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# **Improving Safety At Work: The Role Of Climates**

Joint Doctoral Degree

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## INTRODUCTION

In 2013 (the last year for which national statistics are available) Italy has registered 695 thousands accidents, 460 thousands (65%) of which occurred at work, causing 660 fatalities and 11,5 millions of lost work days (National Institute for Insurance against Accidents at Work, 2013). Despite the injury trend shows a light decrease compared to the last years (2009-2011), the rates of fatalities and injuries can be described as unacceptably high (Konkolewsky, 2004); this lead in turn to a greater focus on organizational and psychological factors to reduce injuries occurrence and spread the culture of health and safety at the workplace.

Main organizational and psychological factors considered by literature about safety concerned the concept of safety climate, defined as individual perceptions about the policies, practices, and procedures related to safety issues (Zohar, 2000); this concept describes the connections between organizational and psychological processes and their relations to safety which affect well-being at work (Fugas, Silva, & Meliá, 2012). Another important construct in safety literature is that one of safety behaviors, represented as a function of both safety compliance and proactive participation in activities related to safety in the workplace (Griffin & Neal, 2000; Hofman & Morgeson, 2002; Marchand, Simard, Carpentier-Roy, Ouellet, 1998; Neal & Griffin, 1997; 2000).

As suggested by many reviews (e.g. Guldemund, 2000; Glendon, 2008, Seo, Torabi, Blair and Ellis, 2004) and meta-analytic studies (e.g. Clarke, 2006; Nahrgang, Morgenson & Hofmann, 2008; Christian, Bradley, Wallace, & Burke, 2009) performed in the last thirty years, the main trend of those research has been the focus on the ability of safety climate to predict safety behaviors. When considering the large amount of past research about safety at work, and comparing them to the present, some important challenges can be revealed for research development in this area, which have been considered for developing the present thesis.

At the same time there is a huge literature about organizational climate which showed how the focus of climate research has changed, as researchers have switched their focus from global to facet-specific climates (Kuenzi & Schminke, 2009); as a result of that, facet-specific climate research has been almost entirely subsumed under particular topical areas (e.g., literatures related specifically to safety). Thus, rather than composing an increasingly strong and broad foundation for our understanding of organizational dynamics, “climate research has splintered, thereby fragmenting our knowledge about and understanding of work climates” (Kuenzi & Schminke, 2009, p. 637). However, the importance of an integration of those fragmented climate domains is clear, as the reality is complex and it is not often plausible or reasonable to find some linear relationships between causes and consequences. Moreover, this makes sense not only intuitively but also statistically; indeed, “as Campbell (1990) notes, when

the latent structure underlying both the predictor and outcome are similar, correlations between variables will be stronger” (p. 694).

Therefore, our main interest was to consider a broader approach when studying organizational dynamics pertaining to safety and to test whether other dimensions of organizational climate could be strictly relevant for safety even if they were not specific to safety. Moreover we tried to frame this aim by considering the existence of multiple simultaneous organizational climates with different (combined) effects on the same safety outcomes.

In particular, the increasing presence of diverse workforce in the organizations requires to be taken into account when studying the relationship between safety climate and safety performance. More than diversity itself, perceptions and beliefs about how diversity is managed within the organizations are of vital importance, because they showed to predict behaviors regardless of their consistence with reality (Mor Barak, Cherin & Berkman, 1998).

In addition to that, the study of diversity in the organizational context has focused disproportionately on demographic characteristics while paying considerably less attention to the unlimited ways in which employees may differ from one another (e.g., personality, functional expertise; Avery, 2011); Therefore, there are a multitude of attributes in which people can diverge, and these differences can be subjectively or objectively perceived (van Knippenberg and Schippers, 2007).

Such considerations lead us to begin wondering why the construct of diversity in the workplace should be framed within some delimited attributes or categories (visible and invisible) and whether it would not be more interesting to focus on people's perceptions about how those diversities are managed within organizations and the consequences in terms of employees' work attitudes and performance, even those ones related to safety.

Together with perceptions about diversity, some evidence from research suggested that other types of specific organizational climates could also be linked with well-being and safety at work; in particular employees' perceptions to be involved in decision making processes, information networks, and to be able to actively participate in social and informal organizational activities – regardless of the individual's belonging to a specific demographical group – is what forms a climate for inclusion, and it seemed to affect some work behaviors and well-being (Nissly, MorBarak, & Levin, 2005). Finally, perceptions of an environment supportive, opened and trustworthy in communication, and where there is an effective exchange of information, namely a communication climate (Smidts, Pruyn & van Riel, 2001) appeared to be closely related to the existence of a positive safety climate (De Joy et al., 2004). The choice to focus on those specific types of climates (diversity, inclusion and communication climates) and their impacts on safety is also due to the social and instrumental support which those kinds of environmental perceptions can give to the individual and that might potentially broaden the focal employee's action repertoire; from this point

of view, the present work has used the theoretical framework of social exchange theory (Blau, 1964) to develop and justify its hypotheses, as it is an influential paradigm concerning organizational behavior (Cropanzano & Mitchell, 2005). Social exchange theory assumes that individuals form, maintain, or terminate relationships with each other on the basis of the perceived ratio of benefits to costs in the relationship (Emerson, 1981). Moreover, another important aspect of that theory is the norm of reciprocity (Emerson, 1981; Homans, 1984), which requires a bidirectional transaction: after something is given, something is expected in return (Cropanzano & Mitchell, 2005). As such, social exchange involves interactions that generate obligations, resulting in a mutually rewarding exchange or transaction between two mutually contingent parties (Emerson, 1976, p.336). For that reason, the study of influences that perceived organizationally based social exchanges may have on safety is really important and interesting and yet not deeply investigated.

In light of the considerations presented above, the present thesis was developed with the general aim of exploring and laying the foundations for a deep understanding of how different, multiple, safety-distinct climates can contribute to employees' safety performance beyond their perceptions of safety climate, with a special attention to the issue of employees' perceptions of diversity in the workplace. In the following chapters, I present the empirical studies we conducted in order to test the framework we developed.

The present dissertation is article-based; therefore in chapter 1, a validation of an Italian adaptation of the Mor Barak, Cherin & Berkman (1998) diversity climate scale is presented, as the first attempt in the European context to test the psychometric properties of the most used tool to measure diversity perceptions, and to explore its measurement equivalence across gender.

Chapter 2 focused on the empirical investigation of the relationships between psychological diversity and inclusion climates and safety participation behaviors through the mediating effect of the motivation to actively promote safety at work; that study extended previous research which simply tested the effects of objective types of diversity on safety performance and theoretically and empirically demonstrated the difference between diversity and inclusion climates, which is something scarcely investigated by literature. Moreover, it explained the mechanism through which diversity and inclusion climates can affect safety citizenship behaviors.

Chapter 3, that is perhaps the most innovative study, represents a preliminary exploration of which different combinations (patterns) of simultaneous climates at the department level - namely, safety, diversity, inclusion and communication climates - are likely to be related to different rates of low/high injuries, by using the statistical technique of multiple correspondence analysis, which has not been given much consideration in previous safety research and in the larger area of organizational climate's investigation.

Finally, in a concluding chapter, I summarized the findings of those studies, discussing the limitations and theoretical and practical implications and offering suggestions for future research.

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# CHAPTER 1

## **Psychometric Properties of the Italian adaptation of the Mor Barak et al. Diversity Climate Scale**

This chapter is based on Paolillo, A., Pasini, M., Silva, S., & Magnano, P. (under review). Psychometric Properties of the Italian version of the Mor Barak et al. Diversity Climate Scale.

## **Abstract**

The Diversity Climate Scale is a questionnaire developed in the U.S. for the investigation of employees' shared perceptions about their organizational context related to women and minorities. The measure was not used in the European context yet. The psychometric properties of the Italian version of the Mor Barak, Cherin and Berkman Diversity Climate Scale were investigated in this work by using a sample of Italian (n= 395) white-collar and blue-collar employees. A pilot study to make the scale suitable for the Italian context was conducted using the cognitive interview technique. Then a series of multiple-group confirmatory factor analyses was performed. The results showed that a three-factor solution best fit the data, using only 9 items of the original scale. The analyses supported factor variance and factor covariance equivalence in addition to metric equivalence. Internal consistency of the scale was good. Discriminant validity between latent factors and Criterion validity were supported.

**Keywords:** diversity climate, measurement equivalence, validation, perceptions, organizational context

## **Introduction**

In the past years, while affirmative action programs have increased the number of employees from various backgrounds, a lot of them have experienced great difficulties in obtaining significant support at the workplace.

Recent studies have suggested that considering how workers perceive diversity management within their work organization, as the workforce becomes more diverse (McKay, Avery & Morris, 2008; 2009), is an important aspect of improving organizational performance and promoting greater inclusion of employees from various backgrounds.

Specifically, Mor Barak, Cherin and Berkman (1998) have proposed that employees develop perceptions about the organizations' stance regarding diversity, as well as developing their own personal opinions about the value of diversity in a company, which have implications for organizational effectiveness, work attitudes and performance. Diversity climate is defined as "employee behaviors and attitudes that are grounded in perceptions of the organizational context related to women and minorities" (Mor Barak et al., 1998, p. 83).

However the definition of diversity climate varied across the studies. Glick (1985) defined it a specific form of organizational climate. Mc Kay & Avery (2008, p. 352) refers to employees' shared perceptions of "the extent to which company practices and social context are affected by group membership, as manifested in various forms of demographic difference (e.g., racial-ethnic, sex,

age, etc.)”. Hofhuis et al. (2012) refers to the degree to which an organizational climate promotes cultural differences in the company and values these ones as a positive asset. Gonzalez and DeNisi (2009) define it as the aggregate perceptions about the formal structure and the informal values related to diversity within an organization. Gelfand and colleagues defined climate for diversity as “employees’ shared perceptions of the policies, practices, and procedures that implicitly and explicitly communicate the extent to which fostering and maintaining diversity and eliminating discrimination is a priority in the organization” (Gelfand et al., 2005, p. 104).

Diversity climate definitions can be explained with reference to the theoretical perspective of Social Identity Theory (SIT; Stryker, 1968; Tajfel & Turner, 1986). According to this, the way people perceive their social reality is determined by their group membership based upon salient characteristics - e.g. race, gender – (Alderfer, 1987). This meanings that organizational policies and practices will be affected by identity group membership, such that individuals will interact with others coherently with their salient group membership and in a way that affirm their identity group and stereotypical perception of self and others (Ashforth & Mael, 1989; Hogg & Terry, 2000). Through these interactions, minorities are more likely to experience discrimination (Feagin, 1991; Utsey, et al., 2002), so they should be more concerned with a firm’s diversity climate than majorities (Mc Kay et al., 2007).

According to Cox's (1994) elaboration of the construct of diversity climate, it may be conceptualized as a function of: individual level factors, concerning the extent of prejudice and stereotyping of each employee in the company; intergroup factors, referring to the degree of conflict between various groups within an organization; and organizational level factors, referring to the degree of fairness and inclusion of underrepresented employees in a firm's policies and practices.

Moving from Cox's model, Mor Barak et al. (1998; 2005) proposed a bi-dimensional model of diversity climate, in which each dimension is composed of two related factors, specifically a) an organizational dimension, concerning perception of fairness in the management's policies and procedure (Factor 1) and inclusion, concerning structural inclusion or exclusion of people belonging to different backgrounds (Factor 2); b) a personal dimension concerning each individual's views of the importance of diversity (Factor 3) and the personal level of comfort and openness to diversity (Factor 4). The authors developed a 16-item self-report questionnaire to measure this construct based on that model and tested validity and reliability. The measure has been used in various studies in different contexts (United States, India, Australia) and with diverse population groups, indicating significant relationships between diversity climate dimensions and job satisfaction, affective commitment, turnover intention (Buttner, Lowe & Billings-Harris, 2010b), psychological contract (Sia & Bhardwaj, 2009;) and the firm's productivity (Gonzalez & Denisi, 2009).

Moreover, several studies have used the diversity climate scale as criteria for the development of other scales measuring diversity perceptions (e.g., McKay et al., 2008, 2009; Pugh, Dietz, Brief & Wiley, 2008). Other instruments have also been developed to assess diversity climate, but considering the scarcity of literature about this issue, all existing scales have been developed for a specific kind of respondents such as managers (Mc Kay et al., 2007; Hicks-Clarke & Iles, 2000), or a specific kind of sector such as University (McClellan & Cogdal, 1996; Kossek & Zonia, 2003) or school (Pike, 2002; Sheau-yuen Yeo, 2006) or they focused specifically on diversity in cultural backgrounds (Luijters, van der Zee & Otten, 2008; Hofhuis, van der Zee & Otten, 2012). Some scales lack construct validity as the prior constructs weren't theoretically justified (e.g. McClellan & Cogdal, 1996), or sometimes they lacked reliability and validity information (e.g. Hicks-Clarke & Iles, 2000). Therefore they were developed with a pragmatic approach, considering particular research objectives but not specifically aimed at validation. Mor Barak's diversity climate scale was developed and used in different kinds of sectors (e.g. electronic, retail, catering, financial), with different kinds of respondents (managers and subordinates) and it is the only instrument which focuses on different specific levels of climate (organizational and individual), thus conforming to the literature about the multidimensional nature of the perception of climate (James, Hater, Gent & Bruni, 1978). Using their Diversity Climate Scale, Mor Barak and colleagues (1998) found significant ethnic and gender differences in employees' perception

of the personal and organizational dimensions of diversity. Specifically for gender, men perceived more fairness and inclusion (organizational dimension) than women, whereas the latter perceived more value in diversity programs (personal dimension) than men.

Most of the studies mentioned above also tested for racial and gender differences in perceptions of diversity climate, but they assumed that each of the instruments of measurement that were developed was operating in exactly the same way and that the underlying construct had the same theoretical structure and psychological meaning across the groups of interest, without statistically testing these assumptions (Byrne, 2008).

