Overcoming Overload: Examining the Importance of Prioritizing Safety and Safety Leadership

by
Allison Tsao

A dissertation submitted to the Department of Psychology,
College of Liberal Arts and Social Sciences
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in Industrial Organizational Psychology

Chair of Committee: Christiane Spitzmueller

Committee Member: Jaye Derrick

Committee Member: Juan Madera

Committee member: Kevin Hoff

University of Houston
December 2020

ACKNOWLEDGMENTS

I would like to acknowledge all of those who have played an important role in helping me achieve my academic goals and completing my PhD. First and foremost, I would like to thank my parents, Fred and Irene, and my siblings, Benjamin and Catherine, for constantly supporting me with love, encouragement, understanding, and providing a financial safeguard for me throughout this journey.

Second, I would like to thank my graduate advisor, Christiane Spitzmueller, for all of her patience, support, advice, and words of wisdom at every milestone in the PhD process. I would also like to thank my committee members for their flexibility, understanding, and invaluable suggestions throughout the dissertation process.

Third, I would like to acknowledge all of the support and love I received from my cohort members, lab members, and friends, without this social and professional support. I am especially grateful to Xueqi (Cecilia) Wen for providing support and guidance on my dissertation.

Lastly, I would like to thank Alex for supporting and loving me throughout this process and helping me mentally cope with the stress of graduate school. I would also like to say thank you to his mother, Jane, who we recently lost, for always loving and supporting me like her own since the day we met. Thank you to everyone listed on here, because of them I was able to achieve my goals and remain strong these past couple of years.

OVERCOMING OVERLOAD: EXAMINING PRIORITY OF SAFETY AND LEADERSHIP

ABSTRACT

The relationship between stressors and safety outcomes has been well-documented in the occupational safety literature and has contributed to the theoretical understanding and practice of reducing occupational safety incidents; however, role overload is a job stressor that continues to increase despite its relationship to safety outcomes. The current study examined the relationship between role overload, safety motivation, safety behaviors, and accidents utilizing data collected from employees at an oil and gas pipeline organization. First, I examined the relationship between role overload and safety motivation as a mechanism by which overload is related to safety behaviors and accidents, specifically by utilizing expectancy theory. Second, I aimed to incorporate situational strength theory within the model of workplace safety to understand how safety-specific transformational leadership and priority of safety moderate the proposed relationship between role overload and safety motivation. I analyzed the proposed model using structural equation modeling (SEM) with Mplus 8.0 (Muthén & Muthén, 2017). I found that safety motivation mediates the relationship between role overload and safety behaviors and accidents. Furthermore, I found that safety-specific transformational leadership moderates the relationship between role overload and safety motivation, but priority of safety did not. The findings may help academics and practitioners better understand how role overload is related to safety motivation and how situational factors can minimize the negative effects of role overload. Moreover, unexpected findings of the study may encourage future researchers to examine how safety-specific transformational leadership interacts with safety predictors to increase safety motivation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Overcoming overload: Examining the importance of prioritizing safety and safety leadership

Over the past century, workplace safety has improved vastly as a result of several factors, such as improved safety equipment, technology, laws and regulations, working conditions, and occupational health and safety research (Hofmann et al., 2017). Research in this area has helped to create safer work environments and conditions, inform better safety practices and training, and identify key organizational factors (i.e., safety climate) that are related to safety outcomes (Hofmann et al., 2017). Despite the improvements and significant research efforts, in 2018, there were still 5,250 fatal work injuries and 2.8 million non-fatal work injuries reported by U.S. private industry employers (Bureau of Labor Statistics, 2019b, 2019a). Work injuries, both fatal and non-fatal, are serious consequences of unsafe work environments and practices, many of which can be prevented by following safety protocols and mitigating job stressors in the workplace that may prevent employees from properly following safety protocols. Thus, it is especially important for organizations to continuously focus on improving occupational safety, specifically what can be done to mitigate the negative effects of job stressors on safety outcomes.

The relationships between organizational (i.e., safety climate), supervisor (i.e., safety-specific transformational leadership), individual (i.e., safety attitudes, personality, and risk propensity) and job-related (i.e. role conflict and training) factors and safety outcomes are well established (Christian et al., 2009; Clarke, 2010, 2012; Nahrgang et al., 2011). Across work settings, predictors of safety, such as job stressors, are related to attitudinal and psychological outcomes, which lead to specific safety behaviors, and ultimately lead to negative safety outcomes such as accidents, injuries, and near-misses. Specifically, job stressors are positively

related to safety outcomes, while job resources are negatively related to safety outcomes (Christian et al., 2009; Clarke, 2006, 2010; Nahrgang et al., 2011). Moreover, job stressors and resources are related to safety outcomes through employees' safety knowledge, motivation, and behaviors (Christian et al., 2009; Griffin & Neal, 2000; Neal & Griffin, 2004, 2006). These well-established relationships have guided organizations to reduce workplace stressors and increase resources; however, some stressors have not been as easily mitigated or removed as others. For example, organizations have seen an upward trend in the prevalence of role overload (Bolino & Turnley, 2005; Brown et al., 2005), when employees have too great of demands for their time, resources, or abilities. Increases in role overload can be caused by increases in productivity demands as well as increasingly complex and fast-paced work environments (Brown et al., 2005). Although it can be suggested that a simple solution to role overload would be to hire more employees, not all organizations have the capability or bandwidth to do so, resulting in higher demands and expectations of their current employees. When job stressors, like role overload, cannot be easily removed from work environments, it is imperative to identify what resources organizations can focus on to reduce the negative effects of such job stressors.

This study builds on prior occupational safety literature through the pursuit of two goals. The first goal is to examine the role of motivation in the relationship between role overload and safety behaviors and performance, specifically utilizing expectancy theory (Vroom, 1964) to understand how motivation acts as an underlying mechanism between role overload and safety behaviors. The second goal is to integrate situational strength theory (Mischel, 1977) with Neal and Griffin's (2004) model of workplace safety to understand how

different characteristics of work environments, specifically safety-specific transformational leadership and priority of safety, can weaken the negative effects of role overload on safety motivation. I draw from leadership and organizational climate literature to examine how the two variables may alleviate the negative effects of role overload. This study aims to aid practitioners with a better understanding of how specific leadership types and organizational climates can be utilized to increase safety behaviors and improve safety performance.

The remainder of the paper will progress as follows. First, I will introduce the current literature and theories utilized in occupational safety, specifically Neal and Griffin's (2004) model of workplace safety. Next, I will briefly provide an overview of research on role overload and discuss its relationship to safety motivation and the model of workplace safety. I will then introduce situational strength theory and how it can be integrated with the model of workplace safety to identify factors that mitigate the negative effects of role overload. Lastly, I will discuss how safety-specific transformational leadership and priority of safety weaken the relationship between role overload and safety motivation.

Theoretical Background

Occupational safety research draws from several different areas of psychological research and integrates a wide array of theoretical frameworks to understand the relationships between safety predictors and outcomes. Organizational health and stress theories have been used to identify job stressors as predictors of safety outcomes and understand the health impairment process by which job stressors are related to safety outcomes (Griffin & Clarke, 2011; Lazarus & Folkman, 1984; Nahrgang et al., 2011). Theories from personality literature have also been used to understand how specific personality traits, such as conscientiousness

and impulsiveness, make individuals more or less likely to behave safely, be accident prone, or be involved in safety incidents (Cellar et al., 2001; Salminen et al., 1999; Visser et al., 2007). Occupational safety research has also drawn from the performance literature, specifically to understand how safety performance can be conceptualized and predicted in the same ways as task and contextual performance.

Model of Workplace Safety

Neal and Griffin (Griffin & Neal, 2000; Neal & Griffin, 2002, 2004) conceptualized a model of workplace safety based on Campbell et al.'s (1993) theory of performance, which posits that there are proximal antecedents of performance, knowledge, skills, and motivation, and distal antecedents, all other factors. Workplace safety performance can be conceptualized similarly to general job performance (Neal & Griffin, 2004), whereas distal antecedents (i.e., safety climate or personality) are directly related to safety motivation and knowledge (proximal antecedents), which are directly related to safety behaviors, which are then directly related to safety performance or outcomes (i.e., accidents, near-misses, injuries, etc.). Safety knowledge consists of knowing how to perform the job safely, and safety motivation is "an individual's willingness to exert effort to enact safety behaviors and the valence associated with those behaviors" (Neal & Griffin, 2006). Employee safety knowledge and motivation are both necessary for behaving in safe ways, as individuals would either lack the knowledge or drive to engage in safety behaviors, such as safety compliance and participation (Christian et al., 2009).

