = .47, p < .01), SPO (r = .50, p < .01), and SPI (r = .62, p < .01). The original safety compliance scale was positively related to SC-RR (r = .72, p < .01), SC-PC (r = .64, p < .01), SPO (r = .49, p < .01), and SPI (r = .58, p < .01), thus supporting Hypothesis 11. Hypothesis 12 was also supported such that the original safety participation scale was positively related to SC-RR (r = .52, p < .01), SC-PC (r = .56, p < .01), SPO (r = .71, p < .01), and SPI (r = .64, p < .01). The summary of hypotheses testing is presented in Table 7.

As the primary concern of the present study was the differentiation between SPO and SPI, a set of *post hoc* analyses was conducted to determine whether or not their

relationships with variables were significantly different. An updated version of Steiger's Z test was used to test the difference between dependent correlations that involves a common variable (Hoerger, 2013; Steiger, 1980). These analyses were limited to the variables which were significantly related to both SPO and SPI. The positive relationship between safety consciousness and SPI was significantly stronger than its relationship with SPO (Z_H = -1.98, $p < .05$). Achievement striving was more strongly related to SPI than to SPO (Z_H = -3.41, $p < .01$). Task performance (Z_H = -3.04, $p < .01$) and OCBI (Z_H = -2.45, $p < .01$) were both more strongly related to SPI than to SPO. The differences between SPO and SPI in their correlations with other variables including safety climate, procedural justice, OCBO, the original safety compliance, and the original safety participation were not significant.

CHAPTER 5. DISCUSSION

Although safety performance has drawn extensive research attention, current safety performance models have yet to recognize the differentiation between safety citizenship behaviors towards the organization and those towards individuals. The present study set out to incorporate three distinctive types of safety performance behaviors (i.e., safety compliance, SPO, and SPI) and develop a new safety performance scale. The proposed factor structure was examined using a set of rigorous tests including EFA, reliability analysis, IRT analysis, and CFA. The nomological network of the new safety performance scale was validated. The new measure of safety performance included four dimensions (i.e., SC-RR, SC-PC, SPO, and SPI), each of which was measured using five items. This relatively brief measure could be applied to different safety-related jobs and holds promise to stimulate more refined scientific inquiry into safety behaviors in the workplace.

Specifically, EFA results supported the differentiation between SPO and SPI. Moreover, two safety compliance dimensions (i.e., SC-RR and SC-PR) also emerged. This four-dimension structure received robust support from CFA. The proposed model provided an acceptable to good fit to the data, despite the small sample size (Hooper et al., 2008; Hu & Bentler, 1999). Chi-square difference tests showed that the four-factor structure of safety performance fitted significantly better than the competing models.

When items from SPO and SPI loaded on the same latent variable (i.e., the 3-factor model *a*), the model fitted significantly worse than the four-factor model. Therefore, it appears that SPO and SPI are two different forms of safety citizenship behaviors. As such, the present study contributed to the safety literature by providing a more refined examination of safety participation. Other competing models also provided an inferior fit than the proposed model. Their fit indices also suggest that the fit between the model and data was unacceptable. As such, the four-dimension structure of the new safety performance measure received consistent support, which further justified the differentiation between distinctive safety performance dimensions (i.e., SC-RR, SC-PC, SPO, and SPI).

Second, results from the construct validation part of the present study further demonstrated the construct validity of the new safety performance scale. Safety consciousness, an important individual predictor of safety performance (e.g., Christian et al., 2009), was positively related to the four safety performance dimensions. Safety climate, an important situational determinant of safety performance (e.g., Clarke, 2006), was also positively related to the four safety performance dimensions. In addition, procedural justice, which might influence the social exchange between employees and the organization (McNeely & Meglino, 1994), was positively related to SPO. Achievement striving, an important motivation variable to personal achievement (Barrick et al., 2002), was positively related to SC-RR.

In addition to antecedents, job performance (i.e., task performance, OCBO, and OCBI) was also correlated with safety performance dimensions. The moderate relationships between job performance dimensions and safety performance dimensions

support the notion that safety performance is a specific domain of job performance (Christian et al., 2009). The moderate correlation coefficients (ranging from .13 to .66, Mean: 0.49) also reduce the concern of construct redundancy between job performance measures and safety performance dimensions. In this sense, the present study also contributed to safety literature by providing empirical evidence regarding the relationship between job performance and safety performance, an assumption in safety research that was rarely tested. The fact that the new safety performance dimensions were only moderated related to the original safety performance dimensions also suggests a moderate degree of construct overlap between the original and the new conceptualizations of safety performance. By looking into a broader behavioral domain of safety performance (i.e., SC-RR, SC-PC, SPO, and SPI), the present study went over and beyond the current safety performance scale and offered a more advanced understanding of safety behaviors in the workplace.

It is important to highlight the value-added of the present study to safety literature, which is the advocated differentiation between distinctive forms of safety citizenship behaviors. Three sources of evidence lend strong support to the differentiation between SPO and SPI. First, the nested-model comparison in CFA showed that the four-factor model fitted significantly better than the alternate model (i.e., the 3-factor *a*) in which items from SPO and SPI loaded on the same latent variable. The fit indices of this alternate model were also unfavorable when compared to the proposed model. Second, *post hoc* analyses revealed some significant differences in their relationships with theoretically related variables (i.e., safety consciousness, achievement striving, task performance, and OCBI). Should SPO and SPI tap into the same form of safety

citizenship behaviors, their relationships with other variables should have revealed no significant differences. For example, OCBI was more strongly related to SPI than to SPO, which suggests that SPI is a distinctive type of citizenship behaviors towards *individuals*. In terms of the stronger relationship between SPI and safety consciousness, it might be because helping others with safety issues requires a good understanding of safety knowledge. Given the teamwork nature of tasks in safety-related industries (e.g., health care), individuals motivated to achieve better task performance might also need to attend to others in terms of their safety procedures. Last, on a content validity note, it is important to point out that most safety performance models do not include items tapping into SPI (cf. Hofmann et al., 2003). In this sense, the new safety performance scale expanded the behavioral domain of safety performance by including safety citizenship behaviors towards individuals. The enhanced content validity also adds to the value of the new safety performance scale.

It is interesting to note that some validation hypotheses did not receive support. For example, the relationships between status striving and SC-PC and between status striving and SPO and between communion striving and SPI were not significant, which could be due to the lack of power given the small sample size (n = 137). Similarly, task performance was not significantly related to SPO. In addition to the lack of power and small variance in task performance, another explanation could be that they were not theoretically related. Since SPO falls outside of the role definition of employees, some employees might just want to focus on in-role behaviors such as task performance and safety compliance whereas others might be motivated to help the organization, which could even out and result in a near-zero nonsignificant relationship between task

performance and SPO. In terms of the nonsignificant relationship between coworker incivility and SPI, less incivility experience might be associated with less negative emotions (Sakurai & Jex, 2012) but not necessarily more positive emotions, as they are relatively independent from each other (Watson & Tellegen, 1985). As such, less incivility might not necessarily translate into more SPI behaviors. An alternate explanation could be the lack of statistical power, considering that the relationship was in the expected direction but failed to reach significance. However, these tentative explanations await further examination and should be interpreted with caution.

Overall, the present scale development study sought to advance the current understanding of safety performance and develop a safety scale that captures different dimensions of safety performance. Consistent with our conceptualization, SPO and SPI were distinctive forms of safety citizenship behaviors. Although not expected *a priori*, two safety compliance dimensions were found and they were consistent with previous conceptualization of safety compliance behaviors (Burke et al., 2002). The four-dimension structure of safety performance received support from CFA and construct validation analyses. This new safety performance measure adds value to current safety literature and holds promise to inform more refined scientific examination of safety behaviors in the future.

CHAPTER 6. STUDY LIMITATIONS AND FUTURE DIRECTIONS

Findings from the present study should be viewed in light of several limitations. First, data was collected from an online panel, which might be less favorable to other sampling methods. However, efforts were made to ensure the dependability of data. Potential subjects were instructed to take the qualification survey prior to participation. These qualification questions were repeated in both Time 1 and Time 2 surveys, with a two-month relapse. Participants were excluded if any of their responses in the qualification survey, Time 1 survey, and Time 2 survey was inconsistent with inclusion criteria (i.e., age, industry, tenure). Given that Mturk has been shown to be an acceptable source of data collection in addition to traditional methods (Buhrmester et al., 2011; Mason & Suri, 2012), the use of an online panel in the present study might be able to provide comparably reliable data. Nevertheless, we encourage future research to utilize other sampling methods to triangulate the psychometric properties of the scale.

Second, participants in the present study came from various safety-related industries, which could limit the utility of the newly developed scale in a specific industry. However, the primary focus of the present study was to further refine the dimensions of safety performance. Accessing a diverse sample from different industries might be helpful, in the sense that it could help provide a preliminary yet generalizable scale for further revisions in one specific industry. This approach is consistent with

earlier work in safety research in which researchers set out to develop a general safety performance scale (Burke et al., 2002) and encourage other researcher to make necessary revisions to tailor it in a specific industry. In this sense, the diverse study sample could be considered as a unique strength. Notwithstanding, researchers are encouraged to take into account the nature of industry and the jobs being performed and carefully revise the scale if necessary before use.

Third, the reliance on self-reports might exaggerate the relationships between study variables because of common method variance (Podsakoff et al., 2012). To alleviate this concern, a longitudinal design with a two-month relapse was adopted and some of the variables in the nomological network were not measured at the same time of safety performance. To minimize the effect of fatigue, the orders of scales and items within each scale were randomized. Moreover, the relationships between Time 1 variables and Time 2 variables were comparable to the relationships between variables measured at the same time, which suggests that common method variance does not pose a great threat to the results of construct validations. Nonetheless, the newly developed scale could be correlated with objective safety records in the organization to further substantiate the utility of this scale.

Another limitation deals with the longitudinal design of Stage II and Stage III. That is, EFA was conducted using Stage II sample and CFA was conducted using Stage III sample, which was essentially a subsample of Stage II sample. This practice is different from common scale development approach in which CFA is usually conducted using another sample and thus might be conceived as tautological. However, it is important to note that there was a two-month time relapse between Time 1 and Time 2.

