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Original article

Role of Supervisor Behavioral Integrity for Safety in the Relationship Between Top-Management Safety Climate, Safety Motivation, and Safety Performance☆

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ABSTRACT

Background: This study examines whether employee perceptions of supervisor behavioral integrity for safety moderates the relationship between top-management safety climate and safety performance (i.e., safety compliance and safety participation) and the mediated relationships through safety motivation.
Methods: Data collected from 389 blue-collar employees were analyzed using latent moderated structural equation modeling.
Results: The results indicate that the relationship between top-management safety climate and safety behavior, and the mediating role of safety motivation were replicated. Moreover, the results show that the mediated relationships between top-management safety climate and safety behaviors through safety motivation were stronger for employees who report high supervisor behavioral integrity for safety.
Conclusion: The study findings suggest the role of supervisor behavioral integrity for safety in clarifying how the employee perceptions of top-management safety climate transfer to the employee safety behaviors through the motivational pathway.

1. Introduction

Research on safety behavior continues to attract scholarly interest due to the substantial human and financial costs of workplace accidents [1]. Two safety-related behaviors—safety compliance and safety participation—were particularly of interest as they are proximal predictors of safety outcomes such as workplace accidents, near-miss incidents, and injuries [2,3]. A significant amount of research has been devoted to understanding the factors that enhance or diminish the adoption of these behaviors. Previous studies have shown that safety climate, defined as a positive employee perception of an organization's stand on safety-related policies, procedures, and practices, is an important predictor of safety compliance and safety participation [4,5]. It is positively related to higher compliance with safety rules and procedures, and higher contribution to an organization's safety-enhancing practices. Moreover, as documented [6] and later confirmed by numerous studies [7–9], safety motivation underlies the relationship between safety climate and safety behaviors, i.e., safety compliance and safety participation.

We aim to contribute to this line of research by further scrutinizing the relationship between safety climate, safety motivation, and safety behavior. Drawing on the theory and research on safety climate [6,10] and behavioral integrity [11], we propose that supervisor behavioral integrity for safety moderates employee perceptions of top-management safety climate's relationships with safety motivation and safety-related behaviors. We also propose that supervisor behavioral integrity operates as a boundary condition for the indirect effect of safety climate on safety behavior through safety motivation.

In confirming the proposed model, this study contributes to theory and practices in safety research in several ways. First, this study extends past research by examining a condition under which the well-confirmed mediation between safety climate and safety

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behavior through safety motivation operates. Second, understanding the distinct role of supervisor behavioral integrity in organizational safety can shed light on how organizational safety is established and promoted. Research on supervisor behavioral integrity can clarify the roles of and interplay between organization-wide policies and supervisory practices on safety behavior. Furthermore, understanding the unique roles of employee perceptions of supervisor word-action alignment in establishing organizational safety may inform future interventions and training programs to promote safety at workplaces.

1.1. Theoretical overview and hypotheses development

Safety climate is described as "shared perceptions with regard to the priority of safety policies, procedures, and practices and the extent to which safety compliant or enhancing behavior is supported and rewarded at the workplace" [12]. The definition underlies the employee perceptions of priority for safety. This is, in part, drawn on the argument that safety priority information conveyed by different units of an organization (e.g., top-management, supervisors) may vary to some degree due to factors such as competing goals of the organization or ambiguous situations in which supervisors have discretion over [10,13]. Thus, safety climate has been conceptualized as employee perceptions about the priority of working safely compared to the competing organizational aims (e.g., production) which were shaped through observations or experiences of workplace occurrences [14,15]. Employees form safety climate perceptions by taking policies and actions of different parties into account, which may align or contradict each other [16]. Several studies provided support for this view. For example, Zohar and Luria [16] reported a significant variation in safety climate perceptions between workgroups in a single organization, which was due to supervisor discretion in enforcing safety procedures and rules. Another study [17] showed that supervisory style and practices in the form of transformational leadership had a buffering effect against a weak organizational-level safety climate at the group level. It was also shown that the organizational- and group-level safety climates are strongly correlated (r =0.78) yet distinct constructs with supplementary interactive effects on, for instance, truck drivers' safety behaviors [18].

These studies suggest that there can be a contradiction between formal policies and procedures stated by top management and practices directed by supervisors. As agents of organizations, supervisors typically convey formal safety policies, procedures, and practices declared by policymakers of organizations. However, they may disregard or bend formal and espoused safety policies to meet other organizational demands such as production or cost reduction [15]. Moreover, all possible incidents encountered in an actual work setting cannot be covered by formal policies and procedures [16]. This results in room for supervisory discretion in decision-making which may lead to divergence between declared safety policies and enforced safety practices. Thus, supervisors' behavioral integrity for safety practices emerges as an important factor in understanding how formal procedures declared by managements of organizations relate to employee safety motivation and behavior [19].