Safety behaviors consist of two different types of behaviors, safety compliance and safety participation, which are similar to task and contextual performance but specific to

safety behaviors. Safety compliance behaviors are those that are related to following safety procedures and working in a safe manner, while safety participation consists of behaviors that involve helping coworkers and participating in extra efforts for improving workplace safety. Safety behaviors, both compliance and participation, are negatively related to safety outcomes, such as accidents, injuries, and near-misses (Christian et al., 2009; Clarke, 2012). Furthermore, distal predictors of safety outcomes, such as personality, safety climate, and safety attitudes, are related to safety outcomes through safety motivation and knowledge (Christian et al., 2009; Clarke, 2012; Neal & Griffin, 2006). For example, when employees perceive higher levels of organizational safety climate, their motivation increases, which subsequently results in increased levels of safety behaviors and fewer accidents (Neal & Griffin, 2006). In alignment with the substantial evidence supporting Neal and Griffin's (2004) workplace safety model, I hypothesize the following:

Hypothesis 1: Safety motivation is positively related to safety behaviors.

Hypothesis 2: Safety behaviors is negatively related to accidents.

Hypothesis 3: Safety motivation is indirectly related to accidents through safety behaviors.

To expand upon the current safety literature and the model of workplace safety (Neal & Griffin, 2004), I seek to examine the relationship between role overload and safety motivation within the model of workplace safety. Although meta-analyses (Christian et al., 2009; Clarke, 2012) have demonstrated that the model of workplace safety holds with many predictors of safety outcomes, there are no specific studies demonstrating the specific relationship between role overload, safety motivation, and safety outcomes, despite the

increasing trend in role overload among U.S. employees (Bolino & Turnley, 2005; Brown et al., 2005). In addition to examining the relationship between safety predictors and safety outcomes, it is important to understand what can be done to improve safety outcomes in the event that safety predictors like role overload persist in the workplace. Thus, this paper further expands upon the model of workplace safety by integrating situational strength theory to understand the impacts of leadership and climate on relationships between role overload, safety motivation, safety behaviors, and safety outcomes.

Role Overload

Employees are increasingly experiencing role overload across many work environments; more and more, employees are having more demands and expectations placed on them and are being asked to exert more effort than they are able to handle given their available resources (Bolino & Turnley, 2005; Brown et al., 2005; Kahn et al., 1964). Role overload is defined as a situation in which an employee has too many responsibilities expected of them in regards to time constraints, resources, or current abilities (Bolino & Turnley, 2005). Role overload has also been conceptualized as work overload, quantitative overload, and qualitative overload, requiring a more refined definition for the purpose of this study. In line with previous studies (Bolino & Turnley, 2005; Brown et al., 2005; Fisher, 2014; Harvey et al., 2003), I conceptualize role overload most similarly to quantitative overload, or overload specifically due to having too many responsibilities or demands expected of an employee given their time constraints.

Role overload is an important safety predictor to study because it is becoming more rampant in the workplace, is a universal job stressor, and may not be easily removed in

workplaces. Organizations may not always be equipped or prepared to hire and train new employees when production demand is high or work becomes more complex; moreover, organizations cannot always control for situations in which timelines become tight due to unforeseen issues that arise in workflows. Unlike other safety predictors, which can easily be removed or added to the workplace, role overload can result from several unpredictable setbacks, making it more difficult to completely remove role overload from workplaces.

The effects of role overload are well established, specifically the effects of role overload on stress and work-family conflict. Role overload is consistently positively related to both psychological and physical well-being issues, including stress, fatigue, sleeping problems, and anxiety (Sales, 1970; Shultz et al., 2010). Moreover, employees who experience high levels of overload also experience lower levels of self-esteem and enjoyment of their tasks, as well as higher levels of tension and anger (Sales, 1970). In addition to the negative effects of role overload, there is evidence to suggest that role overload is positively related to attempts to increase productivity (Sales, 1970); however, attempts to increase productivity do not indicate that individuals are increasing productivity through proper processes or ethical practices. Role overload and well-being are, in part, related because role overload is negatively related to work-family outcomes and negatively impacts employee's ability to balance work and personal lives (Ahmad,A, 2010; Bakar & Salleh, 2015). Lastly, in the occupational safety literature, role overload is positively related to accidents and injuries at work (Hofmann & Stetzer, 1996; Zohar, 2000). Thus, role overload is an important safety predictor to study given its extensive relationship to negative individual and work outcomes, especially its association with increased accidents and injuries at work.

Role Overload and Safety Motivation

Despite the abundance of research linking role overload to work and safety outcomes, limited research points to how and why role overload is related to safety outcomes. In the model of workplace safety, role overload is considered a distal predictor of safety behaviors and outcomes, suggesting that role overload is related to safety behaviors and outcomes through the proximal predictors, safety motivation and safety knowledge. This study focuses on examining safety motivation as the mechanism by which role overload is related to safety behaviors and accidents because safety motivation is more likely to be related to role overload. Specifically, safety knowledge may be present or missing regardless of an employee's role overload and may depend more on having the proper education, experience, and training.

There are several motivational theories that can provide an argument for the relationship between role overload and safety motivation, including expectancy theory (Vroom, 1964), conservation of resources theory (Hobfoll, 1989), and theories based in affect or emotion (Latham & Pinder, 2005); however, this paper will focus specifically on the application of expectancy theory. Expectancy theory (Vroom, 1964) posits that individuals behave in certain ways because they will expect a certain outcome or result from behaving in different ways. They are motivated to behave in different ways based on the desirability of said outcome. Expectancy theory consists of three components: (1) *expectancy*, the expected performance if effort is put forth, (2) *instrumentality*, the outcomes (i.e., rewards) that come from the performance, and (3) *valence*, the value an individual places on the outcomes.

Within safety performance, there are two *expectancies* that are often communicated from the organization: (1) performing safely and (2) meeting production goals. However, the *instrumentality* from meeting these two goals often differs in organizations as employees are more often rewarded for achieving production or performance goals than the actual behaviors of following safety procedures (Christian et al., 2009; Reason et al., 1998). Thus, when employees assess the actual outcomes or rewards from achieving the expectancy, there is more *valence* for the outcomes of achieving production goals. Often times, employees are not rewarded for following actual safety behaviors or procedures, but they are rewarded for not having safety incidents, regardless of how they achieve that goal, allowing safety violations to go unnoticed and possibly rewarded. Because of this, employees are more motivated to cut corners and skip safety procedures in order to make work more efficient or convenient to meet all of their work demands. Therefore, when faced with role overload (i.e., higher work demands), employees are more likely to focus on achieving demands that are rewarded rather than being motivated to work in a safe manner given the low return on investment for the extra time needed to work safely. Additionally, role overload has been related to other motivation processes, specifically self-efficacy and goal-setting theory (Brown et al., 2005). At low levels of role overload, self-efficacy was related to goal performance; however, when role overload was high, self-efficacy was no longer related to goal performance, disrupting the motivational relationship between self-efficacy and the ability to achieve goals.

Thus, I hypothesize that role overload is negatively related to safety motivations, specifically as employees are faced with a greater number of work demands, their expectancy of being rewarded for working safely will decrease, ultimately decreasing their safety

motivation. Furthermore, based on the model of workplace safety (Griffin & Neal, 2000), I hypothesize that role overload will be indirectly related to accidents through safety motivation and safety behaviors.

Hypothesis 4: Role overload is negatively related to safety motivation.

Hypothesis 5: Role overload is indirectly related to accidents through safety motivation and safety behaviors.

