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Leading for Safety: A Question of Leadership Focus

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ABSTRACT

Background: There is considerable evidence that leadership influences workplace safety, but less is known about the relative importance of different leadership styles for safety. In addition, a leadership style characterized by an emphasis and a focus on promoting safety has rarely been investigated alongside other more general leadership styles.
Methods: Data were collected through a survey to which 269 employees in a paper mill company responded. A regression analysis was conducted to examine the relative roles of transformational, transactional (management-by-exception active; MBEA), and safety-specific leadership for different safety behavioral outcomes (compliance behavior and safety initiative behaviors) and for minor and major injuries.
Results: A safety-specific leadership contributed the most to the enhanced safety of the three different kinds of leadership. Transformational leadership did not contribute to any safety outcome over and above that of a safety-specific leadership, whereas a transactional leadership (MBEA) was associated with negative safety outcomes (fewer safety initiatives and increased minor injuries).
Conclusion: The most important thing for leaders aiming at improving workplace safety is to continuously emphasize safety, both in their communication and by acting as role models. This highlights the importance for leadership training programs aiming to improve safety to actually focus on safety-promoting communication and behaviors rather than general leadership. Furthermore, an overly monitoring and controlling leadership style can be detrimental to attempts at achieving improved workplace safety.

1. Introduction

According to the International Labour Organization [1], every 15 seconds, one person dies and 160 are injured from work-related accidents. Although significant improvements have been achieved during the last few decades when it comes to workplace safety, workplace injuries and accidents are still a serious problem in many organizations. Safety in organizations is dependent on several different factors. However, considerable research suggests that organizational leaders play a central role in influencing safety-related attitudes and actions in the workplace [2–4]. The full-range leadership model by Bass [5] is considered one of the most

accepted and researched leadership theories from the last decades [6]. The full-range leadership model has also, partly or in full, been frequently used to investigate the effects of leadership on safety outcomes in occupational settings [6–11]. The leadership styles constituting the model are transformational, transactional, and laissez-faire, but most of prior studies have focused only on one of the three leadership styles in relation to safety outcomes, namely transformational [6–8,12]. Transformational leadership consists of four subdimensions: (1) idealized influence, which implies that the leader demonstrates high standards of moral conduct in his/her own behavior; (2) inspirational motivation, which involves behaviors conveying a clear and positive vision of the future state of

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the organization and its employees; (3) intellectual stimulation, i.e., the encouragement of employees to be creative, take own initiatives, and challenge norms; and (4) individualized consideration, implying that the leader recognizes the unique needs of the employees and demonstrates concern for their welfare [13,14]. Transformational leadership has been found to have positive associations with occupational safety outcomes, such as lower injury rates [10] and increased safety participation and initiative [7,8,15–17]. This involves employee extra-role behaviors such as helping and encouraging coworkers to behave safely, coming up with suggestions for improving safety, and speaking up when detecting nonsafe situations [18]. A common argument for the seemingly close relationship between transformational leadership and safety participation is that the empowering, inspiring, and trust-based leader behaviors characterizing transformational leadership have a positive effect on employee willingness to go beyond formal role obligations [7,19]. When it comes to safety compliance behaviors, that is, in-role behaviors such as following safety regulations and wearing protective equipment, the relationships with transformational leadership appear to be weaker [7,8]. The lack of association between transformational leadership and compliance is suggested to lie in the nature of this leadership style as it includes leader behaviors such as encouraging employees to take own initiatives and indirectly giving them greater latitude to use their discretion in decision-making. This may lead to variability in safety compliance when individuals decide for themselves whether to comply with existing organizational policies, such as safety procedures [8]. Although transformational leadership is the most frequently researched leadership style, some argue that the concept should be questioned due to certain unclarities in the definition of the concept, the difficulties of achieving empirical distinctiveness from other aspects of leadership, and a lack of a causal model explaining how each dimension has a distinct influence on mediating processes and outcomes [20].

Transactional leadership is based on the idea of an exchange process between leaders and followers reliant on the fulfillment of contractual obligations [5]. The role of the leader typically involves many behaviors such as setting objectives and monitoring and controlling employee performance [21]. Transactional leadership comprises three specific leadership styles: (1) contingent reward, implying that a leader clarifies role and task requirements and provides material or psychological rewards in exchange for followers meeting expectations; (2) management-by-exception active (MBEA), i.e., a leader monitors followers' behavior and takes corrective actions before the occurrence of serious problems; and (3) management-by-exception passive, which implies that the leader monitors followers' behavior and takes corrective actions only when noncompliance has occurred or when mistakes have already happened [5].

Studies measuring transactional leadership in relation to safety are rare, but a recent meta-analysis suggested that the active aspects of transactional leadership (i.e., contingent reward and MBEA) have promising, but differentiated, effects on two aspects of safety performance: safety compliance and safety participation [7]. Active transactional leader behaviors were directly and positively related to safety compliance, whereas they were only indirectly and weakly related to participation (mediated by safety climate). It can therefore be assumed that formal control through rewards and punishments in line with more transactional leader behavior may be more appropriate in gaining safety compliance. However, other studies fail to find a relationship between MBEA and safety outcomes [6]. In fact, some have argued that MBEA can even have a negative impact on safety, particularly when its operationalization is focused on negative control behaviors [22].

