

PROSOCIAL AND PROACTIVE SAFETY CITIZENSHIP BEHAVIOUR (SCB)

Prosocial and proactive “safety citizenship behaviour” (SCB):

The mediation role of affective commitment and psychological ownership

Matteo Curcuruto & Mark A. Griffin

(PREPARED FOR SAFETY SCIENCE)

Author Note: Matteo Curcuruto, School of Social Sciences, Leeds Beckett University, Leeds, United Kingdom. Mark A. Griffin, UWA Business School, University of Western Australia, Crawley, Australia. Correspondence concerning this article should be addressed to: Matteo Curcuruto, School of Social Sciences, Leeds Beckett University, Portland Way, Leeds, LS1 3HE, United Kingdom. Email: matteo.curcuruto@gmail.com

Acknowledgements: The authors desire to thank Renato Frigerio (BASF) for his kind support with the survey administration and the data collection at the basis of the present study. The authors desire also to say thank to the staff of the Centre for Safety at the University of Western Australia, for their support along all the research. A special thanks to professor Sharon Parker for her conceptual suggestions and inspirations.

Abstract

Safety citizenship behaviour (SCB) is an important participation factor in work-groups. Our study aims to study the influence of some antecedents of this safety-specific dimension of organizational citizenship. In the light of the current research stream that distinguishes between prosocial vs. proactive forms of organizational citizenship, we will investigate the effects of the following variables: organizational support for safety participation; team safety climate; psychological ownership toward the management of safety; affective commitment toward the organization. The research was conducted in a multinational chemical industry (N = 314). Prosocial oriented forms of SCB (*safety stewardship*) were mainly related to the influence of affective dimensions of organizational belongingness (*affective commitment*). On the other hand, proactive oriented forms of SCB (*safety voice*) showed higher linkages with the internalization of safety promotion instances (*psychological ownership*). The conclusions of the article include conceptual implications for academic research and managerial practice. The aim of this is to support a broader safety citizenship orientation by the workforce in the management of safety related instances in the workplace.

Keywords: proactivity; safety behaviour; organizational citizenship; organizational support; affective commitment; psychological ownership

Prosocial and proactive “safety citizenship behaviour” (SCB):

The mediation role of affective commitment and psychological ownership

1. Introduction

Organizational citizenship behaviour (OCB) is a typology of individual behaviour at work that has positive consequences for organizations. The concept of Organizational Citizenship highlights factors beyond economic exchange that regulate the relationship between individuals and their organization. The exchange involves a willingness to cooperate, a type of prosocial behavioural orientation and a high organizational involvement (Organ, Podsakoff, & Mackenzie, 2006). Organizational citizenship behaviours have a major impact on the effectiveness and efficiency of working groups and organizations, thus contributing to the overall productivity of the organization (Nielsen, Hrivinack, & Shaw, 2009; Podsakoff, Blume, Whiting, & Podsakoff, 2009).

Similarly, in the field of occupational safety, research studies show that safety-specific organizational citizenship behaviours might be related to positive safety outcomes for organizations. These behaviours go beyond safety compliance and can support the overall safety of the organization through either risk management or accident prevention (Curcuruto, Conchie, Mariani, & Violante, 2015). Specific organizational citizenship behaviours include acts to protect the safety of other people, endeavouring to prevent the occurrence of accidents, proactively striving to improve organizational safety systems and general conditions of safety in the workplace (Conchie, 2013).

Although the importance of safety citizenship behaviours is now recognized, there is no clear typology of the different kinds of behaviour that go beyond core safety compliance. In addition, few studies have focused on the factors that motivate different types of safety citizenship behaviour. These limitations mean that behaviours that are important for the long-term safety of organizations might not be adequately recognized or managed appropriately. Therefore, the goal of the current study was to clarify the distinction between different types of safety citizenship behaviours and identify motivational antecedents of these behaviours.

For instance, change-oriented OCB typologies (voice; initiative) seem to be mainly related to proactive actions and programs for the improvement of safety systems (i.e. analysis of potential critical events for safety, like near-misses). On the other hand, more affiliative-oriented OCB (protective stewardship; helping colleagues) might be more directly associated to the reduction of negative safety outcomes for the employees, like micro-injuries and property damage in the work environment.

In the following sections we first review the existing categories of organizational citizenship and identify links to the safety literature. We then differentiate distal and proximal antecedents of safety citizenship. Finally, an empirical research conducted in a chemical industrial plant will be presented.

2. Taxonomies of organizational citizenship behaviour and safety at work

Early research distinguished two main categories of OCB on the basis of their relationship to the *target* specific behaviours. One set of behaviours is targeted toward other *people* and their work activities (e.g., acts of altruism; courtesy between colleagues), the second set is targeted toward the general *organization* itself (e.g., conscientiousness; civic virtue; sportsmanship) (Williams & Anderson, 1991).

Subsequent research has paid greater attention to the *focus* of citizenship. In particular, researchers have distinguished OCBs that *promote* change by individuals, teams and organizations from affiliative behaviours that *protect* people and the stability of work activities and organizational processes (Conchie, 2013; Curcuruto & Griffin, 2016; Grant & Parker, 2009; McAllister, Kamdar, Morrison, & Turban, 2007; Parker, 2014). Change-oriented behaviours include *taking-charge*, which involves voluntary and constructive action by employees to facilitate organizational changes and improvements (Morrison & Phelps, 1999, p. 403), and *voice* (active communication), which has been defined as "the expression of constructive challenges to the organizational status quo with the intent to improve rather than merely criticize" (Van Dyne & Lepine, 1998, p. 109).

Change-oriented OCB can be distinguished from affiliative forms of citizenship behaviour which strengthen social relationships in the organization. Affiliative citizenship behaviours include prosocial, interpersonal, and cooperative behaviours that contribute to the overall effectiveness of work groups and- which eventually result in the strengthening of social relations within working groups and, more generally, organizations¹. Among the others, two of the most studied behaviours in the literature of *affiliative* OCB are *helping* and *stewardship*, defined as a voluntary extra-role behaviour aimed to support and protect colleagues and superiors in the fulfilment of their work functions (Van Dyne & Lepine, 1998). Overall, affiliative-OCBs have been highlighted as a strong predictor of job performance by teams and organizations (Podsakoff et al., 2009).

Affiliative OCBs have been studied more frequently than change-oriented OCBs in the psychological literature. However, several scholars have recently argued the importance

¹ In the remaining sections of the article we will use the expressions *changing-oriented* OCB as a synonym of "proactive citizenship behaviour". Similarly, we will use the label *affiliative-oriented* OCB as a synonym of "prosocial citizenship behaviour".

of including change-oriented behaviours focused on the correction of organizational problems and the improvement of the organizational system (McAllister et al., 2007).

Research suggests change-oriented and affiliative OCBs might be associated with different individual and organizational antecedents. For example, change-oriented OCBs, such as voice, are more strongly related to psychological constructs such as self-efficacy (Morrison & Phelps, 1999). On the other hand, affiliative oriented OCBs, such as helping others are more related to the psychological construct of role-expectations or how much the behaviour is typical in the organization (McAllister et al., 2007). These differences highlight the importance of more integrated research approaches that integrates the psychological mechanisms specifically associated with the two main clusters of OCBs.