Situational Factors Affecting Safety

As role overload persists in the workplace and is seemingly increasing in many work environments (Brown et al., 2005), it is imperative to understand what can be done to combat the negative effects of role overload, especially the negative effects on safety outcomes; thus, this study seeks to explore two situational factors that may moderate the relationship between role overload and safety motivation. Specifically, I will examine safety-specific transformational leadership and priority of safety. Situational factors have been looked at in several areas of psychological research, especially in the personality literature when Mischel (1977) posited that situations moderate the relationship between individual differences and behavior. Situational strength suggests that there are strong and weak situations, and strong situations have greater ability to affect individuals' behaviors than weak situations (Masood et al., 2006; Meyer et al., 2010). Strong situations are ones that provide individuals with clear signs as to what behaviors are expected in the environment they are in and sets the norms. Leadership factors and climate have been shown to be strong situational factors that often guide work attitudes and behaviors (Masood et al., 2006; Schneider et al., 2013). Thus, I posit that safety-specific transformational leadership and priority of safety are strong

situations that moderate the relationship between role overload and employee safety motivation.

Safety-Specific Transformational Leadership

Leaders have significant impacts on employee attitudes, motivation, and job performance (Judge & Piccolo, 2004; Tepper, 2000); however, the directionality of a leader's impact depends on the type of leadership they embody. Transformational leaders are those that are able to obtain follower support by inspiring their followers with a vision beyond their own self-interests and encouraging their followers to develop their own vision beyond their own self-interests (Burns, 1978). Transformational leadership has positive effects on employee job satisfaction, empowerment, motivation, mental health, and job performance (Judge & Piccolo, 2004; Kark et al., 2003; Montano et al., 2017). Furthermore, transformational leadership and safety-specific transformational leadership have positive effects on occupational safety (Barling et al., 2002; Clarke, 2013; J. E. Mullen & Kelloway, 2009).

Safety-specific transformational leaders are leaders that embody the safety expectations of an organization by meeting the four components of transformational leadership (Bass, 1985) in relation to safety (Barling et al., 2002). Safety-specific transformational leaders have an *idealized influence* for safety by encouraging their followers to focus on safety instead of production pressures and can do so through their own commitment to safety (Barling et al., 2002). Such leaders are also able to *inspire and motivate* their employees to achieve their safety goals with a clear vision, as well as *intellectually stimulate* their employees in safety by encouraging employees to think beyond

the current safety practices in places and what can be done to improve current safety practices. Lastly, safety-specific transformational leaders have *individualized consideration* for their employees by maintaining individual attention and consideration towards them, specifically communicating that they value their employees' safety and well-being.

The direct effects of transformational leadership and safety-specific transformational leadership on safety motivation, behaviors, and outcomes has been well-documents (Christian et al., 2009; Mullen et al., 2017; Mullen & Kelloway, 2009); however, the moderating role that safety-specific transformational leadership plays has not been studied as extensively. Transformational leadership is a strong situational factor (Masood et al., 2006) that has been shown to moderate the relationship between work characteristics and work outcomes (Jensen et al., 2014; Wang & Walumbwa, 2007). Moreover, transformational leadership moderates the relationship between safety knowledge and safety participation (Jiang & Probst, 2016). There are several reasons why leadership affects safety motivation, behaviors, and outcomes, including the notion that leaders represent the organization and when leaders embody strong safety principles and emphasize the importance of safety, employees are likely to interpret that as the organization valuing safety (Hofmann et al., 2017). Furthermore, when leaders have the attributes of safety-specific leadership, they are able to inspire and motivate their employees through intellectual stimulation and idealized influence. When leaders fail to act on the safety values that they preach, employees may not truly believe in the safety values (Leroy et al., 2012). Therefore, when individuals encounter stressors, such as role overload, in the workplace, transformational leaders are able to create a situation or environment that is strong enough to motivate employees to behave and

perform in a safe manner. Moreover, leadership characteristics related to safety have been shown to moderate the relationship between predictors of safety and its outcomes (Kao et al., 2016). Thus, I propose that the relationship between role overload and safety motivation will be moderated by safety-specific transformational leadership.

Hypothesis 6: The relationship between role overload and safety motivation is moderated by safety-specific transformational leadership, such that the effect of role overload on safety motivation is weaker at higher levels of safety-specific transformational leadership.

Priority of Safety

Organizational climate is an individual's evaluation about their organization's attributes and work environment and can be evaluations of the broader organizational environment, such as leadership or communication, or it can be evaluations of specific dimensions, like safety (A Neal et al., 2000). Thus, safety climate is an individual's evaluation of the safety policies, procedures, and practices in their workplace environment (Bosak et al., 2013; Christian et al., 2009). Safety climate can address several different themes or topics of safety, leading researchers and practitioners to debate the dimensionality of safety climate (Bosak et al., 2013); although there is not yet consensus on this topic, several researchers have examined different factors or dimensions of safety climate to better understand the different impacts on safety behaviors and outcomes. Therefore, I examine a specific dimension of safety climate, priority of safety, to better understand how the specific dimension of safety climate acts as a strong enough situation to impact the effects of role overload on safety motivation.

Priority of safety is the extent to which an employee perceives that safety is a top priority in their work against competing demands like productivity (Bosak et al., 2013; Naveh et al., 2006). Across many fields, priority of safety has been identified as a factor that is directly related to safety behaviors and outcomes (Beus et al., 2010; Bosak et al., 2013; Katz-Navon et al., 2005; Leroy et al., 2012; Naveh et al., 2006); however, there is also strong evidence to suggest that positive safety climates and priority of safety create a strong situation to influence employees when faced with other predictors of safety (Bosak et al., 2013; Katz-Navon et al., 2005; Smith-Crowe et al., 2003). Organizations with a high priority of safety signal to their employees that safety is a top priority over any production or speed demands, this creates a situation that where employees understand the norms and expectations of the work environment are to continue working safely even if it means working slower and compromising productivity. Once employees understand that they are expected to prioritize safety, they are more likely to be motivated to adjust their attitudes and behaviors to reflect this understanding (Katz-Navon et al., 2005). Thus, I propose that priority of safety moderates the relationship between role overload and safety motivation.

Hypothesis 7: The relationship between role overload and safety motivation is moderated by priority of safety, such that the effect of role overload on safety motivation is weaker at higher levels of priority of safety.

Method

Participants and Procedure

Self-reported survey data was collected from a large North American oil and gas pipeline construction organization, specializing in the transportation, storage, and termination

of natural gas, crude oil, and liquid natural gas. All active employees located in multiple locations across the United States were emailed survey invitations to participate in a safety culture survey, and there was a 79.8% response rate. For the analyses of this study, I analyzed data from 5003 employees, removing those from corporate locations that have near zero incident base rates. Of the sample used for the study, 14.3% were in the 55-59 age range, 12.65% were 60-64, and 12.03% were 35-39. The average tenure of the respondents was 10.36 years.

Measures

Unless otherwise stated, participants responded to all items using a five-point Likert-type scale (1 = Strongly disagree, 5 = Strongly agree) with high scores representing high levels of the construct.

Role overload. Role overload was assessed using three items ($\alpha = .86$) from Ivancevich & Matteson (1980). An example item is, "I never seem to have enough time to get everything done at work".

Safety motivation. Safety motivation was measured using three items ($\alpha = .86$) from Griffin and Neal (2000). An example item is, "I believe that it is worthwhile to put extra effort into maintaining safety".

Safety behavior. Safety behaviors was measured using five items ($\alpha = .91$) from Griffin and Neal's (2000) safety performance scale. Example items include, "I use the correct safety procedures for carrying out my job at all times" and "I voluntarily carry out tasks or activities that help to improve workplace safety".

Safety-specific transformational leadership. Employees rated the level of safety-specific transformational leadership of their direct supervisor using three items ($\alpha = .93$) from Kelloway et al.'s (2006) adaptation of items from the MLQ-5 (Bass & Avolio, 1990). An example item is, "My supervisor behaves in a way that displays a commitment to a safe workplace."

Priority of safety. Three items ($\alpha = .95$) were used from Henning et al.'s (2009) scale of safety attitudes, specifically using items from the subscale of compromising safety for production. Items were reverse coded to reflect priority of safety. An example item is, "Sometimes it is necessary to depart from safety requirements for the sake of production".

Accidents. Accidents were measured with six items ($\alpha = .83$) from Barling and colleagues (2002). Employees were asked to indicate the frequency with which they were involved in different types of accidents in the past six months using a 5-point Likert-type scale (1 = Never, 5 = Frequently). An example accident item is, "open wound cut, puncture, of infection of the wound".