Behavioral integrity reflects the perceived alignment of one's espoused and enacted values [11]. In this manner, behavioral integrity is a distinct term from the concepts of trust (defined as the willingness to accept vulnerability on the basis of positive expectations from the supervisor [20,21]) and credibility (defined as the perceived expertise and trustworthiness of the source of information or the leader [22]). In the context of the current study, supervisors' behavioral integrity for safety refers to the employee perceptions of the supervisor's alignment of words and deeds concerning priority for safety. Supervisor behavioral integrity is an important concept associated with positive employee and organizational outcomes [23]. Indeed, a recent meta-analysis has revealed that supervisor behavioral integrity is related to in-role performance, as well as extra-role performance through sequential mediation of employee trust in leader and employee affective commitment [24]. Related to safety performance, studies also provide support for the positive association between supervisor behavioral integrity and important safety-related outcomes. For example, Leroy et al [25] found that the followers' perceptions of leader behavioral integrity for safety were associated with reported treatment errors in a sample of nurses, and this relationship is mediated by team priority of safety and team psychological safety. The correlation between leader behavioral integrity and reported treatment errors was significantly negative, which indicates that higher supervisor behavioral integrity is associated with committing fewer errors. In a time-lagged study, Halbesleben et al [26] showed that supervisor behavioral integrity for safety was positively related to employee safety performance, measured as injury rate, injury severity, and accident reporting. This relationship was mediated by safety compliance and psychological safety toward the supervisor.

Supervisor behavioral integrity relates to engagement in work-related behaviors via two different processes [27]. First, behavioral integrity conveys the message that the supervisor is genuine in the words, which subsequently leads to employee trust in the supervisor. Both theory and research provide support for the role of employee trust in the supervisor in explaining safety behavior and performance [24,28,29]. Second, behavioral integrity also conveys the message that safety is valued under different circumstances, thus fostering predictability in employee tasks.

Given these characteristics, supervisor behavioral integrity for safety is likely to have a significant role in the relationship between top-management safety climate and safety motivation, as well as safety behaviors. Even though the declared safety policies by the top management are influential in an organization, it is through the enforced practices that employees get information about what behaviors are valued and rewarded, which are typically executed by immediate supervisors [19]. Thus, as laid out in the Sensemaking Theory [30,31], ambiguity or equivocality arising from an incongruence between messages sent by different agents of organizations (e.g., top management and supervisors) may limit or hinder employees' sensemaking. Consequently, such a misalignment is likely to make it difficult for employees to make sense of the situation and endorse positive safety attitudes, i.e., safety motivation [32]. Moreover, when the safety climate declared by the top management is not complemented by the supervisor's behavioral integrity for safety, the employee's sensemaking process may involve questioning the motives of the organization (e.g., the value placed on employee safety) and may lead to perceptions of insincerity. However, a high top-management safety climate coupled with a high supervisor behavioral integrity for safety sends a strong message that employee safety is of high priority and valued under different circumstances [33], which would likely evoke engagement in employees in the form of safety motivation [28]. In such a work environment, employees perceive the intentions of their organization and supervisor regarding safety as sincere, which would be reciprocated with a high motivation toward safety. Moreover, once the trust between the employees and the supervisor is built, employees become more receptive to the supervisor's influence [34], which would make it easier for the supervisor to inspire employee motivation to comply with the safety rules and procedures. However, if the top-management safety climate is not complemented with an alignment between the supervisor's words and

actions, employees' perceptions of the organization's sincerity regarding safety as well as employee safety motivation are likely to suffer.