We apply the concept of change-oriented and affiliative OCB to the domain of safety-related behaviours to clarify the nature of safety citizenship behaviour (SCB) (Conchie, 2013; Hofmann, Morgeson, & Gerras, 2003) and potential predictors of its different elements. Predictors identified by previous research include the strength of the safety climate in work-teams (Zohar, 2008), the extent of organizational support for employees' initiatives (Tucker, Chmiel, Turner, Hershcovis, & Stride, 2008), the quality of the social relationships in the workplace (Parker, Axtell, & Turner, 2001), and the psychological internalization by employees of their potential significant contribution in the promotion of workplace safety (Curcuruto, Mearns, & Mariani, 2016).

3. Antecedents of safety citizenship

The literature of organizational psychology and organizational behaviour describes several antecedents and mediators that can influence the emergence of OCBs in the context of safety promotion in organizations. Consistent with recent reviews on safety research in organizations (Christian, Bradley, Wallace, & Burke, 2009; Griffin & Curcuruto, 2016), we

first discuss more proximal *person-related* antecedents of safety citizenship. Then we will briefly discuss more distal *situation-related* antecedents which characterize a psychosocial environment supporting safety citizenship. In accordance with the model proposed by Christian et al. (2009), person-related antecedents are expected to yield larger relationships with safety behaviours than situational factors. Given the discretionary nature of safety citizenship, we will focus on psychological states by individuals, which in the literature are frequently associated with discretionary organizational behaviours like *affective commitment* and *psychological ownership* (Parker, Bindl, & Strauss, 2010). As far as the situation-related antecedents are concerned, we will focus on two contextual variables like *organizational support* and *safety climate*, which in past research were shown to be meaningful predictors of discretionary safety behaviours like safety citizenship (Christian et al., 2009; Turner et al., 2008)

Person-related antecedents: affective commitment and psychological ownership.

Research examining the exchange relationship between organizations and employee work conduct has shown to be reciprocal, with organizations that demonstrate high levels of investment and commitment in their workforce benefiting from enhanced levels of organizational citizenship behaviour (Mearns & Reader, 2008). Such research can be interpreted in the light of the social exchange theory (Blau, 1964), which posits that an individual who provides a service for another does so in the expectation and trust that there will be a future return for this service. Social exchange theory has been applied extensively to explain why employees undertake organizational citizenship behaviours, from which the concept of safety citizenship derives. A number of mechanisms have been used to explain the social exchange relationship between organizations and employees. In particular, theories of ‘affective commitment’ (Reader, Mearns, Lopes, & Kuhaand, 2017) and ‘psychological ownership’ (Curcuruto et al., 2016) have been increasingly used to account

for this relationship. Below we will describe the implications for research on safety citizenship.

Affective commitment. According to Hofmann et al. (2003), SCB is an expression of the employees' perception of the organizational social expectations about their direct involvement in the management of safety related issues. Involvement might be determined by the interaction of different organizational factors, such as the quality of the relationship with their direct supervisors, and the general perception of the safety climate in the organization. A process of social reciprocity, therefore, motivates individuals to express support for the organization (Blau, 1964; Mearns & Reader, 2008). In other words, employees' safety citizenship would be a symbolic and discretionary way to reciprocate high-quality relationships with supervisors, co-workers, and more broadly, with the organization itself (Curcuruto et al., 2016; Tucker et al., 2008). In a similar way, Parker et al. (2001) have highlighted the role of positive affective states toward the organization (i.e. affective commitment) as potential psychological mediators between a positive social environment and discretionary safety behaviours displayed by the workforce.

Psychological ownership. Other studies have highlighted the importance of the psychological processes associated with the subjective role definition in organizational settings, investigating safety citizenship as an informal facet of the expected role (Chmiel, Laurent, & Hansezand, 2017). Particularly in high-reliability organizations characterized by high levels of safety culture, people more easily see their personal commitment to safety citizenship actions as a real personal responsibility, beyond what is formally predicted as part of their role accountabilities (Turner, Chmiel, & Wall, 2005).

Generally, the construct of psychological ownership has been described as a cognitive-affective construct defined as "the state in which individuals feel as though the

target of ownership or a piece of that target is theirs” and reflects “an individual’s awareness, thoughts, and beliefs regarding the target of ownership” (Pierce, Kostova, & Dirks, 2001). As discussed by Parker et al. (2010), this psychological state encourages a perceived broader role orientation through which employees take responsibility for activities and problems beyond their immediate set of technical role tasks. In line with these conceptual assumptions, Curcuruto et al. (2016) found that psychological ownership related to safety influenced change-oriented SCB, including behaviours such as suggesting initiatives for safety improvement and open safety communication.

Situation-related antecedents: safety climate and organizational support. Two important antecedents at a more distal level include supervisor safety climate at the team level and organizational support for safety participation at the higher company level. On the one hand, a supervisor safety climate is considered essential by scholars (Zohar, 2008) to communicate the priority of safety management instances and values in the daily working activities in the organization at the shop floor level (Mariani, Curcuruto, Matic, Sciacovelli, & Toderi, 2017). On the other hand, organizational support for safety participation concerns the degree whereby companies set up effective managerial systems and practices which sustain open safety communication between the workforce and their organizations (Tucker et al., 2008).

Team safety climate. Social expectations concerning safety exercised by formal supervisors of teams and workgroups, and other managerial roles (e.g. line managers, department managers, safety managers and supervisors) can influence the motivational levels of workers’ engagement toward safety citizenship initiatives (Clarke & Ward, 2006; Conchie, 2013; Griffin & Hu, 2013; Mariani, Solda, & Curcuruto, 2015). Social expectations about safety citizenship are formally and informally expressed in the daily interactions between supervisors and their subordinates. These interactions contribute to

creating a positive safety climate in the workgroups which eventually affect worker commitment to safety (Neal & Griffin, 2006; Zohar & Luria, 2005). For instance, at the shop floor level, positive expectations for safety citizenship behaviour are expressed and reinforced when a supervisor publicly thanks an employee who spends time to report a problem or to prevent a risk (Barling & Hutchinson, 2000; Barling, Loughlin, & Kelloway, 2002). Similarly, at the managerial level, organizational expectations for safety citizenship can be expressed through the use of formal rewarding systems in order to reinforce the best spontaneous safety initiative (Neal & Griffin, 2006; Zohar & Luria, 2005).

Overall, high levels of safety expectations expressed by organizational leaders communicate safety values and safety priorities as fundamental norms of the organizational life, generating and supporting high levels of safety climate in the workplace (Griffin & Curcuruto, 2016; Neal & Griffin, 2006; Zohar, 2008). According to several studies, high levels of safety commitment expressed by organizational leaders would eventually play a relevant and specific motivational function on workers' willingness to get involved in voluntary safety promotion acts such as SCBs (Clarke, 2006; Conchie, 2013; Griffin & Hu, 2013).