Participants were instructed to rate their safety behaviors in the past two months when filling out Time 2 study survey. In this sense, the present study design could be seen as a measurement equivalence design, in which EFA was conducted to determine the factor structure of Time 1 data and CFA was conducted two months later to confirm the structure using Time 2 data. Given that measurement equivalence is an integral part of construct validation, the present study was able to demonstrate the factor structure longitudinally in one sample, which also speaks to the construct validity of safety performance (Pitts, West, & Tein, 1996; Vandenberg & Lance, 2000). Nonetheless, future research will need to replicate the dimensional structure in other safety-related working samples.

Finally, the sample size in IRT falls short of the suggested minimum of 500 (Reise & Yu, 1990; Rupp, 2003). However, the sample size in the present study is comparable to other scale development research that successfully utilized IRT analysis to refine the scale (Sliter, 2013). More importantly, a systematic process (i.e., EFA, reliability estimate, IRT, and CFA) was followed to determine the factor structure and refine the scale. IRT did not serve as the sole basis for scale development in the present study. In light of Monte Carlo simulation evidence suggesting that a sample size of 333 might be able to provide fairly stable model estimates (Reise & Yu, 1990; Sliter, 2013), the IRT analysis was likely reliable in the present study.

In terms of areas of future research that might prove fruitful, I encourage researchers to replicate my results in other safety-related industries and extend the nomological network of this new safety performance scale. One such direction would be to examine safety performance within the framework of the Job Demands-Resources

model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Nahrgang, Morgeson, & Hofmann, 2011). Doing so could paint a bigger picture of how various job characteristics might influence safety performance dimensions via the motivational process and the health impairment process (Nahrgang et al., 2011). Moreover, the meta-analytic model (Nahrgang et al., 2011) did not incorporate the full range of safety performance dimensions. Incorporating different types of safety performance behaviors into this model will prove fruitful to both lines of research.

I also encourage researchers to conduct a more refined examination of safety violation behaviors. Safety researchers tend to treat safety violation as the opposite of safety compliance (Halbesleben, 2010), according to which safety violation approximates the failure to comply with safety protocols. However, some safety violation behaviors might constitute an intentional purpose to jeopardize the organization. Although this seems unlikely given the potential negative impact of unsafe behaviors on the well-being of employees themselves, it is still possible that some minor safety violation behaviors are conducted with an explicit intention of harm. For example, employees might intentionally violate safety procedures that are designed to protect manufactory equipment to retaliate against the organization. In this case, it would be problematic to simply treat these safety violation behaviors as the opposite of safety compliance in that they might have different nomological networks. Research on job performance and leadership has recognized the intentional deviant behaviors as a separate domain of work behaviors (Krasikova, Green, & LeBreton, 2013; Murphy, 1989; Sackett, 2002). Likewise, it is conceivable that SC-RR and SC-PC in the present study constitute a “task performance” component and SPO and SPI constitute a “citizenship behavior”

component whereas some safety violations represent a “counterproductive” component. We encourage future research to explore this possibility both theoretically and empirically.

LIST OF REFERENCES

LIST OF REFERENCES

Andersson, L., & Pearson, C. M. (1999). Tit for tat? The spiraling effect of incivility in the workplace. *Academy of Management Review, 24,* 452-471.

Barling, J., Kelloway, E. K., & Iverson, R. D. (2003). Accidental outcomes: Attitudinal consequences of workplace injuries. *Journal of Occupational Health Psychology, 8,* 74-85.

Barling, J., Loughlin, C., & Kelloway, E. K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology, 87,* 488-496.

Barrick, M. R., Mount, M. K., & Li, N. (2013). The theory of purposeful work behavior: The role of personality, higher-order goals, and job characteristics. *Academy of Management Review, 38,* 132-153.

Barrick, M. R., Stewart, G. L., & Piotrowski, M. (2002). Personality and job performance: The mediating effect of motivation among sales representatives. *Journal of Applied Psychology, 87,* 43-51.

Blau, P. M. (1964). *Exchange and power in social life.* New York: Wiley.

Bolino, M. C. (1999). Citizenship and impression management: Good soldiers or good actors? *Academy of Management Review, 24,* 82-98.

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt, W. C. Borman, & Associates (Eds.), *Personnel selection in organizations,* (pp. 71-98). San Francisco: Jossey-Bass.

Brewer, M. B., & Gardner W. (1996). Who is this “we”? Levels of collective identity and self representations. *Journal of Personality and Social Psychology, 71,* 83-93.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6,* 3-5.

Bureau of Economic Analysis. (2008). *Gross domestic product (GDP).* Retrieved March 1, 2014 from http://www.bea.gov/national/index.htm#gdp

Bureau of Labor Statistics. (2013). *Census of Fatal Occupational Injuries (CFOI) - Current and Revised Data.* Retrieved March 1, 2014 from http://www.bls.gov/iif/oshcfoi1.htm

Burke, M. J., Sarpy, S. A., Tesluk, P. E., & Smith-Crowe, K. (2002). General safety performance: A test of a grounded theoretical model. *Personnel Psychology, 55,* 429-457.

Cabrera-Nguyen, P. (2010). Author guidelines for reporting scale development and validation results in the Journal of the Society for Social Work and Research. *Journal of the Society for Social Work and Research, 1,* 99-103.

Chiaburu, D. S., & Carpenter, N. C. (2013). Employees' motivation for personal initiative: The joint influence of status and communion striving. *Journal of Personnel Psychology, 12,* 97-103.

Chiaburu, D. S., Marinova, S. V., & Lim, A. S. (2007). Proactive and helping extra-role behaviors: The influence of motives, goal orientation, and social context. *Personality and Individual Differences, 43,* 2282-2293.

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology, 94,* 1103-1127.

Clarke, S. (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology, 11,* 315-327.

Clarke, S. (2012). The effect of challenge and hindrance stressors on safety behavior and safety outcomes: A meta-analysis. *Journal of Occupational Health Psychology, 17,* 387-397.

Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology, 86,* 386-400.

Cortina, L. M., Magley, V. J., Williams, J. H., & Langhout, R. D. (2001). Incivility at the workplace: Incidence and impact. *Journal of Occupational Health Psychology, 6,* 64-80.

Costello, A., & Osborne, J. (2005). Best practices in exploratory factory analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation, 10,* 1-9.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16,* 297-334.

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. *Journal of Management, 31,* 874-900.

Cullen, J. C., & Hammer, L. B. (2007). Developing and testing a theoretical model linking work-family conflict to employee safety. *Journal of Occupational Health Psychology,* 12, 266-278.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands–resources model of burnout. *Journal of Applied Psychology, 86,*499-512.

Ford, M. T., & Tetrick, L. E. (2011). Relations among occupational hazards, attitudes, and safety performance. *Journal of Occupational Health Psychology, 16,* 48-66.

Fugas, C. S., Meliá, J. L., & Silva, S. A. (2011). The “is” and the “ought”: How do perceived social norms influence safety behaviors at work? *Journal of Occupational Health Psychology, 16,* 67-79.

Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology, 5,* 347-358.

Halbesleben, J. R. B. (2010). The role of exhaustion and workarounds in predicting occupational injuries: A cross-lagged panel study of health care professionals. *Journal of Occupational Health Psychology, 15,* 1-16.

Halbesleben, J. R. B., & Bowler, W. M. (2007). Emotional exhaustion and job performance: The mediating role of motivation. *Journal of Applied Psychology, 92,* 93-106.

Hayes, B. E., Perander, J., Smecko, T., & Trask, J. (1998). Measuring perceptions of workplace safety: Development and validation of the work safety scale. *Journal of Safety research, 29,* 145-161.

Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods, 1,* 104-121.

Hoerger, M. (2013). *Z_H: An updated version of Steiger's Z and web-based calculator for testing the statistical significance of the difference between dependent correlations.* Retrieved March 1, 2014 from http://www.psychmike.com/dependent_correlations.php

Hofmann, D. A., Morgeson, F. P., & Gerras, S. J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: safety climate as an exemplar. *Journal of Applied Psychology, 88,* 170-178.

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods, 6,* 53-60.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1-55.

Inness, M., Turner, N., Barling, J., & Stride, C. B. (2010). Transformational leadership and employee safety performance: A within-person, between-jobs design. *Journal of Occupational Health Psychology, 15,* 279-290.

Jackson, D. L., Gillaspy, J. A., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological Methods, 14,* 6-23.

Krasikova, D., Green, S. G., & LeBreton, J. L. (2013). Destructive leadership: A theoretical review, integration, and future research agenda. *Journal of Management, 39,* 1308-1338.

Lee, K., & Allen, N. J. (2002). Organizational citizenship behavior and workplace deviance: The role of affect and cognitions. *Journal of Applied Psychology, 87,* 131-142.

Loevinger, J. (1957). Objective tests as instruments of psychological theory: Monograph supplement 9. *Psychological Reports, 3,* 635-694.

Marchand, A., Simard, M., Carpentier-Roy, M., & Ouellet, F. (1998). From a unidimensional to a bidimensional concept and measurement of workers' safety behavior. *Scandinavian Journal of Work, Environment, and Health, 24,* 293-299.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior Research Methods, 44,* 1-23.

McClelland, D. C. (1965). Toward a theory of motive acquisition. *American Psychologist,* 20, 321-333.

McNeely, B. L., & Meglino, B. M. (1994). The role of dispositional and situational antecedents in prosocial organizational behavior: An examination of the intended beneficiaries of prosocial behavior. *Journal of Applied Psychology, 79,* 836-844.

Merritt, S. M. (2012). The two-factor solution to Allen and Meyer's (1990) Affective Commitment Scale: Effects of negatively worded items. *Journal of Business and Psychology, 27,* 421-436.

Mitchell, T. R. (1997). Matching motivational strategies with organizational contexts. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 19, pp. 57-149). Greenwich, CT: JAI Press.

Moorman, R. H., Blakely, G. L., & Niehoff, B. P. (1998). Does perceived organizational support mediate the relationship between procedural justice and organizational citizenship behavior? *Academy of Management Journal, 41,* 351-357.

Motowidlo, S. J. (2003). Job performance. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Handbook of psychology: Vol. 12. Industrial and organizational psychology* (pp. 39-53). Hoboken, NJ: John Wiley & Sons.

Murphy, K. R. (1989). Dimensions of job performance. In R. Dillon, & J. Pellingrino (Eds.), *Testing: Applied and theoretical perspectives* (pp. 218-247). New York: Praeger.

Nahrgang, J. D., Morgeson, F. P., & Hofmann, D. A. (2011). Safety at work: A meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology, 96,* 71-94.

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology, 91,* 946-953.

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science, 34,* 99-109.