The third leadership style, laissez-faire leadership, is characterized by passive or absent leadership behaviors. In terms of safety, previous research has shown clear evidence for this nonleadership style to have either no or negative impact on workplace safety [9,10].

In addition to examining the three leadership styles of full-range leadership model, the relationship between so-called safety leadership, i.e., safety-specific leadership, and different aspects of workplace safety has also been investigated to some extent [23,24]. Safety-specific leadership can be defined as a leadership that is not necessarily characterized by either transformational or transactional leadership behaviors but rather indicates the degree to which the leader gives focus and priority to safety over other aspects such as speed and schedules, reacts to subordinates' safe/unsafe conduct (i.e., positive and negative feedback), and takes initiatives to actions concerning safety issues [25,26] (Fig. 1).

Previous studies have shown that safety-specific leader behaviors such as having a close dialog with subordinates about safety issues and openly encouraging the reporting of safety problems and initiatives for safety improvements are factors that have been related both to subordinates' safety performance and commitment, as well as to a lower number of accidents [27–29]. Within the field of behavior-based safety, research has also shown that specific feedback from systematic observation and recording of designated target behaviors related to safety led to successful reduction of work injuries [30]. In support of this, a recent intervention study at a construction site found that coaching of construction site foremen in safety communication had a significant and lasting effect on safety (measured as observed unsafe employee actions) [31]. There is also evidence that supervisors' responses toward safety-related issues (e.g., attitude toward safety, positive or negative contingencies given by the supervisor, and supervisors' own safety performance) have a positive influence on subordinates' safety attitudes and behavior [24].

These leader behaviors, explicitly enacting and expressing an emphasis on safety, can be assumed to be closely related to the concept of safety climate, considering that safety climate is to a large extent constituted by the employee's collective perception of supervisory safety actions and expectations [10].

For instance, leader behaviors such as communicating safety policies, having a close dialog with subordinates about safety issues, and declaring commitment to safety, are factors that have been related to safety climate [32,33]. Supervisors' responses to safety also played a mediating role between safety climate and a number of safety outcomes [24]. Consequently, considering the close relationship between these safety-focused leader behaviors and safety climate, safety-specific leadership should reasonably

Safety-specific leadership

- Priority to safety rather than speed and quantity

- A proactive focus on safety work procedures and not only on the end product (i.e. absence of accidents and injuries)

- Keeping track of potential risks and routine safety problems apart from major problems

- Overt reactions to subordinates' conduct, i.e., positive and negative feedback

- Initiation of actions concerning safety improvements

- Communicating safety issues and values during everyday work

Fig. 1. The main leader behaviors characterizing safety-specific leadership as defined in the study.

have a central role in promoting workplace safety. This indicates that a specific focus on safety-related issues seems important for workplace safety in itself, regardless of other more facet-general leadership styles (i.e., transformational or transactional elements).

Still, in most cases, safety-specific leadership has not been used as a construct on its own. Instead, it has been conceptualized as an element of transformational leadership, i.e., transformational leadership behaviors specifically focusing on promoting and inspiring positive safety-related practices [23,11,34]. A number of studies have found relationships between safety-specific transformational leadership and safety-related outcomes, such as safety citizenship behavior [35], safety participation and compliance [34], safety climate, safety consciousness, and safety-related events [11]. However, although the safety-specific transformational leadership construct has found empirical support, it has also been questioned. The main controversy regards the possibility to distinguish which aspects of the leadership are actually affecting safety. Given that nonspecific (facet-general) transformational leadership also has been shown to affect safety outcomes, determining whether these effects are due to more general leader behaviors characteristic of facet-general transformational leadership or due to a special focus on safety issues from the side of the leader becomes problematic [8].

The aim of the present study was to examine safety-specific leadership as a separate leadership construct—along with facet-general transactional and transformational leadership—in an attempt to extend the understanding of their relative and independent importance for improving workplace safety.

The focus of the study was on proactive leadership behaviors that can be expected to have a positive impact on safety. Considering that the third leadership style of the full-range leadership model, laissez-faire leadership, has consistently been shown to be unrelated or negatively related to safety, it was consequently not included in the present study.

The present study has two main contributions to the literature of workplace safety. First, considering the critique that has been directed toward the theoretical problems associated with the distinctiveness of components constituting both safety-specific transformational leadership [8] and facet-general transformational leadership [20], there is a need for research making clearer distinctions between leadership components within a leadership paradigm and their respective relationship to safety outcomes. By separating leader behaviors associated with the well-established concepts of transformational and transactional leadership from leader behaviors mainly associated with leaders' safety-related attitudes and activities, the study was designed to add to the theoretical knowledge regarding the actual behavioral components contributing to a safety-promoting leadership. The distinction of a safety-specific leadership from other leadership styles means that a leader could possess a leadership style such as transformational or transactional but apart from that display safety-specific leadership behaviors to a greater or lesser extent regardless of this more facet-general leadership style.