Organizational support for safety participation. In addition to the psychological mechanisms related to safety climate, studies have considered other forms of social influence affecting workers' propensity to engage in safety citizenship (Griffin & Curcuruto, 2016; Reader et al., 2017). These authors argued that specific forms of organizational support for safety participation are an important signal that the company really cares about the active involvement by the workforce in safety management (Tucker et al., 2008). In other words, the construct of organizational support for safety participation expresses the degree whereby individuals perceive that the company supports them in playing a proactive role in the management of workplace safety (Tucker et al., 2008), by voicing their safety

concerns, ideas and opinions about how to manage it. When employees perceive concrete attention and real consideration by the company about their point of view on the actual safety management in the organization, they will be also more motivated to reciprocate this active listening by engaging themselves in discretionary acts of safety citizenship (Reader et al., 2017). In this social-exchange perspective, a supportive and participative style of safety management can be associated with a high level of commitment by the workforce in extra-role safety behaviours, like housekeeping (Geller, 2002), peer-to-peer mentoring (Brondino, Silva, & Pasini, 2012), proactive risk-reporting (Saracino, Curcuruto, Antonioni, Mariani, Guglielmi, & Spadoni, 2015), improvement initiatives (Simard & Marchand, 1995) and safety voice (Tucker et al., 2008).

4. Objectives and research hypotheses

Our review above outlines how affiliative and change-oriented SCBs are distinct safety behaviours that focus on different targets and outcomes. On the one hand, *affiliative* SCBs are prosocial behaviours, focused mainly on the protection of the health and safety of colleagues, and directly oriented to supporting the prevention of accidents and injury in the workplace (e.g. helping others do their work as safely as possible). On the other hand, *change-oriented* safety citizenship proactive behaviours are focused on improving organizational systems, processes and contingencies through voluntary initiatives of employees. These behaviours include making suggestions for safety improvement provided to superiors, safety managers or trade unions; engaging in peer-to-peer communication to increase colleagues' commitment toward safety; and proactively raising concerns about potential risks for safety.

Based on social exchange theory, our review identifies two distinct psychological processes that motivate the enactment SCB: affective commitment toward the organization

(Parker et al., 2001), and psychological ownership of safety promotion (Curcuruto et al., 2016). Both constructs are considered to be proximal predictors of SCBs and mediators of the effects of distal organizational antecedents like team safety climate and organizational support for safety participation. Our study goes beyond the existing literature which is generally focused on single psychological mediation processes (Tucker et al., 2008; Turner et al., 2005)

We first propose that people who experience a feeling of affective organizational commitment will be more motivated to engage in affiliative SCBs because affect generates a concern for the well-being of others that can be achieved by protecting safety conditions in the work environment. This proposition is in line with broader theories that consider safety citizenship behaviour as a way to reciprocate the quality of the social relationships between colleagues, superiors, and more broadly, with the organization itself. In line with research that identifies situational factors as more distal from behaviour compared to person-related factors, we also propose that affective organizational commitment will mediate the effect of organizational support and team safety climate on affiliative-oriented SCBs. Based on our review, we hypothesize that:

Hypothesis 1a) Individual affective commitment toward their organization positively influences workers' propensity to engage in *affiliative-oriented* SCBs, such as support and protection of colleagues' health and safety.

Hypothesis 1b) Individual affective commitment toward their organization is a mediator of the influence of team safety climate on *affiliative-oriented* SCBs by the individual.

Hypothesis 1c) Affective commitment mediates the relationship between organizational support for safety participation and *affiliative-oriented* SCBs by the individual.

Hypothesis 1d) Team safety climate is a mediator of the effects of organizational support toward safety participation and individual affective commitment toward his/her own organization.

We next propose that change-oriented SCBs will be motivated by a sense of psychological ownership through which employees feel responsible for the success of their workplace and have a sense of control over the changes that they can implement. Psychological ownership involves social exchange but reciprocation is based on more cognitive evaluations of the organizational relationship compared to the affective experience of commitment. Therefore, we expect that psychological ownership will support more change-oriented SCBs that are directed toward the quality of work and the overall safety of the organization. Studies of proactivity in organizations (Frese & Fay, 2001; Parker, Williams, & Turner, 2006) indicate that change of organizational settings and daily working conditions influence the anticipation of obstacles and resistance to change, envisioning opportunities, and planning the best course of action (Parker et al., 2010). As Griffin et al. (2007) suggested, proactive behaviors like change-oriented SCBs are often most important in weakly prescribed situations (Mischel, Shoda, & Mendoza-Denton, 2002), in which individuals have high levels of discretion, goals are not tightly specified, the means for achieving them are uncertain, and attainment is not clearly linked to rewards, as in the case of initiating change for the improvement of safety. Under such circumstances there needs to be a strong internal force driving the behaviour (Parker et al., 2010). Psychological ownership has been recently discussed in literature as a strong indicator of autonomous motivation (Matic, Mariani, Curcuruto, González, & Zurriaga, 2017). As argued by

Curcuruto et al., (2016), in the case of safety promotion, psychological ownership entails to consider the improvement of workplace safety as a of one's own personal responsibility. In other words, it would be not enough to consider that workplace safety is a priority for the company, and that the organization supports safety participation, to then consider that improving safety is someone else's responsibility (Curcuruto, Battistelli, & Mariani, 2016). Conversely, the feeling of psychological ownership for safety promotion fuels the individual experience of personal control and responsibility which enable and motivate people to initiate changes in the work procedures, organizational routines and production activities in order to make them safer and more reliable, and eventually creating a more sustainable work environment (Curcuruto, Guglielmi, & Mariani, 2013).

In line with this, we report below a specific set of hypotheses related to changing oriented SCBs.

Hypothesis 2a) Psychological ownership of safety promotion instances in the workplace positively influences the individual propensity to enact *changing-oriented* SCBs, like taking initiatives for safety improvement.

Hypothesis 2b) Psychological ownership of safety promotion instances in the workplace is a mediator of the effects of team safety climate on individual *changing-oriented* SCBs.

Hypothesis 2c) Psychological ownership of safety promotion instances in the workplace is a mediator of the effects of organizational support for safety participation and individual *changing-oriented* SCBs.

Hypothesis 2d) Team safety climate in working groups is a mediator of the effects of organizational support and individual psychological ownership of safety promotion instances in the workplace.

Insert here figure 1

5. Methodology

Sample and procedure. The study took place in a chemical industrial context in Southern Europe. This typology of industrial typology was selected due to existing studies which indicate chemical industries as an appropriate setting for research on proactive dynamics of safety management (Curcuruto et al., 2015; Hofmann et al., 2003; Zohar, 2008). We used a survey methodology for data collection, using existing validated measures with Likert scales as the template to collect self-reported answers by employees. The survey was carried out in four plants. A research team distributed the questionnaires in a sealed envelope together with the survey instructions and a short presentation letter explaining the specific scientific research aims of the survey. Thanks to the collaboration of top management of the plants, all the questionnaires were filled in and collected at the beginning of regular bi-monthly safety meetings, periodically scheduled in each department of the plant. All the data was collected in the training sections scheduled in a two-week period. Upon delivery of the questionnaires, the complete anonymity of responses was assured, explaining the explicit scientific purpose of the data collection. 314 valid questionnaires were eventually collected (74% of the whole worker population). The majority of workers were male (93.6%), with an average age of 41 years ($SD = 10.1$). Most participants had a high-school diploma (53.7%). The average job tenure was 12.4 years ($SD = 4.5$). Most respondents worked in the production areas of the plant (51.3%), the maintenance and storage departments (22.5%), and research and development functions (12.4%).