Parker, S. K., Axtell, C. M., & Turner, N. (2001). Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology, 6,* 211-228.

Penney, L. M., & Spector, P. E. (2005). Job stress, incivility, and counterproductive work behavior (CWB): The moderating role of negative affectivity. *Journal of Organizational Behavior, 26,* 777-796.

Pitts, S. C., West, S. G., & Tein, J. Y. (1996). Longitudinal measurement models in evaluation research: Examining stability and change. *Evaluation and Program Planning, 19,* 333-350.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63,* 539-569.

Reason, J., Parker, D., & Lawton, R. (1998). Organizational controls and safety: The varieties of rule-related behavior. *Journal of Occupational and Organizational Psychology,71,* 289-304.

Reise, S. P., Waller, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision. *Psychological Assessment, 12,* 287-297.

Reise, S. P., & Yu, J. (1990). Parameter recovery in the graded response model using MULTILOG. *Journal of Educational Measurement, 27,* 133-144.

Rioux, S. M., & Penner, L. A. (2001). The causes of organizational citizenship behavior: A motivational analysis. *Journal of Applied Psychology, 86,* 1306-1314.

Rizopoulos, D. (2006). ltm: An R package for latent variable modeling and item response theory analyses. *Journal of Statistical Software, 17,* 1-25.

Roszkowski, M. J., & Soven, M. (2010). Shifting gears: Consequences of including two negatively worded items in the middle of a positively worded questionnaire. *Assessment & Evaluation in Higher Education, 35,* 113-130.

Rupp, A. A. (2003). Item response modeling with BILOG-MG and MULTILOG for Windows. *International Journal of Testing, 3,* 365-384.

Sackett, P. R. (2002). The structure of counterproductive work behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment, 10,* 5-11.

Sakurai, K., & Jex, S. M. (2012). Coworker incivility and incivility targets' work effort and counterproductive work behaviors: The moderating role of supervisor social support. *Journal of Occupational Health Psychology, 17,* 150-161.

Salgado, J., Viswesvaran, C., & Ones, D. S. (2001). Predictors used for personnel selection: An overview of constructs, methods and techniques. In N. Anderson, D. S. Ones, H. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work, and organizational psychology: Vol. 1* (pp. 165-199). London: Sage.

Samejima, F. (1997). The graded response model. In W. Van der Linden & R. Hambleton (Eds.), *Handbook of modern item response theory* (pp. 85-100). New York, NY: Springer.

Sliter, K. A. (2013). Development and validation of a measure of workplace climate for healthy weight maintenance. *Journal of Occupational Health Psychology, 18*, 350-362.

Sliter, K. A., & Zickar, M. J. (2013). An IRT examination of the psychometric functioning of negatively worded personality items. *Educational and Psychological Measurement*. Advance Online Publication.

Snyder, L. A., Krauss, A. D., Chen, P. Y., Finlinson, S., & Huang, Y. H. (2011). Safety performance: The mediating role of safety control. *Work: A Journal of Prevention, Assessment and Rehabilitation, 40*, 99-111.

Spranger, J. L., Colarelli, S. M., Dimotakis, N., Jacob, A. C., & Arvey, R. D. (2012). Effects of kin density within family-owned businesses. *Organizational Behavior and Human Decision Processes, 119*, 151-162.

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87*, 245-251.

Stewart, T. J. & Frye, A. W. (2004). Investigating the use of negatively-phrased survey items in medical education settings: Common wisdom or common mistake? *Academic Medicine, 79(10 Supplement)*, S1-S3.

Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *Canadian Journal of Psychiatry, 39*, 135-140.

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*, 4-70.

Vautier, S., & Pohl, S. (2009). Do balanced scales assess bipolar constructs? The case of the STAI scales. *Psychological assessment, 21*, 187-193.

Watson, D., & Tellegen, A. (1985) Toward a consensual structure of mood. *Psychological Bulletin, 98*, 219-235.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management, 17*, 601-617.

Woods, C. (2006). Careless responding to reverse-worded items: Implications for confirmatory factor analyses. *Journal of Psychopathology and Behavioral Assessment, 28*, 189-194.

World Heath Organization. (2008). *Global strategy on occupational health for all: The way to health at work.* Retrieved March 1, 2014 from http://www.who.int/occupational_health/en/

Zohar, D. (2000). A group-level model of safety climate: Testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of Applied Psychology, 85*, 587-596.

Zohar, D. (2003). Safety climate: Conceptual and measurement issues. In J. C. Quick & L. E. Tetrick (Eds.), *Handbook of occupational health psychology* (pp. 123–142). Washington, DC: American Psychological Association.

TABLES

Table 1 Summary of Study Hypotheses

Hypotheses	Variables	SC	SPO	SPI
H1	1. Safety Consciousness	+	+	+
H2	2. Safety Climate	+	+	+
H3	3. Procedural Justice		+	
H4	4. Coworker Incivility			-
H5	5. Achievement Striving	+		
H6	6. Status Striving		+	
H7	7. Communion Striving			+
H8	8. Task Performance	+	+	+
H9	9. OCBO	+	+	+
H10	10. OCBI	+	+	+
H11	11. Original Safety Compliance	+	+	+
H12	12. Original Safety Participation	+	+	+

Note. OCBO = Organizational Citizenship Behaviors towards the Oganization; OCBI = Organizational Citizenship Behaviors towards Individuals; SC = Safety Compliance (including Reducing Risks and Protection and Communication); SPO = Safety Participation towards the Organization; SPI = Safety Participation towards Individuals.

+ denotes a positive relationship whereas - denotes a negative relationship; the cell is left blank where no relationship was specified in the hypothesis.

Table 2 Scale Items after Item Generation

No.	Item	Source
	Safety Compliance	
1	Use all the necessary safety equipment to do my job	a
2	Use the correct safety procedures for carrying out my job	a
3	Ensure the highest levels of safety when I carry out my job	a
4	Follow safety procedures, even if it causes my work to take longer	b
5	Always wear my protective equipment, even when it's inconvenient	c
6	Keep my work equipment in safe working condition	d
7	Correct safety problems to ensure accidents will not occur	d
8	Use equipment and materials properly	e
9	Maintain an organized work area	e
10	Report maintenance problems or hazards to appropriate people	e
11	Use signs to alert people about potential hazards	e
12	Inspect equipment and tools before use to ensure they are in proper working order	e
13	Adhere to appropriate safety regulations regarding personal appearance	e
14	Assess work tasks for potential safety concerns before I begin my work	e
15	Appropriately report incidents, accidents, and/or illnesses.	f
16	Engage in the appropriate methods to notify workers, supervisors, and/or emergency coordinators of emergency conditions	f

Note: a. Safety Performance (Neal & Griffin, 2006); b. Workarounds (Halbesleben, 2010); c. Safety working. (Parker, Axtell, & Turner, 2001); d. Compliance with safety behaviors. (Hayes, Perander, Smecko, & Trask, 1998); e. Safety performance. (Snyder, Krauss, Chen, Finlinson, & Huang, 2011); f. Safety Citizenship Role Definition (Hofmann et al., 2003); g. newly edited.

Table 2 Continued

No.	Item	Source
	Safety Participation towards the Organization (SPO)	
1	Put in extra effort to improve the safety of the workplace	a
2	Voluntarily carry out tasks or activities that help to improve workplace safety	a
3	Make safety-related recommendations to protect the organization from potential problems	f
4	Express opinions on safety matters even if others disagree	f
5	Raise safety concerns to the management	f
6	Attend nonmandatory safety-oriented meetings	f
7	Stay informed of changes in safety policies and procedures	f
8	Take initiatives to change the way the job is done to make it safer	f
9	Offer ideas to change policies and procedures to make them safer	f
10	Be concerned about the safety of the organization	g
	Safety Participation towards Individuals (SPI)	
1	Warn others nearby when I am engaging in potentially dangerous tasks	e
2	Offer assistance to others when they are working in difficult circumstances or on potentially dangerous tasks	e
3	Remind co-workers about safety when I observe them working in an unsafe manner	e
4	Instruct co-workers on the proper procedures to operate equipment	e
5	Encourage coworkers to work in a safe manner	d
6	Help other people learn about safe work practices	f
7	Protect coworkers from safety hazards	f
8	Go out of my way to look out for the safety of other workers	f
9	Explain to my coworkers that I will report safety violations	f
10	Report coworkers who violate safety procedures	f

Note: a. Safety Performance (Neal & Griffin, 2006); b. Workarounds (Halbesleben, 2010); c. Safety working. (Parker, Axtell, & Turner, 2001); d. Compliance with safety behaviors. (Hayes, Perander, Smecko, & Trask, 1998); e. Safety performance. (Snyder, Krauss, Chen, Finlinson, & Huang, 2011); f. Safety Citizenship Role Definition (Hofmann et al., 2003); g. newly edited.

Table 3 Items and Factor Loadings from Exploratory Factor Analyses

Factors and Items	Factor Loadings			
	1	2	3	4
1. Safety Participation towards the Organization				
Put in extra effort to improve the safety of the workplace	.77			
Voluntarily carry out tasks or activities that help to improve workplace safety	.65			
Make safety-related recommendations to protect the organization from potential problems	.93			
Express opinions on safety matters even if others disagree	.71			
Raise safety concerns to the management	.79			
Attend nonmandatory safety-oriented meetings	.72			
Stay informed of changes in safety policies and procedures	.55			
Take initiatives to change the way the job is done to make it safer	.86			
Offer ideas to change policies and procedures to make them safer	.96			
Be concerned about the safety of the organization	.62			
2. Safety Compliance - Reducing Risks				
Use all the necessary safety equipment to do my job		.81		
Use the correct safety procedures for carrying out my job		.87		
Ensure the highest levels of safety when I carry out my job		.85		
Follow safety procedures, even if it causes my work to take longer		.90		
Always wear my protective equipment, even when it's inconvenient		.72		
Keep my work equipment in safe working condition		.52		
Maintain an organized work area		.32		

Note. Factor loadings less than .30 not displayed in the table. Principal axis factoring and promax rotation with Kaiser normalization were used.