Furthermore, as existing instruments to measure diversity climate have not yet been validated in the European context, it is necessary to develop an instrument that exhibits acceptable psychometric evidence in different work contexts.

Considering all these issues, the main aim of the present study is to contribute to the validation of an Italian adaptation of the Diversity Climate Scale developed by Mor Barak and colleagues and is particularly aimed at 1) examining whether there is any psychometric difference to the whole scale when applied within a European context; 2) advancing the validation of the Diversity Climate Scale by exploring its measurement equivalence across gender (Cheung, 2008; Vanderberg & Lance, 2000); 3) exploring differences in the scale according to the main socio-demographic (gender, age, education) and occupational (length

of employment, type of contract, sector) variables and assessing the discriminant validity and criterion validity of the scale.

More specifically, we hypothesized (Hypothesis 1) that the Italian version adaptation? of the Diversity Climate Scale will show the same 4-factor structure found in the Mor Barak's study. Furthermore, we hypothesized (Hypothesis 2) that the Italian version of the Diversity Climate Scale will show measurement equivalence (Cheung, 2008) across gender (men vs. women); then we hypothesized that for any two latent factors of the Diversity Climate scale, the variance extracted estimate for each of them will be greater than the shared variance between them, thus supporting the discriminant validity of the scale (Hypothesis 3). Finally, we hypothesized that the Diversity Climate Scale will show positive and significant correlations with some criterion-related variables (job satisfaction and organizational support, Hypothesis 4).

## **Methods**

### *Participants*

The present study has been developed with a two-steps procedure, through convenience sampling. At first, a pilot study (more qualitative in nature) was conducted to test the items' comprehensibility; it involved a whole sample of 64 workers, equally balanced for gender (men = 50%) and educational level (30% of participants had an educational level from 5 to 8 years of school, 35 % from 9

to 13, 35 % more than 13); then the main validation study involved a new sample of 395 employees of small, medium and large Italian organizations, belonging to different sectors (manufacturing 53.2%, private services for enterprises 1%, private and public services for health and family 23.4%, public administration 22% , and other 0.4%).

Participants were asked to answer as sincerely as possible, and they were ensured that all data were collected and conserved by the research group. Along with the Italian questionnaire, English and French translations were also provided for foreign workers. Researchers were available to help participants, if necessary.

Of the employees, 389 (98%) returned completed questionnaires.

All data were collected at an individual level. Considering the sample of the main study, 50% of the participants were male, 96% were Italian workers, 52% came from companies from the North of Italy, 48% from the South, and 87% were aged between 26 and 55; 70% of participants had an educational level from 8 to 13 years of school; only 5% had worked for that company for less than 1 year and 73% of the participants had a permanent contract. 66% of respondents were blue-collar workers, 33% white-collar. For the purpose of the study, an examination of the differences in the socio-demographic characteristics across the sample groups was made using the Chi-square test (Table 1.1). Some significant differences were found considering gender, specifically: 90% of males were blue-collar workers from the industrial sector and 88% had attended

from 5 to 13 years of school, while 59% of females were white-collar, 81% worked in the tertiary sector or in the public administration, and 45% had attended more than 13 years of school. Missing values, considering the socio-demographic characteristics, were examined using the Chi-square test and all cases with missing values were removed. No significant differences were found for the socio-demographic characteristics of non-respondents.

### *Measure instruments and procedure*

The present study used the Diversity Climate Scale (Mor Barak et al., 1998), comprising 16 items, with two dimensions: the organizational and the personal, each containing two factors, as follows: *Fairness* (Factor 1), measured by 6 items (e.g., “Managers here give feedback and evaluate employees fairly, regardless of employees’ race, gender, sexual orientation, religion, age, or social background”) and *Inclusion* (Factor 2), measured by 4 items (e.g., “The company spends enough money and time on diversity awareness and related training”), both factors comprised the organizational dimension. *Diversity Value* (Factor 3), measured by 3 items (e.g., “I believe diversity is a strategic business issue”) and *Personal Comfort with diversity* (Factor 4) measured by 3 items (e.g., “I feel at ease with people from backgrounds different from my own”), comprising the personal dimension. Each item was answered on a 6-point Likert scale (from 1=“strongly disagree” to 6=“strongly agree”).

The Italian adaptation of the Diversity Climate scale was developed with a back-translation procedure. A bilingual Italian-English teacher translated the English version of the Diversity Climate scale into Italian. This first Italian version was then translated back to into English by a bilingual psychologist with doctoral degree. Discrepancies emerging from the comparison between the two versions were discussed and revisions to the Italian translation of the Diversity Climate scale were made.

For criterion validity, the Job Satisfaction Scale from the Occupational Stress Indicator - OSI (Cooper, Sloan & Williams, 1988; it. ad. Sirigatti & Stefanile, 2002) and the Survey of Perceived Organizational Support (Eseinberger, Huntington, Hutchison & Sowa, 1986; it. ad. Battistelli, Mariani, 2011) were used. The former, is comprised of 22 items related to psychosocial aspects at work, answered on a 6-point Likert scale (from 1 = “immensely dissatisfied” to 6 = “immensely satisfied”), while the latter, is comprised of 8 items answered on a 5-point Likert scale (from 1= “strongly disagree” to 5= “strongly agree”).

The scales showed a Cronbach’s  $\alpha$  of .76 and .95, respectively, in the present study.

Table 1.1 Distribution of the sample

	<i>Gender</i>		$\chi^2$ (df)
	<i>Men</i>	<i>Women</i>	
	<i>Num</i>	<i>Num</i>	
<i>Region</i>			
North	175	32	
South	24	164	
Total	199	196	203.03 (1)***
<i>Job status</i>			
Blue-collars	180	76	
White-collars	19	116	
Other	0	4	
Total	199	196	115.93 (2)*
<i>Nationality</i>			
Italian	189	193	
Other	10	3	
Total	199	196	3.78 (1)*
<i>Age</i>			
Less than 26	15	4	
26-55	165	178	
More than 55	19	14	
Total	199	196	8.33 (3)***
<i>Years of school</i>			
5-8	70	46	
9-13	106	60	
More than 13	23	90	
Total	199	196	58.22 (3)*
<i>Years of work experience for the same company</i>			
Less than 6 years	53	68	
6 or more years	146	128	
Total	199	196	4.33 (3)
<i>Contract</i>			
Permanent	155	134	
Not permanent	17	31	
Other	27	31	
Total	199	196	5.86 (2)
<i>Sector</i>			
Industrial	180	33	
Tertiary public and private	8	83	
Public administration	11	76	
Other	0	4	
Total	199	196	215.82 (3)*

\*\*\* p <.001; \* p <.05

### *Pilot Study*

The first step consisted in a pilot study to test the comprehensibility of the items. Taking into consideration that the participants were workers from the Italian organizational context (different from the U.S. one), and sometimes with a very low level of schooling, it was necessary to remove sentence ambiguities and to be sure that each participant fully understood its meaning (Jobe, 2003).

The first version of the scale was administered to an initial sample of 59 workers, with two tasks: the first task was to answer the 16 items on a response 6-point Likert scale (from 1 =“strongly disagree” to 6 =“strongly agree”); the second one was to judge the comprehensibility of each item on a 5-point Likert scale (from 1 = “extremely easy to understand” to 5 = “extremely difficult to understand”).

Items that were judged difficult to understand were submitted to a second sample of 5 workers, with the “cognitive interview” technique (Willis, 2005). This technique explicitly focuses on the cognitive processes that the individual uses to answer survey questions; it makes it possible to improve the comprehensibility of the questionnaire and construct validity. Specifically the method of Verbal Probing was used (namely, comprehension/interpretation probe, paraphrasing, confidence judgment, recall probe, specific probe and general probes). A second version of the questionnaire was prepared after these interviews, removing one item (item 9, “The old boys’ network is alive and well here”) because of the differences between the Italian and U.S. organizational

context that made this item difficult to adapt to, and is not very easily understood in the Italian context. Then a modified scale was drawn up of 15 items. This second version of the questionnaire was then administered to 25 workers, who independently provided new comprehensibility judgments on each item; all the items were judged easy to understand.

### *Main Study*

The 15-item final questionnaire was then administered to a new sample of 395 employees (which did not include the workers involved in the first phase) in order to test structural and discriminant validity and to explore differences according to the main socio-demographic and occupational variables (phase 1). The criterion validity of the scale was then tested by verifying its correlations with two related variables, job satisfaction and organizational support and included a sub-sample of 207 employees (phase 2).

### *Data analyses*

Linear structural equations models were calibrated to test the hypothesized model. Tests were completed in AMOS 21.0 (Arbuckle & Wothke, 1999) applying the maximum-likelihood method. Firstly, a sequence of CFA analyses was carried out on the dataset, to establish if the four-factor model was that which best fit the data. Next, a series of multiple-group CFA were run, in which

different, and progressively more stringent forms of measurement equivalence were tested (Cheung, 2008; Vandenberg & Lance, 2000).

The models' "goodness of fit" was evaluated using the Tucker Lewis Index (TLI), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). Furthermore,  $\chi^2$  values and  $\Delta\chi^2$  values between the competing models are presented, but they are sensitive to sample size (Meade, Johnson, & Braddy, 2008), so Akaike Information Criterion (AIC) was also presented (lower values indicate better fit).  $\Delta$ CFI was also used with values not exceeding 0.01 indicating that the models are equivalent in terms of fit (Cheung & Rensvold, 2002).

The use of the Cronbach's Alpha coefficient is limited (Raykov, 1998) to testing the reliability of a multiple indicator construct, so composite reliability (that is the degree to which the scale indicators reflect an underlying factor, Fornell & Larcker, 1981) and average variance extracted - AVE (that is the average percentage of variation explained among the items of a construct, Hair, Black, Babin, Anderson & Tatham, 2006), were also computed. To assess discriminant validity between factors, the Fornell & Larcker technique (1981) was performed, comparing the AVE of each latent construct with its shared variance with any other construct of the Diversity Climate Scale. As noted by Hair et al. (2006), the variance extracted estimates should be greater than the shared variance (e.g. squared correlation), indicating that for any two constructs, the AVE for both of

them need to be higher than the shared variance between them (Farrell, 2010; Fornell & Larcker, 1981).

Other well-known analytical tools such as correlations and multivariate analyses of variance (MANOVA) were also used, which were implemented by using SPSS 21.0.

## **Results**

### **Phase 1**

#### *Confirmatory Factor Analysis (CFA)*

At first, a four-factor model (Model 1) with covariances among the latent variables was tested, showing that the fit indexes were not adequate ( $\chi^2 =$  not possible to estimate; TLI = .78; CFI = .82; SRMR = .075; RMSEA= .095; AIC = 452.952). So it was decided to test a new, more parsimonious, model, after deleting items 1, 5, 6 (from Organizational Fairness factor) and items 14, 15 and 16 (which made up the Personal Comfort with Diversity factor). These decisions were based on an examination of the modification indices and standardized factor loading (not significant and adequate). So a three-factor model (Model 2, comprising Organizational Fairness, Organizational Inclusion and Personal Value factors) was tested, which showed very good fit indexes ( $\chi^2(24) = 73.146$ ;  $p < .001$ ; TLI = .93; CFI = .95; SRMR = .049; RMSEA= .073, AIC = 115.146). Model 2 was then compared to a one-factor Model (Model 3), in which all the

items were predicted by a single factor ( $\chi^2(54) = 619.264$ ;  $p < .001$ ; TLI = .47; CFI = .56; SRMR = .131; RMSEA= .164; AIC = 472.340). The first model of the two showed the best fit to the data, based on fit indexes, AIC and delta Chi-square value ( $\Delta\chi^2_{M3-M2(25)} = 546.118$ ).

Fit indexes for the tested models are presented in Table 1.2.

Furthermore, standardized factor loadings were all statistically significant and varied between .59 and .89, with a mean of .71, while correlations between the latent factors varied within .26 (Organizational Inclusion and Personal Value), .29 (Organizational Fairness and Personal Value) and .59 (Organizational Fairness and Organizational Inclusion).

This final version with 9 items is reported in the Appendix A.

Overall, these results did not support our first hypothesis, i.e. that the Italian dataset would show the same 4-factor structure found in the U.S. (Mor Barak, 1998).

*Table 1.2.* Fit indexes for models tested in CFA

Model	N. items	$\chi^2$	df	TLI	CFI	SRMR	RMSEA (C.I.)	AIC
1	15	n.p.e.	n.p.e.	.78	.82	.075	.095 (.086-.105)	452.952
2	9	73.146*	24	.93	.95	.049	.073 (.054 -.092)	115.146
3	9	436.346*	27	.50	.63	.137	.198 (.182 -.214)	472.340

\*  $p < .001$

*n.p.e.* = not possible to estimate because covariance matrix was not positive defined

### *Multigroup Confirmatory Factor Analysis (MGCFA) for gender*

Preliminary analyses conducted separately on the men and women datasets showed that the 3-factor solution with covariances between the latent variables of the Diversity Climate Scale was a better fit than the 4-factor solution for both the men's dataset (Table 1.3, Model A<sub>1</sub> vs. Model B<sub>1</sub>) and the women's (Table 1.3, Model A<sub>2</sub> vs. Model B<sub>2</sub>).

Model A<sub>1</sub> and Model A<sub>2</sub>, which configured a three-factor solution were taken as the baseline models for a sequence of multiple group analyses by which measurement equivalence was tested. The first multiple-group analysis tested a model of configural invariance (Model C) by simultaneously evaluating the fit of Model A<sub>1</sub> and Model A<sub>2</sub>. The fit indexes ( $\chi^2(48) = 101.172$ ;  $p < .001$ ; GFI = .94; AGFI = .90; TLI = .92; CFI = .95; SRMR = .067; RMSEA = .054) all indicated quite a good fit for this model, supporting an equivalent 3-factor solution for the Diversity Climate Scale in the datasets for both the men and women.

As mentioned above, the fit of this configural model provides the baseline value against which all subsequently specified equivalence models are compared (Byrne, 2008).