Measures. The survey questionnaire consisted of six psychometric scales (30 items) in order to obtain an estimation of the behavioural propensity by individuals to engage in affiliative and changing SCBs in their organization. Two scales were included in the questionnaire to evaluate the individual perception of two distal antecedents of safety citizenship, like team safety climate and organizational support for safety participation. Finally, two scales were used to assess the levels of individual affective commitment toward the organization, and the levels of psychological ownership of safety promotion instances in the workplace. All scales administered used a Likert format response to five intervals, and are briefly described below. All the psychometric properties of the scales are reported in Table 1.

Safety citizenship behaviour. The individual propensity to enact *affiliative-oriented SCBs* was assessed using the *safety stewardship* scale by Hofmann et al. (2003). Five items assessed the propensity to exhibit altruistic behaviours to protect the health and safety of other people in the workplace ("Taking actions to protect other members of the group from risky situations"). Participants were asked to indicate the frequency with which they engaged in that specific behaviour in the previous four months on a Likert scale (0=never; 4=frequently). We used this time interval in order to make our findings comparable with previous studies which used a similar retrospective time interval in assessing behavioural safety criteria (Zohar, 2002; Zohar & Luria, 2005). From a methodological perspective, this appears pertinent to our research because safety citizenship behaviour is relatively rare and not frequent compared to other typologies of safety behaviour (safety compliance) (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002). While some of our research variables are supposed to be relatively constant and stable over time (organizational support for safety participation; team safety climate) (Griffin & Curcuruto, 2016), safety citizenship behaviour focuses on specific actions exhibited by workers. Using this retrospective time interval to assess SCBs

will help us to address this measurement alignment issue between our independent and criteria research variables. Moreover, past research on proactive behaviour (Frese & Fay, 2001; Parker et al., 2006) showed that retrospective self-ratings of behaviour positively relate with the concurrent evaluations of external observers rating the same behaviour.

In the present sample, Cronbach alpha shows a good reliability of the scale (.90). Individual propensity to enact changing-oriented SCBs was assessed using a five-item scale of *safety voice* proposed by Tucker et al. (2008), with contents related to taking initiative to actively promote the improvement of safety aspects in the workplace (for example, "Discuss with colleagues and superiors how to improve safety in the workplace"). Again, participants were asked to indicate the frequency with which they engaged in that specific safety behaviour in the previous four months on a Likert scale (0=never; 4=frequently). In the present sample, Cronbach alpha was .92.

Affective commitment for the organization. Four items of Vandenberghe, Bentein and Stinglhamber (2004) were used to measure the dimensions of individual affective commitment toward the organization they were working for (1=strongly disagree; 5=strongly agree). An example of the item is: "This organization means a lot to me emotionally". In this study, the scale presented a Cronbach's alpha of .85.

Psychological ownership for safety promotion was assessed with four items by Curcuruto et al. (2016). The scale was designed to evaluate the extent to which individuals feel the safety programs in the organization are something they personally own, rather than somebody else's concern, like the direct supervisor, trade union or safety manager in the plant. An example of the items is: "It would be of personal interest to me if workers' initiatives for safety were not encouraged" (1=strongly disagree; 5=strongly agree). In the current research sample, the scale presented Cronbach's alpha of .88.

Team safety climate. A nine-item version of the questionnaire by Zohar and Luria (2005) was used to measure the individual perception of safety commitment by the direct supervisors in the supervision of safety related aspects of the daily work activities². The items were selected according to the study by Johnson (2007) on the internal properties of the original questionnaire. Examples of the item are: "My boss... frequently tells us about the hazards in our work" (1=strongly disagree; 5=strongly agree). In the present sample, the scale presented a Cronbach's alpha of .91.

Organizational support for safety participation. Three items by Tucker et al. (2008) were used to investigate employees' perception about the support by the organization toward a participative approach of safety management systems in the promotion of safety, investigating aspects like the active attention to employees' proposals, reporting actions, and expression of concerns for safety related issues. An example of the item is: "Employees are encouraged to voice their safety concerns". In the present sample, the scale presented a Cronbach's alpha of .84.

Data analysis. To assess the reliability of the measures related to our research variables, we calculated the Cronbach's alpha. The correlations between the variables were performed by the calculation of Pearson's r. The goodness of the measurement model was assessed through the following cut-off indices, which were considered as useful criteria to assess the fit of the statistical model with the empirical data: χ^2 ratio (< 3.0), CFI ($\geq .95$) and RMSEA ($< .08$) (Byrne, 2001). Finally, the study of the direct and mediation hypotheses

² The team safety climate measure is subject to grouping effects, so the interclass correlation coefficient ICC2 was estimated at the beginning of our analysis, as recommended by LeBreton and Senter (2008). ICC2 is an interrater reliability index used in social sciences to justify the aggregation of individual measures as aggregated indicators of collective group phenomena, with values equal to (or above) 0.70 considered as acceptable to justify the aggregation of individual measures.

Given preliminary agreements with the trade unions of the company, we were able to associate every questionnaire only at the department level of the company. Therefore, the ICC2 index was estimated with an overall sample of fifteen department units which embedded the 314 participants. However, the ICC2 eventually estimated with this sample of aggregated units was not so high (.56) to justify the aggregation of the individual measures provided by the participants.

was achieved by path analysis with structural equation models, using the method of maximum likelihood parameter estimation. The significance of indirect effects was tested with the bootstrapping method (5000 samples. Interval of confidence: .95) (Shrout & Bolger, 2002). Statistical analyses were performed with the software M-Plus.

6. Results

Preliminary analysis. The psychometric goodness of our measurement model was preliminarily tested and verified through structural equation models using confirmative factor analyses (Byrne, 2001). We used *maximum likelihood estimation* to derive measurement model factor loadings. Factor analyses conducted on our questionnaire items confirmed the presence of six latent factors of our measurement model ($\chi^2 / df = 1.91$, CFI = .95, RMSEA = .06). The table in appendix 1 reports items loading for every psychometric factor of our research model.

Moreover, in order to demonstrate that our measurement model was the one most suitable to our empirical data, we specified two alternative models in order to compare the goodness of our hypothesized model against two other concurrent measurement models which could have been hypothesized on alternative conceptual bases from the literature. In *alternative model 1* we combined the items of the two organizational antecedent factors: team safety climate and organizational support for safety participation. However, this first concurrent model did not obtain satisfactory fit indices ($\chi^2 / df = 2.37$, CFI = .92, RMSEA = .08). Then we ran *alternative model 2*, where we combined all the items of affiliative and changing-oriented SCB dimensions in a single general factor of safety citizenship. Once again, this concurrent model proved to be not adequate for our data ($\chi^2 / df = 2.84$, CFI = .88, RMSEA = .09).

Finally, since we used only self-report measures and a cross-sectional research design, it was verified whether the statistical variance associated with common method bias might be a threat to our statistical analysis. In this perspective, we applied the Harman test to see if a single method factor can explain all the variance in our data (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The CFA showed that the fit indices are not adequate for a single model factor ($\chi^2/df = 8.36$; CFI = .45, RMSEA = .19). Therefore we concluded that the variance explained by our statistical analyses might not be distorted in a significant way by methodological biases related to the usage of self-report measures (Podsakoff et al., 2003). Based on these preliminary results, correlation analyses and verification of our research hypotheses are described below.