In addition to safety motivation, supervisor behavioral integrity for safety is likely to moderate the relationship of top-management safety climate with safety compliance and safety participation. Simons et al [35] proposed that in addition to the attitudinal pathway (e.g., trust), behavioral integrity also operates through an informational pathway which is reflected in more clear and accurate information the congruent espoused values and enacted practices provide. To put it differently, they argue that behavioral integrity not only conveys the message about what is valued but also provides unambiguous information for employees about the expected behaviors. The importance of clear and unambiguous signals for performance-related outcomes was also discussed in research on the system's strength [36] and shared mental models [37]. For example, Bowen & Ostroff [36] underscored the role of unequivocal and consistent signals conveyed by message senders for a clear understanding of what is expected from employees, and consequently, performance and effectiveness. A high top-management safety climate and low supervisor behavioral integrity for safety create equivocality that may trigger a sensemaking process in employees, which leads employees to form their own interpretations. Bowen & Ostroff [36] point out that such a process may be dangerous because the interpretations developed as a result of sensemaking may hinder performance as they can be different from formal rules and procedures enacted by organizations. Furthermore, shared mental models, defined as the organized knowledge structures that allow employees to understand and implement the course of action in coordination with their group members, are related to effectiveness and performance especially when group communication is difficult [37,38]. In safety-related situations, supervisors' actions executed in concert with their declared policies provide an alignment with the top-management safety climate and positively contribute to the shared mental models of group members. Consequently, supervisor behavioral integrity should have a complementary role in the positive relationship between top-management safety climate and safety behaviors, because behavioral integrity provides informational clarity and consistency in the expected employee safety behaviors. In other words, compared to a working environment in which safety practices vary depending on different situations (e.g., where there is a low supervisor behavioral integrity), consistent supervisor safety practices will provide a clear understanding of how to behave, which will improve the positive relationship between top-management safety climate and performance behaviors. This argument concurs with the reasoning that clear employee comprehension of safety rules and procedures is associated with improved safety performance [39] and the research showed that an intervention designed to improve supervisors' safety-related management practices increased followers' safety-related behaviors [13].

At this point, it is important to note that our conceptualization of the safety climate denotes what is referred to as the psychological safety climate by previous research [2,40]. Since our data consisted of employees working in the same organization, we aimed to investigate whether the relationship between employee perceptions of safety climate reflected by top management and safety-related outcomes is influenced by employee perceptions of supervisor behavioral integrity for safety. Based on the reasoning above, we hypothesize that supervisor behavioral integrity for safety moderates 1) the relationship between top-management safety climate and safety motivation and 2) the relationship between top-management safety climate and safety behaviors, i.e., 2a) safety compliance and 2b) safety participation. Specifically, the relationship between top-management safety climate and these three outcomes will be stronger when the employee's perception of the supervisor's behavioral integrity is high. Furthermore, we hypothesize that 3) supervisor behavioral integrity moderates 3a) the mediated relationship between safety climate and safety compliance and 3b) the mediation between safety climate and safety participation, through safety motivation, such that the mediated relationships will be stronger when the employee perception of their supervisor's behavioral integrity is high. Fig. 1 displays the study model.

2. Methods

2.1. Participants

The study data were collected from 389 production workers (351 men, 90.2%) in a major manufacturing factory that specializes in the production of domestic appliances, located in an industrial zone, in a western province of Turkey. The production lines are specialized in different phases of production with each having serious accident risks such as cuts, burns, or even loss of a limb. The mean age of participants was 32.14 years ($SD = 7.63$). The average organizational tenure was 6.96 ($SD = 7.13$) years. Of the participants, 5.1% graduated from primary school, 78.7% graduated from high school, 12.6% had an Associate's degree, and 3.6% had Bachelor's degree or above.

2.2. Measures

The participants responded to a demographics form and measures of (1) top-management safety climate, (2) supervisor

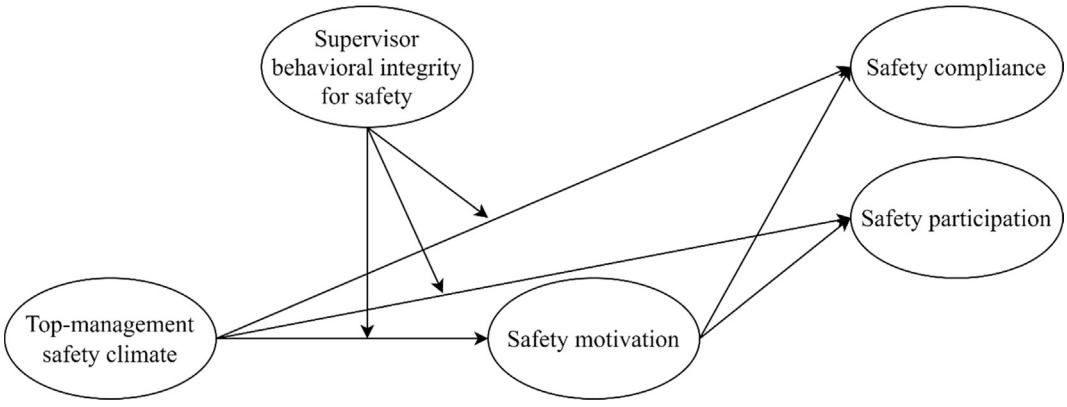

Fig. 1. The study model.