Controls. Employee age was self-reported in bins of 5 year increments. Older employees have been found less likely to be involved in occupational accidents (Barling et al., 2003; Frone, 1998); however, age was positively related to accidents ($r = .01, p < .05$) within the study sample. There has also been evidence to suggest that age may be curvilinearly related to workplace accidents and injuries (Siu et al., 2004), which may account for the small positive correlation found between age and accidents; therefore, age was still controlled for in the analysis.

Results

Based on recommendations from Jackson and colleagues (2009), I examined the normality of the observed data before testing the models. Maximum likelihood estimations used in structural equation modeling (SEM) have an assumption of multivariate normality of the observed exogeneous variables, and violating this assumption may result in biased parameter estimates (Bhat et al., 2015; Crede & Harms, 2019). Due to the large sample size, I used the Kolmogrov-Smirnoff test to test for the normality of the observed exogeneous variables which indicated that all observed exogeneous variables were not normally distributed ($p<.001$); therefore, I used a robust estimator, specifically "Estimator = MLR". Furthermore, I used "Type = complex" for estimating the measurement and structural models to adjust the standard errors to account for non-independence of data nested within workgroups (Muthén & Muthén, 2017).

Measurement Model

Using MPlus (Muthén & Muthén, 2016), I first conducted a series of confirmatory factor analyses (CFA) to determine the consistency, proper factor loading, distinctiveness, and common method bias (CMB) of all scale items after they were reduced from the original scales. Table 1 displays the fit statistics for the CFA modes and table 2 display the factor loadings for each scale in the best fitting model (Model 4). Common method variance (CMV) is the observation of bias that occurs when data is collected in a cross-sectional study (Eichhorn, 2014; Tehseen et al., 2017); therefore, in alignment with recommendations on testing for CMV, or more specifically testing for CMB (Tehseen et al., 2017), I utilized the common latent factor (CLF) method to test for

CMB. The CLF method constrains all factor loadings of the observed variables equally to a common latent factor, in the expected measurement model for the latent factors. The CLF method found that there was no CMB present, with the CLF producing a factor loading of .25, resulting in calculated variance of 6.25%, well below the threshold of 50%. Thus, I proceeded with analyzing the measurement model and hypothesis testing.

Model 1 of the CFA analyzed all items included in the survey loaded onto the intended factors. Despite having acceptable fit statistics $\left(\chi^2(260) = 4518.37, p < .01, RMSEA\left[p_{\varepsilon_0 \leq 0.05} < .05\right] = .06, 90\%\ CI\ [.06, .06], CFI\ (.92), TLI\ (.90)\right)$ and better fit statistics than two alternative models (five-factor model combining safety motivation and safety behaviors as safety outcomes: $\chi^2(265) = 20690.51, p < .01, RMSEA\left[p_{\varepsilon_0 \leq 0.05} < .05\right] = .12, 90\%\ CI\ [.12, .12], CFI\ (.62), TLI\ (.57)$; five-factor model combining safety priority and safety-specific transformational leadership as safety climate: $\chi^2(265) = 9534.41, p < .01, RMSEA\left[p_{\varepsilon_0 \leq 0.05} < .05\right] = .08, 90\%\ CI\ [.08, .08], CFI\ (.82),\ TLI\ (.80)$), Model 1 found that two items from the safety behaviors were not loading properly onto the factor. After re-examining the scale items, it was determined that there was a theoretical distinction between the two low-loading items and the other items. The two items referred to concepts similar to safety climate, referencing the consequences of skipping safety meetings and the employee's perception of their co-workers' acceptance of skipping safety meetings, neither item addressed the employee's own safety behaviors like the other 5 items. Therefore, Model 4 tested the original six-factor model after removing the two items and had the best fit ($\chi^2(215) =$

$2850.15, p < .01,\ RMSEA\ [p_{\varepsilon_0 \leq 0.05} < .05] = .05, 90\%\ CI\ [.05, .05], CFI\ (.94),$ $TLI\ (.94)$) of all four CFA models.

Insert Table 1 and 2 about here

Hypothesis Testing

Next, I calculated the descriptive statistics and inter-correlations of all of the variables (Table 3). The inter-correlations provided initial support for the mediation hypotheses. Role overload was negatively related to safety motivation (*r = -.18, p <.01)*, safety motivation was positively related to safety behaviors (*r = .67, p <.01)*, and safety behaviors was negatively related to accidents (*r = -.19, p <.01)*.

Insert Table 3 about here

Then, using MPlus (Muthén & Muthén, 2017), I examined hypothesis 1 by testing a structural model without the moderators or mediators. In support of hypothesis 1, safety motivation was positively related to safety behaviors (*b* = .67, *SE* = .02, *p* < .01*)*. Next, I examined hypotheses 2-5 by testing structural models without the moderators. When using the robust maximum likelihood estimator, bootstrapping cannot be used; therefore, I utilized model constraints as suggested by Stride and colleagues (2015) to estimate the confidence intervals for the conditional indirect effects. In support of hypothesis 2, safety behaviors were negatively related to accidents (*b* = -.14, *SE* = .02, *p* < .01*)*. In support of

hypothesis 3, safety motivation was indirectly related to accidents through safety behaviors (*unstandardized estimate* = -.10, 95% *CI* [-.13,-.08], $p < .01$). In support of hypothesis 4, role overload was negatively related to safety motivation (b = -.17, *SE* = .01, $p < .01$). Furthermore, in support of hypothesis 5, role overload was related to accidents through safety motivation and safety behaviors (*unstandardized estimate* = .01, 95% *CI* [.01,.02], $p < .01$).

Lastly, I tested the proposed moderated mediation model (Figure 1) with the Unconstrained Product Indicator (UPI, Marsh et al., 2004, 2007). In comparison with other methodologies for structural equation modeling with latent variable interactions, such as the Constrained Product Indicator (CPI, Jöreskog & Yang, 1996), UPI had unbiased latent interaction effect estimates and acceptable Type I error rates when estimating parameters for non-normal observed exogeneous variables (Cham et al., 2012). To conduct the UPI method, I grand mean centered the indicators of role overload, safety-specific transformational leadership, and priority of safety. Then, I used the products between the grand mean centered observed variables as the indicators for the latent interaction variables (Marsh et al., 2004, 2007). The structural model had an adequate model fit ($\chi^2(390) = 4283.89, p < .01,\ RMSEA\ [p_{\varepsilon_0 \leq 0.05} < .05] = .05, 95\%\ CI\ [.04, .05], CFI\ (.92), TLI\ (.91)$).

Hypothesis 6 was partially supported, although safety-specific transformational moderated the relationship between role overload and safety motivation (b = -.10, *SE* = .03, $p < .01$), the interaction effect of safety-specific transformational leadership was contrary to the hypothesized effects. The conditional indirect effect of role overload on

accidents via safety motivation and safety behaviors were stronger and negative at low levels of safety-specific transformational leadership (*unstandardized estimate* = -.01, 95% *CI* [-.01,-.00], $p < .01$) than at high levels of safety-specific transformational leadership (*unstandardized estimate* = .01, 95% *CI* [.00, .01], $p < .01$). Specifically, the findings suggest that at low levels of safety-specific transformational leadership, the relationship between role overload and safety motivation is positive, and ultimately the relationship between role overload and accidents is negative. However, at high levels of safety-specific transformational leadership, the relationship between role overload and safety motivation is negative, and ultimately the relationship between role overload and accidents is positive. The findings did not support hypothesis 7, priority of safety did not moderate the relationship between role overload and safety motivation. Figure 2 displays the results of the proposed SEM model and Figure 3 displays the relationship of role overload with safety motivation at ±1 *SD* of safety-specific transformational leadership.

Discussion

As workplace injuries and accidents persist in the 21st century, it is important for researchers and practitioners to fully understand what workplace characteristics are contributing to the occurrence of workplace injuries and accidents. One safety predictor on the rise in the workplace is role overload; employees are being tasked with more demands than they are able to handle given their available resources and time, creating competing demands in industries with high safety concerns. The current study had two main goals: (1) examine the role of motivation in the relationship between role overload and safety behaviors and performance by utilizing expectancy theory to understand how

motivation is an underlying mechanism between role overload and safety behaviors and (2) integrate situational strength theory with the model of workplace safety to identify workplace factors that could weaken the negative effects of role overload on safety motivation, behaviors, and outcomes.