Descriptive and correlations statistics. Correlation statistics are reported in Table 1. Although the correlation between the two typologies of *affiliative* and *changing* oriented SCBs is high, equal to .57, this is not so high as to support a concurrent research hypothesis of substantial identity between the two categories. This statistical correlation is still higher than those with the remaining variables. Some of the correlation values reported in the table seem to provide support for statistical effects of total mediation, rather than partial mediation (Preacher & Hayes, 2004). This concerns the correlations between team safety climate and affiliative SCBs (hypothesis H1b), and between organizational support for safety participation and the two typologies of SCBs (hypothesis H1c and H2c). In all these cases, the correlations between the organizational antecedents (organizational support; team safety climate) and the two categories of SCBs do not appear to be statistically significant.

Insert here Table 1

Hypothesis verification. The path model presented in Figure 2 illustrates the regression indices for all our hypothesized causal effects. As the two categories of SCBs presented a significant high level of statistical correlation, we had to specify a correlation between the error factors associated with these two categories. In this way, we obtained an adequate statistical goodness of our model: $\chi^2 = 20.11$; $df = 7$; $\chi^2 / df = 2.91$; CFI: 96; RMSEA: 07. On this basis, in the following paragraphs we will discuss the consequent statistical results in more detail.

Affiliative-oriented SCB hypotheses. The affective commitment toward the organization is found to influence the employees' propensity to enact *affiliative* SCBs (.29) (Table 3). This result provides support to hypothesis *H1a*. The affective commitment is influenced by both the distal antecedents' organizational support (.25) and team safety climate (.23). The inclusion in the model of direct effects between organizational support and *affiliative* SCBs ($\chi^2 = 19.41$, $df = 7$), or between team safety climate and *affiliative* SCBs ($\chi^2 = 20.05$, $df = 7$), does not make significant improvements to the goodness of the model. In the light of this, we can assume statistical support for the indirect nature of the mediation effects between team safety climate and *affiliative* SCBs (*H1b*), and between organizational support for safety participation and *affiliative* SCBs (*H1c*). In addition, statistical findings highlight the direct effect of organizational support on team safety climate (.53). This result, together with the effect of team safety climate on affective commitment, supports the verification of our hypothesis *H1d*, with organizational support indirectly impacting on affective commitment (.14) through the partial mediation by team safety climate. A summary of all the direct, indirect and total regression effects related to *affiliative* SCBs and affective commitment is reported in Table 2.

Changing-oriented SCB hypotheses. Looking to the second set of our research hypotheses, we found support for the direct effect by psychological ownership toward safety

management and *changing-oriented* SCBs (.28). This result provides support to hypothesis *H2a*. Psychological ownership is influenced by organizational support for safety participation (.16) and team safety climate (.21). The inclusion in the model of a direct effect between organizational support and *changing-oriented* SCBs ($\chi^2 = 21.17$, $df = 7$), and between team safety climate and *changing-oriented* SCBs ($\chi^2 = 20.01$, $df = 7$) does not provide any statistically significant improvement to our research model. We can therefore assume a statistical verification for a total mediation function of psychological ownership between organizational support (hypotheses *H2b*) and team safety climate with *changing-oriented* SCBs (hypotheses *H2c*). Finally, we found support for an indirect effect (.10) by organizational support for safety participation on psychological ownership for safety promotion (*H2d*), through the partial mediation of team safety climate. Mediation analyses tests are described and reported in Table 2. Finally, an overall summary of all the direct, indirect and total regression effects related to *changing-oriented* SCBs and psychological ownership is reported in Table 3.

 Insert here Figure 2 , Table 2 and 3

7. General discussion and conclusions

This research was developed to investigate organizational antecedents and psychological drivers of safety citizenship behaviour (acronym: SCB), as a discretionary behaviour supporting the promotion of safety in the workplace. In the light of the recent literature on organizational citizenship, we hypothesized differential effects of contextual antecedents (organizational support for safety participation; team safety climate) and psychological

constructs (psychological ownership; affective commitment) on distinct categories of SCB. More specifically, different influence mechanisms were hypothesized affecting two different types of SCBs: on the one hand, *affiliative oriented* SCBs, which are meant to be pro-socially focused, and aimed at protecting the health and safety of colleagues from risks and hazards (e.g. stewardship behaviour; risk warning). On the other hand, *changing-oriented* SCBs, which are meant to be focused more on proactivity dynamics, and aimed at improving safety-related issues (e.g. expressing safety concerns; providing suggestions for improvement).

Conceptual contributions. Overall, the hypotheses were verified by the empirical results, although the variance of the two main dimensions of SCBs was found to be substantially low. The results of our factor analyses seem to support the recent theoretical tendencies inherent in general OCBs, which distinguish at least two macro-categories of organizational citizenship behaviour in terms of degree of change produced in the organization (affiliative VS change-oriented). In addition, our path analysis model confirmed that, at least in the specific organizational domain of safety management, these major categories of OCBs are differently associated with particular psychological mediation processes (affective commitment; psychological ownership). Affiliative-oriented SCBs were found to be directly influenced by the levels of affective commitment to the organization. This appears theoretically founded in the light of the social-exchange literature (Mearns & Reader, 2008; Parker et al., 2001). In this perspective, SCBs emerge as a discretionary way for employees to reciprocate the quality of their work experience in the organization to which they feel a genuine feeling of belongingness (affective commitment). This discretionary commitment by employees will be consistently directed with the perception that they have of organizational support for safety participation and with the perception of safety climate in their working teams. In turn, the influence of psychological ownership on

changing SCBs appears consistent with the literature of role-orientation (Curcuruto et al., 2016). Workers who perceive a high level of safety climate and organizational support will tend to develop higher role boundaries in relation to safety management (Zohar, 2008), along with perceptions of greater influence, controllability and personal responsibility over specific safety related issues. Therefore, they will appear more likely to express and exhibit behaviours of personal initiative and safety voice to express their suggestions, expectations and concerns about safety in the workplace.

Overall, we believe that the findings from the present research entail a few conceptual advancements for the substantive theory on social exchange and role orientation research paradigms. First, our results show that the perceptions of organizational support affect organizational citizenship through two distinct internal psychological processes (psychological ownership; affective commitment), whereas previous literature on social exchange tends to focus only on the role of affective commitment (Reader et al., 2017). At the same time, our findings provide new insights on theories of proactive role orientation (Curcuruto et al., 2016), which were investigated in our present study in terms of “psychological ownership”, in line with former studies on proactivity in organizations (Parker et al., 2006). More precisely, our study provides empirical support to better understand the distinctive and unique impact of a proactive role orientation toward the management of workplace safety. Our findings showed that checking for the psychological effects of affective commitment and changing oriented forms of safety citizenship are associated uniquely with psychological ownership. Overall, we showed both affective commitment and psychological ownership present distinctive links with complementary forms of safety citizenship, supporting a composite definition of the safety citizenship construct.

Moreover, our results can also stimulate further reflection on safety citizenship research in the light of the theory of the regulatory focus of Higgins (2000), which contrasts *promotion* versus *prevention* forms of motivation focus. The psychological processes associated with affiliative oriented SCBs (protecting colleagues) can be seen as the expression of a preventive motivation approach toward safety management, with respect to safeguarding the welfare of colleagues and the functioning of the organization and supporting safety systems and procedures in place. On the other hand, the psychological processes associated with changing oriented SCBs (raising concerns and suggestions) appears as the expression of a promotive motivation approach toward safety management. Although safety behaviours are mainly associated in the literature with a preventive motivational focus (Wallace & Chen, 2006), it might be possible that certain organizational contexts characterized by a high positive safety climate associated with adequate levels of psychological ownership can facilitate the expression of a complementary promotion-oriented focus. This can be especially true in work contexts characterized by high levels of job autonomy, participative decision-making and discretionary planning of activities of work activities, as is the case of the chemical company hosting our study (Zohar, 2008). Future studies could better investigate whether in such socio-technical systems with high-reliability processes, the management of workplace safety could be more easily associated with a promotion oriented focus. This would assume safety as a positive and crucial value for the strategic management and achievement of the goals of the individuals and teams, and eventually for the mission of the organization (Bindl, Parker, Totterdell, & Hagger-Johnson, 2012; Higgins, 2000; Hollnagel, 2014).