Model D was tested for metric invariance. All the fit indices were acceptable (Table 1.3). More importantly,  $\Delta\chi^2_{MC-MD}(6) = .512$  and  $\Delta CFI = .005$  suggested that Model D could be considered equivalent to Model C. Thus, metric invariance was supported.

Also, measurement error invariance (as tested by Model E) was found, ( $\Delta\chi^2_{ME-MD}(9) = 18.679$ ;  $\Delta CFI_{ME-MD} = .009$ ).

Model F was tested for scalar equivalence but displayed a significantly worse fit to the data ( $\Delta\chi^2_{MF-ME}(9) = 83.0$ ;  $\Delta CFI_{MF-ME} = .069$ , see Model F in table 1.3).

This result may be a consequence of the fact that the two samples were not sufficiently homogeneous with respect to some control variables (see table 1.1) and it suggests that a meaningful comparison of the diversity climate dimensions between the two groups investigated is not practicable (Byrne, 2008).

The equivalence in factor variances was tested (Model G) and it was found to be tenable ( $\Delta\chi^2_{MG-ME}(3) = 6.753$ ;  $\Delta CFI_{MG-ME} = .003$ ). Finally, the equivalence in factor covariances was tested (Model H), by nesting the respective model with Model G, and the result was that it was supported ( $\Delta\chi^2_{MH-MG}(3) = 6.469$ ;  $\Delta CFI_{MH-MG} = .004$ ).

Standardized factor loadings for the final model (Model H) were all statistically significant and adequate, with a mean loading of .70, and a mean correlation between latent variables of .35.

Moreover, correlations between this final scale and the 15-items version (the original scale minus item 9, revealed not suitable for the Italian context), was .92 ( $p < .01$ ), indicating the two scales can be considered virtually identical.

Overall these results supported our Hypothesis 2 (Table 1.3).

*Table 1.3. Tests of measurement invariance for the Diversity Climate Scale across gender*

Model	$\chi^2$	df	SRMR	RMSEA (C.I.)	CFI	$\Delta$ CFI
M_A <sub>1</sub> (3-factors, Men)	61.8*	24	.067	.091 (.063 -.119)	.917	-
M_B <sub>1</sub> (4-factors, Men)	140.4*	48	.086	.100 (.081 -.120)	.844	-
M_A <sub>2</sub> (3-factors, Women)	39.4**	24	.047	.057 (.021 -.089)	.975	-
M_B <sub>2</sub> (4-factors, Women)	86.3*	48	.062	.074 (.054 -.095)	.925	-
M_C (Configural Invariance)	101.2*	48	.067	.054 (.039 -.068)	.950	-
M_D (Metric Invariance)	101.7*	54	.066	.048 (.033 -.062)	.955	.005
M_E (Measurement error Invariance)	120.4*	63	.067	.049 (.035 -.062)	.946	.009
M_F (Scalar Invariance)	203.4*	72	.071	.069 (.058 -.080)	.877	.069
M_G (Structural Variance Invariance)	127.2*	66	.068	.049 (.036 -.062)	.943	.003
M_H (Structural Covariance Invariance)	133.6*	69	.081	.049 (.037 -.062)	.939	.004

\* $p < .001$ ; \*\* $p < .05$

### *Additional Psychometric Analyses*

Cronbach's Alpha was computed for each factor to test reliability and showed acceptable internal consistency of the scale: Organizational Fairness .82, Organizational Inclusion .70, Personal Diversity Value .74. Composite reliability and average variance extracted were: CR .83, AVE .63 for Organizational Fairness, CR .69, AVE .44 for Organizational Inclusion and CR .75, AVE .51 for Personal Diversity Value.

Discriminant validity among the latent factors (Farrell, 2010) was tested, using the Fornell & Larcker (1981) technique, by comparing the AVE of each construct with its shared variance with any other construct. As suggested by Farrell (2010), both AVE and shared variance were estimated by using the CFA correlation matrix taken from structural equation output, in order to include measurement error. Discriminant validity was supported for all the three latent

constructs, where the AVE for Organizational Fairness (.63) and for Organizational Inclusion (.44) was greater than the shared variance (e.g. square of the correlation) between the two constructs (.34). Similar results were found for Organizational Fairness (AVE .63) and Personal Value (AVE .51) with their shared variance (.07). Organizational Inclusion (AVE .44) and Personal Value (AVE .51) had a shared variance of .06. Thus, Hypothesis 3 was supported.

Furthermore, the mean values obtained on the scales fell within the positive range in all the cases; Inclusion had the lowest mean value ( $M = 3.06$ ;  $SD = 1.29$ ), while Personal Value had the highest ( $M = 4.35$ ,  $SD = 1.23$ ). Table 1.4 shows the descriptive statistics of the 3 factors of the Diversity Climate Scale.

Once equivalence has been established, we proceeded with examining mean group differences, having confidence that if the group differences found are due to actual differences in diversity climate perceptions and are not an artifact of measurement error (Vandenberg and Lance, 2000; van de Vijver and Leung, 2000).

The differences in Diversity Climate perceptions, based on a number of socio-demographic and occupational variables, were then examined using MANOVA. MANOVA (Wilk's criterion), revealed an overall significant difference in diversity perceptions according to gender, region, education and years of work experience in the company ( $\Lambda = .854$ ,  $F = 16.469$ ,  $p < .001$  for gender;  $\Lambda = .771$ ,  $F = 28.545$ ,  $p < .001$  for Region;  $\Lambda = .855$ ,  $F = 5.14$ ,  $p < .001$  for education;  $\Lambda = .939$ ,  $F = 2.03$ ,  $p < .05$  for years of work experience in the company). As far as

gender is concerned, follow-up *F*-tests revealed significant differences in all the cases except Fairness, with women consistently reporting higher Inclusion and Personal Value perceptions than men. With respect to Region, significant differences emerged in all cases, with those from Southern Italy perceiving better Diversity Climate in all of its dimensions. As for gender, significant differences emerged at the educational level for all cases except Fairness, with those who had a high educational level (more than 13 years) reporting higher values for Organizational Inclusion and Personal Value than those who had less than 13 years of education. Finally, follow-up *F*-tests for years of work experience in the company revealed significant differences in the means for Organizational Inclusion and Personal Value, with employees who worked for the same company for less than 1 year and from 2 to 5 years, reporting higher Organizational Inclusion and Personal value perceptions than those who worked for 6 or more years.

*Table 1.4. Descriptive statistics and Pearson correlations between study variables*

	M	SD	1	2	3	4	5	6
1. Diversity Climate	3.76	0.97	1					
2. Organizational Fairness	3.86	1.47	.801*	1				
3. Organizational Inclusion	3.06	1.29	.746*	.441*	1			
4. Personal Diversity Value	4.35	1.23	.632*	.243*	.196*	1		
5. Job satisfaction	4.02	0.85	.299*	.287*	.379*	.072	1	
6. Perceived Organizational Support	3.43	0.80	.439*	.446*	.471*	.038	.630*	1

\* $p < .01$

## **Phase 2**

### *Criterion Validity*

As expected (see Table 1.4), the Diversity Climate Scale showed significant correlations with job satisfaction and perceived organizational support (Hypothesis 4), for all of its dimensions except “Personal Value”; a possible explanation might be that the criterion variables are related to the organizational level, while “Personal Value” is concerned with individual views on the importance of diversity. Significant correlations varied from .28 (between Job Satisfaction and Organizational Fairness) to .33 (between Perceived Organizational Support and Organizational Inclusion).

### **Discussion**

The aim of this study was to discover if there were different psychometric characteristics in the Diversity Climate scale when applied within a European context. Specifically the main focus was on the measurement properties of the diversity climate instrument across gender groups (i.e., establishing measurement and structural equivalence) and its implications for practice given the popularized assessments of diversity climate in organizations and industries of the U. S. context, which are exclusively based on observed mean scores.

Several procedures (quantitative and qualitative ones) were used: Judges Content Validity and Cognitive Interview were performed for the European

adaptation of the questionnaire and specifically to make it suitable for the Italian context. Following this, Confirmative Factor Analyses and Multigroup Confirmative Factor Analyses using Structural Equation Modeling (AMOS 21.0) were performed to verify the factorial structure of the scale.

Firstly, although not consistent with what had been found for the original scale (Mor Barak et al., 1998), we found that a three-factor solution (without the Personal Comfort factor) would best fit the data for the Italian sample, so 9 items were used (instead of the 16) of the original scale. This fact means that the Diversity Climate construct works in the Italian context in a different way from the one in which it had been developed (U.S.). Nevertheless, it has to be said that, regardless of the geographical context of the research (U.S., Australia, India, Italy), this was the first time that a study about psychometric properties of the whole Diversity Climate Scale was made. All the previous studies only made use of some specific subscales (Buttner et al. 2010b) and also mainly focused on the organizational dimension (Buttner et al. 2012, Gonzalez & DeNisi, 2009; McKay et al, 2007, 2008, 2009). Only one study (Sia & Bhardwaj, 2009) chose to use 3 factors from the original DC scale – the same revealed from our study, respectively organizational fairness, organizational inclusion and personal diversity value – with the motivation that they were considered more relevant for the Indian context. Moreover, in Mor Barak and colleagues original article (1998) the fourth factor accounted only for the 6.6% of variance and it was made of 3 items, the last of which did not quite fall under the meaning of

Personal Comfort with Diversity, but the authors decided to keep it because they considered it loaded high enough (p. 92). Nevertheless, its loading was .50, therefore raising some doubts about the face and content validity of that factor. Another issue to be mentioned is that the present study has been the first in testing the complete DC scale, so no comparable data are available about the complete 4-factor structure, except for the original article (with its limitations mentioned above). A possible explanation could also be the fact that personal comfort with diversity seems to be more related to an individual feeling or sense of ease/discomfort with a specific situation pertaining diversity, but it has no much in common with perceptions about diversity's value and support or treatment, neither at the individual level. Thus perhaps it could be a reason why we did not find it as a constitutive factor of climate for diversity.

Secondly, we found that the same three-factor solution was invariant for the Italian data across gender (men vs. women). This implies that Italian workers conceptualize diversity climate in the same way (Byrne, 2008). Furthermore, the present study found evidence for metric invariance, uniqueness invariance and structural invariance, suggesting that the relationship between the constructs was the same across the groups. However, results for the scalar invariance test failed, indicating that a meaningful comparison at the level of the mean of the constructs was precluded. As mentioned above, this result could be a consequence of the fact that the samples were not sufficiently homogeneous with respect to some control variables.

The reliability of the scale, evaluated by computing Cronbach's alpha, composite reliability and average variance extracted (given the multidimensionality of the scale) shows acceptable values except for Organizational Inclusion (but the C.R. and AVE values were only a little below the recommended thresholds). Discriminant validity between latent factors (Farrell, 2010) was tested using Fornell & Larcker (1981) technique, and we found that it was supported.

As in Mor Barak's study (1998), the average score on the diversity climate scale was higher for the Personal level than for the Organizational one, and the Personal level scores were higher for female workers than for male. This provides important action guidelines for organizational diversity, because it suggests that employees recognize the importance of diversity as a strategic resource for their companies and for their work effectiveness, even if they do not perceive the organization is particularly fair and inclusive.

Differently from Mor Barak's study (1998) female workers reported higher inclusion than male did; a possible explanation for that result may be the generally more favorable work conditions in the tertiary companies compared to the manufacturing one in Italy. The 81% of the women of the sample worked in the tertiary sector (both private and public) as white collars, they enjoy better salaries, extended benefits and comfortable work environments and, as a result, they can be more favorably aware (or they may have more favorable views about) of the management actions that affect their inclusion in the workplace.

Another possible explanation can be driven from the limited diversity characterizing the companies' sector to which our women sample belong; specifically they represents highly feminized professions (71% of persons employed in desk works and 63.4% of individuals employed in the health and family services are women; Italian National Institute of Statistics, [ISTAT], 2013). Therefore, as a result, women of our sample can feel more included than men as the formers would not represent a minority in their work context; subsequently, they are able to obtain a greater support from their work-context than their males' counterpart probably, again, as a result also of their better work conditions.

Our findings reveal other significant differences for some socio-demographic and occupational variables, where employees from Southern Italy and those with a high educational level reported better perceptions at all levels (organizational and personal), while those with fewer years of work experience in the company, reported better perceptions at the Organizational level.

Correlations between the Diversity Climate subscales, Job Satisfaction Scale and Survey of Perceived Organizational Support were all significant except for the "Personal Value"; this result could be explained considering that the criterion – related variables, refer to perceptions concerning the organizational context, while Personal Value is related with perceptions about the importance of diversity for the individual.

### *Limitations*

There are several additional opportunities for future research to improve or extend the present study. First of all, further studies involving other countries are needed to verify whether the same three-factor solution is found to best fit the data, particularly in the European context. Moreover, future studies should increase the diversity of sectors the companies come from and increase the number of foreign personnel responding to the questionnaire. The number of participants from different ethnic groups was very low in the present study. As the European workforce becomes increasingly diverse, knowledge about the diversity perceptions of different ethnic groups, if any, may be important in order to better achieve organizational goals through the realization of the employees' full potential.

The present study was also limited in that it was not possible to obtain entirely balanced occupational samples for the control variables (e.g. job status, educational level), which could be a reason for the lack of scalar equivalence.

A fourth limitation of the study was the use of convenience sampling methods for data collection. While cross-sectional convenience samples may prove useful in exploring theoretical models, such as the one built in the present study, caution should be exercised while generalizing the results beyond the current research.

Another fruitful directions for future research could be to consider also the group level (Cox, 1994) within diversity climates' perception; infact as

suggested by literature (Reichers and Schneider, 1990) by definition climate may be best measured as a group phenomenon. Moreover Chiaburu & Harrison (2008) stressed that coworkers' support and antagonism have an effect on employees' outcomes, so it could be useful to consider for future researches also coworkers' perceptions as a diversity climates' dimension and to develop an adequate instrument to assess that and to be integrated in the present scale.