Table 3 Continued

Factors and Items	Factor Loadings			
	1	2	3	4
3. Safety Compliance - Protection and Communication				
Correct safety problems to ensure accidents will not occur			.76	
Report maintenance problems or hazards to appropriate people			.89	
Use signs to alert people about potential hazards			.50	
Inspect equipment and tools before use to ensure they are in proper working order			.61	
Assess work tasks for potential safety concerns before I begin my work			.50	
Appropriately report incidents, accidents, and/or illnesses.			.59	
Engage in the appropriate methods to notify workers, supervisors, and/or emergency coordinators of emergency conditions			.83	
4. Safety Participation towards Individuals				
Offer assistance to others when they are working in difficult circumstances or on potentially dangerous tasks				.62
Remind co-workers about safety when I observe them working in an unsafe manner				.67
Instruct co-workers on the proper procedures to operate equipment				.62
Encourage coworkers to work in a safe manner				.80
Help other people learn about safe work practices				.70
Protect coworkers from safety hazards				.85
Go out of my way to look out for the safety of other workers				.71

Note. Factor loadings less than .30 not displayed in the table. Principal axis factoring and promax rotation with Kaiser normalization were used.

Table 4 Items and Parameters Estimates from Item Response Theory (IRT) Analyses

Factors and Items	Item Parameters							Information	
	a	b_1	b_2	b_3	b_4	b_5	b_6	Total	Θ (-3, 3)
1. Safety Compliance - Reducing Risks									
Use the correct safety procedures for carrying out my job	3.87	-3.10	-2.63	-1.47	-0.81	0.22	*	15.74	13.32
Ensure the highest levels of safety when I carry out my job	4.53	-2.89	-2.23	-1.36	-0.67	0.25	*	19.70	17.97
Follow safety procedures, even if it causes my work to take longer	3.35	-3.12	-1.95	-1.25	-0.48	0.39	*	13.41	11.38
Keep my work equipment in safe working condition	1.99	-3.42	-3.17	-2.74	-2.26	-1.12	-0.14	5.93	4.38
Maintain an organized work area	1.27	-5.35	-4.08	-2.47	-1.11	0.39	*	4.02	2.21
2. Safety Compliance - Protection and Communication									
Correct safety problems to ensure accidents will not occur	4.55	-2.56	-2.23	-1.22	-0.54	0.23	*	18.28	17.72
Report maintenance problems or hazards to appropriate people	4.30	-2.30	-2.04	-1.70	-1.20	-0.54	0.03	16.64	16.43
Inspect equipment and tools before use to ensure they are in proper working order	3.20	-2.55	-1.93	-1.65	-0.97	-0.41	0.42	12.04	11.43
Assess work tasks for potential safety concerns before I begin my work	2.42	-2.59	-2.13	-1.72	-0.85	-0.25	0.64	8.15	7.49
Appropriately report incidents, accidents, and/or illnesses.	2.39	-3.02	-2.41	-1.96	-1.22	-0.62	0.08	7.87	6.61

Note. * This occurred because no participant endorsed one of the response options. Total information refers to information along the whole continuum of Θ; Θ (-3, 3) refers to information in the interval between Θ = -3 and Θ = -3.

Table 4 Continued

Factors and Items	Item Parameters							Information	
	a	b_1	b_2	b_3	b_4	b_5	b_6	Total	Θ (-3, 3)
3. Safety Participation towards the Organization									
Put in extra effort to improve the safety of the workplace	3.69	-2.22	-1.91	-1.39	-0.50	0.24	1.00	15.58	15.38
Voluntarily carry out tasks or activities that help to improve workplace safety	2.95	-2.31	-1.90	-1.16	-0.45	0.18	1.04	11.44	11.08
Make safety-related recommendations to protect the organization from potential problems	3.89	-2.05	-1.63	-1.08	-0.18	0.20	0.89	16.10	16.01
Raise safety concerns to the management	3.12	-2.12	-1.69	-1.12	-0.29	0.30	1.01	12.04	11.84
Be concerned about the safety of the organization	3.61	-1.92	-1.53	-0.90	-0.12	0.40	1.04	14.63	14.56
4. Safety Participation towards Individuals									
Offer assistance to others when they are working in difficult circumstances or on potentially dangerous tasks	2.19	-3.20	-3.02	-2.13	-1.30	-0.42	0.59	7.56	6.14
Instruct co-workers on the proper procedures to operate equipment	2.79	-2.31	-2.10	-1.75	-0.91	-0.26	0.51	9.31	8.95
Encourage coworkers to work in a safe manner	3.64	-2.60	-2.10	-1.78	-0.93	-0.30	0.50	15.00	14.30
Help other people learn about safe work practices	3.55	-2.33	-1.92	-1.51	-0.73	-0.14	0.72	14.33	14.02
Go out of my way to look out for the safety of other workers	2.55	-2.71	-2.23	-1.62	-0.84	-0.17	0.75	9.25	8.42

Note. * This occurred because no participant endorsed one of the response options. Total information refers to information along the whole continuum of Θ; Θ (-3, 3) refers to information in the interval between Θ = -3 and Θ = -3.

Table 5 Confirmatory Factor Analysis Fit Indices and Model Comparison Results

Model	χ^2	*df*	χ^2/df	$\Delta\chi^2$	Δdf	*p*	RMSEA	CFI	IFI	TLI
4-factor Model	314.43	164	1.92				0.08	0.93	0.93	0.92
3-factor Model *a*	390.98	167	2.34	76.55	3	<.005	0.10	0.89	0.89	0.88
3-factor Model *b*	449.19	167	2.69	134.76	3	<.005	0.11	0.86	0.87	0.85
2-factor Model	516.03	169	3.05	201.60	5	<.005	0.12	0.83	0.83	0.81
1-factor Model	738.76	170	4.35	347.79	3	<.005	0.16	0.72	0.73	0.69

Note. 4-factor Model = SC-RR, SC-PC, SPO, and SPI; 3-factor Model a = SC-RR, SC-PC, and items from SPO and SPO loading on the same latent variable; 3-factor Model b = SPO, SPI, and items from SC-RR and SC-PC loading on the same latent variable; 2-factor Model = items from SC-RR and SC-PC loading on the same latent variable and items from SPO and SPI loading on the same latent variable; 1-factor Model = all items loading on the same latent variable.

RMSEA = root mean square error of approximation; CFI = comparative fit index, IFI = Bollen's Incremental Fit Index; TLI = Tucker-Lewis index.

Model comparison ($\Delta\chi^2$; Δdf) based on the 4-factor model and one of the other four alternative models.

Table 6 Reliabilities, Means, SDs, and Intercorrelations among the Study Variables

	Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	T2 Safety Compliance-I	5.01	0.82	*.89*															
2	T2 Safety Compliance-II	4.78	1.06	.69	*.89*														
3	T2 SPO	3.83	1.21	.45	.63	*.90*													
4	T2 SPI	4.32	1.15	.64	.67	.75	*.91*												
5	T1 Safety Consciousness	4.38	0.53	.49	.52	.33	.44	*.81*											
6	T2 Safety Climate	3.61	0.69	.48	.34	.32	.35	.26	*.87*										
7	T1 Procedural Justice	3.82	0.78	.29	.18	.25	.28	.36	.41	*.93*									
8	T1 Coworker Incivility	1.89	0.77	-.19	-.11	.08	-.03	-.19	-.28	-.34	*.90*								
9	T1 Achievement Striving	4.11	0.52	.28	.14	.15	.35	.30	.23	.36	-.10	*.89*							
10	T1 Status Striving	3.40	0.93	-.01	-.01	.14	.10	-.01	.06	.22	.00	.48	*.92*						
11	T1 Communion Striving	3.18	0.75	.06	.00	.21	.16	.05	.14	.31	-.10	.38	.41	*.88*					
12	T2 Task Performance	6.00	0.82	.57	.43	.13	.31	.37	.34	.13	-.21	.24	-.01	-.12	*.79*				
13	T2 OCBO	4.87	1.07	.53	.53	.66	.63	.36	.39	.42	-.07	.36	.27	.24	.33	*.90*			
14	T2 OCBI	5.09	1.02	.47	.47	.50	.62	.34	.27	.29	.03	.29	.03	.17	.35	.66	*.90*		
15	T2 Original Safety Compliance	4.32	0.63	.72	.64	.49	.58	.51	.39	.24	-.10	.29	.03	.06	.39	.47	.43	*.90*	
16	T2 Original Safety Participation	3.92	0.72	.52	.56	.71	.64	.30	.37	.28	.05	.28	.16	.23	.23	.59	.51	.58	*.83*

Note. $N = 137$. *M* = mean; *SD* = standard deviation; Cronbach's α values on the diagonal.

Correlations greater than .21 are significant at $p < .01$ level; correlations greater than .17 are significant at $p < .05$ level.

Table 7 Summary of Hypotheses Testing

Hypotheses	Variables	SC-RR	SC-PC	SPO	SPI	Support
H1	1. Safety Consciousness	+/+	+/+	+/+	+/+	Yes
H2	2. Safety Climate	+/+	+/+	+/+	+/+	Yes
H3	3. Procedural Justice			+/+		Yes
H4	4. Coworker Incivility				-/*n.s.*	No
H5	5. Achievement Striving	+/+	+/*n.s.*			Partial
H6	6. Status Striving			+/*n.s.*		No
H7	7. Communion Striving				+/*n.s.*	No
H8	8. Task Performance	+/+	+/+	+/*n.s.*	+/+	Partial
H9	9. OCBO	+/+	+/+	+/+	+/+	Yes
H10	10. OCBI	+/+	+/+	+/+	+/+	Yes
H11	11. Original Safety Compliance	+/+	+/+	+/+	+/+	Yes
H12	12. Original Safety Participation	+/+	+/+	+/+	+/+	Yes

Note. OCBO = Organizational Citizenship Behaviors towards the Oganization; OCBI = Organizational Citizenship Behaviors towards Individuals; SC-RR = Safety Compliance - Reducing Risks; SC-PC = Safety Compliance - Protection and Communication; SPO = Safety Participation towards the Organization; SPI = Safety Participation towards Individuals.

"+" denotes a positive relationship whereas "-" denotes a negative relationship; *n.s.* indicates nonsignificance; the cell is left blank where no relationship was specified in the hypothesis; hypothesized relationship is indicated before "/" whereas the result is after "/".