The first goal of the present study was to utilize expectancy theory to understand how role overload is related to accidents through safety motivation and safety behaviors. Expectancy theory suggests that individuals will consider the expectancy, instrumentality, and valence of different behaviors and will act depending on which outcome they find most desirable. Specifically, when faced with greater work demands and safety demands, employees may value the rewards from meeting the work demands over meeting safety demands; thus, employees will be motivated to complete work demands as quickly as possible instead of following safety procedures that may slow down their ability to meet work demands. The study provides evidence to support that role overload is related to accidents through safety motivation and safety behaviors. Specifically, when experiencing role overload, employees were less motivated to behave in safe ways, which in turn was related to actual safety behaviors and accidents. However, when analyzing the effects of the moderators, the relationship between role overload and safety motivation shifted.

The second goal of the study was to integrate situational strength theory with Neal and Griffin's (2004) model of workplace safety to identify factors that could mitigate the negative effects of role overload on safety motivation, behaviors, and outcomes. The study examined safety-specific transformational leadership and priority of safety as

potential moderators of the relationship between role overload and safety motivation; however, the study only found that safety-specific transformational leadership moderated the relationship between role overload and safety motivation. Although the findings of the study suggest that safety-specific transformational leadership moderates the relationship between role overload and safety motivation, the findings were contrary to the hypothesized directionality. When analyzing the full proposed model, the relationship between role overload and safety motivation became positive and non-significant due to the polarizing results from high and low levels of safety-specific transformational leadership. Contrary to the original hypothesis, the findings suggest that at low levels of safety-specific transformational leadership, role overload is positively related to safety motivation and at high levels of safety-specific transformational leadership, role overload is negatively related to safety motivation. This suggests that at low levels of safety-specific transformational leadership, individuals experiencing higher levels of role overload have higher levels of safety motivation, and ultimately less accidents, and at high levels of safety-specific transformational leadership, the opposite relationships are occurring. Overall, the findings suggest that at all levels of overload, safety-specific transformational leadership provides a buffer to the negative effects of role overload, at higher levels of role overload, this buffer begins to diminish, and high safety-specific transformational leadership has a negative interaction effect with role overload on safety motivation. Despite this finding, the present study still provides support that safety-specific transformational leadership can serve as a situational factor to affect employees' safety motivation and improve safety outcomes.

Theoretical and Practical Implications

The current study attempted to expand the theoretical understanding of how role overload is related to safety outcomes and what situational factors could act as strong situations to mitigate any negative effects of role overload on safety outcomes. First, the study incorporated expectancy theory (Vroom, 1964) to understand how role overload is related to safety motivation. I found that safety motivation is a mechanism by which role overload is related to safety behaviors and accidents, increasing the theoretical understanding of why employees may decrease safety behaviors when faced with role overload. Although Neal and Griffin's (2004) model of workplace safety suggested that safety performance can be conceptualized similarly to general job performance, including safety motivation as the underlying mechanism between safety predictors and safety behaviors, the theoretical basis for the relationship between safety predictors and safety motivation has not been fully established in the literature. Furthermore, Neal and Griffin's (2004) model does not provide a distinction between which distal safety predictors are related to safety behaviors through either safety motivation or knowledge, and theoretical bases for these relationships are necessary to understanding which underlying mechanism is facilitating the relationship. This study expands the theoretical understanding of how role overload, a distal safety predictor, is related to safety behaviors and outcomes through safety motivation.

Second, this study attempted to integrate situational strength theory with Neal and Griffin's (2004) model of workplace safety. By drawing from situational strength theory, the study was able to demonstrate that there are workplace factors that can act as strong

situational strengths to mitigate the negative effects of unfavorable safety predictors. Although priority of safety did not present as a situational factor affecting the relationship between role overload and safety motivation, safety-specific transformational leadership did buffer the negative effects of role overload on safety motivation. However, this finding has left an interesting theoretical gap to address, which is why there is an effect in the opposite direction at high levels of overload. Future studies could examine the effects of challenge versus hindrance stressors or controlled versus autonomous motivation from transformational leadership. For example, in field and experimental studies, transformational leadership is positively related to self-concordant goals; however, in field studies, transformational leadership was positively related to autonomous motivation and negatively related to controlled motivation (Bono & Judge, 2003). Autonomous motivation is formed in congruence with an individual's own values and intrinsic motivation and controlled motivation comes from outward motivation, such as a leader telling you that safety should be important to you or providing incentives for behaving safely and does not allow you to freely form the motivation in congruence with your own safety values. This theory should be considered further for future studies in understanding under what circumstances transformational leadership leads to positive or negative outcomes.

Lastly, as role overload continues to increase in the workplace, it is imperative that researchers and practitioners identify workplace factors that can act as buffers to the negative effects of role overload on safety outcomes. Simple solutions such as hiring more employees are not always feasible or accepted by organizations. This study

identified safety-specific transformational as a strong situational factor that buffers the negative effects of role overload, especially at lower levels of role overload. Although the effects begin to diminish at high levels of overload, there is still a buffer to the negative effects of role overload on safety motivation. Practically, this suggests that organizations should focus on ensuring their leaders are embodying safety values and communicating this to their subordinates in order to mitigate negative effects of unfavorable safety predictors and increase employee safety motivation.

Limitations and Future Directions

Although the present study had interesting findings, there are several limitations that should be discussed and addressed in future studies. The first limitation of the study is the generalizability of the results to other industries. The sample for this study was collected from the employees of a single oil and gas pipeline construction company in North America. Although safety concerns are often top of mind for oil and gas organizations, the safety procedures, behaviors, outcomes, and risks are vastly different between oil and gas and other industries where safety is also top of mind (e.g., healthcare, travel, etc.).

Second, the study was limited to the variables of interest from the organization for the safety culture survey. The study was not able to fully confirm why role overload is related to safety motivation, and could only use theory to support the relationship, but future studies could include variables to understand the underlying cognitive reasonings that may lead to safety motivation. The study was also unable to consider other variables that may affect the relationship between role overload and safety motivation and

behaviors. For example, different safety procedures may have different levels of risk associated with them when skipping the procedure, whereas skipping one procedure could lead to minor safety outcomes while others could lead to catastrophic outcomes. The calculated risks of skipping safety procedures could be an important variable in understanding if employees would be motivated or willing to bypass them to quickly meet production or performance goals. Moreover, motivational theories also include stress theories that could contribute to the theoretical foundation of the relationship between role overload and safety motivation; thus, understanding the underlying mechanisms within the stress and motivational theories could be considered for future research. Future researchers should also consider other situational factors that may have strong situational strength in mitigating the negative effects of role overload on safety motivation.

Third, in organizations where safety is of such high importance, social desirability bias may become an issue when soliciting self-report survey responses. Social desirability bias is the notion that individuals tend to present themselves in ways that are perceived to be more socially acceptable and does not truly reflect reality (Bergen & Labonté, 2020). This bias can occur due to two possible reasons: (1) an honest but inflated sense of self or (2) a real attempt of impression management and maintain a positive self-image. In a workplace where safety should be top of mind, employees may be tempted to fall victim to social desirability bias and answer survey questions in a way that may inflate their scores in relation to safety motivation, behaviors, and even self-reported accidents. Social desirability bias should be considered in future studies, and researchers should attempt

other methods for reducing social desirability bias, such as using safety outcome measures from the organization (not self-report).

Lastly, the study was cross-sectional with one survey sent out at a single time point. This limited the study in its ability to determine causality for the mediating relationships analyzed in the study, as well as the applicability of the moderators as potential interventions to reduce the effects of role overload. Future researchers may benefit from using a longitudinal methodology to further understand the causal effects of the study's variables. Moreover, with a better understanding of causal effects, future researchers may be able to consider alternative versions of this study's model. For example, researchers could consider the direct relationship between safety-specifical transformational leadership on safety motivation (Kelloway et al., 2006; J. Mullen et al., 2017; J. E. Mullen & Kelloway, 2009) and how role overload potentially moderates that relationship, or whether safety-specific transformational leadership has a causal effect on priority of safety.