## **Conclusions**

Recent research suggests that to improve organizational performance and inclusiveness, organizational diversity climates must change as workforces become more diverse (McKay et al. 2008, 2009). Further, the development of a positive diversity climate is important for organizations that want to make the most of diversity. Therefore, organizations will need measures to assess diversity climate and to evaluate how it can affect work outcomes, it is also important that these instruments are suitable for the work context in which they are applied. With this intent, the present study has attempted to adapt a tool that may prove useful to assess perceptions of diversity in a different work context from the one in which it was developed, and in particular it represents the first attempt to validate a measure of diversity climate within a European context.

The availability of common tools with characteristics of validity, reliability, comprehensiveness, and brevity, which are all revealed by the Italian adaptation of the Diversity Climate scale, would be an important step toward developing a

unified assessment system on diversity perceptions at the European level, especially if other European countries would reveal to conceptualize diversity climate through the same 3 factor solution.

Moreover, looking to an international perspective, the present study represents the first work aimed to a validation of a diversity climate instrument which considered both the organizational and personal dimensions, and which used rigorous qualitative and quantitative techniques of analysis.

For that reason further replications of the present study across different countries are strongly needed and recommended.

## **Appendix A**

The final version of the Diversity Climate questionnaire used for the Italian validation with the specification of the dimensions.

### *Organizational Fairness*

1. Managers here have a track record of hiring and promoting employees objectively, regardless of their race, gender, sexual orientation, religion, or age.
2. Managers here give feedback and evaluate employees fairly, regardless of employees' race, gender, sexual orientation, religion, age, or social background.
3. Managers here make layoff decisions fairly, regardless of factors such as employees' race, gender, age, or social background.

### *Organizational Inclusion*

4. Management here encourages the formation of employee network support groups.
5. There is a mentoring program in use here that identifies and prepares all minority and female employees for promotion.
6. The company spends enough money and time on diversity awareness and related training.

### *Personal Diversity Value*

7. Knowing more about cultural norms of diverse groups would help me be more effective in my job.
8. I think that diverse viewpoints add value.
9. I believe diversity is a strategic business issue.

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## **CHAPTER 2**

### **Promoting Safety Participation through Diversity and Inclusion Climates**

This chapter is based on Paolillo, A., Silva, S., & Pasini, M. (under review).  
Promoting Safety Participation through Diversity and Inclusion Climates.

## **Abstract**

This paper aimed to investigate the impact of diversity climate and inclusion climate on safety participation behaviors through the mediating effect of the motivation to actively promote safety at work. Participants were 491 workers employed in four Italian metal-mechanical companies. They completed a paper questionnaire containing measures of psychological diversity climate, psychological inclusion climate, safety motivation participation and safety participation behaviors. Data were analyzed with structural equation modeling. Results showed that safety participation motivation fully mediates the relationship between diversity climate and safety participation behaviors, whereas it partially mediates the relationship between climate for inclusion and safety participation behaviors. The present findings can help managers to arouse employees in pursuing safety goals independently of compensation or obligation by creating an organization which main concern is caring for each other's wellbeing. This is the first study which has empirically tested the relationships between diversity climate, inclusion climate and safety behaviors. It has extended previous research which simply tested the effects of objective types of diversity on safety performance.

**Keywords:** diversity, inclusion, climate, safety, behaviors, participation, motivation.

## **Introduction**

The past 30 years have been marked by a significant growth in empirical research on the effects of diversity on individual, group and organizational level outcomes. This growth in diversity research is a consequence of the fact that the contemporary European workforce is increasingly diverse. This literature has revealed numerous benefits of diversity, including: increased access to new consumer markets, innovation and competitive advantage, improved corporate image, reduced legal liability, greater creativity, decision-making and problem-solving abilities, work performance and market share (Joshi, Liao, & Jackson, 2006; Richard, Barnett, Dwyer, & Chadwick, 2004; Sacco & Schmitt, 2005). At the same time many studies have been developed around the relationships between diversity and safety, showing that employees' differences (in some social, demographic and functional dimensions) can be associated to higher rates of accidents and injuries (Ahonen & Benavidesand, 2006). Specifically, research in this field has found evidence that differences in dimensions such as: personality (e.g., Naibi, Consoli, Chastang, Chiron, Lafon, & Largarde, 2005), age (e.g., Ng & Feldman, 2008), gender (e.g., Skaar and Williams, 2003), ethnicity (Panikkar et al., 2012), competencies and skills (e.g., Lloyd & Härtel, 2010) and employment status (Luria & Yagil, 2010), have an influence on safety behaviors and safety outcomes, leading to different levels of risk taking and accident rates and influence the workers' ability to handle workplace hazards safely.

Workforce diversity can affect safety because how the employees perceive the safety procedures in organizations and related rules, norms and behaviors differ from each other (Seymen & Bolat, 2010), and this can influence their attitudes while choosing the right behavior when confronted with a new situation (Spector et al.2001; Miroshnik, 2002).

Nevertheless, some of the above mentioned studies, which focused on the impact of specific and objective kinds of diversity on safety behaviors, had showed ambiguous and contradictory results (e.g. Clarke, 2006; Ucho & Gbande, 2012); a reason for this could be that diversity refers to differences between individuals concerning any personal attribute that determines how people perceive one another (Ragins & Gonzalez, 2003), thus the most important thing is how this diversity is interpreted and perceived, because there are numerous ways in which a person or group can be different from others, but it is important to understand how this difference is relevant for him/them (Stegmann, 2011).

Moreover, it has been documented that behavior is driven by perceptions of reality (Eisenberger, Fasolo & Davis-LaMastro, 1990) in such a way that those beliefs are of vital importance, regardless of whether or not they are consistent with reality (Mor Barak, Cherin & Berkman, 1998). Therefore, “in order to benefit from diversity, the accurate management of mutual perceptions and interactions is crucial” (Hertel, Van der Heijden, de Lange & Deller, 2013, p. 858); for that reason in the present study we decided to focus on subjective

climate perceptions of diversity and inclusion (rather than on objective kinds of diversity) as linked to safety behaviors, which is something never studied before.

Specifically, perceptions related to how diversity is treated within the organizational context are what form a climate for diversity (Mor Barak et al., 1998), which can manifest itself at an individual level (James, 1982), or at an organizational level (Schneider & Reichers, 1993). That construct is strongly linked with inclusion/exclusion (Mor Barak & Cherin, 1998), since research indicates that individuals from diverse groups commonly find themselves excluded from networks of information and opportunity (Cox, 1994). According to previous research, a climate of inclusion is based on perceptions of collaborative work arrangements and the conflict resolution procedures created in order to involve diverse employees in the decision making processes (Roberson 2006). So, it is related not only to the perceived treatment of organizational demography within the company (just as diversity climate is), but it is also focused on the participation of all employees in the company's activities.

In particular we hypothesized that both climates have an important impact on safety participative behaviors through any effect on motivation to actively promote safety at work. Essentially, climates that are viewed as supportive enhance employee attitudes and goal-relevant work behaviors, with favorable influences on company performance (McKay, Avery & Morris, 2009); a reason

for that could be the fact that individuals would feel obliged to conform to organizational expectations to fulfill their need of social approval (e.g. Blau, 1964) by maintaining harmony with the social environment and, as a result, they will adapt their responses to be congruent with the culture or climate (Schneider, 1975). In this way climate helps to clarify these performance-rewarded contingencies by influencing the motivation to perform (Kopelman, Brief & Guzzo, 1990; Vroom, 1964).

Furthermore multiple climates exist in organizations, therefore it is reasonable to ask how they relate to one another and how these contextual influences operate in organizational settings (Kuenzi and Schminke, 2009) and can be related to effectiveness of outcomes in different domains (Carr, Schmidt, Ford, and Deshon, 2003).

This study extends previous research in several ways. Firstly, it provides a much needed empirical and theoretical investigation concerning perceptions of diversity and inclusion and the differences/similarities between the two constructs. Secondly, it responds to calls for research on the effect of some facet-specific climates on distinct kinds of specific outcome (Kuenzi & Schminke, 2009). Thirdly, by doing so, it extends existing research on the business case for diversity and on safety in the workplace by being among the first studies to a) empirically analyze the ramifications of perceptions of diversity and inclusion for performance outcomes and b) include different kinds of climates as antecedents to safety motivation and safety performance.

In the section below, we develop the theoretical explanations about how diversity climate and climate for inclusion can affect safety behaviors and outcomes.

## **Theoretical background**

### *Diversity Climate*

Mor Barak and colleagues (1998) defined diversity climate as “employee behaviors and attitudes that are grounded in perceptions of the organizational context related to women and minorities” (Mor Barak et al., 1998, p. 83), such as global reactions and ideas resulting from the organization’s efforts to promote diversity (Kossek & Zonia, 1993). Diversity climate, in essence, is conceptualized as the degree to which a firm advocates fair human resource policies and socially integrates underrepresented employees (McKay, Avery & Morris, 2008), and it reflects the extent to which promoting diversity and eliminating discrimination is a priority in the organization (Gelfand, Nishii, Raver & Schneider, 2005).

According to the authors, the elaboration of the construct of diversity climate can be conceptualized as a function of 4 factors, organized on two levels: an organizational level, concerning perceptions of fairness (such as discrimination or preferential treatment in hiring and promotion procedures) and inclusion in company policies and practices (intended as mentoring programs or other

management decisions that affect the inclusion or exclusion of women and members of minority groups) and an individual level, concerning individuals' views on the importance of diversity and personal degrees of comfort with diversity.

Specifically for safety performance, there is no literature about the relationship between diversity climate and safety; nevertheless, there are other specific organizational climates, which have some similarity with diversity climate, that have been linked to employee motivation and safety-related outcomes. In particular: justice climate has been demonstrated to be a predictor of helping behaviors (Naumann & Bennett, 2000; 2002) and organizational citizenship behaviors (Ehrhart, 2004), of which safety citizenship behaviors (such as voluntarily taking personal responsibility to remove hazards) are an important part (Willis, Brown & Prussia, 2012). Moreover, it has been showed to predict employee psychosocial health (Eloviano, Kivimaki, Vahtera, 2002), safety performance (Gatien, 2010) and safety incident report (Beyea, 2004; Weiner, Hobgood & Lewis, 2008).

Ethical climate has been also linked with safety outcomes, since Parboteeah & Kapp (2008) demonstrated that a benevolent-local climate is inherently concerned with attention to the welfare and the well-being of others. Such perceptions lead to an environment whereby people's physical well-being and safety are important, therefore encouraging employees to voluntarily participate in safety enhancing behaviors, and decreasing incidences of injuries.

Specifically, the authors found that safety motivation mediated the relationships between ethical climates and safety-enhancing behaviors.

Organizational justice has long been viewed as one of diversity climate's main components (Mor Barak et al, 1998; McKay et al., 2008) and diversity climate has been considered as a reflection of organizational ethics (Singh, Barjinder & Selvarajan, 2013); despite this, the construct of diversity climate has some peculiarities which distinguish it from both justice and ethics, since it concerns the structural and social integration of minorities (which is totally missing in justice climate theory, McKay et al., 2008). Moreover it appears to fulfill the economic responsibility of a company by making jobs available to different groups, increasing the organization's public image and communicating the company's diversity value (which is missing in the ethical climate theory, since this latter is more focused on the legal responsibility of an organization; Stewart, Volpone, Avery & McKay, 2011). Therefore, the uniqueness of its characteristics suggests the importance of further exploration of the specific role of diversity climate on safety performance; specifically perceptions of company's efforts towards underrepresented employees can be considered as an indicator of how much the company cares for its employees' wellbeing. As a consequence of that, the individual will be influenced in his/her motivation to care for coworkers' health too, and this will translate in more or less proactive safety behaviors.

### *Climate For Inclusion*

There is a strong and consistent relationship between diversity and inclusion (Ibarra, 1993); research indicates that employees can feel excluded from networks of information and opportunity (O'Leary & Ickovics, 1992) because of their actual or perceived membership in a minority or disfavored identity group (Milliken & Martins 1996). The concept of employees' perceptions regarding inclusion-exclusion in the workplace is conceptualized as a continuum of the degree to which individuals feel a part of critical organizational processes (Mor Barak & Cherin, 1998), such as access to information, influence on decision-making and participation in social activities (Mor Barak, 2005). Nevertheless, there is only limited literature about the theoretical (Holvino, Ferdman & Merrill-Sands 2004) and empirical (Nishii, 2013) development of this concept. Considering Shore et al. (2011) study, shared perceptions of inclusion can build a climate for inclusion, which realizes interpersonal integration and involvement in decision making of all social groups. Although there is no empirical research examining the construct of inclusion climate related to safety outcomes, an employee's perception of inclusion has been found to influence work quality (Glisson & James, 2002), workers' health and social functioning (McNeely, 1992) and well-being (Mor Barak & Levin, 2002). Furthermore, as employees perceive they are involved in some critical organizational processes, such as decision making, they will feel empowered and supported (Travis & Mor Barak, 2010), with positive effects on their stress levels, mental health, and

psychological well-being (Michie & Williams, 2003) and this can in turn affect their work behaviors (Nissly, MorBarak, & Levin, 2005).

Thus, employees may reciprocate a felt sense of inclusion by broadening their role definitions to include safety-related OCBs (Hofmann, Morgeson, & Gerras, 2003), such as going beyond mere compliance and being more voluntarily motivated to participate in activities which promote safety within the organization.

Another study (Singh and Winkel, 2012) demonstrated that a positive relational climate of mutual respect and psychological safety exerts a strong impact on cognitive and affective processes that, in turn, motivate interpersonal helping behaviors, because the environment fosters such interpersonal caring behaviors (Geller, 1991), through the norm of reciprocity. Considering that a climate for inclusion is based on perceptions to be actively involved in some social (formal and informal) relationships, it could have the same beneficial consequences on safety outcomes.

