

The Relationship between Leader-Members Exchange and Different Perceptions on Safety Climate in the Work Group

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Abstract

From the end of nineties leader – member exchange theory has been considered one of the most useful approaches for studying links between leadership and organizational outcomes and particularly with safety outcomes (Zohar, 2002; Hofmann and Morgenson, 1999). The studies of Zohar and Hofmann & Morgenson suggested to integrate leadership, and in particular leader – member exchange, and safety climate (SC) as crucial factors of occupational safety. In this study leadership style is connected with the organizational-level safety climate (OSC), i.e. shared perceptions about management priorities about safety, and with group-level safety climate, considering group’s supervisor as a climate agent (supervisor safety climate, SSC), i.e. shared perceptions about supervisor’s priorities about safety. OSC and SSC are considered from two different points of view: supervisor’s perceptions, and his/her group members’ perceptions. Agreement degree about level of OSC/SSC perceived from group members and level of OSC/SSC perceived from supervisor (i.e. his/her psychological OSC, and self-evaluation of his/her safety commitment in the case of SSC) depends on LMX level, and can mediate the effect of LMX level on safety behaviours. The aim of the present work is to study the relationship between LMX level and safety behaviours, specifically safety compliance, and the mediation role of agreement degree about OSC/SSC among supervisor and his/her group members. Data collection involved 508 blue-collars belonging to 3 Italian manufacturing companies. Safety climate was measured at the organizational level (OSC) and at the group level (SSC). The same measures were gathered also on their supervisors (22 team managers). The agreement degree was computed as the difference between supervisors' and their workers' scores. Results confirmed the hypothesis of the relationship between LMX scores and safety compliance: the higher the LMX scores, the higher the safety compliance. Furthermore, the mediation role of agreement degree has been verified showing a total mediation. This means that the impact of LMX on safety compliance depends on the distance between supervisor's and his/her members’ perceptions about the real importance of safety, at the organizational and at the group level. An important implication of this result is that organizations should develop effective exchange relationships between supervisor and work group, to improve safety at work.

Introduction

Safety climate and culture research developed successfully since the inquiry into Chernobyl disaster identified inadequate safety culture as a major underlying factor for the accident (IAEA, 1986). However, the most important seminal paper on this topic was

proposed by Zohar in 1980, some years before the disaster. In this paper Zohar offered a great contribution on the definition and operationalization of safety climate, showing how this construct is related to the general safety level in the organizations and, in particular, how “management commitment to safety is a major factor affecting the success of safety programs in industry” (1980, p. 101).

The ensuing success of this approach to safety is indicated by later studies, which show how safety climate is a robust predictor of safety subjective outcomes, such as safety behaviour, and of objective outcomes, such as accidents and injuries (Christian, Bradley, Wallace and Burke, 2009). Safety climate has been one of the most frequently studied antecedents of safety performance since nineties. Safety climate is usually defined as the shared perceptions of the employees on policies, procedures, and practices relating to safety. It can be investigated at two hierarchical levels: group level, and organizational level. At the group level, safety climate usually refers to the role of supervisor (e.g. Zohar, 2000; Zohar & Luria, 2005; Wallace, & Chen, 2006, Melià & Sesè, 2007), but recent research has highlighted the importance of co-workers’ role as well (Brondino, Silva, Pasini, in press). Leadership was recognized as an important antecedent of safety climate (Zohar and Luria, 2004; Mullen and Kelloway, 2009). Leader – member exchange theory (LMX) has evolved in the past few years as one of the most useful approaches for studying hypothesized links between leadership and organizational outcomes (Schriesheim, Castro, & Cogliser, 1999). Taking into account that LMX quality refers to an interaction process through which leaders exert demands and give resources to workers, recent study have claimed LMX is related with safety behaviour (Hofman, Morgeson & Gerras, 2003). Hofmann and Morgenson (1999) provided the first attempt to study leadership as a predictor of safety outcomes. Results showed that quality of relationships between group leaders and their supervisors (i.e., leader-member exchange – LMX – level) predicted injuries in work groups, through the mediating effects of some safety climate dimensions (safety communication and management commitment). Zohar (2002) suggested a mediation model in which leadership style influences safety-climate perceptions in the group and hence the group's safety performance.

