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The Role of Safety Training and Safety Leadership in Determining Safety Organisational Citizenship Behaviours

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Safety in the workplace is an important topic that needs to be addressed in order to create safer and healthier workplaces. Currently there has been an increase of papers investigating safety employing organisational psychology models, such as the Job Demands-Resource model, which has been used by many Occupational Health and Safety/Workplace Health & Safety regulators and government agencies around the world (Bakker and Demerouti, 2017). Using this model and specifically, the motivational hypothesis, it has been hypothesized that job resources such as safety training in the workplace and safety leadership styles of the supervisor could be related to work engagement of the workers and consequently safety organisational citizenship behaviours (SOCBs). Furthermore, in order to fill in the gap in literature on the outcomes of different types of safety leadership styles, this study aims to analyse potential differential effects of safety transformational leadership style and passive leadership style in determining safety outcomes such as SOCBs. In order to test these hypotheses, a study has been conducted on a site of a chemical multinational corporation in the northern part of Italy. The participants of the cross-sectional study were 60 workers, of which 69.6% were less than 50 years old. Almost half of them (53.3%) had the role of safety supervisor or safety manager. Furthermore, 40% belonged to safety emergency teams. Results of the study showed that work engagement fully mediated the relationship between safety training, safety transformational leadership and safety passive leadership and SOCBs. In other words, findings showed that safety training and transformational leadership were related to higher levels of work engagement, which in turn was related to higher levels of SOCBs. On the other hand, we found that passive safety leadership style was related to lower levels of work engagement and consequently lower levels of SOCBs. This study enhances the knowledge concerning the role played by safety training and safety leadership styles in order to determine SOCBs, which in turn could be related to lower levels of injuries and accidents in the workplace and higher levels of health and safety in companies.

1. Introduction

Safety in organisations is still an important topic in scientific literature and for organisations that aim to increase the health of their employees (Vignoli et al., 2014). From a scientific point of view, many studies investigated the factors able to influence safety in organisations from a human factor or psychosocial perspective.

One of the most used models concerning the human factor is the Griffin and Neal model developed in 2000. The framework proposed by these authors aimed at explaining how to define safety performance which could prevent injuries and accidents. The authors stated that antecedents of safety performance (such as safety climate, composed of different dimensions such as safety training) is able to influence knowledge skills and motivation which in turn affect safety task and contextual performance. This model has been largely investigated in the scientific literature and many studies have demonstrated its effectiveness.

Recently, literature has moved forward stating the use of other models seen to have influenced performance and behaviours in the workplace (such as the Job-Demands Resources Model) and there is also a growing interest in using those models to explain also safety outcomes. Thus, the aim of this study is to enhance knowledge on which job resources connected to safety are able to influence safety behaviours using the motivational process of the Job-Demands Resources Model.

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1.1 The Job Demands-Resources Model

The Job Demands-Resources Model (JD-R) was first developed in 2001 and it is one of the most used models in understanding how psychosocial work conditions could affect workers' outcomes (e.g. job performance).
The JD-R model is composed of two main processes: the health impairment process and the motivational process. The health impairment process posited that job demands could lead to enhance workers' strain (burnout), which is consequently related to lower levels of workers' health. On the other hand, the motivational process states that job resources are able to enhance work engagement, which consequently affects job performance. Considering the revised version of this model, Schaufeli and Taris (2014) stated that the motivational process of the Job Demands-Resources model is especially related to job performance.
Job resources are the main triggers of the motivational process, they are not fixed but they could depend on the work environment. Specifically, job resources have been defined as "those physical, social, or organizational aspects of the job that may do any of the following: a) be functional in achieving work goals; b) reduce job demands and the associated physiological and psychological costs; c) stimulate personal growth and development" (Demerouti et al., 2001, p.501).
According to the motivational process, job resources are the main antecedents of work engagement, defined as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli et al. 2002, p. 74). Further studies have demonstrated how work engagement is able to influence job performance. For example, a recent study of Reijseger and colleagues (2017) showed how work engagement is related to both in-role and extra-role performance.
For this reason it is important to investigate how job resources and consequently, work engagement could enhance job performance, specifically, safety performance such as the safety organisational citizenship behaviours (SOCBs), which refers to safety participation behaviours related to the context, referring mostly to voluntary actions, that are important in developing attention and social value to safety within the organizational context (Toderi et al., 2015).
In order to investigate which job resources could influence safety outcomes through the enhancement of work engagement it is important to define what safety job resources are able to trigger the motivational process. In fact, as previously reported, one of the main characteristics of the JD-R model is its flexibility which means that job resources could be defined according to the specific work context. In this study, we investigate two potential job resources able to influence safety performance in the workplace: safety training and safety leadership styles.