Second, the present study also is innovative in how it examines the relationship between leadership and injury frequency of differing degree of severity. Previous research has failed to find clear links between leadership styles and injury rates. By examining minor injuries in addition to major injuries, it might be possible to identify a relationship between leadership and injuries, which would otherwise risk going by undetected due to distributional problems resulting from the rare occurrence of major injuries [26]. To further reduce the impact of low base rates of the measure, near-injury events were also included in the injury frequency measure. The benefits of using this kind of combined measure of injury frequency, including near-injury events and minor injury events in addition to major injury events (which are usually the ones reported) as a means of minimizing distributional problems in safety research has been previously suggested [11], but rarely empirically studied.

In sum, based on previous literature, the overall hypothesis for the study is that safety-specific leadership will contribute the most to the enhancement of safety when the variance of the other two leadership styles is controlled for. Apart from this general assumption, the study has an explorative approach in the examination of the relative importance of the different leadership styles for various safety outcomes.

2. Materials and methods

The study was carried out as part of a longitudinal intervention study evaluating a leadership training program in a paper mill company in Sweden with approximately 800 employees. For the sake of this study, ratings from employees are used. Because the safety measures of interest in the present study were not included in the first wave, cross-sectional survey data with employees from the second wave (April 2013) were used.

The managers (n = 101) invited employees to the questionnaire surveys following a procedure common in leadership research [36]. The managers were asked to invite five subordinates each to respond to the questionnaire, including both subordinates with whom they were perceived to be close, as well as subordinates with whom they were perceived to have more distant relationships. This was done to increase the representability of the sample because research has shown that the relationship between rater and the one who is rated affects ratings on leader performance, e.g., depending on whether they can be considered as in-group or out-group members [37,38]. In the end, 88 managers invited a total of 345 employees to participate in the study. The invited employees all worked in paper mill production. The invitation was sent by email and accompanied by information about the study and that participation was voluntary and that the data would be confidentially and anonymously treated. A total of 269 employees responded to the survey (response rate 78%), and of these, 68 (25%) were women, who corresponded well to the distribution within the company. The mean age of the participants was 48 years [standard deviation (SD) = 9], and the mean number of years the participants had worked at the plant was 24 (SD = 12).

One sub element of transactional leadership—MBEA—and transformational leadership was measured with the Multifactor Leadership Questionnaire (MLQ) [39]. MBEA was measured with four items ($\alpha = .72$). An example item follows, "My manager focuses attention on irregularities, mistakes, exceptions, and deviations from what is expected of me". Transformational leadership was measured with 20 items representing four dimensions: idealized influence (8 items), inspirational motivation (4 items), intellectual stimulation (4 items), and individualized consideration (4 items). The four dimensions were combined into a single unidimensional measure of transformational leadership, which is a common practice, based on the high correlation between the dimensions [39,40] ($\alpha = .89$). One example item is "The person I am rating talks optimistically about the future".

Safety-specific leadership was measured with the Group Safety Climate scale [26]. The scale consists of 10 items measuring workers' perception of their supervisors' safety behaviors and expression of safety values and priority. Even though the scale items are all measuring supervisory safety behaviors and practices, it was originally developed to measure perceptions of supervisory behaviors on an aggregated (group) level to assess safety climate. Given that the interest of the present study was on the perception of leader safety behaviors on an individual level rather than collective perceptions (climate), the data obtained by the scale have

not been aggregated as in the original version. The development of the original scale was based on 73 interviews with individual production workers in three manufacturing companies regarding interpersonal interactions with their supervisor, in which safety matters were brought up directly or indirectly. The 197 episodes that resulted from the collection were classified in themes, which were subsequently converted into a questionnaire. Exploratory factor analyses (PCA) of two separate samples (n = 152 and n = 534) of workers in manufacturing companies both revealed two factors: supervisory safety expectations and supervisory safety actions. Cross-loadings between the factors were rather small, which according to the author of the scale could have been at least partly attributable to the separation of the positively phrased and the negatively phrased items into different factors. After having reversed the items to maintain concordant scoring among the two climate subscales, the correlation was r = .45, p < .001. In support of the assumption that the phrasing (negative vs. positive) of the items might have contributed to the two-factor solution, later studies [10] have failed to replicate this structure and instead found evidence for other subscales (e.g., three factors: preventive, pro-active, and prioritization). Owing to this currently somewhat un-clear factor structure, the 10 scale items were used as a single combined measure of safety leadership in the present study ($\alpha = .84$). Example items are "My supervisor approaches workers during work to discuss safety issues", "My supervisor says a good word whenever he sees a job done according to safety rules", and "As long as work remains on schedule, my supervisor doesn't care how our goal has been achieved (R)". The measure is assessed on a 5-point Likert scale, ranging from 1 (totally disagree) to 5 (totally agree).

Safety compliance behaviors were measured with four items from the compliance/risk-taking scale [41] ($\alpha = .72$). It measures the extent to which employees follow safety rules and regulations. Example item: I have to break rules to get the job done.

The safety initiative was measured with four items from the Safety Self-Efficacy Scale [42] ($\alpha = .78$). It measures employees' tendency to participate and take initiative in favor of workplace safety. Example item: How comfortable would you be in stopping a colleague who you think might be performing an unsafe act? A 10-point Likert scale ranging from 1 (I cannot do that) to 10 (of course I can do that) was used.