### *Diversity climate and climate for inclusion: clarifying the differences*

In the last few years, many organizations and practitioners have shifted from a focus on diversity to one on inclusion (Mehta, 2000). The existing literature about those issues states that there are some differences in focusing on diversity or on inclusion, suggesting a distinction between the two concepts (Cox, 1991;

Kossek & Zonia, 1993; Thomas and Ely, 1996) but there is still little empirical investigation about that (Roberson, 2006).

Particularly concerning climate's perceptions, recent literature considers climate for inclusion as broader in scope than diversity climate, because it requires more than increasing diverse representation and implementing fair human resource practices (as diversity climate does). It also "requires a change in interaction patterns" (Nishii, 2013, p. 1756) in terms of the workers' participation in the organizational structures and processes (formal and informal ones). More specifically, diversity climate focuses on the issue of organizational demography, such as the representation of different demographic groups at all levels, respect for differences and fair treatment and it also has a dimension of "organizational inclusion" (Mor Barak et al., 1998, p. 92). This last component refers to the degree of affirmative action programs implemented by the company to promote integration of women and minorities, so it is quite different from the construct of climate for inclusion; the latter focuses more on the removal of obstacles to the full participation and contribution of all employees in organizations (Roberson 2006), especially (but not only) those who belong to minority or disfavored identity groups. For that reason a climate for inclusion is more related to the process of empowerment and involvement of workers in decision making processes, information networks, and social and informal activities and not only to the specific issue of how to deal with organizational demography. Obviously diversity climate and inclusion climate are related

concepts but, as shown in previous research (Roberson, 2006), organizations may vary in the way they follow these two philosophies (e.g. inclusive organizations and diverse organizations have not the same attributes), so suggesting that they represent two different, yet related, approaches to managing diversity. They are distinguished, but both are considered, in this study to observe whether they have different effects on the same specific outcomes.

### *Safety Behaviors*

Neal and colleagues (e.g., Neal & Griffin, 1997; Griffin & Neal, 2000; Neal, Griffin & Hart, 2000) adopted and applied Borman and Motowidlo's (1993) categories of task performance and contextual performance to describe safety behaviors at the workplace, safety compliance corresponding to task performance and safety participation corresponding to contextual performance. The first one refers to activities concerning adherence and respect for safety procedures and taking precautions against hazards (such as using the proper protective equipment and following the correct procedures). The latter refers to behaviors that do not directly increase workplace safety, but that help to create an atmosphere supportive of safety (such as helping co-workers, promoting voluntary safety-programs and making an effort to improve safety at work). Although safety compliance involves engaging in behaviors that are viewed as part of an employee's work role, safety participation involves a greater voluntary element, including behaviors beyond the employee's formal role, that

is, extra-role or organizational citizenship behaviors (OCBs; Clarke, 2006). This means that safety participation is not mandatory and, for that reason, it is less prone to the issue of social desirability than safety compliance, so in the present study we decided to focus only on safety participation behaviors.

Starting from Campbell, McCloy, Oppler and Sager's (1993) theory about the three determinants of work performance (knowledge, skills and motivation), Griffin and Neal (2000) considered and adapted them to describe the determinants of safety behaviors. The authors focused particular attention on the construct of safety motivation, which they distinguished in safety compliance motivation and safety motivation participation. The former is the motivation to adhere to safety rules by respecting the required procedures, whereas the latter is the motivation to actively participate in activities promoting safety at the workplace. Motivation is likely to be more important for participation than for compliance, because participatory activities are voluntary, whereas compliance is generally mandatory.

Then, following the above mentioned theories, the authors also considered the antecedents to performance. These include some organizational factors, such as leadership, group norms, and climate. As Campbell et al. (1993) argued, the determinants of performance (knowledge, skill and motivation) must mediate the relationship between the antecedents and components of performance.

Moreover, recent literature suggested that many facet-specific climates appear to exert an important impact on related, but distinct, outcomes as well (Kuenzi &

Schminke, 2009). This implies that climate research should include studies exploring the link between facet-specific climates (e.g. diversity climate and climate for inclusion, which have never before been considered as related to safety) and distinct facet-specific outcomes (e.g. safety participation behaviors) through the mediating effect of the determinants of safety performance (e.g. safety participation motivation).

### *Development of hypotheses*

Since procedures are seen as manifestations of group values, they have a symbolic significance for employee attitudes and behaviors (Lind & Tyler, 1988), thus climate perceptions provide guidance to employees with respect to the types of role behaviors that will be rewarded and supported in the organization (Zohar & Luria, 2004).

As many studies investigating the effects of organizational climate on work's outcomes had done, the present research applied Blau's (1964) social exchange theory to develop the hypotheses. In details, if group members perceive they are treated in a certain way, then they should similarly assign meaning to that treatment as representative of a social exchange relationship; therefore, in the light of a positive treatment received from others, a reciprocal relationship is formed such that employees feel concern for one another and may be motivated to engage in mutually benefiting citizenship behaviors. Thus, the underlying reasoning of the present study is that a climate, which is supportive of

differences and really committed to the integration of all employees in the organizational processes, will motivate workers to perform safely because they feel the company has their best interests at heart and they will feel the need to reciprocate by improving their attitudes toward safety.

Moreover our hypotheses' development draws on Kopelman et al's. (1990) climate model, suggesting that climate influences company performance through its effects on cognitive and affective states (e.g., motivation). Those states result from perceptions of the work environment (climate), which, combined with opportunities to act and associated beliefs, become the immediate antecedents of behavior (Mathieu & Zajac, 1990). Although the literature on the relationship between climate and work motivation is weak (Carr et al., 2003), several research showed that climate influences cognitive and affective states and that these ones are predictive of behavioral outcomes. Specifically for our research purpose, there are some studies which showed how some cognitive and affective states such as job satisfaction and organizational commitment (which are based on motivational processes; Tella, 2007) are predicted by diversity climate (Caldwell, Mack, Johnson & Biderman, 2002; Buttner, Lowe & Billings-Harris 2010) and inclusion climate (Cho & Mor Barak, 2008; Acquavita, Pittman, Gibbons & Castellanos-Brown, 2009).

Moreover, some specific kinds of motivation have been found to relate to some specific outcomes; for example, safety motivation has been found to be a predictor of safety performance (Neal et al., 2000, Christian, Bradley, Wallace

and Burke, 2009). Finally, given that diversity and inclusion climates are concerned with behaviors that have consequences for others, it is logical that they should be related to safety motivation. Given that, it follows that safety motivation mediates the relationships between those climates and safety behaviors. Our proposition is consistent with previous research showing the mediating effects of motivation on the link between other forms of organizational climates and behaviors (Brown and Leigh, 1996).

Thus, by promoting the equal treatment of all employees and by including them in information networks and decision making processes, pro-diversity climate and inclusive climate should improve workers' safety performance, by activating a positive internal state which leads employees to care for others' well-being through the participation in actively promoting safe behavior.

Considering all those issues, we specifically hypothesized that:

H1: Safety participation motivation mediates the relationship between diversity climate and safety participation behavior.

H2: Safety participation motivation mediates the relationship between climate for inclusion and safety participation behavior.

The theoretical model is presented in Fig. 2.1.



Fig. 2. 1. Theoretical model

## Methods

### *Participants*

Data were collected through convenience sampling, where questionnaires were distributed to 491 employees of 4 medium and large Italian organizations, belonging to the metal-mechanical sector. From a geographical point of view, attention was focused on a specific zone, the region of Veneto in the North of Italy, a region with a high rate of accidents at the workplace and with a high level of industrial production, particularly in the metal-mechanical sector, which is one of the most relevant industrial sectors of this region.

Of the employees, 481 (98%) returned completed questionnaires.

All data were collected at an individual level. Considering the whole sample, 88.2% of the participants were male, and 92.5% were Italian workers. For the other social and demographic characteristics the company percentage were as follows: age (19-25 = 6.3%, 26-35 = 22.6%, 36-45 = 34.8%, 46-55 = 28.9%, over 55 = 7.5%); religion (Catholic = 84.4%, Atheistic = 4.6%, Orthodox =

3.6%, Muslim = 2.4%, Others = 5%); educational level (in years of schooling: less than 5 = 1.4%, 5-8 = 24.4%, 9-13 = 62%, more than 13 = 12.2%). Moreover 24.8% of respondents had worked for that company for less than 5 years and 84% of the participants had a permanent contract. As showed above, the sample's main diversity is in age and educational level variables; however, the presence of small but different minorities for some other social and demographic variables (for instance gender, nationality and religion) is also relevant for the purpose of the study (in terms of underrepresented groups).

### *Procedure*

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 ensured that 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. Along with the Italian questionnaire, English and French translations were also provided for foreign workers. Researchers were available to help participants, if necessary.

### *Measures*

*Diversity Climate.* The Italian version of the *Diversity Climate Scale* (Paolillo, Pasini, Silva & Magnano, under review; Mor Barak et al., 1998), comprised by 9 items, was used. Specifically it measures the organizational dimension of

Diversity Climate, comprising two factors: fairness (e.g., “Managers here give feedback and evaluate employees fairly, regardless of employees’ race, gender, sexual orientation, religion, age, or social background”) and inclusion (e.g., “The company spends enough money and time on diversity awareness and related training”), and the individual dimension of diversity climate, comprised by the personal diversity value (e.g., “I think that diverse viewpoints add value”). Each item was answered on a 6-point Likert scale (from 1=“strongly disagree” to 6=“strongly agree”). Alpha reliability of the scale was .76.

*Inclusion Climate.* Climate for Inclusion was assessed using the Mor Barak Inclusion-Exclusion scale (MBIE) (Mor Barak, 2005), made of 15 items answered on a 6-point Likert scale (from 1=“strongly disagree” to 6=“strongly agree”). It uses a matrix system of five work-organization system levels (work group, organization, supervisor, higher management, and social/informal). For each of these levels the respondent is asked to assess his or her perception of inclusion across the following three dimensions: the decision-making process (e.g., “I have influence in decisions taken by my work group regarding our tasks”), the information networks (e.g., “I am always informed about informal social activities and company social events”) and the level of participation/involvement (e.g., “I am typically involved and invited to actively participate in work-related activities of my work group”). Alpha reliability of the scale was .83

*Safety participation motivation.* This was measured with a 3-item scale, answered on a 7-point Likert scale (from 1=“not at all” to 7=“very much”). It is a shorter version of Brondino’s (2011) scale about safety participation motivation. It assesses motivation to participate in activities supporting safety in the organization (e.g., “I believe that it is worthwhile to put extra effort into maintaining safety”). Alpha reliability of the scale was .76.

*Safety participation behavior.* This was measured with 3 items from Brondino, Pasini and Silva’s (2012) scale about safety behavior. The items are answered on a 7-point Likert scale (from 1=“not at all” to 7=“very much”), which assessed the employee’s participation in activities supporting safety in the workplace (e.g., “I voluntarily carry out tasks or activities that help to improve workplace safety”). Cronbach’s Alpha was .70. A factorial analysis with Maximum Likelihood Extraction Method and OBLIMIN rotation was conducted on safety motivation and safety behavior and it confirmed that they were different constructs (with 65% of explained variance).

### *Data Analysis*

The survey data were analyzed with structural equation modeling (SEM). Tests were completed in AMOS 21.0 (Arbuckle & Wothke, 1999) applying the maximum-likelihood (ML) method. Firstly, a confirmatory factor analysis (CFA) was used to test the model fit of the measurement model (Byrne, 2001).

The SEM approach was then used to test the mediation model shown in Figure 2.1, following James, Mulaik & Brett's recommendations (2004) and Shrout and Bolger's (2002) logic with regard to expected proximal and distal effects.

Other well-known analytical tools, such as correlations, were also used, implemented by using SPSS 21.0.

## **Results**

### *Descriptive Statistics and Correlations*

Descriptive statistics and correlations of data are provided in Table 2.1. As shown in Table 2.1, correlations between diversity climate and inclusion climate dimensions do not exceed .50, and correlation among climates and all the other study variables varied from .07 to .41 (for Inclusion Climate) and from .13 to .37 (for Diversity Climate), thus confirming that they are different, but related, constructs.

### *CFA of the Measures*

All the variables studied were measured from the same source (employees), and therefore common method bias may occur. A confirmatory factor analysis (CFA) was conducted according to Harman's single-factor test in order to diagnose the extent to which common method variance might be a problem. A comparison between a model with one factor (with all items loading on a unique

factor) and a model with 4 factors (diversity climate and inclusion climate as separate second-order factors, safety participation motivation and safety participation behavior as separate first order factors) revealed that the latter provided a better fit for the data in all the CFA fit measures (e.g.: 1 Factor Model:  $\chi^2(405) = 2941.25$ ,  $p < .001$ ; CFI = .52; GFI = .66; SRMR = .10; RMSEA = .11; AIC = 3061.25, vs. 4 Factor Model:  $\chi^2(386) = 872.98$ ,  $p < .001$ ; CFI = .91; GFI = .89; SRMR = .06; RMSEA = .05; AIC = 1030.98). The differences were found to be significant by comparing the chi-square values and the degrees of freedom of both models ( $\Delta\chi^2(19) = 2068.27$ ,  $p < .001$ ). According to these results, no evidence for common method bias was found in the data.