FIGURES

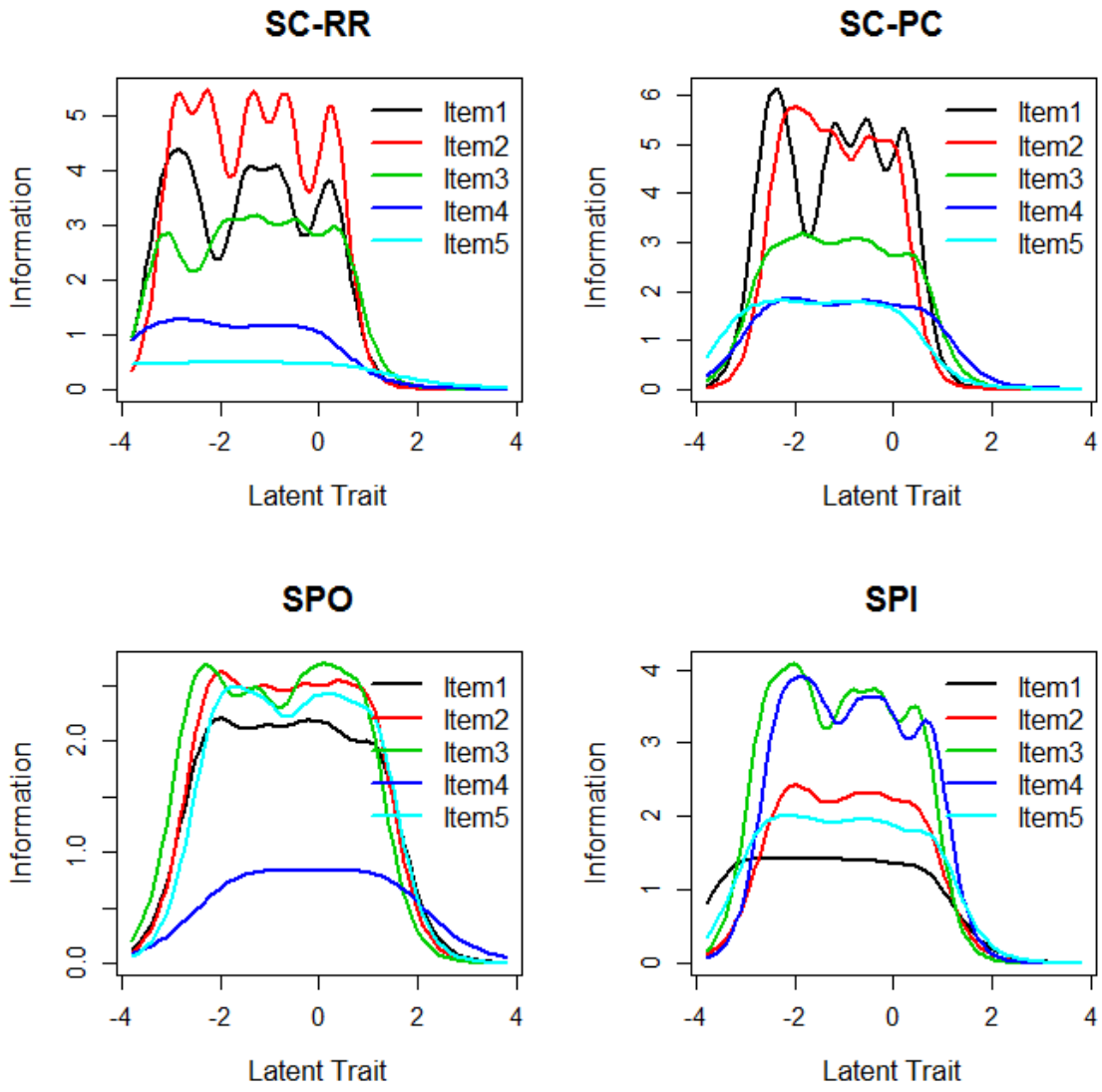

Figure 1 Item Information Curves

APPENDICES

Appendix A Proposal

Introduction

Occupational safety remains one of the greatest concerns for many organizations across the world. Workplace accidents resulted in approximately two million work-related deaths in 2000 around the globe (World Health Organization, 2008). The associated economic cost of workplace accidents is estimated to amount to 4 to 5% of gross domestic product (World Health Organization, 2008). In 2007, this summed up to over $550 billion economic losses in the United States (Bureau of Economic Analysis, 2008). In addition to the economic cost, workplace accidents in 2011 resulted in 4,609 fatal work injuries and 3.8 million nonfatal occupational injuries and illnesses in the United States (Bureau of Labor Statistics, 2012). Beyond these high human and financial costs, workplace accidents are also associated with negative affective reactions from employees who themselves had accidents and who witnessed accidents, which further translate into increased turnover and impaired job performance (Barling, Kelloway, & Iverson, 2003).

The staggering cost of workplace safety issues justifies more academic effort devoted to safety issues in applied psychology and management research. However, there has been a paucity of occupational safety research in organizational research literature (Campbell, Daft, & Hulin, 1982). Safety performance did not receive adequate academic attention until 2000 when researchers first conceptualized it as a two-component construct (i.e., safety compliance and safety participation; Griffin & Neal, 2000). This conceptualization has dominated safety performance research ever since. However,

researchers in this area failed to advance the understanding of safety performance while studies in general job performance have well established voluntary helping behavior towards different beneficiaries (e.g., the organization and other individuals; Williams & Anderson, 1991). As such, the *first* goal of the present study is to propose and empirically test a three-component structure of safety performance (i.e., safety compliance, safety participation towards the organization, and safety participation towards individuals) by following the steps taken in differentiating organizational citizenship behavior towards different beneficiaries (Lee & Allen, 2002; McNeely & Meglino, 1994; Williams & Anderson, 1991).

Recently there have been some systematic attempts to examine the antecedents to workplace safety (e.g. Christian, Bradley, Wallace, & Burke, 2009; Nahrgang, Morgeson, & Hofmann, 2011). More specifically, the missing link between health and safety, which is evidenced in past occupational health psychology research, is drawing more and more attention (Halbesleben, 2010; Hansez & Chmiel, 2010; Nahrgang et al., 2011; Snyder, Krauss, Chen, Finlinson, & Huang, 2008). However, one notable job-related stress phenomenon, burnout, has yet to be linked to safety performance. Given the negative impact of burnout on job performance (e.g., Cropanzano, Rupp, & Byrne, 2003; Swider & Zimmerman 2010; Wright & Cropanzano, 1998), it is crucial to gain a better understanding of the implications of burnout in safety context. Accordingly, the *second* goal of the present study is to utilize the conservation of resources (COR) theory (Hobfoll, 1989, 2001) and examine the relationships between job burnout and safety performance dimensions.

The *final* goal of the present study is to examine safety climate as a potential moderator in the relationships between burnout and safety performance dimensions. Safety climate is an important contextual factor that has been found to influence safety behaviors (Zohar, 2000; Clarke, 2006). By examining the moderating role of safety climate, the present study will try to provide insight into managerial practice as to how to shape the contextual perception that guides safety-related behaviors.

Safety Performance

Although the notion of safety behavior is of inherent interest to organizational researchers, safety performance does not readily lend itself to conceptualization. Safety performance taps into safety behaviors such as following safety protocols whereas safety outcomes refer to the organizational records related to workplace safety, such as accidents and injuries (Christian et al., 2009). Because the present study aims to examine safety behavior in the workplace, safety performance is the variable of interest rather than safety outcome.

Safety performance comprises two components: safety compliance and safety participation (Griffin & Neal, 2000). *Safety compliance* refers to the core safety activities that need to be carried out by individuals to maintain workplace safety (Griffin & Neal, 2000). An example of safety compliance behaviors is using the correct safety procedures for carrying out one's job. *Safety participation* refers to behaviors that may not directly contribute to workplace safety, but do help to develop an environment that supports safety (Griffin & Neal, 2000). An example of safety participation behaviors is voluntary behavior that helps to improve safety. While safety compliance is usually mandated by the organization, safety participation leans toward discretionary behavior that is not

formally required. Therefore, it follows that safety compliance and safety participation, although correlated with each other, are distinct types of safety behavior and have different determinants (Neal, Griffin, & Hart, 2000; Clarke, 2012).

The two components of safety performance adequately capture the domain of safety behaviors, similar to the task performance and organizational citizenship behavior (OCB) components of general job performance (Borman & Motowidlo, 1993; Griffin & Neal, 2000). However, in the OCB literature, citizenship behaviors targeted at different beneficiaries (i.e. OCB towards individuals and OCB towards the organization) have been empirically distinguished (Lee & Allen, 2002; McNeely & Meglino, 1994; Williams & Anderson, 1991). Importantly, OCB towards individuals (OCB-I) and OCB towards the organization (OCB-O) demonstrate different relationships with antecedents (Halbesleben & Bowler, 2007; Lee & Allen, 2002; McNeely & Meglino, 1994; Williams & Anderson, 1991). These two dimensions of OCB have advanced the understanding of citizenship behavior in the workplace.

As a type of citizenship behavior in the context of safety performance, safety participation behaviors might have different beneficiaries as well. For example, among the dimensions of safety citizenship role definition by Hofmann, Morgeson, and Gerras (2003), voice and civic virtue seem to tap into citizenship behavior towards the organization while helping and stewardship lean towards citizenship behavior towards individuals. Making safety-related recommendations about work activities (an item from voice) is citizenship behavior targeted towards the organization whereas assisting others to make sure they perform their work safely (an item from helping) is an example of citizenship behavior towards individuals. In other words, safety participation might be

further distinguished into safety participation towards individuals and safety participation towards the organization.

Similar to OCB-I and OCB-O, safety participation towards individuals (safety participation-I) and safety participation towards the organization (safety participation-O) might have different relationships with antecedents. Differentiating these dimensions presents an opportunity to advance the current understanding of safety participation, which has not received attention in safety research. As the present study tries to examine safety behaviors in the workplace, the differentiation between these two dimensions of safety participation will add great value to the inquiry into safety performance. Therefore, I propose a more refined structure of safety performance, which includes safety compliance, safety participation towards individuals, and safety participation towards the organization.

Safety performance is subject to the influence of a host of factors and job burnout is an important antecedent (Nahrgang et al., 2011). Existing studies point to the important role of workplace stress in safety issues. Specifically, stress-related concepts including psychological strain (Fogarty, 2005; Goldenhar, Williams, & Swanson, 2003), physical symptoms (Goldenhar et al., 2003), and psychological distress (Siu, Phillips, & Leung, 2004) have been shown to be associated with worse safety outcomes. A meta-analytic study (Nahrgang et al., 2011) examined burnout using similar constructs such as anxiety and depression and found that burnout was associated with more adverse events (a proxy of unsafe events). However, these studies did not explicitly examine burnout or safety performance.