Table 1
Means, standard deviations, and correlations among variables

Scale	1	2	3	4	5	6	7	8
1. Gender	—							
2. Age	−0.01	—						
3. Tenure	−0.04	0.79**	—					
4. Safety climate	0.09	0.05	−0.02	(0.92)				
5. Supervisor integrity	0.16**	−0.03	−0.04	0.57**	(0.87)			
6. Safety motivation	0.02	0.13*	0.05	0.39**	0.31**	(0.87)		
7. Safety compliance	0.01	−0.03	−0.11*	0.40**	0.34**	0.44**	(0.73)	
8. Safety participation	−0.07	0.13*	0.07	0.30**	0.23**	0.40**	0.43**	(0.70)
Mean	—	32.54	6.96	3.81	3.76	4.49	4.60	4.24
SD	—	7.63	7.13	0.60	0.80	0.52	0.52	0.67

Note. $N = 389$. Cronbach α values were reported in parentheses on the diagonal. Gender was dummy coded: 1 = male and 2 = female. *$p < 0.05$ and **$p < 0.01$.

behavioral integrity for safety, (3) safety motivation, (4) safety compliance, and (5) safety participation on a five-point Likert type scale. All the scales were translated into Turkish by three bilingual experts. Unless otherwise indicated, all scales were rated by using a scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

2.2.1. Employee Perceptions of Top-management Safety Climate

We used a 16-item questionnaire to measure employee perceptions of top-management safety climate attitudes and behaviors [16]. An example item of this scale is "Top management of this factory invests a lot of time and money in safety training for workers". The reported reliability coefficient of the scale was 0.92.

2.2.2. Supervisor Behavioral Integrity for Safety

Employees rated the extent to which they perceive alignment between their supervisors' words and actions regarding safety by using a six-item scale [25] based on an earlier behavioral integrity scale [41]. An example item for this scale is "Regarding safety, my supervisor delivers the consequences he/she describes". The reported reliability score of the scale in Leroy et al [25] was 0.93.

2.2.3. Safety Motivation

Employees rated their safety motivation levels by using a three-item scale [6]. "I feel that it is important to maintain safety at all times" is an example item of the scale. The reported reliability score on the scale was 0.93.

2.2.4. Safety Behavior

Safety behavior was assessed by safety compliance (three items) and safety participation (three items) scales [6]. Employees responded on a scale ranging from 1 (*never)* to 5 (*always*). Example items are "I use the correct safety procedures for carrying out my job" and "I put in extra effort to improve the safety of the workplace" for safety compliance and safety participation, respectively. The reliability scores were 0.94 for safety compliance and 0.89 for safety participation.

2.3. Procedure

The surveys were administered to employees working in the production lines of the factory. Before the surveys were handed out, the purpose of the study was explained and a consent form stating the participants' rights and confidentiality assurance was provided. All employees filled out the survey in meeting rooms at the workplace, at the end of the shifts. The supervisors were not present during data collection to ensure confidentiality. Employees enveloped and sealed the completed questionnaires themselves. The questionnaires were collected by health and safety executives of the factory, who did not have a supervisory relationship with the employees. The sessions took approximately 15 minutes for each participant.

3. Results

3.1. Analytic strategy

Before the hypothesis tests, we calculated the ICCs of safety motivation, safety compliance, and safety participation to examine whether there is a considerable agreement within the 20 work units from which the data were collected. The ICCs were −0.005, 0.002, and 0.02 for safety motivation, safety compliance, and safety participation, respectively. Based on the low ICC values and relatively low cluster size, we did not employ multilevel analysis.

We utilized structural equation modeling with maximum likelihood estimation in Mplus 8 [42] to test our model and treated the scale items as indicators of latent constructs. As a first step, we tested the discriminant validity of the measures by running a five-factor measurement model (safety climate, supervisor behavioral integrity, safety motivation, safety compliance, and safety participation). The initial model fit was poor; however, the inspection of modification indices revealed that the model fit could be improved by letting the error variances among five pairs[1] of items correlate. The resulting model fit was acceptable, $\chi^2(419, N = 389) = 982.679$, $p < 0.001$; RMSEA = 0.059; CFI = 0.914; TLI = 0.905; and SRMR = 0.053. We compared the five-factor model with two alternative four-factor models. The fit of the five-factor model was better compared to the four-factor model in which the items of safety climate and supervisor behavioral integrity loaded in the same factor, $\chi^2(423, N = 389) = 1529.548$, $p < 0.001$; RMSEA = 0.082; CFI = 0.832; TLI = 0.815; SRMR = 0.065; $\Delta\chi^2(4) = 546.869$, $p < 0.001$, and the four-factor model in which safety compliance and safety behavior items were combined, $\chi^2(423, N = 389) = 1059.747$, $p < 0.001$; RMSEA = 0.062; CFI = 0.903; TLI = 0.894; SRMR = 0.050; $\Delta\chi^2(4) = 77.068$, and $p < 0.001$. The results confirmed that the variables in the model are distinct constructs.