In this framework, safety climate perception has a central role in the safety performance. However, the impact of agreement degree about organizational and group level safety climate between supervisors and members of their work group, on safety behaviours, has not been investigated yet. This agreement should depend on leadership style: closer, higher-quality relationships between supervisor and group members could lead to higher agreement degree about safety climate.

The aim of the present work is to study the relationship between LMX level and the agreement degree about safety climate (considering organizational level and group level, i.e. OSC and SSC) between supervisors and members of their work group. Furthermore, the study explores the mediating role of the agreement degree between LMX and safety compliance.

Discussion and hypothesis

Leader-member exchange theory is a useful approach for studying link between leadership and organizational outcomes. Group members in a context of high-quality relationships with their supervisor show higher level of resources, given the trust and the emotional support they receive from their leader (Uhl-Bien, Graen, & Scandura, 2000). Quality of relationships between supervisor and members also predict safety performance as accidents and injuries (Hofmann & Morgeson, 1999). Thus, a high level of quality of relationship between supervisor and his/her members should predict high level of safety behaviours.

Hypothesis 1: LMX will be positively related to safety behaviours.

Quality of relationships between supervisor and members is positively related to safety climate (Zohar, 2002), a leading indicator of safety performance. Climate implies a dynamic of social interactions. Complex environments present many confusing cues conducive to a collective interpretation process that makes an environment more understandable. Unit members communicate and discuss their understanding of work environment events, and develop a shared interpretation of that environment. According to this social-interaction approach, events can thus be understood homogeneously if subordinates communicate with one another (socially interact) while attempting to understand those events. One of the ways to reach consensus in a group can be social group interactions (Gonzalez-Roma, Peirò, Tordera, 2002; Klein, Conn, Smith, Sorra, 2001). Quality of members' interaction affects climate strength, a sort of agreement degree among members about environmental cues. All these studies have considered the role of agreement degree among peers (members), but no study considers agreement degree between supervisor and group members. Taking into account that leader-member exchange quality refers to an interaction process, high level of quality of relationship between supervisor and his/her members should predict high level of agreement degree about climate.

Hypothesis 2a: LMX will be positively related to agreement degree about Organizational Safety Climate.

Hypothesis 2b: LMX will be positively related to agreement degree about Supervisor Safety Climate.

The present study explores the underlying mechanism linking LMX to safety performance. The hypothesis is that this relationship is mediated by the agreement degree about climate between supervisor and his/her members. A different evaluation about safety priorities between supervisor and members could be connected with incoherent cues for worker, which could affect their safety performance.

Hypothesis 3a: Agreement degree about Organizational Safety Climate will mediate the relationship between LMX and safety behaviours.

Hypothesis 3a: Agreement degree about Supervisor Safety Climate will mediate the relationship between LMX and safety behaviours.

Procedure for collecting data

Data collection involved 508 blue-collars and their supervisors (22 team managers) belonging to 3 Italian metal-mechanical companies. A one-level design was used, considering the work-group level. All data was collected at individual level. Considering the whole sample, 98% of the participants were male; 74% had an educational level from 5 to 13 years of school; 82% of the participants had been working in the company for more than 10 year; all the participants had a permanent contract.

Measures

LMX is measured with the 7-item LMX measure provided by Graen and Uhl-Bien (1995). The items asked workers the extent to which they had high- quality exchanges with

their supervisor. Higher scores reflected higher quality exchanges. Items are accompanied by a 7-point rating scale ranging from 1 (not at all) to 7 (to a very large extent). Alpha reliability of this scale was .93.

Agreement degree on organizational safety climate (OSC) and supervisor's safety climate (SSC). The agreement degree consisted of the absolute difference between supervisors' and their workers' scores of OSC and SSC; higher values of this absolute difference means lower agreement degree (higher disagreement degree). OSC and SSC are measured with the Integrated Organizational Safety Climate Questionnaire by Brondino, Pasini, Silva (2011). OSC is measured with a 12-item scale in which the target of the safety climate judgement given by the worker is the entire organization. Each item of OSC scale is connected to one of the four domains identified by Griffin & Neal (2000, personal communication): Management values, Safety systems, Safety communication, and Safety training. Items are accompanied by a 7-point rating scale, ranging from 1 (never) to 7 (always). Alpha reliability of this scale was .95. SSC is assessed by a 10-item scale in which the workers had to judge the real importance given to safety by their direct supervisor in the work-group. Each item of SSC scale refers to two domains identified as supervisor reaction to the workers' safety behaviours and supervisor's own safety behaviour and effort to improve safety. Items are accompanied by a 7-point rating scale, commensurate with the organizational level scale. Alpha reliability of this scale was .96.