1.2 Safety training and safety leadership styles

Safety training is one of the most frequent practices implemented by organizations in order to increase safety behaviours and performances and consequently reduce injuries and accidents. In fact, many studies have demonstrated that safety training is an important preventive measure (Freitas and Silva, 2017) and effective in modifying workers' behaviours (e.g. Robson et al., 2012). Furthermore, the European Commission has been strongly promoting safety training also through the development of a strategic framework on safety and health at work (European Commission, 2014). In line with the motivational process of the JD-R model we hypothesized that:

Hp1. Work engagement mediates the relationship between safety training and safety organisational citizenship behaviours (SOCBs). In other words, we expect that safety training is positively related to higher levels of work engagement, which in turn is related to higher safety organisational citizenship behaviours (SOCBs).

Another important relevant concept in safety literature is the role played by safety supervisors in determining both attitudes and behaviours of the workers. In fact, the leadership exercised by the management influences the behaviors of the members of the company (Saracino et al 2015b). Concerning the role played by safety supervisors, there is a growing body of literature which has investigated the different effects played by two main (and somewhat opposite) leadership styles: safety transformational leadership style and the safety passive leadership style. Specifically, adapting the classical definitions of Bass (1990) of transformational and passive leadership style to safety, safety transformational leaders can be defined as leaders who inspire, intellectually stimulate and consider workers as individuals. On the other hand, safety passive leaders are those who tend to avoid decision-making and leadership responsibilities. Despite a growing number of studies that have investigated the effects of this kind of leadership style, few studies have investigated the relationship between safety-specific leadership styles and safety outcomes (Vignoli et al., 2018). Thus, we hypothesized that:

Hp 2. Work engagement mediates the relationship between safety transformational leadership style and safety organisational citizenship behaviours (SOCBs). In other words, we expect that safety transformational leadership style is positively related to higher levels of work engagement, which in turn is related to higher safety organisational citizenship behaviours (SOCBs).

Hp 3. Work engagement mediates the relationship between safety passive leadership style and safety organisational citizenship behaviours (SOCBs). In other words, we expect that safety passive leadership style is negatively related to higher levels of work engagement, which in turn is related to higher safety organisational citizenship behaviours (SOCBs).

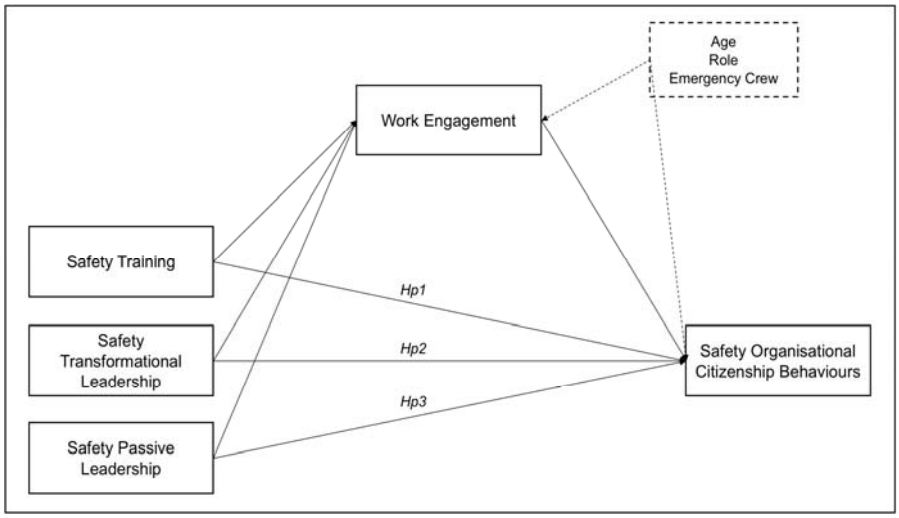

Figure 1: Summary of the hypotheses and variables

2. Methods

2.1 Participants

This study is cross sectional and involves 60 employees belonging to a multinational corporation chemical plant located in Northern Italy. During a company event dedicated to its employees, an anonymous questionnaire was distributed. A researcher explained the project and answered to all the comments and questions that arose during the session giving extra information on the project. Overall, the participants of this study were 60 workers, of which 69.6% were less than 50 years old. Almost half of them (53.3%) had the role of safety supervisor or safety manager. Furthermore, 40% belonged to safety emergency teams.