In addition to safety research that examined stress-related concepts, a few studies directly investigated burnout and found that burnout was associated with adverse events, a proxy of unsafe events (Laschinger & Leiter, 2006), the perception of lower patient safety (Halbesleben, Wakefield, Wakefield, & Cooper, 2008), and workarounds, a type of at-risk safety behaviors (Halbesleben, 2010; Habesleben, Rathert, & Williams, 2013). However, none of these studies looked at *safety performance* as the criterion variable. An exception is Li, Jiang, Yao, and Li's (2013) study, in which they found exhaustion component of burnout was negative related to safety compliance. Still, the burnout-safety performance relationship was not the focus of that study. Therefore, it can be seen from current safety literature that the burnout-safety performance relationship has not received enough research attention although the general influence of workplace stress on safety issues has long been recognized. This dearth of research effort is evidenced in the lack of studies that directly examined the relationship between burnout and safety performance.

Compared with other stress-related constructs such as anxiety and depression, burnout, which will be discussed in detail later, is a unique job-related and situation-specific stress reaction after prolonged exposure to workplace stressors (Maslach, Schaufeli, & Leiter, 2001). Importantly, there is mounting evidence that consistently supports its influence on a variety of job-related outcomes, including absenteeism, turnover, and job performance (see a meta-analysis by Swider & Zimmerman, 2010). It follows that burnout might have important implications for safety performance in the workplace. Therefore, it is prudent to examine the relationship between burnout and safety performance. Now that safety performance is introduced and the inquiry into the burnout-safety performance relationship is justified, I now turn to burnout.

Burnout

Burnout was first coined by Freudenberger (1975), who worked in a health care agency and provided the first accounts of emotional depletion experienced by health care workers. Although it was initially studied in human service and education occupations, this concept was soon extended to a wide range of occupations and remains one of the central topics of occupational health psychology research (Halbesleben & Buckley, 2004; Maslach et al., 2001). Specifically, burnout is characterized by exhaustion and disengagement (Demerouti & Nachreiner, 1996; Halbesleben & Demerouti, 2005). Exhaustion refers to the state of intensive physical, affective, and cognitive weariness whereas disengagement refers to distancing oneself from work and holding negative attitudes towards aspects of work (i.e. work object, work content and one's work in general). The corresponding measure is referred to as OLBI (Oldenburg Burnout Inventory; Demerouti & Nachreiner, 1996; Halbesleben & Demerouti, 2005).

The current study retreats from adopting the most common conceptualization of burnout by Maslach and colleagues (Maslach & Jackson, 1981) because their three-component conceptualization is less appropriate for the current study. According to Maslach and colleagues, burnout is characterized by emotional exhaustion, depersonalization, and reduced accomplishment (Maslach et al., 2001; Maslach & Jackson, 1981; Pines & Maslach, 1980). First of all, MBI focuses narrowly on emotional exhaustion whereas OLBI incorporates physical, affective and cognitive aspects of exhaustion. Accumulating evidence suggests that cognitive factors (Wallace & Vodanovich, 2003), affective factors (Iverson & Erwin, 1997), and physical factors (Williamson, Lombardi, Folkard, Stutts, Courtney, & Connor, 2011) all play important

roles in safety performance. Second, OLBI contains both positively and negatively worded items and can be applied in any occupational context. Moreover, OLBI does not include personal accomplishment dimension of burnout which seems to develop independent of exhaustion and depersonalization (Taris, Le Blanc, Schaufeli, & Schreurs, 2005) and should be seen as a personality factor (Shirom, 2003). Based on these considerations, conceptualizing burnout as exhaustion and disengagement is more appropriate for the present study.

Burnout and Safety Performance

Now that safety performance and burnout have been introduced, it is prudent to establish the theoretical link from burnout to safety performance. Among the handful of theories delineating workplace stress, the current study utilizes the conservation of resources (COR) theory (Hobfoll, 1989, 2001; Hobfoll & Freedy, 1993) to examine the implications of burnout for safety performance, which provides a good account of the behavioral implications of experiencing stress.

The core concept of the COR theory is resources, which refer to tangible objects (e.g., food), personal characteristics (e.g., sense of optimism), energies (e.g., time), and/or situations (e.g., tenure) that are valued by the individual for their own sake or can help with the attainment of these resources. The basic tenet of the COR theory states that individuals are motivated to obtain, protect, retain, and enlarge their resource pool (Hobfoll, 1989, 2001; Hobfoll & Freedy, 1993). Individuals experience stress when they are faced with (a) the actual loss of resources; (b) the threatened loss of resources; (c) resource investment followed by inadequate resource return. Moreover, individuals tend to adopt a defensive strategy after experiencing stress. When choosing their resource

investment strategy, people experiencing stress tend to be very conservative. These behavioral implications of stress can shed valuable lights into the safety performance behaviors of people who are experiencing burnout, a unique stress phenomenon.

Burnout and Safety Compliance

The unique strength of the COR theory has been captured by safety researchers in that safety compliance has been conceptualized as a type of discretionary behavior that requires the investment of resources (Halbesleben, 2010). In routine situations, individuals could adopt short-cut approaches to finish their tasks instead of abiding by the safety protocols. Moreover, complying with safety procedures is usually not associated with reward. The lack of resource replenishment makes investment in safety compliance behavior even more burdensome.

People experiencing burnout are experiencing a great loss of resources (Maslach et al., 2001; Hobfoll & Freedy, 1993). According to the COR theory, individuals tend to take deliberate steps to protect themselves from future resource loss after they are exposed to resource loss or threats of loss (Hobfoll, 1989, 2001). They come up with better ways to invest their resource, as an attempt to maximize the returns of their investment (Baltes, & Baltes, 1990; Baltes, 1997; Hobfoll, 2001; Habesleben & Bowler, 2007). When faced with safety protocols that involves seemingly redundant protective steps to get the task done, exhausted employees may not see their investment in these routine compliance behavior worthwhile and instead choose to engage in short-cuts (Halbesleben, 2010). In this way, they can complete their task assignments without investing additional resources into safety compliance behavior which is not rewarded and

thus will not lead to a resource gain (Halbesleben, 2010). Therefore, burnout might be associated with lower levels of safety compliance.

Despite the compelling theoretical support, the link between burnout and safety compliance has remained largely unexplored empirically. As mentioned earlier, some studies found that stress-related concepts including strain, physical symptoms and distress were associated with worse safety outcomes (Fogarty, 2005; Goldenhar et al., 2003; Siu et al., 2004). Although these findings shed light into the proposed link between burnout and safety performance, neither the antecedents (i.e. stress-related constructs) nor the outcomes (i.e. safety outcomes) they investigated are the exact variables of interest to the present study. This lack of conceptualization precision can be also found in a recent meta-analytic study (Nahrgang et al., 2011). In that study, the authors claimed to examine the relationship between burnout and safety outcomes while they used stress-related constructs to represent burnout. More convincing evidence comes from studies that directly looked at burnout. Specifically, burnout was found to be related to unsafe events (Laschinger & Leiter, 2006) and the perception of lower patient safety (Halbesleben et al., 2008). In addition, there exist several studies that investigated both burnout and safety performance. Burnout was found to be associated with workaround, the opposite form of safety behavior to safety compliance (Halbesleben, 2010; Halbesleben et al., 2013). Li and colleagues (2013) found that emotional exhaustion was negatively related to safety compliance.

Hypothesis 1: Burnout will negatively relate to safety compliance.

Burnout and Safety Participation towards the Organization

Following the logic that individuals experiencing burnout are selective in their resource investment (Hobfoll, 2001), burnout might have implications for safety participation-O. As individuals experience the loss of resources, they may become more calculative in their work-related behavior. Specifically, individuals might view their employment relations carefully through the lens of social exchange (Cropanzano et al., 2003). They tend to reciprocate implied obligations by expanding or minimizing their role definitions so that their behaviors are consistent with the way they are being treated (Hofmann et al., 2003). Being overworked to the point of burnout by the organization, individuals may come to perceive a lack of equity in terms of what they have invested in and received from their job and even resent the organization and lower their organizational commitment (Cropanzano et al., 2003). Therefore, burnout may impede the exchange relationship that they have with the organization (Cropanzano, Rupp, Mohler, & Schminke, 2001) and result in lowered organizational commitment (Cropanzano et al., 2003). Therefore, people experiencing burnout might perceive their exchange with the organization unfair. As a result, they tend to lower their safety participation towards the organization as an attempt to restore equity in their exchange relationship with the organization.

Furthermore, safety participation behavior is neither mandated not recognized by the organization. Accordingly, employees will not receive any reward or recognition from engaging in safety participation-O. They might perceive safety participation behavior towards the organization as an effort in vain because they cannot get anything out of it. In other words, individuals are unlikely to foresee adequate return if they invest their resources in safety participation-O (Cropanzano et al., 2003; Halbesleben & Bowler,

2007; Halbesleben & Wheeler, 2011). Therefore, people high on burnout might decrease their safety participation-O in that they do not foresee any resource gain after their voluntary citizenship behaviors (Halbesleben & Bowler, 2007; Halbesleben & Wheeler, 2011). Taking the exchange perspective and the resource gain perspective leads to the proposition that burnout might be associated with lower levels of safety participation-O.

Empirical support for this link stems from job characteristics research and research on OCB. In Clarke's (2012) meta-analysis, hindrance stressors (a type of stressors that thwarts personal growth, learning, and goal attainment; Cavanaugh, Boswell, Roehling, & Boudreau, 2000), an important precursor to burnout, were negatively associated with safety participation. However, as current safety research has not differentiated the two proposed dimensions of safety participation (i.e., safety participation-O and safety participation-I), none of the empirical studies in the meta-analysis have examined safety participation *towards the organization* but rather used safety participation as a unitary construct. Further inspection of the items of the safety participation measure shows that all of the three items appear to tap into safety participation towards the organization. In this sense, the meta-analysis findings lend some support to the proposed negative relationship between burnout and safety participation-O. In a similar vein, Turner, Chmiel and Wall's (2005) research showed that job demands (also an important antecedent of burnout) negatively related to safety citizenship behaviors. Similarly, some items of the safety citizenship behaviors scale deal with safety participation-O.

Research evidence accumulated in OCB domain also helps to shed light into the relation between burnout and safety participation-O. Halbesleben and Bowler's (2007)

study demonstrated that exhaustion at time 1 was negatively related to organizational citizenship behavior towards the organization (OCB-O) at time 3 through status striving motivation measured at time 2. Another study that took a within-individual approach also provided support for the link from burnout to OCB-O (Halbesleben & Wheeler, 2011). Their study showed that burnout was negatively related to same-day OCB-O and minimized the reversed causation concern by showing that OCB-O did not significantly predict next-day burnout.