To test the latent interaction effects, we followed the latent moderated structural equations approach [43]. This technique allows the creation of latent interaction terms and takes the nonlinearity issue of the interaction effects into account by modeling

[1] Error variances of three pairs of items (Item 1—Item 2, Item 5—Item 6, and Item 15—Item 16) in top-management safety climate scale and of two pairs of items (Item 3—Item 4 and Item 5—Item 6) in supervisor behavioral integrity for safety scale were set free. These items either shared a similar wording, measured the same underlying construct (e.g., the priority placed on safety by top-management for Items 5 and 6 of safety climate measure), or had structural similarities (e.g., Items 5 and 6 of behavioral integrity for safety scale were both negatively worded items) and thus were let to correlate.

Table 2
Results of latent moderated structural equation modeling analysis

Variables	Mediator: Safety motivation		DV: Safety compliance		DV: Safety participation	
	Coeff	*SE*	Coeff	*SE*	Coeff	*SE*
Gender	−0.107	0.191	−0.101	0.211	−0.400	0.218
Age	0.032**	0.012	0.002	0.014	0.019	0.014
Tenure	−0.015	0.013	−0.028	0.014	−0.007	0.015
Safety climate (SC)	0.422***	0.088	0.300***	0.080	0.226**	0.079
Behavioral integrity (BI)	0.160	0.084				
SC × BI	0.125*	0.055				
Safety Motivation			0.475***	0.075	0.411***	0.077
R^2	0.260		0.367		0.300	

Note. $N = 389$. Unstandardized coefficients were reported. DV: dependent variable, Coeff: coefficient, and SE: standard error. Gender was dummy coded: 1 = male and 2 = female. *p <0.05, **p <0.01, and ***p <0.001.

their distribution. The parameters are estimated with numerical integration and models are compared with −2 log-likelihood values. Cheung and Lau [44] applied the latent moderated structural equations approach to moderated mediation models with the bootstrap method and showed that it provides more accurate estimates and confidence intervals compared to regression. Gender, age, and organizational tenure were controlled for the endogenous variables in the analyses.

3.2. Hypothesis tests

The means, standard deviations, reliability estimates, and correlations among the variables are shown in Table 1. The correlations among the variables were comparable to the previous research [6,26].

We compared the model without the interaction effects (−2 log-likelihood = 28,442.722) with the model with three hypothesized interactions (−2 log-likelihood = 28,436.764) and the results showed that the difference was not significant Δ−2 log-likelihood(3) = 5.958, $p > 0.05$. The inspection of the estimates showed that the safety climate−supervisor behavioral integrity interaction was not significant for safety compliance ($b = -0.020$, $SE = 0.062$, $p = 0.752$) and safety participation ($b = 0.047$, $SE = 0.064$, $p = 0.461$). Consequently, we removed the two non-significant interaction terms and direct paths from supervisor behavioral integrity to safety compliance and safety participation to test an alternative model in which safety climate−supervisor behavioral integrity interaction predicts only safety motivation. Before testing, we assessed whether deletion of the two direct paths had a significant effect on the model by conducting a difference test and found it was not significant, Δ−2 log-likelihood(2) = 4.442, $p > 0.05$. The results indicated that supervisor behavioral integrity's association with safety compliance ($b = 0.165$, $SE = 0.093$, $p = 0.075$) and safety participation (b =0.133, SE =0.094, p =0.158) did not significantly improve the model fit.

The alternative model with the interaction effect (−2 log-likelihood = 28,441.652) provided a better fit to the data than the model without interaction (−2 log-likelihood = 28,446.888), Δ−2 log-likelihood(1) = 5.236, $p < 0.05$. The unstandardized path estimates of the model with the standard errors are provided in Table 2. The safety climate−supervisor behavioral integrity interaction was significant for safety motivation ($b = 0.125$, $SE = 0.055$, $p = 0.024$, see Fig. 2). The safety climate−safety motivation relationship at low (−1 *SD*) and high (+1 *SD*) values of supervisor behavioral integrity can be seen in Fig. 3. The relationship between safety climate and safety motivation was stronger when employees reported higher behavioral integrity of their supervisors. Altogether, these results indicated that Hypothesis 1 was confirmed, while Hypothesis 2a and Hypothesis 2b were not.