*Table 2.1. Descriptive statistics and Pearson correlations between study variables*

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Diversity Climate (DC Tot)	3,39	0,89	1										
2. DC Organizational Fairness	3,67	1,38	,75**	1									
3. DC Organizational Inclusion	2,77	1,13	,72**	,32**	1								
4. DC Personal Diversity Value	3,72	1,23	,68**	,20**	,27**	1							
5. Inclusion Climate (IC Tot)	3,15	0,78	,50**	,40**	,47**	,21**	1						
6. IC Workgroup Level	3,96	1,22	,39**	,41**	,27**	,13**	,70**	1					
7. IC Organization Level	2,94	0,94	,35**	,18**	,39**	,19**	,66**	,26**	1				
8. IC Supervisor Level	2,98	1,02	,37**	,25**	,41**	,14**	,74**	,34**	,45**	1			
9. IC Higher management Level	2,41	1,28	,44**	,32**	,39**	,23**	,83**	,42**	,53**	,57**	1		
10. IC Social /Informal Level	3,45	1,11	,17**	,17**	,16**	,02	,59**	,33**	,14**	,24**	,30**	1	
11. Safety Participation Mot	6,12	0,80	,25**	,13**	,14**	,26**	,20**	,24**	,09*	,13**	,14**	,07*	1
12. Safety Participation Beh	4,81	1,21	,37**	,21**	,37**	,23**	,41**	,32**	,26**	,35**	,34**	,16**	,50**

\*\*  $p < .01$ ; \*  $p < .05$

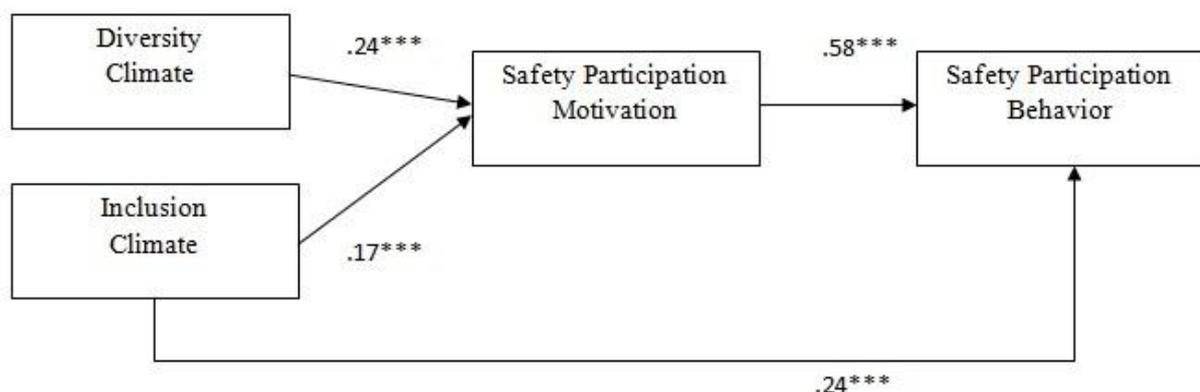
### *Structural model*

We first compared the model shown in Figure 2.1 (which we will refer to as model 1) with the same model but adding a path from diversity climate to safety participation behavior (model 2). These models were not significantly different ( $\Delta\chi^2 (1) = 1.45, p > .05$ ), indicating that the addition of this path for partial mediation did not add significantly to the model. Therefore, we retained model 1, the fully mediated and most parsimonious version (for diversity climate), as the preferred model. Next we compared model 1 to the same model but adding a path from inclusion climate to safety participation behavior (model 3). The models were significantly different ( $\Delta\chi^2 (2) = 49.90, p < .001$ ) therefore, we retained model 3, reflecting a fully mediated relationship for diversity climate and safety participation behavior and a partial mediated relationship for inclusion climate and safety participation behavior, as the preferred model. The standardized path coefficients from the final model are presented in Fig. 2.2.

Hypothesis 1, which stated that the relationship between diversity climate and safety participation behavior would be fully mediated by safety participation motivation, was entirely supported. As shown in Figure 2.2, there was a significant relationship between diversity climate and safety participation motivation ( $\beta = .24, p < .001$ ), as well as a significant relationship between safety participation motivation and safety participation behavior ( $\beta = .58, p < .001$ ). Moreover the indirect effect was significant ( $\beta = .14, p < .001$ ).

Hypothesis 2, which assumed that the relationship between inclusion climate and safety participation behavior would be fully mediated by safety participation motivation, received only moderate support. As shown in Figure 2.2, the path from inclusion climate to safety participation motivation was significant ( $\beta = .17, p < .001$ ), as well as the path from safety participation motivation to safety participation behavior ( $\beta = .58, p < .001$ ). However, the comparisons of the models revealed that the direct path from inclusion climate to safety participation behavior did add significantly to the model, implying partial mediation. Moreover the indirect effect was significant too ( $\beta = .10, p < .001$ ). Table 2.2 depicts standardized direct, indirect, and total effect estimates for climates and safety participation behavior through safety participation motivation.

Figure 2. 2. Empirical results (\*\*\*)  $p < .001$



*Table 2.2. Effects of DC and IC on safety participation*

Paths	Indirect effect	Direct effect	Total effect
DC and safety participation relationship			
DC - Safety Participation Beh		.07	
DC – SP Mot – SP Beh	.14***		.21 ***
IC and safety participation relationship			
IC - Safety Participation Beh		.24***	
IC – SP Mot – SP Beh	.10 ***		.34***

\*\*\*  $p < .001$

## Discussion

### *Theoretical implication*

The different results found for the two climates on safety participation behaviors have several implications; first of all, they confirm that diversity climate and climate for inclusion are different constructs which have different and important impacts on safety. In particular, climate for inclusion is considered as being broader in scope (Nishii, 2013), so this could be a reason why it has a stronger relationship with safety behaviors than diversity climate, since it has a direct impact on safety behaviors independently of workers' motivation in promoting safety (which is one of the most proximal determinants of safety participation behavior). A reason for this could be that safety performance is strictly dependent on the supervisors' and coworkers' support, communication and quality of social exchange (Zohar & Luria 2005; Wallace, Popp & Mondore, 2006), which are somewhat strictly related to the dimensions of climate for

inclusion (participation in decision making processes, involvement in information networks and in social/informal activities).

On the other hand, diversity climate has a distal effect on employees' safety behaviors, as it is completely performed throughout its influence on motivational processes. This results suggests that interventions designed to promote climates supporting diversity and inclusiveness will have a positive impact on safety performance; in particular they are in line with some previous findings (Luijters, van der Zee & Otten, 2008) suggesting that a climate which supports and values diversity – instead of just tolerating diversity – gives the possibility to offer ideas for innovative and improved ways of working (e.g. participative safety, Anderson & West, 1998).

Moreover it demonstrated that some broader contextual factors may influence the development of safe/unsafe behaviors (Hofmann & Stetzer, 1996).

### *Practical Implications*

The present finding also has several important implications for practitioners, since it suggests that interventions designed to promote climates supporting diversity and inclusiveness can affect different aspects of safety. In particular, to promote diversity and eliminate discrimination by adopting fair human resource policies and implementing affirmative action programs (such as mentoring programs for career development of minorities) and other management policies (such as promoting diversity awareness training among employees), can help

managers to arouse employees in pursuing safety goals based on values unrelated to compensation or obligation. Accordingly, employees can be motivated by more than just extrinsic rewards, and the fit between organizational and individual value systems plays a key role in affecting motivational states and process. On the other hand, managers should not only communicate the organization's respect for diversity to workers, but they should also translate the belief that people's diverse backgrounds are a source of insight in real practices to adapt and improve the organizations' strategic tasks (Boswell, Colvin & Darnold, 2008). Consistent with this, managers should become aware of the Human Resources policies and diversity initiatives; then they should indicate through their behaviors and attitudes a real support for those intended policies. This may include involving direct supervisors in policy development and enactment, implementing action plans for the workers, and then give them "the opportunity to be present, to have their voices heard and appreciated, and to engage in core activities on behalf of the collective." (Wasserman, Gallegos, and Ferdman , 2008, p. 176).

In doing so, according to our research results, employees will feel empowered, so they will be more likely to perceive themselves as agents of own and others' safety, and to feel able to actively participate with some discretionary and self-determined behaviors to improve safety in the workplace.

This also implicitly suggests that when the social quality of a work environment is low, with regard to fairness and inclusiveness, employees are deprived of the

extra protection that might be provided by their colleagues (Yagil & Luria, 2010).

### *Limitations*

As the questionnaires were completed by the same individuals at the same point in time, a single-source bias was created. Although statistical steps (Harman's single-factor test) provided an indication that a single factor does not account for all co-variances among the items, it would be better to control for this effect at the research design stage (i.e. future research should collect the data at different times and from separate sources). Moreover, and in line with suggestions from the literature (Kozlowski & Klein, 2000), future research about diversity climate, inclusion climate and safety, should also consider the possibility of aggregating data at the group level of analysis, as required by the multilevel nature of climate constructs, to test how a group-level process (shared climate perceptions) can influence another process at the individual level (individual behavior).

A third limitation of the study was the use of convenience sampling methods for data collection. While cross-sectional convenience samples may prove useful in exploring theoretical models, such as the one built in the present study, caution should be exercised while generalizing the results beyond the current research.

A further limitation of the study was the cross-sectional measurement. It was not possible to test the causal relationships proposed in the theoretical framework,

and longitudinal assessment would provide further validation of specific relationships. Additionally, the use of structural equation analyses, in itself, cannot provide evidence about causation, but provided the possibility to test a series of hypotheses that were consistent with a causal theory.

Although those limitations, the significant results suggest that further research should be undertaken to replicate these preliminary findings.

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## **CHAPTER 3**

### **Exploring multiple climates' patterns and their effects on safety performance at the department level**

This chapter is based on Paolillo, A., Silva, S., Pasini, M. & Carvalho, H. (in preparation for submission). Exploring multiple climates' patterns and their effects on safety performance at the department level.

## **Abstract**

Specific climates have been pointed out as critical for organizational performance but the study of how different specific climates can simultaneously exist in the organizational context and their relationship with organizational outcomes has not been previously investigated.

This paper represents a first attempt to answer to this call for research by exploring the possible simultaneous influence of multiple climates on safety outcomes (injuries) at the group level in the metal and mechanical sector.

A total of 430 blue-collars working in 35 departments answered a questionnaire covering safety, diversity, inclusion and communication climates measures. Organizations' archival records were used to collect injuries data during the 12 months following the survey administration. Multiple correspondence analysis was performed to identify patterns of different climates and their possible association with departments and injury rate.

Results showed the existence of four differentiated patterns of climates; there were three homogenous patterns (coherent association among low, medium and high climates' perceptions) and one heterogeneous (medium diversity, inclusion and communication climates associated with high coworkers' safety climate). Moreover, finding did not showed any pattern of injury rates coherently associated with the climates' profiles.

The present research represents the first exploratory study about simultaneous correspondence of multiple climates to safety outcomes; moreover it is the first study in the safety field which used the MCA to highlight the multifaceted nature of organizational environments.

**Keywords:** multiple climates, diversity, inclusion, safety, communication, multi correspondence analyses

## **Introduction**

Work-related and occupational injuries are multi-factorial occurrences among the working population that have a heavy impact on workers, enterprises, and society.

Eurostat has published standardized statistics for fatal injuries across EU countries. In 2011, the last year for which comparable statistics are available, there were 3,515 work-related fatalities and 2,487 accidents with more than three days' absence from work in the EU-28, including the manufacturing sector (Statistical Office of the European Communities, 2011).

Although great progress has been made as a result of improving preventive measures, the rates of fatalities and injuries can be described as unacceptably high (Konkolewsky, 2004).

During the past decade, there has been increased interest in trying to understand how management practices and other organizational factors impact workplace safety. Indeed, the attention given to organizational factors has expanded to the extent that Hale and Hovden (1998) refer to it as the third age of safety. Much of this activity has focused on the constructs of safety culture and safety climate (e.g., Glendon & Stanton, 2000; Guldenmund, 2000; Hofmann, Jacobs, & Landy, 1995; Shannon, Mayr, & Haines, 1997).

Specifically, the importance of safety climate rests on its ability to predict safety behavior (Larsson, 2005). Based on this faculty, it has been linked to a number of different safety-related outcomes, showing its ability to predict important

safety-related outcomes, such as perceived risk, accidents and injuries (e.g. Cooper & Phillips, 2004; Silva, Lima & Baptista, 2004; Smith, Huang, Ho & Chen, 2006; Hofmann & Stetzer, 1996; Oliver, Cheyne, Tomas, & Cox, 2002 ). Nevertheless, meta-analytic studies and reviews on safety and climate research reveal that some issues are still open.

The first issue handles with the recent changes in the focus of climate research, as researchers have switched their focus from global to facet-specific climates (Kuenzi & Schminke, 2009). Specifically, facet-specific climates differ from global climates in that they are related to a particular aspect of the organizational context, and follow from the idea that organizations can be viewed as having a number of specific climates, such as climate for safety (Zohar, 2000), climate for diversity (Mor Barak, Cherin & Berkman, 1998), climate for communication (Smidts, Pruyn & van Riel, 2001), and so forth. Because they represent climates for specific aspects of the organizational environment, many of these facet-specific climates may be present in a work setting at any given time. Some authors have argued that it is meaningless to speak about organizational climate without attaching some type of specific referent (Schneider & Reichers, 1983). In Kuenzi & Schminke (2009) review about organizational work climate literature, the authors listed several studies which had examined the link between facet-specific climates and global outcomes at the work-unit level (e.g. group safety climate and production performance, Wallace & Chen, 2006); in addition to that, considerable research explored the impact of facet-specific

climates on parallel facet-specific outcomes (e.g. safety climate as predictor of safety-related outcomes; Dedobbeleer & Beland, 1998; Hofmann & Stetzer, 1996; Oliver et al., 2002). As suggested by Kuenzi & Schminke (2009), this makes sense not only theoretically, but also statistically; indeed, “as Campbell (1990) notes, when the latent structure underlying both the predictor and outcome are similar, correlations between variables will be stronger” (p. 694).

Furthermore, many facet-specific climates appeared to exert an important impact on related but distinct outcomes as well (e.g., diversity climate was positively related to store unit sales performance; McKay, Avery & Morris, 2009), but the research in this area is still scarce, suggesting that climate research should not limit itself to studies exploring the link between facet-specific climates and facet-specific outcomes (e.g. safety climate as leading predictor of safety behaviors and safety outcomes; Meliá, Mearns, Silva & Lima, 2008; Zohar, 2000; Zohar & Tenne-Gazit, 2008).