Hypothesis 2: Burnout will negatively relate to safety participation towards the organization.

Burnout and Safety Participation towards Individuals

In line with the COR theory (Hobfoll, 1989, 2001), burnout might have important implications for safety participation towards other individuals. In the sense that people experiencing burnout are selective and defensive in terms of resource investment, safety participation-I might provide an important avenue to glean more resources (Halbesleben & Bowler, 2007; Halbesleben & Wheeler, 2011).

Coworkers are important sources of social support which has been shown to be a crucial resource in addressing the detrimental effect of stress (Halbesleben, 2006; Lee & Ashforth, 1996). According to social exchange theory (Blau, 1964), helping behavior such as safety participation-I is expected to foster social support through reciprocal social exchange. Therefore, employees might see value in helping their coworkers in the workplace. In other words, employees might choose to invest their resources into safety participation-I as an attempt to maintain an adequate level of social support (Halbesleben & Bowler, 2007; Halbesleben & Wheeler, 2011). Research has supported the mediating

role of communion motivation between burnout and helping behavior (Halbesleben & Bowler, 2007). Specifically, communion motivation is directed at "obtaining acceptance in personal relationships and getting along with others" (Barrick, Stewart, & Piotrowski, 2002, p.44). This motivation is consistent with the contention that people experiencing burnout tend to increase helping behavior to increase their acceptance in a social system and garner social support (Halbesleben & Bowler, 2007). Therefore, burnout might be associated with high levels of safety participation towards individuals.

Empirical support for this link is limited to research on OCB. Two studies have consistently supported the positive relationship between exhaustion and organizational citizenship behavior towards individuals (Halbesleben & Bowler, 2007; Halbesleben & Wheeler, 2011). As mentioned earlier, one study (Halbesleben & Bowler, 2007) found that burnout at time 1 predicted OCB-I at time 3 whereas the other study (Halbesleben & Wheeler, 2011) tested the relationship on a within-individual level and found that burnout positively related to OCB-I but not vice versa.

Hypothesis 3: Burnout will positively relate to safety participation towards individuals.

Safety Climate as a Moderator

Given that burnout has become an inevitable phenomenon in the workplace (Halbesleben & Bowler, 2007; Maslach & Leiter, 1997), it is important to consider moderators that could potentially buffer the detrimental effects of burnout. Moreover, the moderator(s) can offer a fruitful avenue for practitioners to pursue and help them address the negative implications of burnout for workplace safety issues.

Psychological climate refers to individual perceptions of behaviors that are expected and rewarded in a particular organizational setting (James & James, 1989; Schneider, 1990). Accordingly, these perceptions of expected behaviors could greatly alter the way individuals behave in the workplace (Neal & Griffin, 2006). In safety research domain, the concept of safety climate has been established as a specific facet of climate and refers to the organized perceptions that employees hold to guide their safety-related behaviors, such as perceived management commitment to safety and the degree to which safety is valued by the organization (Neal & Griffin, 2006; Zohar, 1980, 2000). Consistent with past safety climate research (Hofmann et al., 2003), "a positive safety climate" will be used to refer to higher levels of safety climate. A positive safety climate informs employees of safety behavior-outcome expectancies and reinforces safety behavior (Zohar, 2000). Accumulating studies have documented the effects of safety climate on higher levels of safety performance (Christian et al., 2009; Neal & Griffin, 2006; Neal et al. , 2000) and safety outcomes including medication errors and nurse injuries (Hofmann & Mark, 2006) and microaccidents (Zohar, 2000).

As mentioned earlier, the moderating role of safety climate is of more interest to the present study in that it provides a possible avenue to mitigate the negative effects of burnout on safety performance. In the workplace characterized by a positive safety climate, individuals are well informed of the value of performing safety behaviors through the recognition and reward from management (cf. Clarke, 2006; Christian et al., 2009; Zohar, 2000). Accordingly, employees experiencing burnout might perceive their investment of resources in safety performance to be less risky and more fruitful.

Moreover, a positive safety climate will also equip employees with more resources to engage in safety behavior. When individuals' resources are exhausted, they have inadequate resources to carry out their tasks (Chowdhury & Endres, 2010). For example, they might lose focus on performing the tasks in the way consistent with the safety procedures. A positive safety climate is characterized by the organization's priority on safety issues and management commitment and support to workplace safety (Neal & Griffin, 2006; Zohar, 1980, 2000). In a workplace characterized by a positive safety climate, individuals have frequent access to management support, which is an important resource and can help employees focus their attention on safety issues (Halbesleben, 2006; Hobfoll, 2001; Chowdhury & Endres, 2010).

Taken together, a positive safety climate will inform individuals of the expected resource return once they engage in safety behaviors and provide necessary resources to carry out tasks safely. Consistent with the COR theory (Hobfoll, 2001), having access to other resources can buffer the negative effect of primary resource loss (Halbesleben, 2006). Therefore, safety climate might buffer the detrimental effect of burnout on safety performance. Specifically, the relationship between burnout and safety compliance will be weaker when safety climate level is higher in that individuals are better able (i.e. equipped with more resources) and more motivated (i.e. increased valence of safety behavior) to comply with safety protocols. In a similar vein, safety climate will moderate the burnout – safety participation-O relation. Moreover, individuals might be more motivated to engage in this type of safety behavior because they feel more urged to reciprocate the supportive climate by voluntarily promoting workplace safety (Hofmann et al., 2003). In terms of burnout and safety participation-I, organizations with a priority

on safety issues usually encourage collective effort to promote workplace safety. Helping others is congruent with the essence of safety climate. Therefore, under conditions of a positive safety climate, the positive influence of burnout on safety participation towards individuals is stronger in that individuals are motivated to align their behavior with contextual cues (Hofmann et al., 2003).

Empirically, Probst (2004) found the attenuating effect of safety climate on the relation between job insecurity, a stressor that could lead to burnout, and safety compliance as well as safety outcomes such as accidents and injuries. In a study by Baba, Tourigny, Wang, and Liu (2009), support was found for the interaction between emotional exhaustion and safety climate in predicting individual *job performance*. However, these two studies neither looked at stress-related concepts (Probst, 2004) nor included safety-related outcomes (Baba et al., 2009). More convincing evidence is provided by Chowdhury and Endres's (2010) study, in which they found that safety climate attenuated the relationship between occupational strain (a stress reaction similar to burnout) and injury (as a type of safety outcomes).

Hypothesis 4a: Safety climate will moderate the relationship between burnout and safety compliance such that when the safety climate level is higher the negative relationship between burnout and safety compliance will be weaker.

Hypothesis 4b: Safety climate will moderate the relationship between burnout and safety compliance such that when the safety climate level is higher the negative relationship between burnout and safety participation towards the organization will be weaker.

Hypothesis 4c: Safety climate will moderate the relationship between burnout and safety compliance such that when the safety climate level is higher the positive relationship between burnout and safety participation towards individuals will be stronger.

Method

Participants

Participants for the current study will be nurses working in a local hospital. Nurses have been studied in safety research (e.g., Hofmann & Stetzer, 1996) and safety issue is particular relevant in this occupations. Utilizing samples from safety-critical industries can reduce the possibility of low base rate of unsafe behaviors (Zohar, 2000), which could pose difficulty to statistical analysis. Burnout, safety climate, safety performance and control variables will all be reported by participants. If viable, safety performance data will include supervisor ratings to reduce the concern of common method variance. As reversed causation poses threat to the current study, longitudinal data collection will be utilized if possible to establish causation among study variables.

Power analysis as calculated by G*Power reveals that a sample of 186 will be needed to detect a small effect size (alpha = .05, power = .80, small effect size = .10) for regression analysis. Accordingly, recruitment efforts will be made to enlarge the sample size to 300, considering that some incomplete responses might have to be deleted in later analysis. As will be discussed in the analysis strategy, the present study might conduct a structural equation model (SEM) to test the hypotheses. Therefore, effort will be made to recruit as many participants as possible to ensure a sample size that is large enough for SEM analysis.

Measures

Burnout. Burnout will be measured using the Oldenburg Burnout Inventory (OLBI; Demerouti, Bakker, Vardakou, & Kantas, 2003), consistent with the conceptualization approach of burnout that the current study takes. OLBI consists of two dimensions: exhaustion and disengagement. The items are rated along a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A confirmatory factor analysis will be carried out to examine the construct validity. As these dimensions are usually highly correlated (Sliter, Pui, Sliter, & Jex, 2011), a composite score will used by summing all items across the two dimensions, which is not uncommon in burnout research (e.g., Armon, Shirom, Berliner, Shapira, & Melamed, 2008).

Safety Performance. Safety compliance will be measured using the safety behavior scale from Neal and Griffin (2006). Safety compliance includes three items that are scored on a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). A sample item of safety compliance is “I use all the necessary safety equipment to do my job”.

As the current study aims to refine the dimensions of safety participation behavior, items reflecting safety participation from the safety behavior scale from Neal and Griffin (2006) and the safety citizenship role definition scale from Hofmann and colleagues (2003) will be used to generate an item pool. Items tapping safety participation behaviors that are clearly beneficial to either the organization or individuals will be selected. A pilot study will be conducted to assess the factor structure of the proposed safety participation dimensions. The sample for the pilot study will come from Mturk or Study Response website, both of which provide online data-collection. Specifically, participants in the

pilot study will be asked to report their safety participation behaviors using 5-point scales, ranging from 1(*almost never*) to 5 (*almost always*). Similar to previous studies that refined OCB dimensions (Williams & Anderson, 1991; Lee & Allen, 2002), a confirmatory factor analysis will be run to examine the empirical distinction between safety participation towards the organization and safety participation toward individuals.

Safety Climate. The safety climate scale to be used depends on the occupation of the sample, as there are a variety of versions for different occupations available. If the sample comes from an occupation for which no specific safety scale exists, a general version of safety climate scale will be used (Hofmann & Stetzer, 1996). This scale was based on Zohar's (1980) original measure and went through revisions by Dedobbeleer and BeLand (1991) and Hofmann and Stetzer (1996).