Limitations and future research. Some limits of the present study should be pointed out, from both a theoretical and methodological point of view. From a conceptual point of view, we focused our attention on a limited set of antecedents of safety citizenship. For

instance we did not take into consideration individual antecedents like individual trait-dispositions, safety knowledge or the subjective perception of risks and hazards in the workplace, which may affect the emergence of safety-specific forms of organizational citizenship behaviour (Christian et al., 2009; Leiter et al., 2009).

Second, it might be assumed that the levels of the effects of the psychological mediators considered here (affective commitment; psychological ownership), can be significantly moderated by the levels of other psychological variables related to social aspects of the working groups (e.g. psychological safety; cohesion among group members; co-workers trust; leader-member exchange) (Matic et al., 2017; Parker et al., 2001). Or in relation to other psychological dimensions concerning the job-design of work activities of individuals and teams (e.g. degree of interdependence of roles and tasks; perception of voluntariness and decision-making autonomy) not controlled in this study and that may exert restraints on the exercise of discretionary behaviours like safety citizenship (Griffin & Curcuruto, 2016; Parker, 2014; Parker et al., 2001).

From a methodological point of view, the first weakness is that this study was based on a cross-sectional and not longitudinal research design. Consequently, a certain degree of caution appears necessary with the interpretation of the findings when we attempt to infer causal links between the present variables. Second, the research data was collected exclusively through a self-report questionnaire. Even if previous studies (Curcuruto et al., 2015) have showed that SCBs are effectively associated with observable and measurable organizational safety outcomes (near misses; property damages), the validity of self-report measures is always threatened by bias inherent in the use of a single method to detect all of the research variables. However, this potential bias has been partially controlled by the use of the Harman test.

Practical implications for managerial programs in organizations.

In terms of practical implications, the findings suggest that supervision training and participative safety programs aimed at improving an organization's safety performance can be most effective if they are targeted at specific safety citizenship behaviours. Given that both classes of behaviour (affiliative and change-oriented SCBs) play an important and complimentary role in promoting safety (Curcuruto et al., 2015), interventions or training initiatives that focus too heavily on the entire class of behaviours, or on those behaviours unrelated to the outcome, may observe minimal improvements. From a managerial perspective, organizations may increase change-oriented SCBs by investing in communication strategies by team supervisors that focus on stimulating and reinforcing employees to go above and beyond mandatory safety behaviours when they offer meaningful safety related feedback (Saracino et al., 2015). Similarly, public reward systems for raising suggestions about safety, for example, would provide employees with a visible demonstration of managerial support and recognition by top management for their commitment to safety communication (Geller, 2002). In contrast, research on job design suggests that affiliative oriented SCBs may be more effectively promoted by focusing on the social aspects of teamwork (Parker, 2014). From a managerial perspective, organizations may increase affiliative-oriented SCBs by training team supervisors in managing psychosocial aspects of workgroups, reinforcing interdependence, cohesion, and peer-to-peer communication. All this serves to enhance mutual trust and a positive psychological atmosphere in the workgroup (Frese & Fay, 2001). One outcome of this may be an increase in prosocial efforts like engaging in affiliative SCBs, such as looking out for the safety of others when carrying out job tasks.

References

- Barling, J., & Hutchinson, I. (2000). Commitment vs. control-based safety practices, safety reputation, and perceived safety climate. *Canadian Journal of Administrative Sciences, 17*, 76-84.
- Barling, J., Loughlin, C., & Kelloway, E. K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology, 87*, 488-496.
- Bindl, U. K., Parker, S. K., Totterdell, P., & Hagger-Johnson, G. (2012). Fuel of the self-starter: How mood relates to proactive goal regulation. *Journal of Applied Psychology, 97*, 134-150.
- Blau, P. (1964). *Exchange and power in social life*. New York: Wiley.
- Brondino, M., Silva S. A., & Pasini, M. (2012). Multilevel approach to organizational and group safety climate and safety performance: co-workers as the missing link. *Safety Science, 50*, 1847-1856.
- Burke, M. J., Sarpy, S. A., Tesluk, P. E., & Smith-Crowe, K. (2002). General safety performance: A test of a grounded theoretical model. *Personnel Psychology, 55*, 429-457.
- Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Chmiel, N., Laurent, J., & Hansez, I. (2017). Employee perspectives on safety citizenship behaviors and safety violations. *Safety Science, 93*, 96-107.
- Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. *Journal of Applied Psychology, 94*, 1103-1127.

- Clarke, S. (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology, 11*, 315-327.
- Clarke, S., & Ward, K. (2006). The role of leader influence tactics and safety climate in engaging employees' safety participation. *Risk Analysis, 26*, 1175-1185.
- Conchie, S. (2013). Transformational leadership, intrinsic motivation and trust: A moderated-mediated model of workplace safety. *Journal of Occupational Health Psychology, 18*, 198-210.
- Curcuruto, M., Conchie, S. M., Mariani, M. G., & Violante, F. S. (2015). The role of prosocial and proactive safety behaviors in predicting safety performance. *Safety Science, 80*, 317-323.
- Curcuruto, M., & Griffin, M. A. (2016). Safety proactivity in organizations: The initiative to improve individual, team and organizational safety. In S. K. Parker & U. Bindl (Eds.), *Proactivity at Work: Making Things Happen in Organizations* (pp. 105-137). New York: Routledge.
- Curcuruto, M., Guglielmi, D., & Mariani, M. G. (2013). Organizational citizenship for safety: Psycho-social processes of mediation. *Psicologia Sociale, 8*, 229-248.
- Curcuruto, M., Mariani, M. G., & Battistelli, A. (2016). Proactive orientation toward work safety: A qualitative study on motivational antecedent. *Giornale Italiano di Medicina del Lavoro ed Ergonomia, 38*, 295-301.
- Curcuruto, M., Mearns, K. J., & Mariani, M. G. (2016). Proactive role-orientation toward workplace safety: Psychological dimensions, nomological network and external validity. *Safety Science, 87*, 144-155.
- Frese, M., & Fay, D. (2001). Personal initiative (PI): An active performance concept for work in the 21st Century. *Research in Organizational Behavior, 23*, 133-187.
- Geller, E. (2002). *The participation factor*. Boca Raton: CRC Press.

- Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals*, 3, 317-375.
- Griffin, M. A., & Curcuruto, M. (2016). Safety climate in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 3, 191-212.
- Griffin, M. A., & Hu, X. (2013). How leaders differentially motivate safety compliance and safety participation: The role of monitoring, inspiring, and learning'. *Safety Science*, 60, 196-202.
- Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: Positive behavior in uncertain and interdependent contexts. *Academy of Management Journal*, 50, 327–347.
- Higgins, E. (2000). Making a good decision: Value from fit. *American Psychologist*, 55, 1217-1230.
- Hofmann, D. A., Morgeson, F. P., & Gerras, S. J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. *Journal of Applied Psychology*, 88, 170-178.
- Johnson, S. E. (2007). The predictive validity of safety climate. *Journal of Safety Research*, 38, 511-521.
- LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11, 815-852.
- Mariani, M. G., Curcuruto, M., Matic, M., Sciacovelli, P., & Toderi, S. (2017). Can leader-member exchange contribute to safety performance in an Italian warehouse? *Frontiers in Psychology*, 8, 1-9.
- Mariani, M. G., Solda, B. L., & Curcuruto, M. (2015). Employee safety motivation: Perspectives and measures on the basis of the self-determination theory. *Medicina del Lavoro*, 106, 333-341.

- Matic, M., Mariani, M. G., Curcuruto, M., González, P., & Zurriaga, R. (2017). The role of psychological ownership in the relationship between leader-member exchange and job satisfaction. *TPM. Testing, psychometrics, methodologies in applied psychology*, 24.
- McAllister, D., Kamdar, D., Morrison, E. M., & Turban, D. B. (2007). Disentangling role perceptions: how perceived role breadth, discretion, instrumentality, and efficacy relate to helping and taking charge. *Journal of Applied Psychology*, 92, 1200–1211.
- Mearns, K. J., & Reader, T. T. (2008). Organizational support and safety outcomes: An uninvestigated relationship? *Safety Science*, 46, 388-397.
- Mischel, W., Shoda, Y., & Mendoza-Denton, R. (2002). Situation-behavior profiles as a locus of consistency in personality. *Current Directions in Psychological Science*, 11, 50–54.
- Morrison, E. W., & Phelps, C. C. (1999). Taking charge at work: Extra role efforts to initiate workplace change. *Academy of Management Journal*, 42, 403–419.
- Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, 91, 946-953.
- Nielsen, T. M., Hrivnak, G. A., & Shaw, M. (2009). Organizational citizenship behavior and performance: A meta-analysis of group-level research. *Small Group Research*, 40, 555-577.
- Organ, D. W., Podsakoff, P. M., & MacKenzie S. P. (2006). *Organizational citizenship behavior: Its nature, antecedents, and consequences*. London: Sage Publications.
- Parker, S. K. (2014). Beyond Motivation: Job and Work Design for Development, Health, Ambidexterity, and More. *Annual Review of Psychology*, 65, 661-691.

- Parker, S. K., Axtell, C. M., & Turner, N. (2001). Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology, 6*, 211-228.
- Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. *Journal of Management, 36*, 827-856.
- Parker, S. K., Williams, H. M., & Turner, N. (2006). Modeling the antecedents of proactive behavior at work. *Journal of Applied Psychology, 91*, 636-652.
- Pierce, J., Kostova T., & Dirks, K. (2001). Toward a theory of psychological ownership in organizations. *The Academy of Management Review, 26*, 298-310.
- Podsakoff, N. P., Blume, B. D., Whiting, S. W., & Podsakoff, P. M. (2009). Individual and organizational level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 94*, 122-141.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology, 94*, 879-903.
- Preacher, K. J., Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*, 717-731.
- Reader, T. W., Mearns, K., Lopes, C., & Kuha, J. (2017). Organizational support for the workforce and employee safety citizenship behaviors: a social exchange relationship. *Human Relations, 70*, 362-385.
- Saracino, A., Curcuruto, M., Antonioni, G., Mariani, M. G., Guglielmi, D., & Spadoni, G. (2015) Proactivity-and-consequence-based safety incentive (PCBSI) developed with a fuzzy approach to reduce occupational accidents. *Safety Science, 79*, 175-183.

- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422-445.
- Simard, M., & Marchand, A. (1995). A multilevel analysis of organisational factors related to the taking of safety initiatives by work groups. *Safety Science, 21*, 113-129.
- Tucker, S., Chmiel, N., Turner, N., Hershcovis, M., & Stride, C. B. (2008). Perceived organizational support for safety and employee safety voice: The mediating role of coworker support for safety. *Journal of Occupational Health Psychology, 13*, 319-330.
- Turner, N., Chmiel, N., & Walls, M. (2005). Railing for Safety: Job Demands, Job Control, and Safety Citizenship Role Definition. *Journal of Occupational Health Psychology, 10*, 504-512.
- Van Dyne, L., & LePine, J. A. (1998). Helping and voice extra-role behaviors: Evidence of construct and predictive validity. *Academy of Management Journal, 41*, 108–119.
- Vandenberghe, C., Bentein, K., & Stinglhamber, F. (2004). Affective commitment to the organization, supervisor, and work group: Antecedents and outcomes. *Journal of Vocational Behavior, 64*, 47-71.
- Wallace, C., & Chen, G. (2006). A multilevel integration of personality, climate, self-regulation, and performance. *Personnel Psychology, 59*, 529-557
- Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management, 17*, 601-617.
- Zohar, D. (2008). Safety climate and beyond: A multi-level multi-climate framework. *Safety Science, 46*, 376-387.

Zohar, D., & Luria, G. (2005). A Multilevel Model of Safety Climate: Cross-Level Relationships Between Organization and Group-Level Climates. *Journal of Applied Psychology, 90*, 616-628.

Table 1: Descriptive, correlation, reliability statistics (Cronbach's alpha) (N = 314)

Dimension	M	SD	α	1	2	3	4	5	6
Affiliative-oriented SCB (<i>stewardship</i>)	3.02	.97	.90	--					
Changing-oriented SCB (<i>voice</i>)	3.08	1.04	.92	.57**	--				
Affective commitment	3.88	1.01	.85	.39**	.22**	--			
Psychological ownership	3.79	.89	.88	.13*	.35**	.20**	--		
Team safety climate	3.43	.98	.91	.11*	.03ns	.32**	.24**	--	
Organizational support for participation	3.66	1.04	.84	.05ns	.08ns	.37**	.21**	.59**	--

Note: * $p < .05$; ** $p < .01$

Table 2: Test of indirect mediation effects (N = 314): effect size, standard error (SE), lower and upper confidence intervals

Mediation hypothesis description	Effect size	SE	Lower CI	Upper CI
<i>Hypothesis 1b</i> Team safety climate affects <i>affiliative oriented</i> SCBs by individuals via the affective commitment toward the organization (<i>total mediation hypothesis</i>)	.15	.03	.10	.24
<i>Hypothesis 1c</i> The perception of organizational support for safety participation affects individual <i>affiliative oriented</i> SCBs via the affective commitment toward the organization (<i>total mediation hypothesis</i>)	.10	.04	.12	.27
<i>Hypothesis 1d</i> The perception of organizational support toward safety participation influences individual affective commitment via the perceived team safety climate (<i>partial mediation hypothesis</i>)	.14	.03	.07	.25
<i>Hypothesis 2b</i> Team safety climate influences individual <i>changing-oriented</i> SCBs via psychological ownership of safety promotion instances (<i>total mediation hypothesis</i>)	.12	.03	.06	.19
<i>Hypothesis 2c</i> The perception of organizational support for safety participation affects individual <i>changing-oriented</i> SCBs via psychological ownership of safety promotion instances (<i>total mediation hypothesis</i>)	.11	.04	.06	.17
<i>Hypothesis 2d</i> The perception of organizational support for safety participation affects psychological ownership of safety promotion instances via the perceived team safety climate (<i>partial mediation hypothesis</i>)	.10	.04	.04	.13