The frequency of injury events was measured with the Accident Indices Scale [43], where the respondents were asked to indicate the frequency of different kinds of workplace-related injury events experienced during the last 6 months. Owing to the common problem of underreporting, the scale included both reported and unreported events to receive a more accurate assessment of injury rates [44]. The employees were also asked to indicate the frequency

of near-injury experiences. In line with recommendations in previous research, the different workplace-related injury events to be rated in the scale were divided into minor and major events [11,45]. Minor injury events included less serious injuries, such as bruises and scratches that might require first aid. Major injury events included more serious events, such as poisoning, concussion, open wounds, and fractures that often demand hospital care. All injury inquiries were assessed using a 5-point scale [from 1 (never) to 5 (very frequently)], indicating the extent of reported, unreported, or near-injuries of respective severity (minor and major) during the last 6 months. In accordance with Hemmingway and Smith [45], reported, unreported, and near-injuries were combined to a composite measure separately for minor and major injury events. Thus, the minor injury composite consisted of the total estimation of all three types of minor injury events (reported, unreported, and near-injuries). The same was true for the major injury composite, consisting of the total estimation of major injury events for reported, unreported, and near-injuries.

Given that previous research has suggested that age and gender are associated with perceptions of leadership [46,47], we chose to include them as covariates in our study. Table 1 shows an overview of the mean (M), SD, alpha value, and correlation for the study variables.

3. Results

We investigate the relative importance of safety-specific leadership, general transformational leadership, and the active part of transactional leadership (MBEA) for safety behavioral outcomes (compliance behavior and safety initiative behaviors) and for minor and major injuries in four hierarchal regression analyses. In Step 1, demographics variables (gender and age) were entered; in Step 2, MBEA was entered; and in Steps 3 and 4, transformational and safety leaderships were entered, respectively. Table 2 shows the standardized regression weights (betas) for the different regression steps, the amount of explained variance in each step, and the total amount of explained variance for the whole regression model.

In the first step of the first regression, compliance behavior was predicted by gender ($\beta = .30$, $p < .001$), indicating that women report more compliance behavior than men. The model explained 8% of the variance. Adding MBEA (Step 2) and transformational leadership (Step 3) as predictors did not improve the model. In the last step, safety-specific leadership was added. This resulted in a significantly improved model, explaining 11% of the variance. Gender ($\beta = .29$, $p < .001$) and safety-specific leadership ($\beta = .18$, $p < .01$) were significant predictors of compliance behavior, indicating that being women and reporting a higher level of safety-

Table 1
Descriptive statistics and correlations for the study variables

Variable	M	SD	Alpha	1	2	3	4	5	6	7	8	9
Leadership												
1. Transactional (MBEA)	1.10	.77	.72									
2. Transformational	2.48	.62	.89	.09								
3. Safety leadership	3.92	.55	.84	.04	.54***							
Employee safety behaviors												
4. Safety Compliance	4.65	.49	.72	−.09	.10	.13*						
5. Safety Initiative	9.03	1.07	.78	−.14*	.18**	.29***	.14*					
Occupational injuries												
6. Minor injuries	1.47	.52	(.80)	.23***	.06	.05	−.28***	−.12*				
7. Major injuries	1.04	.15	(.76)	−.04	.06	.09	−.19**	−.09	.27***			
Demographics												
8. Gender†	1.25	.44	—	−.07	.10	−.13*	.30***	.09	−.04	−.09		
9. Age	47.63	8.90	—	.11	−.07	−.05	−.05	.03	−.19**	−.13*	−.12	

N = 269, *p < 0.05, **p < 0.01, ***p < 0.001, † Male = 1, Female = 2.
M, mean; MBEA, management-by-exception active; SD, standard deviation.

specific leadership were associated with more safety compliance behaviors.

In the second regression, safety initiative behavior was predicted. Age and gender, entered in the first step, did not significantly predict safety initiative behaviors. In the second step, MBEA predicted safety initiative behaviors ($\beta = -.14$, $p < .05$) in a model that explained 2% of the variance. The negative relationship indicated that MBEA had a negative impact on safety initiative behavior. In the third step, transformational leadership was entered and resulted in a significantly improved model, explaining 5% of the variance. Both MBEA ($\beta = -.16$, $p < .01$) and transformational leadership ($\beta = .19$, $p < .01$) were significant predictors. When safety-specific leadership was entered to the regression model in the last step, an additional 7% of the variance was explained, resulting in 12% of the variance in safety initiative behavior being explained. In this final model, safety-specific leadership ($\beta = .33$, $p < .001$), gender ($\beta = .12$, $p < .02$), and MBEA ($\beta = -.12$, $p < .02$), but not transformational leadership ($\beta = .0$, p ns), were significant predictors of safety initiative behaviors.

The third regression showed that a minor injury event was, in the first step, predicted by age ($\beta = -.20$, $p < .01$), implying that younger employees tend to experience more minor injuries than older employees. This model accounted for 3% of the variance in minor injuries. Step 2 also showed that MBEA predicted minor injuries ($\beta = .25$, $p < .001$), in that MBEA increased the frequency of minor injuries. This model explained 9% of the variance in minor injuries. The transformational leadership style (Step 3) and safety-specific leadership (Step 4) were not associated with minor injuries.