2.2 Measures

The questionnaire was composed of the following scales.
Safety training. This dimension is measured with the five point Likert scale of 5 items ranging from 1 (strongly disagree) to 5 (strongly agree). One example item is My company provides a comprehensive training program to the workers on the health and safety topics".
Leadership styles. Safety transformational and safety passive leadership styles were both measured using the scales developed by Kelloway et al. (2006). The transformational leadership scale is composed of ten items, while the passive leadership scale is composed of three items. All items are on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). One example item of the transformational leadership scale is "Encourages me to express my ideas and opinions on safety at work", while one example item of the passive leadership scale is "Fails to intervene until safety problems become serious".
Organisational citizenship behaviours. This dimension is measured with a 7-item Likert scale also used in previous studies in an Italian Sample (Toderi et al. 2015; Mariani et al., 2017). The scale is composed of 4 items ranging from 1 (strongly disagree) to 5 (strongly agree). One example item is: "I help my colleagues when they are working in danger or risky situations".
Control variables. We included age, whether they are managers or not, supervisors or not and whether they are members of the emergency crew as control variables

2.3 Data analyses

SPSS software (version 23.0) was used. First of all, descriptive statistics, correlation analysis and scale reliabilities were computed. Then, following the Preacher and Hayes (2004) analytical approach we tested three mediation analysis, using the Model 4 of the PROCESS macros. According to the hypotheses, safety training (Hp 1), safety transformational leadership style (Hp 2) and safety passive leadership style (Hp 3) have been included as independent variables (X), work engagement has been included as the mediator (M) and safety organizational citizenship behaviours (SOCBs) have been included as dependent variable (Y). Due to the small sample size, a bootstrapping method was used (Preacher and Hayes, 2008). This method is appropriate when sample sizes are relatively small as it can provide distribution using the observed data, from which statistical effects are estimated.

3. Results

3.1 Descriptive statistics

Firstly, descriptive statistics were computed and are presented in table 1. Concerning the reliability of the scale used, all the alpha values met the threshold of .70. except for the safety training scale which showed a very low value in the first place (.20). Performing some additional analyses it has been found that one item of the scale "The new workers are appropriately trained so that they could learn safety rules and procedures" aggravated the reliability of the scale. This was probably because no new workers had been hired in that site of the company in recent years, thus did not apply to the participants. In fact, by deleting this item the alpha of the scale increased greatly (.84), thus a four-item version of the scale was used.
Concerning the correlation coefficients (see Table 1), results showed that safety SOCBs were positively related to all the job resources proposed (e.g. safety training and safety transformational leadership) except for safety passive leadership which was not related to SOCBs. Furthermore, findings showed that work engagement was positively related to safety training and safety transformational leadership and negatively related to safety passive leadership. The control variables investigated did not show a relationship with any of the main variables investigated.

Table 1: Descriptive statistics, correlation matrix and Cronbach's alpha

Variables	Mean; %	St. dev.	1	2	3	4	5	6	7	8
1. Age[1]	69.9	-	-							
2. Role[2]	53.3	-	-.05	-						
3. Emergency[3]	40	-	-.08	.29*	-					
4. Safety Training	4.22	.63	.06	.03	.18	(.84)				
5. Safety Transform. Lead.	3.75	.83	-.12	-.21	.06	.35**	(.95)			
6. Safety Pass. Lead.	1.69	.87	.02	-.23	-.15	-.23	-.05	(.81)		
7. Work engagement	4.85	1.34	-.03	-.15	-.11	.47***	.41**	-.30*	(.96)	
8. SOCBs	3.94	.84	-.23	.07	.22	.41**	.43**	-.05	.48***	(.87)

Notes. *p<.05; **p<.01; ***p<.001; [1] Older than 50 years old = 1 and otherwise = 0, [2] Manager or supervisor =1 and otherwise =0; [3] Member of the emergency crew = 1 and otherwise = 0.

3.2 Testing of the hypotheses

All the results concerning the testing of the hypotheses are presented in table 2 and table 3. Specifically, table 2 shows the direct effects among the variables investigated, while table 3 shows the indirect effects, i.e. the mediation results.
Concerning hypothesis 1, results showed that work engagement was able to fully mediate the relationship between safety training and SOCBs. Specifically, safety training was related to higher levels to work engagement, which in turn was related to higher levels of SOCBs. Thus, hypothesis 1 is supported.
Furthermore, a similar result was found for hypothesis 2. In fact results showed that work engagement mediated the relationship between safety leadership style and SOCBs.
In other words, despite safety transformational leadership not being directly related to SOCBs, our results showed that this relationship is explained by the role of work engagement: higher levels of safety transformational leadership are related to higher levels of work engagement, which in turn are related to higher levels of SOCBs. Thus, hypothesis 2 is supported.
On the contrary, according to hypothesis 3 results showed that work engagement mediated the relationship between safety passive leadership and SOCBs.