Indirect effects tested with bootstrapping method (5000 samples. Interval of confidence: .95)

Table 3: Summary of regression effects (N = 314): direct effects, indirect effects, total effects

Antecedents	Criteria variables			
	Affiliative SCB (<i>stewardship</i>)	Affective commitment	Changing SCB (<i>voice</i>)	Psychological Ownership
Direct effects	<i>Hypothesis 1a</i>		<i>Hypothesis 2a</i>	
Org. support for participation	--	.23**	--	.16**
Team safety climate	--	.25**	--	.21**
Affective commitment	.31**	--	--	--
Psychological ownership	--	--	.28**	--
Indirect effects	<i>Hypotheses 1b & 1c</i>	<i>Hypothesis 1d</i>	<i>Hypotheses 2b & 2c</i>	<i>Hypothesis 2d</i>
Org. support for participation	.15	.14	.12	.10
Team safety climate	.10	--	.11	--
Affective commitment	--	--	--	--
Psychological ownership	--	--	--	--
Total effects				
Org. support for participation	.15*	.37**	.12*	.26**
Team safety climate	.10*	.25**	.11*	.21**
Affective commitment	.31**	--	--	--
Psychological ownership	--	--	.28**	--
Total explained variance	.10	.18	.08	.13

Note: * p < .05; ** p < .01. Indirect effects tested with bootstrapping method (5000 samples. Interval of confidence: .95)

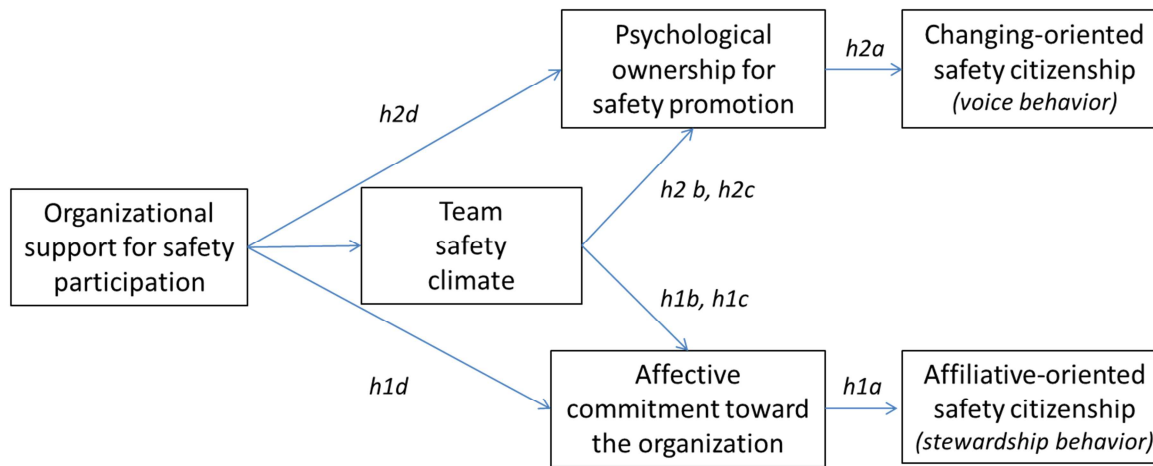


Figure 1. Research model: organizational antecedents and psychological mediators of SCBs

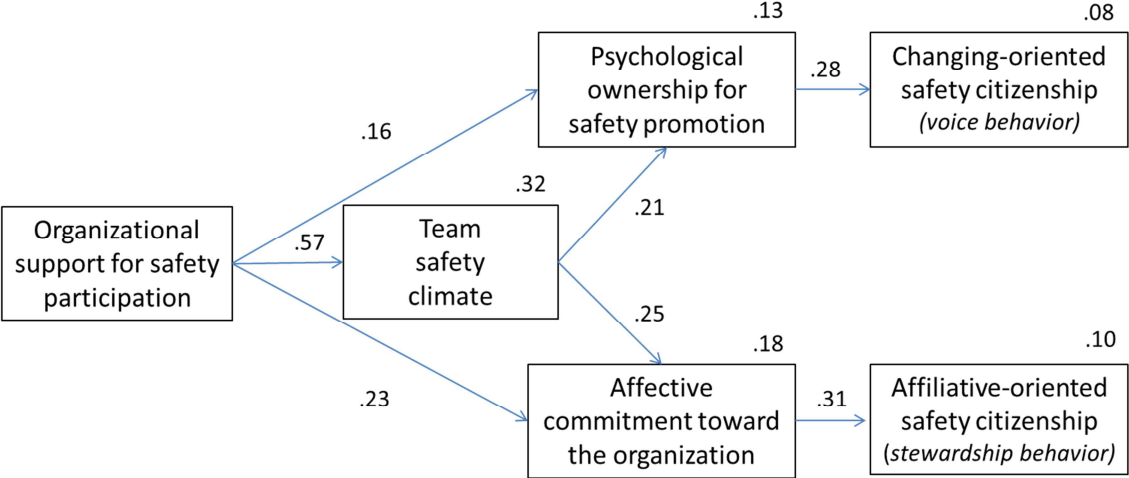


Figure 2. Verified model with statistical regression indices and explained variance (N = 314)

Appendix 1: Preliminary psychometric analysis: factor loading indices (N = 314)

Item description	F1	F2	F3	F4	F5	F6
<i>Affiliative oriented SCB – Stewardship behaviour</i>						
... To protect team members from risky situations	.84					
... Look out for the safety of other team members	.80					
... Protecting fellow team members from safety hazards	.77					
... To prevent other team members from being injured	.72					
... To stop violations to protect the well-being of others	.69					
<i>Changing oriented SCB – Voice behaviour</i>						
... To discuss new ways to improve safety		.85				
... To report if a colleague breaks any safety rules		.84				
... To inform the union/boss when I notice a work hazard		.83				
... To make suggestions about how safety can be improved		.80				
... To ask a colleague who is doing something unsafe to stop		.72				
<i>Affective commitment toward the organization</i>						
... This company is very important to me			.91			
... I really feel I belong to this company			.85			
... I am really proud to be part of this company			.82			
... I feel emotionally related to this company			.75			
<i>Psychological ownership for safety promotion</i>						
... To be personally engaged in the promotion of safety				.83		
... To be personally concerned about stimulating safety initiatives				.81		
... To be personally open to new ways to manage safety				.77		
... To be personally committed to safety programs				.75		
<i>Organizational support for safety participation</i>						
... The company takes safety ideas by employees seriously					.82	
... Employees are encouraged to voice their safety concerns					.79	
... Employees’ safety concerns are addressed quickly					.73	
<i>Team safety climate (My direct supervisor)</i>						
... Spends time helping us to learn to see problems in advance						.87
... Frequently tells us about the hazards in our workplace						.84
... Reminds workers who need reminders to work safely						.81
... Says a “good word” to workers who pay attention to safety						.77
... Discusses how to improve safety with us						.76
... Makes sure we follow all the safety rules						.72
... Uses explanations (not just compliance) to get us to act safely						.69
... Is strict about working safely when we are tired or stressed						.64
... Frequently checks if we are all obeying the safety rules						.61