Additionally the literature has started to consider the potential mutual influences of global and specific climates on each other but research in this area is in its infancy, indicating the existence of multiple climates inside the same organization. It is therefore reasonable to examine what happens when they exist simultaneously (Kuenzi & Schminke, 2009).

Another issue concerns the fact that literature, which initially focused on individual-level variables (e.g., workers’ attitudes and the role of leadership), has evolved to consider group-level constructs such as the influence of social

norms on safety behaviors (Fugas, Silva & Melià, 2011). This is true also for safety climate literature, since it has been recently re-defined as a multilevel construct (Zohar, 2000, 2008, 2010; Zohar & Luria, 2005; Glendon, 2008; Meliá et al., 2008). Many scholars underlined that organizational processes take place simultaneously at several levels, and that processes at different levels are linked in some way (e.g. Kozlowski & Klein, 2000; Shannon & Norman, 2008); thus, operationalised at the group level, safety climate refers to the sharing of individual perceptions of work environment characteristics pertaining to safety that affect a group (Neal & Griffin, 2004; Zohar & Luria, 2005).

Yet, for the group safety climate, research on this issue tended to overlook the role of co-workers, and focused more on the leadership perspective; it considered the supervisor as “enough” to represent the group climate (Brondino, Silva & Pasini, 2012, p. 1848). However, strong evidence from social and organizational psychology highlights the need to consider the influence of coworkers on group safety climate (e.g. Bandura, 1986; Deutsch & Gerard, 1955), as they offer information, show behavioral support for desired practices while discouraging others, and might shape their peers’ roles through offering lateral mentoring (e.g. Ashforth, 1985; Chiaburu & Harrison, 2008). Since a large part of the research about safety climate has not systematically included coworkers, it is essential to study group safety climate by taking into account what a group stands for and distinguishes between the role of the supervisor and that one of co-workers (Brondino et al., 2012).

Finally, another open issue concerns the methodology related to safety research. Previous research on the predictors of safety behaviors (including safety climate) tended to use multiple linear regression analysis (Fugas et al., 2011; Cooper & Phillips, 2004) and multilevel structural equation modeling (Brondino, Pasini & Silva, 2013; Huang, Chen, DeArmond, Cigularov & Chen, 2007; Zohar & Luria, 2005). To the best of our knowledge, the use of multiple correspondence analysis (MCA) in the study of safety has not received much attention; nevertheless, it could be useful to our extent of describing the associations between multiple variables and to provide a graphical display of the multidimensional analyzed space of perceptions (Ramos & Carvalho, 2011).

Therefore, the present study represents a preliminary exploration of the possible simultaneous influence of different climates on some specific safety outcomes at the work-group level, with two aims: the first one is to explore how different specific climates (safety, communication, diversity and inclusion climates) can be associated to each others, considering the department level of analysis; the second one is to examine the relationships between those patterns of climates with low/high rates of injuries. Specifically, while in some work groups all the types of climates can be very high or positive, in others they can be very low, and in other work groups there could be a combination of different levels of climates' perceptions which will have a different impact on safety outcomes.

On the basis of what has been said above, the present study extended the existing literature in several ways: first of all, it responded to the need for

knowledge in the field of organizational climate research about how different facet-specific climates relate to one another and whether certain climates exert greater relative impacts on specific outcomes than others (Kuenzi & Schminke, 2009).

In addition to that, it operationalised the safety climate construct at different levels (organizational, group and individual), by taking also into account the role of coworkers (still scarcely explored) in its reciprocal influences with the supervisor (so not considering the supervisors' point of view as the only representative agent of the group safety climate), something that most of the previous research had missed (Chiaburu & Harrison, 2008).

Third, it used a particular methodology (MCA) which has not been considered previously in safety research and in the larger area of organizational climate's investigation, as it allows to gain some information about which different configurations (patterns) of simultaneous climates are likely to be related to effectiveness of outcomes.

The study of safety performance has mainly been framed within the literature on safety climate (Zohar, 2000), and research on safety at work has mainly centered on safety climate as an antecedent of safety performance; for that reason we decided to keep safety climate among the specific climates which can interact in explaining some safety outcomes. Then, and in order to creating synergies with other theoretical perspectives, we chose to give special attention to the issue of employees' perceptions about diversity and inclusion in the workplace; this is a

consequence of the fact that the contemporary European workforce is increasingly diverse. Moreover several research has examined the nature of diversity's effects on individual, team and organizational level outcomes (including safety), but no research has considered the role of shared perceptions about diversities within organizations (which form a climate for diversity, Mor Barak et al., 1998) in its consequences on employees' work attitudes and performance related to safety.

The construct of inclusion climate (Shore et al., 2011) was also considered in the present study as related to safety; specifically it is based on the employees' perceptions to be involved in decision making and information networks, and to be able to actively participate in social and informal organizational activities, regardless of the individual's belonging to a specific demographical group. We considered that the degree of such kinds of social empowerment – which have been already demonstrated to influence work quality and work behaviors, as explained later – could also have positive consequences for workers' involvement and commitment to safety and their safety performance.

Finally, perceptions of a supportive, opened and trustworthy organizational communication, together with an effective exchange of information, namely a positive communication climate (Smidts et al., 2001) appeared to impact on safety climate and helped to develop a participative organizational culture for safety (Cheyne, Cox, Oliver & Tomas, 1998), and it is also a core element of the

inclusiveness and integration of all workers within their organizations; for that reason communication climate was included in this study.

In the following section, we describe each of the theoretical construct mentioned above and the theoretical framework underlying this study.

## **Theoretical background**

### *Safety Climate*

Since the 1990s, research on safety at work has often focused on safety climate as an antecedent of safety performance, defining safety climate as the shared perceptions of policies, procedures, and practices relating to safety which affect well-being at work (e.g. James & James, 1989; Griffin & Neal, 2000; Zohar, 2003). This concept describes the connections between organizational and psychological processes and their relations to safety.

Since the early nineties, Meliá and colleagues have introduced a structured multilevel view of safety climate based on the identification of the agent responsible for each safety climate issue (e.g., Meliá, Sesé, Tomás & Oliver, 1992, 1994b; Meliá & Sesé, 1998, 1999). Recently, the value of this point of view has been widely recognized (e.g. Zohar, 2000; Zohar & Luria, 2005; Guldenmund, 2007), and it has been possible to organize safety climate dimensions into a multilevel construct from the point of view of the agents of the safety climate actions or omissions (Meliá & Becerril, 2006). Therefore

safety climate has been conceptualized at different levels considering each safety agent's point of view, i.e. the top management, supervisors, co-workers, and the worker who answers the safety climate questionnaire; specifically, at the organizational level, safety climate refers to workers' perceptions of the top management's policies and procedures, while, at the group level, safety climate usually refers to the role of supervisor (e.g. Zohar, 2000; Zohar & Luria, 2005; Wallace & Chen, 2006; Meliá & Sesé, 2007) and particularly to workers' perceptions of how the supervisors transform those policies and procedures into daily practice.

Although the psychosocial, organizational, and safety literature recognizes the importance of co-worker influence, research has not systematically included coworkers (Brondino et al., 2012; 2013), preferring to study leadership's influence on safety (Cooper, 2001; Geller, 2001; Clark & Ward, 2006), considering both the role of top management and supervisors. Managers' attitudes are important in defining the organization's safety culture, since they can significantly influence employees' attitudes and behavior by creating an environment that places a high value on safety behaviors (Hofmann & Morgeson, 2002). Supervisors are also important, because they can use discretion in a lot of situations depending on the presence of competing operational demands, and the fact that procedures rarely cover all the situations. Workers, as members at the same time of units and of the entire organization, perceive signals both from top management regarding policies and from their

group supervisor regarding how these policies are implemented in their department (Brondino, 2010).

Top management and supervisor's roles were deeply explored in safety literature (e.g. Zohar, 2000, Clarke, 2006; Allen, Baran and Scott, 2010), whereas until recently, the influence of peers had received less systematic attention, and their impact on employees' safety behavior has hardly been explored (Fugas, Silva & Meliá, 2012). However the change in the content of the tasks, from individual and routine to more collective and complex (Harrison, Johns, Martocchio, 2000) has increased the salience of peers in social interactions at work and their potential impact on individual behavior (Fugas et al., 2012). Specifically, coworkers give task advice that diminishes their colleagues' role ambiguity (the uncertainty experienced about behavioral expectations), provide information resources (Bales, 1950), offer lateral mentoring (Raabe & Beehr, 2003) and supply with cues about task prioritizing that can reduce role conflict and role overload (Beehr, Jex, Stacy, & Murray, 2000); finally, they might influence elements of the effectiveness space (Harrison et al., 2006), including counterproductive work behaviors (CWBs), organizational citizenship behaviors (OCBs), and task performance. Hence, in any work organization, employees are exposed to both positive and negative stimuli from coworkers, and they engage in sense-making or attribution about the sources and causes of them (Green & Mitchell, 1979). Previous research has shown the importance of peers' safety response in predicting workers' safety behaviors, considering different

coworkers' facets, such as co-workers' support (e.g. Chiaburu & Harrison, 2008; Burt, Sepie and McFadden, 2008), social norms (e.g. Hahn & Murphy, 2008, Fugas, Silva & Meliá, 2009, 2011; Kath, Marks & Ranney, 2010), co-workers' practices (e.g. Singer et al., 2007; Meliá, 1998; Jiang, Lu, Li & Li, 2009), coworkers' interaction (e.g. Cavazza & Serpe, 2009; Zohar & Tenne-Gazit, 2008; Zohar, 2010), and also regarding a more generalized block as co-worker safety (e.g. Gyekyes & Salminen, 2009; Morrow et al., 2010). Despite this, literature review revealed that only one study highlighted the importance of co-workers as a safety climate agent side by side to supervisors at the group level (Brondino et al., 2012), showing that coworkers' safety climate was a better predictor of safety behaviors than supervisor's safety climate.

Such results are consistent with theoretical arguments that coworkers are an important, yet neglected, source of commitment (Reichers, 1985) and they stress, as suggested by Chiaburu & Harrison (2008), the importance for future research to create synergies with different theoretical perspectives; in particular "theoretical advances could be made by simultaneously examining influences from coworkers, supervisors and the organization to understand whether the influences of such social agents are additive, interactive, or compensatory" (p. 1096).

Therefore the present study aims to address this issue.

### *Diversity climate*

Recent studies have suggested that considering how workers perceive diversity management within their work organization, as the workforce becomes more diverse (McKay, Avery & Morris, 2008; 2009), is an important aspect of improving organizational performance and promoting greater inclusion of employees from various backgrounds.

Specifically, Mor Barak et al., (1998) have proposed that employees develop perceptions about the organizations' stance regarding diversity, as well as developing their own personal opinions about the value of diversity in a company, which have implications for organizational effectiveness, work attitudes and performance. Diversity climate is defined as "employee behaviors and attitudes that are grounded in perceptions of the organizational context related to women and minorities" (Mor Barak et al., 1998, p. 83). These perceptions can manifest themselves at an individual level, or at a social unit level (Stegmann, 2011). Diversity climate, in essence, is conceptualized as the degree to which a firm advocates fair human resource policies and socially integrates underrepresented employees (McKay, et al., 2008), and it reflects the extent to which promoting diversity and eliminating discrimination is a priority in the organization (Gelfand, Nishii, Raver & Schneider, 2005).

According to Mor barak and colleagues (1998), the elaboration of the construct of diversity climate can be conceptualized as a function of 4 factors, organized on two levels: an organizational level, concerning perceptions of fairness (such

as discrimination or preferential treatment in hiring and promotion procedures) and inclusion in company policies and practices (intended as mentoring programs or other management decisions that affect the inclusion or exclusion of women and members of minority groups) and an individual level, concerning individuals' views on the importance of diversity and personal degrees of comfort with diversity.

Specifically for safety performance, there is no literature about the relationship between diversity climate and safety; nevertheless, there are other specific organizational climates, which have some similarity with diversity climate, that have been linked to employee safety-related outcomes. In particular: justice climate has been demonstrated to be a predictor of helping behaviors (Naumann & Bennett, 2000; 2002) and organizational citizenship behaviors (Ehrhart, 2004), of which safety citizenship behaviors (such as voluntarily taking personal responsibility to remove hazards) are an important part (Willis, Brown & Prussia, 2012). Moreover, it has been showed to predict employee psychosocial health (Eloviano, Kivimaki, Vahtera, 2002), safety performance (Gatien, 2010) and safety incident report (Beyea, 2004; Weiner, Hobgood & Lewis, 2008).

Ethical climate has been also linked with safety outcomes, since Parboteeah & Kapp (2008) demonstrated that a benevolent-local climate is inherently concerned with attention to the welfare and the well-being of others. Such perceptions lead to an environment whereby people's physical well-being and

safety are important, therefore encouraging employees to voluntarily participate in safety enhancing behaviors, and decreasing incidences of injuries.

As many studies investigating the effects of organizational climate on work's outcomes had done, the present research applied Blau's (1964) social exchange theory to develop the hypotheses. In details, if group members perceive they are treated in a certain way, then they should similarly assign meaning to that treatment as representative of a social exchange relationship; therefore, in the light of a positive treatment received from others, a reciprocal relationship is formed such that employees feel concern for one another and may be motivated to engage in safe behaviors, because they feel the company has their best interests at heart and they will feel the need to reciprocate by improving their attitudes toward safety. Considering the shortcomings of previous research, it is expected that a high pro-diversity climate at the group level will be associated with less injuries, but it makes sense to question which kind of contribution diversity climate can give to safety performance when combined with different patterns of low/medium/high safety climates and other "relational" climates (such as inclusion and communication climates).

### *Inclusion Climate*

There is a strong and consistent relationship between diversity and inclusion (Ibarra, 1993); research indicates that employees can feel excluded from networks of information and opportunity (O'Leary & Ickovics, 1992) because of

their actual or perceived membership in a minority or disfavored identity group (Milliken & Martins 1996). As suggested by Shore et al. (2011), shared perceptions of inclusion can build a climate for inclusion, which realizes interpersonal integration and involvement in decision making of all social groups.