Before the moderated mediation analyses, we tested whether the mediated effects were significant. The mediation and moderated mediation effects were tested with a 1000-resamples bootstrap analysis. Bias-corrected 95% confidence intervals were produced to test if the estimates were significant. The results indicated that safety motivation mediates the relationship between safety climate and safety compliance (coefficient = 0.200, 95% CI [0.106, 0.356]) and safety participation (coefficient = 0.173, 95% CI [0.087, 0.320]). Given the support for the mediation effects, we tested if the indirect effects changed at low (−1 *SD*) and high (+1 *SD*) values of the supervisor behavioral integrity for safety.

The bootstrap analysis results are presented in Table 3. The results showed that the indirect association between safety climate

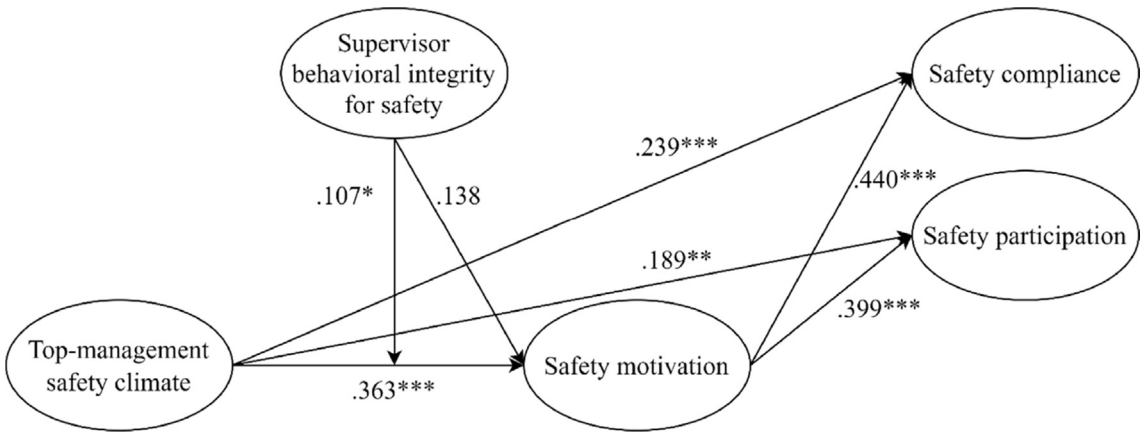

Fig. 2. Standardized path estimates of the final model. *Note:* Control variables were estimated but not included in the figure for brevity. *p <0.05, **p <0.01, and ***p <0.001.

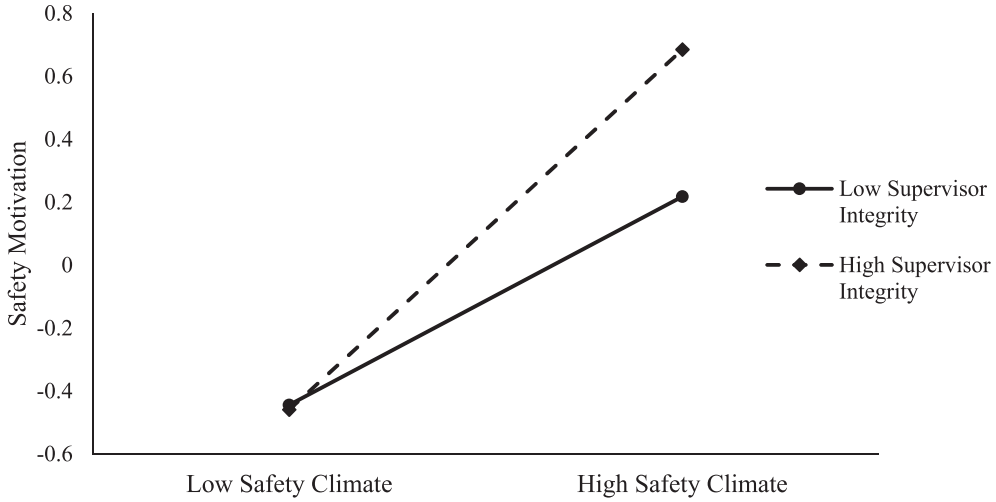

Fig. 3. The top-management safety climate–safety motivation relationship at low and high values of supervisor behavioral integrity for safety.

and safety compliance through safety motivation was stronger when the supervisor behavioral integrity was higher (coefficient = 0.260, 95% CI [0.149, 0.453]) than when it was lower (coefficient = 0.141, 95% CI [0.038, 0.289]), as suggested by a significant difference (coefficient = 0.119, 95% CI [0.018, 0.277]) between the two conditional indirect effects. Likewise, the indirect relationship between safety climate and safety participation was stronger at high (coefficient = 0.225, 95% CI [0.111, 0.405]) rather than low (coefficient = 0.122, 95% CI [0.031, 0.254]) values of supervisor behavioral integrity. The difference between the two conditional relationships was significant (coefficient = 0.103, 95% CI [0.015, 0.257]), which indicated the moderated mediation. The model explained 26%, 36,7%, and 30% in safety motivation, safety compliance, and safety participation, respectively, incrementing the variance explained by only the control variables for 23.2%, 34%, and 26.4% for safety motivation, safety compliance, and safety participation, respectively. Altogether, these results provided support for Hypotheses 3a and 3b.