In the last regression, major injuries were predicted by age ($\beta = -.14$, $p < .05$), in that younger employees experienced more major injuries than older employees. None of the three leadership variables were significantly related to reporting major injuries. In total, the predictors explained 2% of the variance in reporting major injuries.

4. Discussion

The aim was to examine the relative importance of safety-specific leadership, facet-specific transformational leadership, and transactional leadership (MBEA) for employee safety outcomes. The results showed that safety-specific leadership predicted behavioral outcomes over and above general leadership styles (transformational and MBEA). The relationship between transformational leadership and safety outcomes was limited to a positive relationship to safety initiative, which disappeared when safety-specific leadership was added to the model. Interestingly, neither safety leadership nor transformational leadership appeared

to be related to injuries of any degree. In addition, the results revealed that MBEA had a negative impact on employee safety initiatives and an increase in minor injuries.

4.1. Theoretical implications

The finding that safety-specific leadership was related to behavioral safety outcomes beyond the extent to which both transformational and transactional leadership were related to these outcomes supports the value of safety-specific leadership as a separate concept. Previous studies have shown that safety-specific transformational leadership was related to safety outcomes [11]. However, in these studies, the possible relationship between the safety aspects of leadership and the transformational aspects was not separated. Based on our results, one interpretation may be that the safety-specific leadership may be more essential than transformational leadership aspects in promoting a safe work environment. Another interpretation is that safety focus might mediate the effect of transformational leadership on safety outcomes. This would imply that transformational leadership carries a positive effect on safety if and when transformational leader behaviors—such as being a role model (idealized influence), showing concern for the well-being of the employees (individualized concern), and encouraging initiatives (intellectual stimulation)—are focused specifically on the enhancement of safety. This reasoning would also be in line with recent findings from the broader occupational health field, where the effect of transformational leadership on the outcomes of an occupational health interventions has been shown to be indirect and mediated by intervention-specific leadership [48]. The possible variability in the extent to which participating leaders had a safety focus could thus explain ambiguities in previous research regarding these transformational leader characteristics in relation to safety [7].

Of the leadership styles, only MBEA was related to injuries, showing a relatively strong positive relationship between MBEA and minor injuries, but not major injuries. This could indicate three things. First, in line with previous studies [7], there is overall limited direct relationships between leadership styles and injuries. This may suggest that the focus on leadership as an explanation of safety outcomes is overrated, yet this may be a premature conclusion as it also has been suggested that the relationship between leadership and injuries is indirect, making the relationship dependent on other factors [6,11]. It may also be because the occurrence of injuries is likely to be multifactorial, i.e., influenced by numerous organizational, situational, and personal conditions, e.g., safety culture, social norms (e.g., gender expectations), organizational structures, mandate, role clarity, and personal factors

Table 2
Regression analysis

Predictors	Behavioral outcomes								Injuries							
	Compliance behaviors				Safety initiative behaviors				Minor injuries				Major injuries			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Step 1. Demographics																
Gender (female)	.30***	.29***	.29***	.32***	.09	.09	.07	.12*	−.07	−.05	−.06	−.06	−.10	−.11	−.11	−.10
Age	−.01	−.01	−.00	.00	.04	.06	.07	.07	−.20**	−.23***	−.22***	−.23***	−.14*	.14*	−.13*	−.13*
Step 2. Transactional MBEA		−.07	−.08	−.06		−.14*	−.16**	.−12*		.25***	.25***	.25***		−.03	−.04	−.03
Step 3. Transformational			.08	−.02			.19**	.01			.03	.03			.07	.05
Step 4. Safety leadership				.18**				.33***				−.01				.04
R² (adjusted)	.08***	.08***	.08***	.11***	.00	.02*	.05**	.12***	.03**	.09***	.09***	.09***	.02*	.02	.02	.02
ΔR²	.08***	.00	.00	.03**	.00	.02*	.03**	.07***	.03**	.06***	.00	.00	.02*	.00	.00	.00

N = 269, * p< 0.05, ** p< 0.01, *** p<0.001.
MBEA, management-by-exception active.

such as motivation and personality. This would imply that the causal effects of each specific factor are likely to be small [49]. Second, the finding that MBEA was positively related to minor but not major injuries highlights the value of differentiating between injuries of different degrees of severity. The lack of differentiation has previously been suggested as why a relationship between leadership styles and injuries is seldom found [26]. However, major injuries are rare, and thus, significant relationships between them and other factors may be hard to detect. Regardless of the causes, however, the fact remains that the relationship between MBEA and injuries would not have been detected if only major injuries (or a composite measure of minor and major injuries) had been used.

Third, the measurement of MBEA merits further attention. Here, we measured MBEA with the original and most commonly used version of MLQ. This version of MLQ has, however, been criticized for only capturing negative aspects of monitoring and corrective behaviors, whereas the theoretical definition of MBEA includes more neutral or positive aspects of active transactional leader behaviors [6]. Differences in operationalization of the construct could be one explanation to why previous studies of the type of active controlling behavior that MBEA theoretically entails have been contradictory, from showing that it is positively related [6] and unrelated [10,50] to negatively related [5,7,51] to safety. This is in line with a recent study that separated negative and positive active controlling behaviors and showed that leadership training that increased positive controlling behaviors and decreased negative behaviors was positively related to safety climate [22]. To further our understanding of the theoretical construct of MBEA, future studies that use another operationalization are warranted.