In other words we found that higher levels of safety passive leadership are related to lower levels of work engagement which is positively related to SOCBs. Overall the indirect effect of safety passive leadership on SOCBs via work engagement is negative, which means that safety passive leadership is negatively related to SOCBs.

Table 2: Descriptive statistics, correlation matrix and Cronbach's alpha

Variables	Work Engagement	SOCBs	Work Engagement	SOCBs	Work Engagement	SOCBs
	Effect (SE)	Effect (SE)	Effect (SE)	Effect (SE)	Effect (SE)	Effect (SE)
Age[1]	-.21 (.38)	-.40 (.21)	.13 (.37)	-.31 (.22)	-.03 (.41)	-.37 (.22)
Role[2]	-.35 (.35)	.16 (.20)	-.09 (.35)	.23 (.21)	-.57 (.39)	.29 (.21)
Emergency[3]	-.50 (.16)	.35 (.21)	-.46 (.34)	.36 (.21)	-.37 (.38)	.50* (.21)
Safety Training	.97*** (.27)	.28 (.18)	-	-	-	-
Safety Transf. Lead.	-	-	.82*** (.20)	.24 (.14)	-	-
Safety Pass. Lead.	-	-	-	-	-.48* (.03)	.22 (.12)
Work engagement	-	.27** (.08)	-	.26** (.09)	-	.38*** (08)

Table 3: Indirect Effect

Variables	Effect	Boot SE	Boot LLCI	Boot ULCI
H1) Safety Training → Work Engagement → SOCBs	.27	.10	.09	.48
H2) Safety Transf. Lead. → Work Engagement → SOCBs	.21	.08	.05	.37
H3) Safety Pass. Lead. → Work Engagement → SOCBs	-.18	.08	-.35	-.04

4. Conclusions

The present study investigated the role played by different job resources (i.e. safety training and safety leadership styles) in determining SOCBs using the JD-R model. Furthermore, this study adds knowledge concerning the analysis of safety topics using the JD-R model and complements previous studies (such as the one developed by Li et al (2013) who aimed at assessing the effectiveness of the job demands–resources (JD–R) model in explaining the relationship of job demands and resources with safety outcomes (specifically workplace injuries and near-misses).

Results of this study highlighted the relevant role of work engagement (which is also considered a motivational state) in explaining the relationship between relevant safety antecedents (safety training and safety leadership styles) and outcomes (such as SOCBs).

Specifically, the results of this study showed that job resources such as safety training and safety leadership style are able to enhance work engagement of the workers and consequently increase SOCBs in the workplace.

Our results are in line with previous studies which showed the relevant role of safety motivation. Specifically, a study conducted by Ricci et al (2016) showed that intrinsic motivation was able to predict safety outcomes after a safety intervention.

This study also adds knowledge concerning the different role played by safety transformational leadership style and safety passive leadership style. In fact, our results showed that both safety transformational leadership style and safety passive leadership style are related to SOCBs through the mediation of work engagement.

This result is in line with the study of Mullen et al. 2011, which showed safety transformational leadership style being related to higher levels of safety compliance and safety participation in employees and this effect was attenuated when supervisors also showed a passive leadership style.

Some limitations of this study need to be acknowledged. First of all the sample is quite small, thus future studies should investigate these aspects on a larger sample. Furthermore, this study is cross-sectional and thus prevents us from defying the causal relationship between the study variables.

In addition, the study participants worked in a single company, so caution is necessary when making generalisations based on the results. Moreover, data were collected through self-reported questionnaires, thus increasing the chances of common method variance biases. Lastly, this study has only investigated safety training and safety leadership styles as safety job resources, whereas other studies have indicated other potential resources which could be related to motivational state, such as a reward distribution system considered one of the most relevant instrument to enhance workers' motivation and could decrease the accident rates (Saracino et al. 2015).

Results of this study could be useful for organisations aiming to enhance safety not only by improving the safety equipments and procedures but also by implementing interventions aimed to enhance the supervisors' skills and consequently enhance employees' work engagement and safety citizenship behaviours.

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