4. Discussion

Safety behaviors have been subjected to rigorous research and great progress has been made in identifying its antecedents. Safety climate was one of the important factors that are closely related to safety motivation, safety compliance, and safety participation [2,3]. More recently, the research has started to address the conditions that boost or hinder the positive effect of the safety climate on safety behaviors [45,46]. We aimed to contribute to this line of research and found that supervisor behavioral integrity for safety plays an important role in the mediated relationship between top-management safety climate and safety behaviors through safety motivation.

The first and second hypotheses of the current study claimed that supervisor behavioral integrity for safety moderates the safety climate's relationship with safety motivation, safety compliance, and safety participation in a way that the relationships are stronger when employees perceive higher supervisor behavioral integrity. The results showed that the expectations were confirmed for safety motivation while they were rejected for the two safety behaviors. The confirmed moderating role of supervisor behavioral integrity for safety between safety climate and safety motivation relationship was coherent with the existing research. It can be argued that in an organization, unequivocal concern for safety displayed by top management in the form of a positive safety climate as well as reflected in the supervisor's alignment in words and deeds sends a clearer and stronger signal that the employee safety is valued [33]. Such a signal is well received by the employees and is reciprocated with increased engagement in safety-related attitudes including safety motivation. This reasoning concurs with the Sensemaking Theory [36] which underscores the role of congruence of signals sent by agents of an organization in shaping clear employee perceptions and understanding. Yet, the finding that the relationships between safety climate and safety behaviors are not moderated by the supervisor behavioral integrity for safety is somewhat surprising, given the theory and research on the supervisor's positive and strong role in the safety behavior of employees [16]. The costs

Table 3
Results of bootstrap analysis

Effect	DV: Safety compliance		DV: Safety participation	
	Coeff	95% CI	Coeff	95% CI
Direct effect of safety climate	0.300	[0.114,0.500]	0.226	[0.060,0.409]
Conditional indirect effects				
Low supervisor behavioral integrity	0.141	[0.038,0.289]	0.122	[0.031,0.254]
High supervisor behavioral integrity	0.260	[0.149,0.453]	0.225	[0.111,0.405]
Difference	0.119	[0.018,0.277]	0.103	[0.015,0.257]
Total effects				
Low supervisor behavioral integrity	0.441	[0.232,0.674]	0.348	[0.148,0.527]
High supervisor behavioral integrity	0.560	[0.351,0.817]	0.451	[0.257,0.643]

Note. $N = 389$. Unstandardized coefficients and bias-corrected confidence intervals obtained from bootstrap analysis were reported. DV: dependent variable, Coeff: regression coefficient, and CI: confidence interval.

(e.g., serious injuries) associated with not complying with and not supporting safety rules and procedures may explain why the relationships between top-management safety climate and safety outcomes are not different between those who reported high supervisor behavioral integrity and those who did not. To put it differently, since safety compliance and safety participation are associated with serious risks when not adhered to [47] and with potential rewards when properly exerted [48], the relationship between perceptions of top-management safety climate and safety behaviors may be more resilient to the potential influences such as supervisor behavioral integrity. Lending support to this argument, Clarke [49] showed in a meta-analysis that no moderators are present in the relationship between psychological safety climate and safety behaviors which were constructed by combining safety compliance and safety participation, indicating the robustness of the relationship. Likewise, findings of another meta-analytic study showed that the organizational safety climate is a robust predictor of accidents, a safety-related outcome that is closely tied to safety compliance and participation [40]. Yet, this meta-analysis could not examine the relationship between psychological safety climate and accidents due to the insufficient number of studies in this area.