Safety behaviours are measured with a 4-item scale which refers to individual performance of safety compliance. The scale is an adjusted version of Griffin & Neal scale about safety behaviour (2000, personal communication). Responses were given on a 7-point Likert scale, from 1 = "not at all" to 7 = "very much". Alpha reliability of this scale was .80.

Procedure

Few days before administering the questionnaire, either the top management organized an ad hoc meeting with unions, the Safety Commission and the safety officer or a trade-union meeting was held and workers were told that they were part of a larger sample of workers involved in a research supported by INAIL, and received information about the research program. Participants were informed that the questionnaire was anonymous, and all data were collected and conserved by the research group. They were also ensured that only aggregate results would be given to the management of the company.

All participants answered the questionnaire during working hours, at the end or at the beginning of their work shift, and were asked to answer as sincerely as possible. They were told that items concerned with their perception of organizational management, direct supervisor, and work-group co-workers about safety at works, they were told that, in case they found difficult to answer to an item, due to ignorance of something regarding, for instance, organizational policy, they should choose the answer which was closest to their perception. At the end of the questionnaire participants were asked to answer questions about some socio-demographic data. Researchers were available during all time, to help participants, if necessary. The duration of the whole procedure was about 20 minutes.

Results

Descriptive statistics of the scales (means and standard deviations) and Bravais-Pearson's r correlation index among the variables are reported in Table 1. As expected, the correlation matrix showed that LMX is positively related with safety behaviours ($r=.19$; $p<.001$), supporting hypothesis 1 that the higher the leader-member exchange, the higher the safety behaviours. LMX negatively correlates with disagreement degree about OSC and SSC: a high quality of relationship between supervisors and their members lead to a lower

disagreement degree about safety climate perceptions, supporting hypotheses 2a and 2b. All correlation coefficients are significantly different from zero.

Table 1 - Descriptive statistics

Variables	M	SD	1	2	3	4
1. LMX	25,2	11,0	-	-.37**	-.68**	.19**
2. Disagreement degree - OSC	1,5	1,1	-	-	.63**	-.30**
3. Disagreement degree - SSC	2,3	1,5	-	-	-	-.24**
4. Safety behaviours	5,8	1,1	-	-	-	-

** = p value < .01

To test the hypothesised mediational models shown in Figure 1, two path analyses were conducted, one considering agreement about OSC, and one considering agreement about SSC. Standardized path coefficients of the first model are shown in Figure 1. Hypothesis 3a predicted that agreement degree about OSC mediated the relationship between LMX and safety behaviours. The path coefficient from LMX to disagreement degree about OSC was negative and statistically significant ($\beta = -.37$, $p < .001$), i.e. higher LMX scores are connected with a lower disagreement degree about organizational safety climate between supervisors and their members. In turn, disagreement degree about OSC exerted a negative significant effect on safety behaviours ($\beta = -.27$; $p < .001$), suggesting that a high agreement between supervisor and members about organizational safety climate leads to high safety behaviours. The direct path running from LMX to safety behaviours does not significantly differs from zero ($\beta = .01$; n.s). The model explains 10% of variance in safety behaviours. In order to test the mediating role, we examined the significance of each indirect effect. In support to our hypothesis, the results showed that LMX had a significant indirect association, via agreement degree about OSC, with safety behaviours (standardized indirect effect = .10) and that agreement degree about OSC fully mediated this relationship, supporting hypothesis 3a.

Looking at agreement about supervisor's safety climate, similar results are found: The path coefficient from LMX to disagreement degree about SSC was negative and statistically significant ($\beta = -.68$; $p < .001$), showing that high leader-member exchange scores lead to low disagreement between supervisors and members. Similarly, disagreement degree about SSC has a negative significant effect on safety behaviours ($\beta = -.21$; $p < .001$): higher disagreement degree corresponds to lower safety behaviours. Furthermore, agreement degree about SSC fully mediated the relationship between LMX and safety behaviours (standardized indirect effect = .14), supporting hypothesis 3b.