Still, given this slightly negative operationalization of MBEA, the result is intriguing in that it suggests that negative behaviors may have a detrimental impact on workplace safety. One possible explanation of the seemingly negative effects of MBEA on safety is that when a supervisor is perceived as overly monitoring and controlling, his or her employees may let go of his or her own sense of responsibility for safety, failing to instill a feeling of safe behaviors as important for one's own benefit rather than only as a form of lip service toward management. This may make employees less willing to engage in extra-role behaviors to improve safety and may make them more prone to engage in riskier behavior when the supervisor is not around.

It is worth noting that gender and age were important predictors of safety outcomes in this study. Women reported more compliant behaviors, and younger employees reported more injuries. Younger age employees are consistently found to be at the highest risk for injury [52−54]. Gender differences in relation to safety is an area that is less researched; however, according to the European Agency for Safety and Health at Work [55], men are consistently found to have a higher accident rate, even after adjustments are made for fewer hours worked by women. One interpretation is that compliance may be a factor in this relationship [56]. Although these results are interesting, gender and age were merely included as control variables and were not part of the study's hypothesis. It is hence outside the scope of the present study to draw any far-reaching conclusions based on this result. Nevertheless, it merits further consideration in future studies.

4.2. Practical implications

The results indicate that supervisors openly promoting safety as a prioritized issue are a vital factor on its own in affecting subordinate safety behaviors, regardless of the use of any general leadership style such as transformational or transactional leader behaviors. This is in line with previous studies, indicating that leaders who include safety issues in their daily verbal communication with workers may contribute to a significant and lasting effect on the level of safety at the workplace [24,31].

Our findings have implications for the design of leadership training programs to enhance workplace safety. We found that leadership focusing specifically on safety was the strongest predictor of safety behaviors, regardless of transactional or transformational leadership behaviors, implying that leadership training programs should emphasize the importance of a focus on safety to achieve workplace safety improvements, rather than general leadership. Another implication is that an overly controlling, correcting, and monitoring leadership (without a specific focus on safety) could actually be regarded as negative for safety and might better be avoided in leadership training.

4.3. Methodological discussion

The cross-sectional design of the study has implications for the possibilities of drawing causal conclusions from the results. Owing to the difficulty of determining the direction and the potential reciprocity in the relationships between variables, the detected relationships being rather an indication of the occurrence of injuries affecting leadership style cannot be entirely excluded. Nevertheless, based on significant previous research supporting the idea that leadership influences employee outcomes [23,57−59], it is plausible to assume that the conclusions are valid. We recommend longitudinal replications of the study to further validate the results.

In addition, the study was conducted in only one company. Naturally, using a single company limits the generalizability of the findings, and we recommend replication of the study across several organizations. It could also be possible that some variation within the company existed in an actual level of safety due to differences in work tasks. However, this problem should be limited as the employees participating in the survey all had similar tasks related to production in paper mill.

The selection of participants may also be an issue, where managers were asked to invite (up to) five of their subordinates to participate. It remains unclear to what extent the managers followed the request, and there are no data on the degree of closeness. This means that we do not know if the approach, which was chosen to minimize selection bias, was successful in doing so.

Furthermore, the use of employee self-reports in measuring safety outcomes could be a methodological shortcoming. One argument is that objective data from injury records could be a more reliable outcome variable of safety. However, owing to underreporting of injuries, safety records tend to contain errors [60,61]. Hence, relying only on organizational records might introduce a systematic bias. In fact, a comparison of independent observations and employee self-report data showed that self-reports were highly correlated with independent observations [62], implying that self-reports of safety behaviors and injuries appear to be a relatively accurate measure. Nevertheless, future studies could benefit from the use of safety outcomes from multiple sources to avoid monomethod bias.

5. Conclusions

The results from the present study contribute to an increased understanding of the relative importance of safety-specific leadership, general transformational leadership, and active transactional leadership (MBEA) for workplace safety. The main findings indicate that safety-specific leadership makes an incremental contribution to the prediction of positive safety behaviors over and above the variance accounted for by both transactional and transformational leadership. This highlights the importance of

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emphasizing and encouraging a focus on safety issues in safety leadership training programs, regardless of improvements in leader behaviors associated with any other general leadership style. The finding that MBEA was associated with negative safety outcomes also has important implications in that an overly monitoring and controlling leadership can be detrimental to any attempts at achieving improved workplace safety. Another conclusion that can be drawn from the results is that distinguishing between injuries of varying severity (i.e., including measures of minor injuries) may be beneficial for the detection of relationships between organizational factors and injury outcomes.

Conflicts of interest

None of the authors have any conflicts of interest to declare.