Control Variables. Negative affectivity (NA) will be used as a control for common method variance among self-report measures (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Neal & Griffin, 2006). The inclusion of NA helps to rule out the possibility of dispositional NA as the common cause of burnout and safety behavior (Neal & Griffin, 2006). Specifically, the Negative affectivity scale will be used (Watson, Clark, & Tellegen, 1988). The literature on burnout and citizenship behaviors supported the influence of specific demographic variables, including age (cf. Ryan, 2001; Schaufeli & Enzmann, 1998; Turnipseed, 1994; Wagner & Rush, 2000), organizational tenure (Schaufeli & Enzmann, 1998; Turnipseed, 1994) and gender (cf. Purvanova & Muros, 2010). Following past research on burnout and performance (Cropanzano et al., 2003; Halbesleben & Bowler, 2007; Wright & Bonett, 1997), the current study will control for

age, organizational tenure, and gender to rule out the possibility of these variables acting as alternative explanations.

Analysis Strategy

As the first step of analysis, preliminary data analyses will be conducted to check for outliers, replace missing values, and check for abnormal distributions of variables. Next, sampling and sample characteristics will be introduced. Sampling strategy and frequencies of demographics variables will be summarized. Means, standard deviations, and zero-order correlations between study variables will be analyzed and displayed in a table.

If the final sample size is large enough, a structural equation model (SEM) will be conducted to test the study hypotheses. In SEM, the overall model can be tested all at once and measurement errors are taken into account. Specifically, the model depicted in Figure 1 will be tested. Control variables will be included in the model to examine their potential influence over the overall model. The moderator (i.e., safety climate) will be examined by moderated structural equation modeling (Cortina, Chen, & Dunlap, 2001). To test for reversed causality, a competing model in which safety performance leads to burnout will be tested.

If the sample size is not large enough for SEM, hierarchical regression analysis will be conducted to test the study hypotheses. For multivariate tests, hypotheses 1, 2 and 3 will be tested using hierarchical regression analysis. The control variables will be entered first and then burnout will be entered in the next step. For hypothesis 4, safety climate and burnout will be standardized to reduce interpretation concern associated with multicollinearity (Cohen, Cohen, West, & Aiken, 2003). Control variables will be entered

in step 1 and burnout will be added in step 2. A cross product of safety climate and burnout will be created and then entered into the regression analysis in step 3. A significant change in the variance explained by step 3 will support a significant moderation effect. Significant interactions will be graphed, and simple slope analyses (Aiken & West, 1991) will be conducted to determine whether the change in slopes was significant from low levels of the moderator to high levels of the moderator.

Appendix B Measures

Safety Consciousness (Barling et al., 2002)

Strongly Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree

1. I always wear the protective equipment or clothing required by my job
2. I am well aware of the safety risks involved in my job
3. I know where the fire extinguishers are located in my workplace
4. I do not use equipment that I feel is unsafe
5. I inform management of any potential hazards I notice on the job
6. I know what procedures to follow if injured on my shift
7. I would know what to do if an emergency occurred on my shift (e.g., fire)

Safety Climate (Zohar, 2000)

Strongly Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree

1. My supervisor says a good word whenever he sees a job done according to the safety rules.
2. My supervisor seriously considers any worker's suggestions for improving safety.
3. My supervisor approaches workers during work to discuss safety issues.
4. My supervisor gets annoyed with any worker ignoring safety rules, even minor rules.
5. My supervisor watches more often when a worker has violated some safety rule.
6. As long as there is no accident, my supervisor doesn't care how the work is done (R).
7. Whenever pressure builds up, my supervisor wants us to work faster, rather than by the rules (R).
8. My supervisor pays less attention to safety problems than most other supervisors in this company (R).
9. My supervisor only keeps track of major safety problems and overlooks routine problems (R).
10. As long as work remains on schedule, my supervisor doesn't care how this has been achieved (R).

Procedural Justice (Spranger et al., 2012)

Strongly Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree

Procedures in your organization are designed to…

1. Collect accurate information necessary for making decisions.
2. Provide opportunities to appeal or challenge the decision.
3. Have all sides affected by the decision represented.
4. Generate standards so that decisions can be made with consistency.
5. Hear the concerns of all those affected by the decision.
6. Provide useful feedback regarding the decision and its implementation.
7. Allow for requests for clarification or additional information about the decision.

Coworker Incivility (Cortina et al., 2001)

Never; Rarely; Sometimes; Quite Often; Very Often

During the PAST three months, have you been in a situation where any of your coworkers…

1. Put you down or was condescending to you?
2. Paid little attention to your statement or showed little interest in your opinion?
3. Made demeaning or derogatory remarks about you?
4. Addressed you in unprofessional terms, either publicly or privately?
5. Ignored or excluded you from professional camaraderie?
6. Doubted your judgment on a matter over which you have responsibility?
7. Made unwanted attempts to draw you into a discussion of personal matters?

Motivation Orientation (Barrick et al., 2002)

Strongly Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree

Accomplishment striving

1. I frequently think about getting my work done.
2. I focus my attention on completing work assignments.
3. I set personal goals to get a lot of work accomplished.
4. I spend a lot of time thinking about finishing my work tasks.
5. I often consider how I can get more work done.
6. I try hard to get things done in my job.
7. I put a lot of effort into completing my work tasks.
8. I never give up trying to finish my work.
9. I spend a lot of effort completing work assignments.
10. I feel enthused when I think about finishing my work tasks.
11. It is very important to me that I complete a lot of work.

Status striving

1. I frequently think about ways to advance and obtain better pay or working conditions.
2. I spend a lot of time contemplating ways to get ahead of my coworkers.
3. I often compare my work accomplishments against coworkers' accomplishments.
4. I never give up trying to perform at a level higher than others.
5. I always try to be the highest performer.
6. I get excited about the prospect of being the most successful sales representative.

7. I feel a thrill when I think about getting a higher status position at work.
8. I am challenged by a desire to perform my job better than my coworkers.

Communion striving

1. I focus my attention on getting along with others at work.
2. I spend a lot of time contemplating whether my coworkers like me.
3. I never give up trying to be liked by my coworkers and supervisors.
4. I expend a lot of effort developing a reputation as someone who is easy to get along with.
5. I get excited about the prospect of having coworkers who are good friends.
6. I enjoy thinking about cooperating with my coworkers and supervisors.
7. I care a lot about having coworkers and supervisors who are like me.
8. I am challenged by a desire to be a team player.
9. I get worked up thinking about ways to make sure others like me.

Task Performance (Williams & Anderson, 1991)

Never; Almost Never; Rarely; Sometimes; Often; Very Often; Always

1. Adequately completes assigned duties
2. Fulfills responsibilities specified in job description
3. Performs tasks that are expected of him/her
4. Meets formal performance requirements of the job
5. Engages in activities that will directly affect his/her performance evaluation
6. Neglects aspects of the job he/she is obligated to perform. (R)
7. Fails to perform essential duties. (R)

Organizational Citizenship Behaviors (Lee & Allen, 2002)

Never; Almost Never; Rarely; Sometimes; Often; Very Often; Always

OCBO

1. Attend functions that are not required but that help the organizational image.
2. Keep up with developments in the organization.
3. Defend the organization when other employees criticize it.
4. Show pride when representing the organization in public.
5. Offer ideas to improve the functioning of the organization.
6. Express loyalty toward the organization.
7. Take action to protect the organization from potential problems.
8. Demonstrate concern about the image of the organization.

OCBI

1. Help others who have been absent.
2. Willingly give your time to help others who have work-related problems.
3. Adjust your work schedule to accommodate other employees' requests for time off.
4. Go out of the way to make newer employees feel welcome in the work group.
5. Show genuine concern and courtesy toward coworkers, even under the most trying business or personal situations.
6. Give up time to help others who have work or nonwork problems.
7. Assist others with their duties.
8. Share personal property with others to help their work.

Safety Performance (Neal & Griffin, 2006)

Strongly Disagree; Disagree; Neither Agree Nor Disagree; Agree; Strongly Agree

Safety compliance

1. I use all the necessary safety equipment to do my job
2. I use the correct safety procedures for carrying out my job
3. I ensure the highest levels of safety when I carry out my job

Safety participation

1. I promote the safety program within the organization
2. I put in extra effort to improve the safety of the workplace
3. I voluntarily carry out tasks or activities that help to improve workplace safety

New Safety Performance Scale

Never; Almost Never; Rarely; Sometimes; Often; Very Often; Always

Safety Compliance - Reducing Risks

1. Use the correct safety procedures for carrying out my job
2. Ensure the highest levels of safety when I carry out my job
3. Follow safety procedures, even if it causes my work to take longer
4. Keep my work equipment in safe working condition
5. Maintain an organized work area

Safety Compliance - Protection and Communication

1. Correct safety problems to ensure accidents will not occur
2. Report maintenance problems or hazards to appropriate people
3. Inspect equipment and tools before use to ensure they are in proper working order
4. Assess work tasks for potential safety concerns before I begin my work
5. Appropriately report incidents, accidents, and/or illnesses.

Safety Participation towards the Organization

1. Put in extra effort to improve the safety of the workplace
2. Voluntarily carry out tasks or activities that help to improve workplace safety
3. Make safety-related recommendations to protect the organization from potential problems
4. Raise safety concerns to the management

5. Be concerned about the safety of the organization

Safety Participation towards Individuals

1. Offer assistance to others when they are working in difficult circumstances or on potentially dangerous tasks
2. Instruct co-workers on the proper procedures to operate equipment
3. Encourage coworkers to work in a safe manner
4. Help other people learn about safe work practices
5. Go out of my way to look out for the safety of other workers

Demographics

1. What is your job title at your current job? Please try to be as specific as possible (e.g., retail associate, product manager).
2. How many hours do you typically work each week in paid employment? (please provide an exact number)
3. How long have you been working at your current organization? (In Years)
4. What is your age?
5. What is your gender?

   __Male

   __Female
6. What is your current level of education?

   __Some high school

   __High school diploma or GED

   __Some college

   __Associate's degree

   __Bachelor's degree

   __Master's degree

   __Advanced degree (e.g., PhD, JD, MD)
7. What is your race/ethnicity? (check all that apply)

   __White

   __Black or African American

   __Hispanic

   __American Indian or Alaskan Native

__Asian or Pacific Islander

__Asian Indian

__Some other race

8. Which of the following industries are you currently working in? *This question is required.

__Construction

__Health care

__Manufacturing/processing

__Transportation

__Mining

__Administrative and waste services

__Education

__Real estate and rental and leasing

__Information

__Financial and insurance

__Arts, entertainment, and recreation

__Professional and technical services

__Other industries

9. How long have you been working in this industry?

__Less than three months

__Three months or longer, but less than a year

__A year or longer