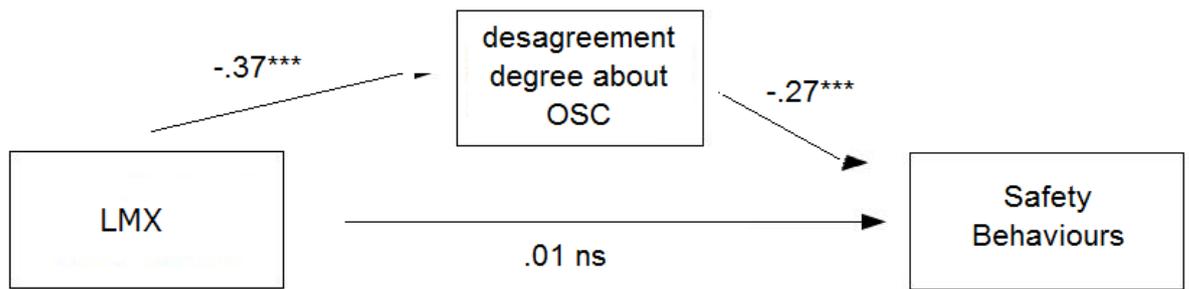


figure 1a

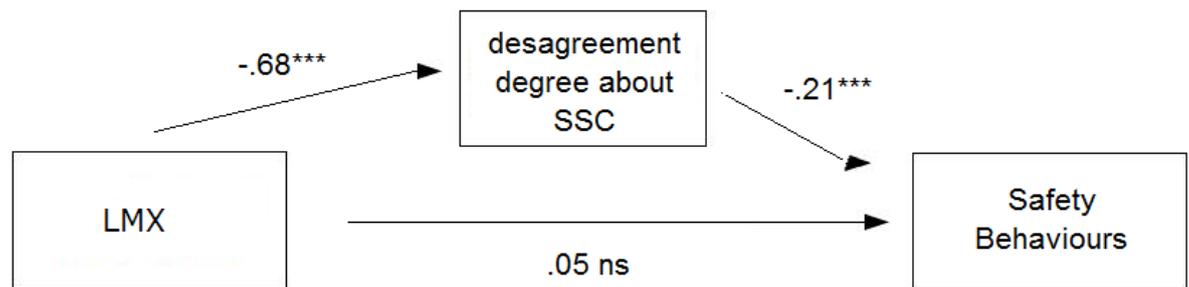


figure 1b

Figure 1. Hypothesized models with path coefficients, considering agreement about organizational safety climate (1a) and agreement about supervisor safety climate (1b). (n=508; *** = p<.001)

Conclusions

The aim of this study was to explore the relationship between LMX level and safety behaviours, specifically safety compliance, and the mediation role of agreement degree about OSC/SSC among supervisor and his/her group members. The hypothesized relationship between LMX scores and safety behaviour was found, and this result is consistent with results described by Hofmann and Morgeson (1999). However, this relationship seems to be fully mediated by agreement on safety climate. This variable is an indicator of how much supervisors' and their group members' perceptions of policies, procedures and practices about safety are similar. Quality of relationships between group leaders and their supervisors (i.e., leader-member exchange level) leads similar level of safety climate, which in turn lead to higher safety behaviour level.

International and managerial implications

Organizational psychology increasingly interested in the role that organizational factors can play in the safety field. This study suggest that employees that have high quality relationships with their supervisor show higher agreement degree about organizational and supervisor's safety climate. This agreement degree, in turn, is strongly related to safety behaviour. This suggests the importance to encourage the development of effective exchange relationships between supervisor and work group members. Positive relationships are in fact related to agreement and sharing about safety policy and values, and, in long run, this can contribute to the success of safety programs implementation.

This study is a first attempt to join together leadership style, safety climate and safety behaviours, considering the level of agreement about safety climate shared by supervisors and group members. Safety behaviours has been measured as safety compliance, and it should be interesting to explore whether this full mediation model should be valid with safety participation as well, which could be more directly influenced by leadership style.

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