Conclusion

As role overload becomes a greater threat to safety performance and outcomes in the workplace, organizations must understand how role overload is related to safety performance and outcomes and what are potential steps to reduce the negative effects of role overload. The present study utilized expectancy theory to examine the role of safety motivation in how role overload is related to safety behaviors and accidents. The findings of the study suggest that role overload is related to accidents through safety motivation and safety behaviors. Moreover, the study sought to identify moderators of this

relationship that may mitigate the negative effects of role overload. The study found that safety-specific transformational leadership moderated the relationship between role overload and safety motivation, providing a buffer on the negative effects of role overload. Thus, organizations can reduce the negative effects of role overload and increase safety motivation by improving safety-specific transformational leadership.

References

Ahmad,A. (2010). Work-family conflict among junior physicians: Its mediating role in the relationship between role overload and emotional exhaustion. *Journal of Social Sciences*, *6*(2), 265–271. https://doi.org/10.3844/jssp.2010.265.271

Bakar, Z. A., & Salleh, R. (2015). Role demands, work-family conflict and motivation: A proposed framework. *Global Business and Management Research: An International Journal*, *7*(2), 11.

Barling, J., Kelloway, E. K., & Iverson, R. D. (2003). High-quality work, job satisfaction, and occupational injuries. *Journal of Applied Psychology*, *88*(2), 276–283. https://doi.org/10.1037/0021-9010.88.2.276

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*(3), 488–496. https://doi.org/10.1037/0021-9010.87.3.488

Bass, B. M. (1985). Leadership: Good, better, best. *Organizational Dynamics*, *13*(3), 26–40. https://doi.org/10.1016/0090-2616(85)90028-2

Bass, B. M., & Avolio, B. J. (1990). Developing transformational leadership: 1992 and Beyond. *Journal of European Industrial Training*, *14*(5), 03090599010135122. https://doi.org/10.1108/03090599010135122

Bergen, N., & Labonté, R. (2020). "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qualitative Health Research*, *30*(5), 783–792. https://doi.org/10.1177/1049732319889354

Beus, J. M., Payne, S. C., Bergman, M. E., & Arthur, W. (2010). Safety climate and injuries: An examination of theoretical and empirical relationships. *Journal of Applied Psychology*, *95*(4), 713–727. https://doi.org/10.1037/a0019164

Bhat, C. R., Dubey, S. K., & Nagel, K. (2015). Introducing non-normality of latent psychological constructs in choice modeling with an application to bicyclist route choice. *Transportation Research Part B: Methodological*, *78*, 341–363. https://doi.org/10.1016/j.trb.2015.04.005

Bolino, M. C., & Turnley, W. H. (2005). The personal costs of citizenship behavior: The relationship between individual initiative and role overload, job stress, and work-family conflict. *Journal of Applied Psychology*, *90*(4), 740–748. https://doi.org/10.1037/0021-9010.90.4.740

Bono, J. E., & Judge, T. A. (2003). Self-concodrance at work: Toward understanding the motivational effects of transformational leaders. *Academy of Management Journal*, 19.

Bosak, J., Coetsee, W. J., & Cullinane, S.-J. (2013). Safety climate dimensions as predictors for risk behavior. *Accident Analysis & Prevention*, *55*, 256–264. https://doi.org/10.1016/j.aap.2013.02.022

Brown, S. P., Jones, E., & Leigh, T. W. (2005). The attenuating effect of role overload on relationships linking self-efficacy and goal level to work performance. *Journal of Applied Psychology*, *90*(5), 972–979. https://doi.org/10.1037/0021-9010.90.5.972

Bureau of Labor Statistics. (2019a). *Employer-reported workplace injuries and illnesses-2018*. 8.

Bureau of Labor Statistics. (2019b). *National Census of Fatal Occupational Injuries in 2018*. https://www.bls.gov/news.release/pdf/cfoi.pdf

Burns, J. M. (1978). *Leadership*. Harper & Row.

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. *Personnel Selection in Organizations*, *3570*, 35–70.

Cellar, D. F., Nelson, Z. C., Yorke, C. M., & Bauer, C. (2001). The five-factor model and safety in the workplace: Investigating the relationships between personality and accident involvement. *Journal of Prevention & Intervention in the Community*, *22*(1), 43–52. https://doi.org/10.1080/10852350109511210

Cham, H., West, S. G., Ma, Y., & Aiken, L. S. (2012). Estimating Latent Variable Interactions With Nonnormal Observed Data: A Comparison of Four Approaches. *Multivariate Behavioral Research*, *47*(6), 840–876. https://doi.org/10.1080/00273171.2012.732901

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*(5), 1103–1127. https://doi.org/10.1037/a0016172

Clarke, S. (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology*, *11*(4), 315–327. https://doi.org/10.1037/1076-8998.11.4.315

Clarke, S. (2010). An integrative model of safety climate: Linking psychological climate and work attitudes to individual safety outcomes using meta-analysis. *Journal of*

Occupational and Organizational Psychology, *83*(3), 553–578. https://doi.org/10.1348/096317909X452122

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*(4), 387–397. https://doi.org/10.1037/a0029817

Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. *Journal of Occupational and Organizational Psychology*, *86*(1), 22–49. https://doi.org/10.1111/j.2044-8325.2012.02064.x

Crede, M., & Harms, P. (2019). Questionable research practices when using confirmatory factor analysis. *Journal of Managerial Psychology*, *34*(1), 18–30. https://doi.org/10.1108/JMP-06-2018-0272

Eichhorn, B. R. (2014). *Common Method Variance Techniques* (p. 11).

Fisher, D. M. (2014). A multilevel cross-cultural examination of role overload and organizational commitment: Investigating the interactive effects of context. *Journal of Applied Psychology*, *99*(4), 723–736. https://doi.org/10.1037/a0035861

Frone, M. R. (1998). Predictors of work injuries among employed adolescents. *Journal of Applied Pyschology*, *83*(4), 565–576.

Griffin, M. A., & Clarke, S. (2011). Stress and well-being at work. In *APA handbook of industrial and organizational psychology, Vol 3: Maintaining, expanding, and contracting the organization* (pp. 359–397). American Psychological Association. https://doi.org/10.1037/12171-010

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*(3), 347–358. https://doi.org/10.1037//1076-8998.5.3.347

Harvey, S., Kelloway, E. K., & Duncan-Leiper, L. (2003). Trust in management as a buffer of the relationships between overload and strain. *Journal of Occupational Health Psychology*, *8*(4), 306–315. https://doi.org/10.1037/1076-8998.8.4.306

Henning, J. B., Stufft, C. J., Payne, S. C., Bergman, M. E., Mannan, M. S., & Keren, N. (2009). The influence of individual differences on organizational safety attitudes. *Safety Science*, *47*(3), 337–345. https://doi.org/10.1016/j.ssci.2008.05.003

Hobfoll, S. E. (1989). Conservation of Resources. *American Psychologist*, 12.

Hofmann, D. A., Burke, M. J., & Zohar, D. (2017). 100 years of occupational safety research: From basic protections and work analysis to a multilevel view of workplace safety and risk. *Journal of Applied Psychology*, *102*(3), 375–388. https://doi.org/10.1037/apl0000114

Hofmann, D. A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents. *Personnel Psychology*, *49*(2), 307–339. https://doi.org/10.1111/j.1744-6570.1996.tb01802.x

Ivancevich, J. M., & Matteson, M. T. (1980). *Stress and work: A managerial perspective*. Scott Foresman.

Jackson, D. L., Gillaspy, J. A., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological Methods*, *14*(1), 6–23. https://doi.org/10.1037/a0014694

Jensen, S. Q., Kyed, M., Christensen, A.-D., Bloksgaard, L., Hansen, C. D., & Nielsen, K. J. (2014). A gender perspective on work-related accidents. *Safety Science*, *64*, 190–198. https://doi.org/10.1016/j.ssci.2013.12.004

Jiang, L., & Probst, T. M. (2016). Transformational and passive leadership as cross-level moderators of the relationships between safety knowledge, safety motivation, and safety participation. *Journal of Safety Research*, *57*, 27–32. https://doi.org/10.1016/j.jsr.2016.03.002

Jöreskog, K. G., & Yang, F. (1996). *Nonlinear structural equation models: The Kenny-Judd model with interaction effects*.