Acknowledgments

References

[1] [Internet]Safety and health at work. Genève, Switzerland: International Labour Organization. 2014 cited 2015 April 15]. Available from: http://www.ilo.org/global/topics/safety-and-health-at-work/lang−en/index.htm.
[2] Butler MC, Jones AP. Perceived leader behavior, individual characteristics, and injury occurrence in hazardous work environments. J Appl Psychol 1979;64: 299−304.
[3] Martínez-Córcoles M, Gracia F, Tomás I, Peiró JM. Leadership and employees' perceived safety behaviours in a nuclear power plant: a structural equation model. Saf Sci 2011;49:1118−29.
[4] Parker SK, Axtell CM, Turner N. Designing a safer workplace: importance of job autonomy, communication quality, and supportive supervisors. J Occup Health Psychol 2001;6(3):211−28.
[5] Bass BM. Leadership and performance beyond expectations. New York (NY): Free Press; 1985. 191 p.
[6] Hoffmeister K, Gibbons AM, Johnson SK, Cigularov KP, Chen PY, Rosecrance JC. The differential effects of transformational leadership facets on employee safety. Saf Sci 2014;62:68−78.
[7] Clarke S. Safety leadership: a meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. J Occup Organ Psychol 2013;86:22−49.
[8] Inness M, Turner N, Barling J, Stride CB. Transformational leadership and employee safety performance: a within-person, between-jobs design. J Occup Health Psychol 2010;15(3):279−90.
[9] Kelloway EK, Mullen JE, Francis L. Divergent effects of transformational and passive leadership on employee safety. J Occup Health Psychol 2006;11: 76−86.
[10] Zohar D. The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. J Organ Behav 2002;23(1):75−92.
[11] Barling J, Loughlin C, Kelloway EK. Development and test of a model linking safety-specific transformational leadership and occupational safety. J Appl Psychol 2002;87(3):488−96.
[12] Judge TA, Bono JE. Five factor model of personality and transformational leadership. J Appl Psychol 2000;85:751−65.
[13] Avolio BJ. Full leadership development. Thousand Oaks (CA): Sage; 1999. 248 p.
[14] Bass BM, Riggio RE. Transformational leadership. 2nd ed. Mahwah, NJ: Erlbaum; 2006. 296 p.
[15] Clarke S, Ward K. The role of leader influence tactics and safety climate in engaging employee safety participation. Risk Anal 2006;26:1175−86.
[16] Conchie SM, Taylor PJ, Donald IJ. Promoting safety voice with safety-specific transformational leadership: the mediating role of two dimensions of trust. J Occup Health Psychol 2012;17:105−15.
[17] Koh WL, Steers RM, Terborg JR. The effects of transformation leadership on teacher attitudes and student performance in Singapore. J Organ Behav 1995;16:319−33.
[18] Neal A, Griffin MA, Hart PM. The impact of organizational climate and individual behaviour. Saf Sci 2000;34:99−109.
[19] Podsakoff PM, MacKenzie SB, Moorman RH, Fetter R. Transformational leader behaviours and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviours. Leadersh Q 1990;1:107−42.
[20] van Knippenberg D, Sitkin SB. A critical assessment of charismatic − transformational leadership research: back to the drawing board? Acad Manag Ann 2013;7:1−60.
[21] Antonakis J, Avolio BJ, Sivasubramaniam N. Context and leadership: an examination of the nine-factor full-range leadership theory using the Multifactor Leadership Questionnaire. Leadersh Q 2003;14:261−95.
[22] von Thiele Schwarz U, Hasson H, Tafvelin S. Leadership training as an occupational health intervention: improved safety and sustained productivity. Saf Sci 2016;81:35−45.
[23] Mullen J, Kelloway K. Safety leadership: a longitudinal study of the effects of transformational leadership on safety outcomes. J Occup Organ Psychol 2009;82:253−72.
[24] Tomás JM, Meliá JL, Oliver A. A cross-validation of a structural equation model of accidents: organizational and psychological variables as predictors of work safety. Work Stress 1999;13:49−58.
[25] Shannon HS, Mayr J, Haines T. Overview of the relationship between organizational and workplace factors and injury rates. Saf Sci 1997;26:201−17.
[26] Zohar D. A group-level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs. J Appl Psychol 2000;85(4): 587−96.
[27] Hofmann DA, Morgeson F. Safety-related behavior as a social exchange: the role of perceived organizational support and leader-member exchange. J Appl Psychol 1999;84:286−96.
[28] Vredenburgh AG. Organizational safety: which management practices are most effective in reducing employee injury rates? J Saf Res 2002;33:259−76.
[29] Michael JH, Guo ZG, Wiedenbeck JK, Ray CD. Production supervisor impacts on subordinates' safety outcomes: an investigation of leader-member exchange and safety communication. J Saf Res 2006;37:469−77.
[30] Geller ES, Roberts DS, Gilmore MR. Predicting propensity to actively care for occupational safety. J Saf Res 1996;27:1−8.
[31] Kines P, Andersen LPS, Spangenberg S, Mikkelsen KL, Dyreborg J, Zohar D. Improving construction site safety through leader-based verbal safety communication. J Saf Res 2010;41:399−406.
[32] DeJoy DM, Schaffer BS, Wilson MG, Vandenberg RJ, Butts MM. Creating safer workplaces: assessing the determinants and role of safety climate. J Saf Res 2004;35:81−90.
[33] Thomas E, Sexton JB, Neilands TB, Frankel A, Helmreich RL. The effect of executive walk rounds on nurse safety climate attitudes: a randomized trial of clinical units. BMC Health Serv Res 2005;5:1−9.
[34] Mullen J, Kelloway EK, Teed M. Inconsistent style of leadership as a predictor of safety behaviour. Work Stress 2011;25:41−54.
[35] Conchie SM, Donald IJ. The moderating role of safety-specific trust on the relation between safety-specific leadership and safety citizenship behaviors. J Occup Health Psychol 2009;14(2):137−47.
[36] Fleenor JW, Smither JW, Atwater LE, Braddy PW, Sturm RE. Self−other rating agreement in leadership: a review. Leadersh Q 2010;21:1005−34.
[37] Conway JM, Huffcutt AI. Psychometric properties of multisource performance ratings: a meta-analysis of subordinate, supervisor, peer, and selfratings. Hum Perform 1997;10:331−60.
[38] Murphy KR, Cleveland JN. Understanding performance appraisal: social, organizational, and goal-based perspectives. Thousand Oaks, CA: Sage; 1995. 502 p.
[39] Avolio BJ, Bass BM. Multifactor leadership questionnaire: manual and sampler set. 3rd ed. Redwood City (CA): Mind Garden; 2004. 110 p.
[40] Carless SA. Assessing the discriminant validity of transformational leadership behavior as measured by the MLQ. J Occup Organ Psycho 1998;71:353−8.
[41] Storseth F. Changes at work and employee reactions: organizational elements, job insecurity, and short-term stress as predictors for employee health and safety. Scand J Psychol 2006;47:541−50.
[42] Pettinger CB. Improving occupational safety & health interventions: a comparison of safety self-efficacy and safety stages of change. PhD Thesis. Blacksburg (VA): Virginia Polytechnic Institute & State University; 2000. 158 p.
[43] Hayes BE, Perander J, Smecko T, Trask J. Measuring perceptions of workplace safety: development and validation of the work safety scale. J Saf Res 1998;29: 145−61.
[44] Probst TM, Brubaker TL. The effects of job insecurity on employee safety outcomes: cross-sectional and longitudinal explorations. J Occup Health Psychol 2001;6:139−59.
[45] Hemingway MA, Smith CS. Organizational climate and occupational stressors as predictors of withdrawal behaviours and injuries in nurses. J Occup Organ Psychol 1999;72:285−99.
[46] Muchiri MK, Cooksey RW, Di Milia LV, Walumbwa FO. Gender and managerial level differences in perceptions of effective leadership. Leadersh Org Dev J 2011;32:462−92.
[47] Chong E, Wolf H. Factors influencing followers' perception of organisational leaders. Leadersh Org Dev J 2010;31:402−19.
[48] Lundmark R, Tafvelin S, von Thiele Schwarz U, Hasson H. Leading for change -line managers' influence on the outcomes of an occupational health intervention. Work and Stress 2017;30.
[49] Zapf D, Dormann C, Frese M. Longitudinal studies in organizational stress research: a review of the literature with reference to methodological issues. J Occup Health Psychol 1996;1:145−69.
[50] Luria G. Climate strength: how leaders form consensus. Leadersh Q 2008;19: 42−53.