Confirmation of Hypotheses 3a and 3b showed that even though supervisor behavioral integrity did not directly moderate the safety behaviors, it did so through safety motivation. In other words, supervisor behavioral integrity moderated the mediated relationship between safety climate and safety behaviors through safety motivation. Indeed, for employees who think that their supervisor's words and deeds on safety-related practices align, the relationship between safety climate and safety behaviors through safety motivation was stronger, which has important implications for both theory and practice. It can be suggested that supervisor behavioral integrity for safety can be enhanced to promote safety motivation and safety behavior (albeit indirectly). Specifically, future interventions that aim to promote the safety behavior of employees can target supervisors as well, which has several successful examples. For instance, in a recent intervention to promote safety behavior in health care organizations, Bronkhorst et al [18] implemented a six-month training intervention among the team members, supervisors, and senior management and found a significant increase in safety behavior among the intervention group participants. Zohar and Luria [13] gave supervisors regular feedback about their safety-related interactions with their subordinates over three months and observed improvements in safety behavior among the workers. These interventions may have been successful partially because they enhanced supervisor behavioral integrity for safety via increasing their awareness about their own safety behavior through training and/or feedback. Furthermore, organizations can use this knowledge to incorporate behavioral integrity into their training programs [50,51]. Yet, further research is required to test the true effect of enhancing supervisor behavioral integrity on safety behaviors.

Arguably, our study's primary theoretical contribution is the role of the supervisor's behavioral integrity in explaining how the employee perceptions of top-management safety climate transfer to the employee safety behaviors through the motivational pathway. Past research [25,26] applied the concept of behavioral integrity to safety research and revealed its relationship with important safety outcomes. However, to our knowledge, no prior study examined whether supervisor behavioral integrity has a moderating role in the relationship between top-management safety climate and safety outcomes. Moreover, our findings also suggest that the top-management safety climate and supervisor behavioral integrity have a complementary influence on safety motivation. In other words, employee perceptions of high supervisor behavioral integrity facilitated a positive mediated relationship between top-management safety climate and safety behaviors through safety motivation. These results are also in line with the view which argues that employees may form distinct yet complementary safety climate perceptions of different organizational units such as top management and immediate supervisors [17,52]. This study highlights the importance of alignment between supervisors' words and deeds for organizations to facilitate safety motivation, and consequently safety behaviors of employees. Organizations often devote time and make costly purchases to safety-related issues which not only results in an increase in the safety level of the work but also conveys the message that they genuinely care about the well-being of their employees [53]. Such perceptions of employees are related to positive outcomes such as organizational trust and affective commitment, in addition to safety-related outcomes [39,45,54]. Based on the findings of the current study, organizations may benefit from encouraging immediate and middle-level supervisors to maintain their integrity regarding safety to increase the positive outcomes of a positive safety climate.

There are several limitations of the current study. First, the study data are self-reported and collected from a single source, which may pose a threat of bias. Although the confirmatory factor analyses demonstrated the discriminant validity of the measures and a previous meta-analysis showed that self-report measures of safety-related constructs perform well [2], this remains a limitation. Second, the cross-sectional design of the study makes it difficult to infer causality and draw definite conclusions about the mediated relationships. The fact that the mediated relationship between safety climate and safety behaviors through safety motivation is well-established by both theory and past cross-sectional as well as longitudinal research [2,8] may provide confidence in the results obtained in the current study for the mediation tests [55]. Nevertheless, mediation analysis with cross-sectional data is prone to the threat of biased estimates [56,57], and research utilizing longitudinal designs is warranted to confirm the findings obtained in this study. Third, the data were collected from a manufacturing factory, and the results should be taken with caution when generalizing to other work areas. While the supervisory practices on safety behavior yield similar results in different sectors [13], safety culture and safety behavior can be observed and manifested differently in different work areas such as construction [46], food industry [58], airline industry [59], health care [60], or manufacturing [10]. The way safety behavior is measured is also different as the jobs may involve different tasks and procedures [58,61]. Hence, the effect of supervisor behavioral integrity for safety on safety motivation and safety behaviors of employees should be tested in different sectors. Lastly, we investigated the relationship between the supervisor's behavioral integrity for safety and safety climate as a unidimensional construct. However, recent research showed that safety climate has a multidimensional structure and dimensions that display distinct relationships with safety-related outcomes [62]. Investigating the role of supervisor's behavioral integrity for safety in the relationships between dimensions of safety climate and safety-related outcomes can be an interesting area for future research.

5. Conclusions

The current study provided important and useful information by revealing supervisor behavioral integrity for safety as a moderator of the relationship between top-management safety climate perceptions and safety motivation, and the mediated relationship between top-management safety climate and two safety performance types through safety motivation. Altogether, these results highlight the importance of supervisor behavioral integrity in the relationship between organizational-level safety climate and safety

outcomes, which provide valuable insight into safety research and practice.

Conflict of interest

The authors declare they have no conflict of interest.

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