Judge, T. A., & Piccolo, R. F. (2004). Transformational and Transactional Leadership: A Meta-Analytic Test of Their Relative Validity. *Journal of Applied Psychology*, *89*(5), 755–768. https://doi.org/10.1037/0021-9010.89.5.755

Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). *Organizational stress: Studies in role conflict and ambiguity* (pp. xii, 470). John Wiley.

Kao, K.-Y., Spitzmueller, C., Cigularov, K., & Wu, H. (2016). Linking insomnia to workplace injuries: A moderated mediation model of supervisor safety priority and safety behavior. *Journal of Occupational Health Psychology*, *21*(1), 91–104. https://doi.org/10.1037/a0039144

Kark, R., Shamir, B., & Chen, G. (2003). The two faces of transformational leadership: Empowerment and dependency. *Journal of Applied Psychology*, *88*(2), 246–255. https://doi.org/10.1037/0021-9010.88.2.246

Katz-Navon, T., Naveh, E., & Stern, Z. (2005). Safety climate in health care organizations: A multidimensional approach. *Academy of Management Journal*, *48*(6), 1075–1089. https://doi.org/10.5465/amj.2005.19573110

Kelloway, E. K., Mullen, J., & Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. *Journal of Occupational Health Psychology*, *11*(1), 76–86. https://doi.org/10.1037/1076-8998.11.1.76

Latham, G. P., & Pinder, C. C. (2005). Work motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology*, *56*(1), 485–516. https://doi.org/10.1146/annurev.psych.55.090902.142105

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping* (11. [print.]). Springer.

Leroy, H., Dierynck, B., Anseel, F., Simons, T., Halbesleben, J. R. B., McCaughey, D., Savage, G. T., & Sels, L. (2012). Behavioral integrity for safety, priority of safety, psychological safety, and patient safety: A team-level study. *Journal of Applied Psychology*, *97*(6), 1273–1281. https://doi.org/10.1037/a0030076

Marsh, H. W., Wen, Z., & Hau, K.-T. (2004). Structural Equation Models of Latent Interactions: Evaluation of Alternative Estimation Strategies and Indicator Construction. *Psychological Methods*, *9*(3), 275–300. https://doi.org/10.1037/1082-989X.9.3.275

Marsh, H. W., Wen, Z., Hau, K.-T., Little, T. D., Bovaird, J. A., & Widaman, K. F. (2007). Unconstrained Structural Equation Models of Latent Interactions: Contrasting Residual- and Mean-Centered Approaches. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(4), 570–580. https://doi.org/10.1080/10705510701303921

Masood, S. A., Dani, S. S., Burns, N. D., & Backhouse, C. J. (2006). Transformational leadership and organizational culture: The situational strength perspective. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, *220*(6), 941–949. https://doi.org/10.1243/09544054JEM499

Meyer, R., Dalal, R., & Hermida, R. (2010). A review and synthesis of situational strength in the organizational sciences. *Journal of Management*, *36*, 121–140. https://doi.org/10.1177/0149206309349309

Mischel, W. (1977). The interaction of person and situation. *Personality at the Crossroads: Current Issues in Interactional Psychology*, *333*, 352.

Montano, D., Reeske, A., Franke, F., & Hüffmeier, J. (2017). Leadership, followers' mental health and job performance in organizations: A comprehensive meta-analysis from an occupational health perspective. *Journal of Organizational Behavior*, *38*(3), 327–350. https://doi.org/10.1002/job.2124

Mullen, J. E., & Kelloway, E. K. (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of Occupational*

and Organizational Psychology, *82*(2), 253–272. https://doi.org/10.1348/096317908X325313

Mullen, J., Kelloway, E. K., & Teed, M. (2017). Employer safety obligations, transformational leadership and their interactive effects on employee safety performance. *Safety Science*, *91*, 405–412. https://doi.org/10.1016/j.ssci.2016.09.007

Muthén, L. K., & Muthén, B. (2016). Mplus. *The Comprehensive Modelling Program for Applied Researchers: User's Guide*, *5*.

Muthén, L. K., & Muthén, B. O. (2017). *Mplus: Statistical Analysis with Latent Variables: User's Guide (Version 8)*.

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*(1), 71–94. https://doi.org/10.1037/a0021484

Naveh, E., Katz-Navon, T., & Stern, Z. (2006). Readiness to report medical treatment errors. *Medical Care*, *44*(2), 8.

Neal, A, Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, *34*(1–3), 99–109. https://doi.org/10.1016/S0925-7535(00)00008-4

Neal, Andrew, & Griffin, M. A. (2002). Safety Climate and Safety Behaviour. *Australian Journal of Management*, *27*, 67–75. https://doi.org/10.1177/031289620202701S08

Neal, Andrew, & Griffin, M. A. (2004). Safety Climate and Safety at Work. In *The Psychology of Workplace Safety* (pp. 15–34). American Psychological Association.

Neal, Andrew, & 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*(4), 946–953. https://doi.org/10.1037/0021-9010.91.4.946

Reason, J., Parker, D., & Lawton, R. (1998). Organizational controls and safety: The varieties of rule-related behavior. *Journal of Occupational and Organizational Psychology*, *71*(4), 289–304.

Sales, S. M. (1970). Some effects of role overload and role underload. *Organizational Behavior and Human Performance*, *5*(6), 592–608. https://doi.org/10.1016/0030-5073(70)90042-5

Salminen, S., Klen, T., & Ojanen, K. (1999). Risk taking and accident frequency among Finnish forestry workers. *Safety Science*, *33*(3), 143–153. https://doi.org/10.1016/S0925-7535(99)00029-6

Schneider, B., Ehrhart, M. G., & Macey, W. H. (2013). Organizational climate and culture. *Annual Review of Psychology*, *64*(1), 361–388. https://doi.org/10.1146/annurev-psych-113011-143809

Shultz, K. S., Wang, M., & Olson, D. A. (2010). Role overload and underload in relation to occupational stress and health. *Stress and Health*, *26*(2), 99–111. https://doi.org/10.1002/smi.1268

Siu, O., Phillips, D. R., & Leung, T. (2004). Safety climate and safety performance among construction workers in Hong Kong. *Accident Analysis & Prevention*, *36*(3), 359–366. https://doi.org/10.1016/S0001-4575(03)00016-2

Smith-Crowe, K., Burke, M. J., & Landis, R. S. (2003). *Organizational climate as a moderator of safety knowledge-safety performance relationships*. 18.

Stride, C. B., Gardner, S., Carley, N., & Thomas, F. (2015). *Mplus code for mediation, moderation, and moderated mediation models*. https://www.researchgate.net/publication/311511623_Mplus_code_for_mediation_moderation_and_moderated_mediation_models

Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and Controlling for Common Method Variance: A Review of Available Methods. *Journal of Management Sciences*, *4*(2), 142–168. https://doi.org/10.20547/jms.2014.1704202

Tepper, B. J. (2000). Consequences of Abusive Supervision. *Academy of Management Journal*, *43*(2), 178–190. https://doi.org/10.5465/1556375

Visser, E., Pijl, Y. J., Stolk, R. P., Neeleman, J., & Rosmalen, J. G. M. (2007). Accident proneness, does it exist? A review and meta-analysis. *Accident Analysis & Prevention*, *39*(3), 556–564. https://doi.org/10.1016/j.aap.2006.09.012

Vroom, V. H. (1964). *Work and motivation*. Wiley.

Wang, P., & Walumbwa, F. O. (2007). Family-friendly programs, organizational commitment, and work withdrawal: The moderating role of transformational leadership. *Personnel Psychology*, *60*(2), 397–427. https://doi.org/10.1111/j.1744-6570.2007.00078.x

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*(4), 587–596. https://doi.org/10.1037/0021-9010.85.4.587

Tables and Figures

Table 1
Fit Statistics for Confirmatory Factory Analysis (N=5003)

	χ^2	*df*	RMSEA	LO 90	HI 90	CFI	TLI	SRMR
Model 1: All items, six-factor	4518.37	260	.06	.06	.06	.92	.90	.06
Model 2: All items, five-factor (safety climate)	9534.41	265	.08	.08	.08	.82	.80	.09
Model 3: All items, five-factor (safety outcomes)	20690.51	265	.12	.12	.12	.62	.57	.14
Model 4: Removed items, six-factor	2850.15	215	.05	.05	.05	.94	.94	.04

Note. All four models were tested using all other variables in the model. The data fit the six-factor measurement model for better than it did for other five-factor models. The data also fit better after removing two items from the safety behaviors factor that was not loading onto the factor.
N = 5003.