[51] Avolio BJ, Jung DI, Murry W Sivasbramaniam N. Building highly developed teams: focusing on shared leadership processes, efficacy, trust, and performance. Adv Int St 1996;3:173–209.

[52] Dupre D. Accidents at work in the EU in 1996. Luxembourg City (Luxembourg): Eurostat; 2000. 7 p. A-NK-OO-004-EN-C.

[53] Loughlin C, Frone M. Young workers' occupational safety. In: Barling J, Frone M, editors. Psychology of workplace safety. Washington (DC): American Psychological Association; 2004. p. 299–306.

[54] Runyan CW, Zakocs RC. Epidemiology and prevention of injuries among adolescent workers in the United States. Annu Rev Public Health 2000;21: 247–69.

[55] [Internet]What are the gender differences in occupational safety and health? Brussels (Belgium): European Agency for Safety and Health at Work. 2014 cited 2015 April 15]. Available from: https://osha.europa.eu/en/faq/women-and-health/what-are-the-gender-differences-in-occupational-safety-and-health.

[56] Reason JT, Manstead ASR, Stradling SG, Baxter JS, Campbell K. Errors and violations on the road: a real distinction? Ergonomics 1990;33:1315–32.

[57] Hofmann DA, Morgeson FP. The role of leadership in safety. In: Barling J, Frone MR, editors. Psychology of workplace safety. Washington, DC: American Psychological. Association; 2004. p. 159–80.

[58] Bommer WH, Rich GA, Rubin RS. Changing attitudes about change: longitudinal effects of transformational leader behavior on employee cynicism about organizational change. J Organ Behav 2005;26(7):733–53.

[59] Yun S, Cox J, Sims Jr HP, Salam S. Leadership and teamwork: the effects of leadership and job satisfaction on team citizenship. Int J Leadersh Stud 2007;2(3):171–93.

[60] Eisenberg WM, McDonald H. Evaluating workplace injury and illness records: testing a procedure. Mon Labor Rev 1988;111:58–60.

[61] Probst TM, Estrada AX. Accident under-reporting among employees: testing the moderating influence of psychological safety climate and supervisor enforcement of safety practices. Accid Anal Prev 2010;42:1438–44.

[62] Lusk SL, Ronis DL, Baer LM. A comparison of multiple indicators: observations, supervisors' report, and self-report as measures of workers' hearing protection use. Eval Health Prof 1995;18:51–63.