Table 2

Factor Loadings for Model 4 of the Confirmatory Factor Analysis

	Factor					
Item	1	2	3	4	5	6
I feel that it is important to encourage others to use safe practices.	**.92**					
I believe that it is worthwhile to put extra effort into maintaining safety.	**.93**					
I feel that it is worthwhile to volunteer for safety related tasks.	**.66**					
I use all the necessary safety equipment to do my job at all times.		**.89**				
I use the correct safety procedures for carrying out my job at all times.		**.92**				
I carry out work in a safe manner at all times.		**.88**				
I put in extra efforts to improve the safety of the workplace.		**.75**				
I voluntarily carry out tasks or activities that help to improve workplace safety.		**.66**				
[My supervisor] shows determination to maintain a safe work environment.			**.93**			
[My supervisor] talks about his/her values and beliefs of the importance of safety.			**.88**			
[My supervisor] behaves in a way that displays a commitment to a safe workplace.			**.91**			
Sometimes it is necessary to depart from safety requirements for the sake of production.				**.88**		
Sometimes it is necessary to take safety risks to get a job done efficiently.				**.97**		
Sometimes it is necessary to take safety shortcuts to get a job done on time.				**.94**		
The amount of work I am expected to do is too great.					**.77**	
I never seem to have enough time to get everything done at work.					**.86**	
I do not have enough time to get the job done well.					**.82**	
Burns						**.65**
Open wounds, cut, puncture, or infection of the wound						**.71**
Have particles of objects enter into my eyes						**.69**
Sprain, strain, or tears						**.69**
Caught in, under, between machines/equipment						**.54**
Falls, slips, or trips at same level						**.67**

N = 5003.

Table 3

Descriptive Statistics and Correlation Matrix

Variable	Mean	SD	1	2	3	4	5	6
1. Role Overload	2.46	.86	-					
2. Priority of Safety	4.20	1.00	-.21 **	-				
3. Safety-Specific Transformational	4.08	.74	-.26**	.14**	-			
Leadership								
4. Safety Motivation	4.36	.57	-.18**	.31**	.53**	-		
5. Safety Behaviors	4.16	.58	-.26**	.25**	.57**	.67**	-	
6. Accidents	1.16	.32	.18**	-.11**	-.10**	-.14**	-.19**	-
7. Age	6.87	2.45	.05**	.12**	-.07**	-.05**	-.08**	.04*

Note. $N = 5003$. Age was reported in age categories.
* $p < .05$
** $p < .01$

Figure 1

Proposed Conceptual Model

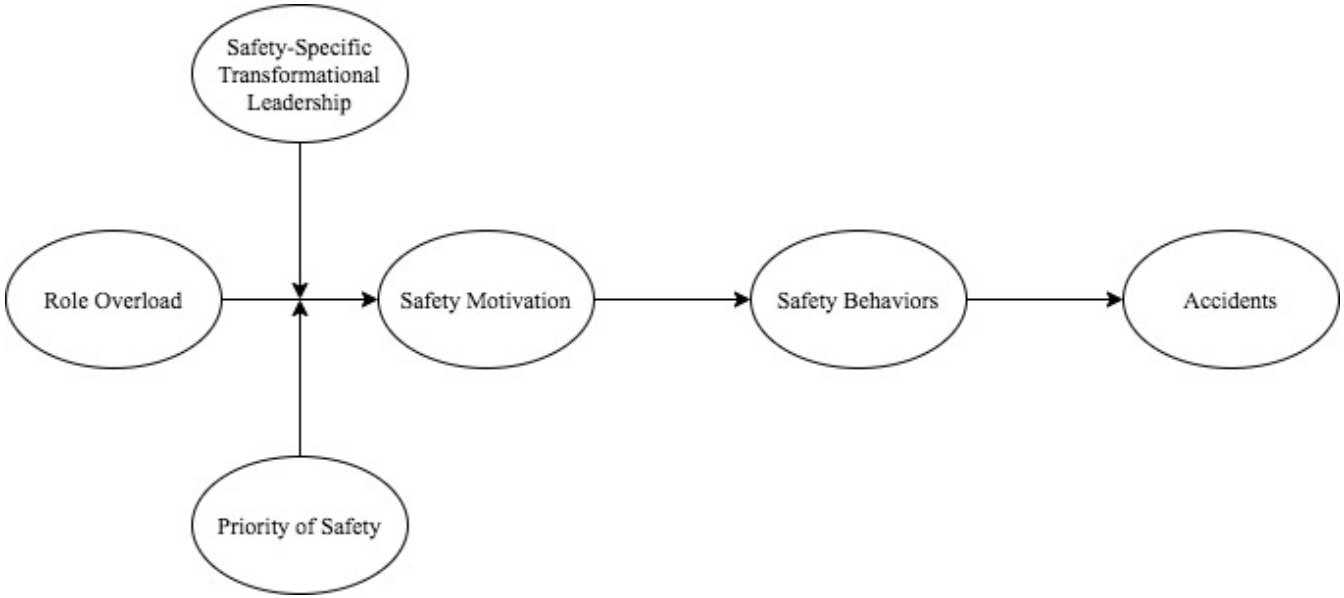
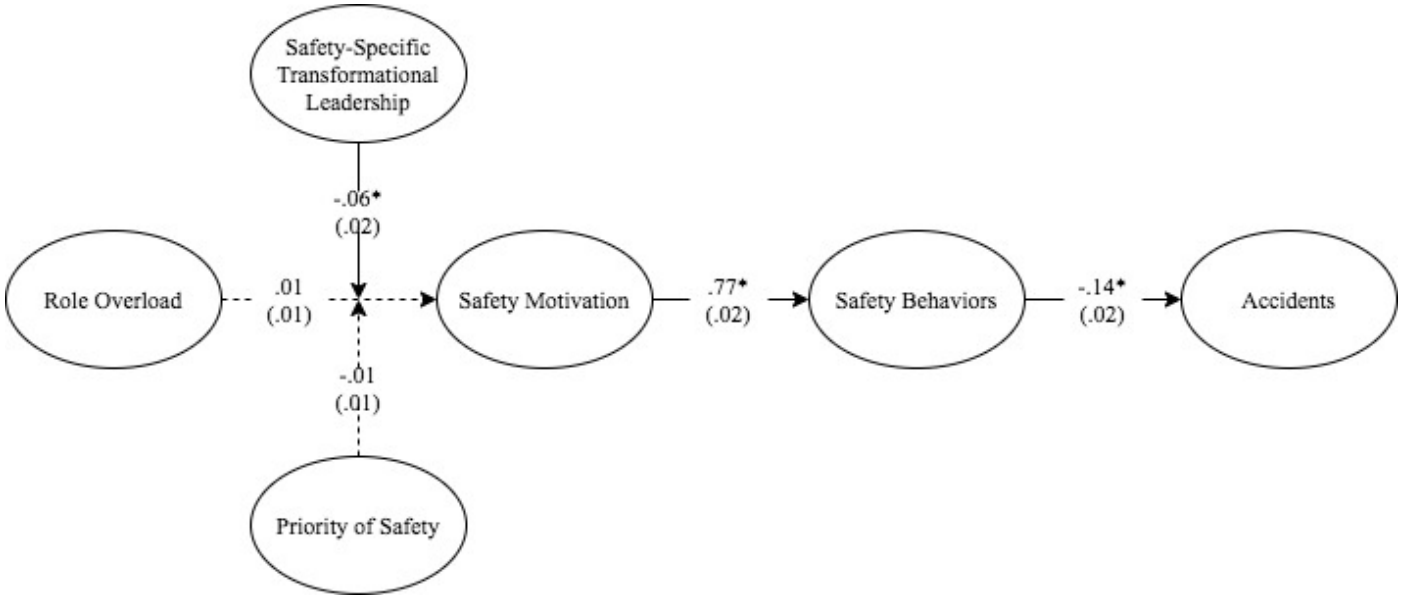


Figure 2

Results of Proposed Conceptual Model



Note. Unstandardized path coefficients are presented. Standard errors are presented in parentheses. * $p < .01$.

Figure 3

Interaction Effect of Role Overload and Safety-Specific Transformational Leadership