Recent literature considers climate for inclusion as broader in scope than diversity climate, because it requires more than increasing diverse representation and implementing fair human resource practices (as diversity climate does). It also “requires a change in interaction patterns” (Nishii, 2013, p. 1756) in terms of the workers’ participation in the organizational structures and processes (formal and informal ones). Therefore climate for inclusion focuses on the removal of obstacles to the full participation and contribution of all employees in organizations (Roberson 2006), especially (but not only) those who belong to minority or disfavored identity groups. For that reason a climate for inclusion is more related to the process of empowerment and involvement of workers in decision making processes, information networks, and social and informal activities and not only to the specific issue of how to deal with organizational demography.

Although there is no empirical research examining the construct of inclusion climate related to safety outcomes, an employee's perception of inclusion has been found to influence work quality (Glisson & James, 2002), workers’ health and social functioning (McNeely, 1992) and well-being (Mor Barak & Levin,

2002). Furthermore, as employees perceive they are involved in some critical organizational processes, such as decision making, they will feel empowered and supported (Travis & Mor Barak, 2010), with positive effects on their stress levels, mental health, and psychological well-being (Michie & Williams, 2003) and this can in turn affect their work behaviors (Nissly, Mor Barak, & Levin, 2005).

Thus, employees may reciprocate a felt sense of inclusion by broadening their role definitions to include safety-related behaviors (Hofmann, Morgeson, & Gerrass, 2003); those kinds of results can be particularly enhanced when a high sense of inclusion is combined with a high safety climate. Nevertheless, it could be also interesting to explore whether perceptions of inclusion will be associated in a coherent and expected way to the other distinct but related climates (climate for diversity and communication) and which kind of influence those patterns of climates could have on injuries when crossed with positive and negative influences originating from safety climates.

### *Communication Climate*

Research into major organizational accidents in several sectors has highlighted, as recurrent features contributing to such events, the failure of communication processes both within and between organizations (Turner, 1978). This observation has led in turn to a requirement, inherent in most models of positive safety culture, for more open systems of communication (Jeffcott, Pidgeon,

Weyman, & Walls, 2006). The concept of open communication is said to encompass free data sharing, inclusive decision making, and collaborative working (Firth-Cozens, 2004). Moreover, if employees perceive that there is open communication in the organization, then they may also perceive that communication about safety is valued in the organization (Neal, Griffin & Hart, 2000).

Specifically for such perceptions, communication climate can be defined as a facet-specific climate which includes only communicative elements of a work environment, such as perceptions about the receptivity of management to employee communication or the trustworthiness of information being disseminated in the organization (Guzley, 1992). Main dimensions of communication climate (Dennis, 1975; Guzley, 1992; Redding, 1972) are: “openness and trust (candor) in communication, perceived participation in decision making (or the feeling of having a voice in the organization), and supportiveness (or the feeling of being taken seriously)” (Smidts et al., 2001, p. 1053).

As with the distinction between psychological and organizational climate, communication climate may reside on both the individual and the group level.

Several research have shown the link between communication and safety; Neal and colleagues (2000) found a relationship between general organizational climate (considered as a function of supportive leadership and communication) and safety climate. Other studies (De Joy, Schaffer, Wilson, Vandenberg &

Butts, 2004; Hofmann & Morgeson, 1999) concluded that communication was an important contributing factor to safety climate. Moreover communication (as an element of the overall organizational climate) appeared to be closely related to organizational support in the context of safety (De Joy et al., 2004); the importance of this association is due to the fact that “a positive safety climate is more likely to exist in an environment that generally supports and values its employees and where there is open and effective exchange of information” (De Joy et al., 2004, p.88). This would in turn justify our association of communication climate with other kinds of social climates such as climate for diversity and inclusion. Specifically for our purposes, in social exchange terms (Blau, 1964; Eisenberger, Fasolo, & Davis-LaMastro, 1990), when employees perceive that their employer values and supports them, this engenders an implied obligation, on the part of employees, for future reciprocity that will benefit the organization in some way. The findings above mentioned suggest that open and effective communication is a key feature of a positive safety climate and indicative of a supporting work climate, showing the interesting (yet not enough raised) concern that some dimensions of organizational climate are strictly related to safety but (at the same time) are not specific to safety per se (De Joy et al., 2004).

Other studies have shown that both openness of management in communication and employees' involvement in organizational decision making increase trust in management (e.g., McCauley & Kuhnert, 1992) and may even increase profit

and productivity (Rosenberg & Rosenstein, 1980); therefore it is reasonable to ask which kind of effect communication climate could have on injury rates when crossed with different patterns of low/high perceived organizational priorities related to safety. Moreover the link between communication climate and diversity and inclusion climates is evident, since by providing each employee with adequate information and the opportunities to speak out, get involved, be listened to, and actively participate, may lead the employee to categorize him/herself more easily as a significant member of an in-group (a greater sense of to be treated fairly and to be involved in some critical organizational processes). Moreover, experiencing openness in communication with supervisors and colleagues may increase the employee's feelings of self-worth, because under such conditions she or he will experience being taken seriously (Smidts et al., 2001), thus enhancing the sense of inclusion and empowerment.

Considering all those issues, the first aim of the present preliminary study was to identify profiles in unit-level perceptions of different facet-specific climates. Next, a second aim was to explore possible associations between each profile mentioned above and the distribution of the sample (divided in companies, nested in departments), namely to understand whether each company belonging to the sample shows a particular climates' profile or just several departmental sub-climates.

Finally, a third aim was to identify which combination/configuration of different climates exert greater relative impacts on safety outcomes than others and

specifically whether there are some patterns of climates which better discriminate between low and high injury rates.

## **Method**

### *Participants*

Data were collected through convenience sampling, where questionnaires were distributed to 429 blue-collar workers of 4 small (from 0 to 50 employees), medium (from 50 to 200) and large (200 and beyond) Italian organizations, belonging to the metal-mechanical sector and working in different departments. From a geographical point of view, attention was focused on a specific zone, the region of Veneto in the North of Italy, a region with a high rate of accidents at the workplace and with a high level of industrial production, particularly in the metal-mechanical sector, which is one of the most relevant industrial sectors of this region. Table 3.1 shows the characteristics of the four companies, whereas a complete list of each company's department is given in the Appendix B.

Of the employees, 406 (94%) returned completed questionnaires, resulting in 35 work departments.

All data were collected at an individual level. Considering the whole sample, 88.2% of the participants were male, and 93.6% were Italian workers. For the other social and demographic characteristics of the sample, percentages were as follows: age (19-25 = 7.4%, 26-35 = 23.4%, 36-45 = 32.8%, 46-55 = 29.3%,

over 55 = 7.1%); religion (Catholic = 84.3%, Atheistic = 5.7%, Orthodox = 3%, Muslim = 2.3%, Others = 4.7%); educational level (number of school years: less than 5 = 1.5%, 5-8 = 24.4%, 9-13 = 62.1%, more than 13 = 11.8%). Moreover 27.3% of respondents had worked for that company for less than 5 years and 82.2% of the participants had a permanent contract.

*Table 3.1. Characteristics of the company*

<i>Company</i>	<i>Products</i>	<i>Company Size</i>	<i>Departments</i>	<i>Participants</i>
1	Generators and electric motors	Large	17	244
2	Steam turbines	Medium	8	93
3	Shelves and cash registers	Medium	6	58
4	Boilers	Small	4	34
Tot			35	429

### *Procedure*

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 ensured that 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. Along with the Italian questionnaire, English and French translations were also provided for foreign workers. Researchers were available to help participants, if necessary.

## *Measures*

*Safety climate.* The Integrated Organizational Safety Climate Questionnaire (Brondino et al., 2013) that assess, respectively, organizational safety climate (defined as shared perceptions about the real importance given to safety by the top management), supervisor's safety climate (defined as shared perceptions about the real importance given to safety by employees' direct supervisor) and coworkers' safety climate (defined as shared perceptions about the real priority given to safety by employees' colleagues) was used. The complete version of the Organizational safety climate scale (OSC) was used and it included 12 items distributed on 4 factors: values, safety systems, communication, and training. The complete version of Supervisor's safety climate scale (SSC) was used and it included 10 items distributed on 2 factors: values-safety systems and coaching-communication. Also the complete version of Coworkers' safety climate scale (CSC) was used and it included 12 items distributed on 4 factors: Values, Safety Systems, Communication, and Mentoring.

For each scale, Values sub-scale consisted of items related to the real importance given to safety by top management/supervisor/co-workers (e.g., "Top management considers a person's safety behavior when moving—promoting people"); Safety System sub-scale consisted of items related to the importance that top management/supervisor/co-workers assign to the safety procedures, practices and equipment connected to safety at work (e.g., "My direct supervisor makes sure we receive all the equipment needed (DPI) to do

the job safely”); Communication, consisted of items related to the quality of top management/supervisor/coworkers’ communication processes concerning safety issues (e.g., “My team members talk about safety issues throughout the work week”); then, Training sub-scale was specific for the OSC as it considered the importance that top management places on safety training (e.g., “Employees receive comprehensive training in workplace health and safety issues”), whereas Coaching and Mentoring subscales (respectively for SSC and CSC) considered supervisor/coworkers activities aimed at helping their colleagues behave more safely (e.g., “If it is necessary, my team members use explanations to get other team members to act safely”).

Each item was answered on a response 7-point Likert scale (from 1=“never” to 7=“always”). Alpha reliability of each scale were, respectively, .94 for OSC, .96 for SSC and .95 for CSC.

*Diversity Climate.* The Italian version of the *Diversity Climate Scale* (Paolillo, Pasini, Silva & Magnano, under review; Mor Barak et al., 1998) was used to measure diversity climate. 6 items were used, in order to measure the organizational dimension of Diversity Climate, comprising two factors: fairness (e.g., “Managers here give feedback and evaluate employees fairly, regardless of employees’ race, gender, sexual orientation, religion, age, or social background”) and inclusion (e.g., “The company spends enough money and time on diversity awareness and related training”). Each item was answered on a

6-point Likert scale (from 1="strongly disagree" to 6="strongly agree"). Alpha reliability of the scale was .74.

*Inclusion Climate.* Climate for Inclusion was assessed using the Mor Barak Inclusion-Exclusion scale (MBIE) (Mor Barak, 2005), made of 15 items answered on a 6-point Likert scale (from 1="strongly disagree" to 6="strongly agree"). It uses a matrix system of five work-organization system levels (work group, organization, supervisor, higher management, and social/informal). For each of these levels the respondent is asked to assess his or her perception of inclusion across the following three dimensions: the decision-making process (e.g., "I have influence in decisions taken by my work group regarding our tasks"), the information networks (e.g., "I am always informed about informal social activities and company social events") and the level of participation/involvement (e.g., "I am typically involved and invited to actively participate in work-related activities of my work group"). Alpha reliability of the scale was .83.

*Communication Climate.* It was assessed using the Communication Climate scale of Smidts and colleagues (2001), made of 15 items answered on a 5-point Likert scale (from 1="strongly disagree" to 5="strongly agree"). 1979). The items represent three dimensions: trust and openness in communication (upward, downward, and horizontal, e.g., "When my colleagues tell me something, I trust them to tell me the truth"); participation in decision making (having a say in the organization, e.g., "In this organization, I have ample opportunity to have my

say”); and supportiveness (the feeling of being taken seriously by other members of the organization, e.g., “If you say something here, you are taken seriously”). Alpha reliability of the scale was .70.

Each Likert scale of the instruments described above has been operationalised by doing a tertiles recodification; it meant to divide each Likert scale in three groups – low, medium and high – according to the distribution of the values.

*Injuries.* The organizations’ archival records were used to collect injuries data. The recording period considered for the present study was during the 12 months following the survey administration. Injuries records included employees’ department, date, location of injury, type of activity during injury, type of injury, treatment and numbers of lost workdays. They met the following criteria: injuries suffered during the work; of sufficient severity to discount the possibility of an unjustified visit to the infirmary and incurred as a result of controllable role behavior. The injuries’ database is kept by the health and safety manager of each company. Injury rate was computed as the total number of group injuries meeting the above criteria over the 12-month period, divided by group size.

### *Data Analysis*

Data were analyzed using Multiple Correspondence Analysis - MCA (Meulman, 1992; Gifi, 1996; de Geer, 1993a, b; Heiser & Meulman 1994; Carvalho 2008).

MCA is a multivariate method used to explore interrelationships between multiple categorical variables (Greenacre, 2007; Carvalho, 2008; Ramos & Carvalho, 2011).

In the MCA the interpretation of the dimensions is based on the discrimination measures and the contributions of the active variables. The most relevant active variables for each dimension are the ones that have the highest discrimination/contributions values (i.e., highest explained variance; Bernardes, Silva, Carvalho, Costa & Pereira, 2014).

Moreover, MCA projects a graphical display of the associations between all the categories into a subspace - namely a bi-dimensional graph - with the minimum number of dimensions (axes) possible. MCA transforms categorical variables using an optimal scaling procedure and consequently assigns quantifications to the input variables categories; by doing so, it is able to map all the categories along two axes and to graphically display their associations (Ramos & Carvalho, 2011).

The patterns are identified by considering the associations between the categories with the highest contributions to one or both factorial dimensions, i.e., the geometrical proximity of the categories in the factorial plane (Bernardes et al., 2014). All statistical analysis were conducted using SPSS Statistics 21.0.

## Results

Homogeneity of climates perceptions was assessed with with  $r_{wg}$  (James, Demaree, & Wolf, 1993), intraclass correlation (ICC[1]), and reliability of the mean (ICC[2]; James, 1982; Shrout & Fleiss, 1979). Methodological implications of homogeneity statistics are debatable. Lindell and Brandt (2000) suggested that homogeneity statistics merely reflect the extent of consensus (e.g., climate strength) and should not be considered as an aggregation criterion.  $R_{wg}$  interpretation was made according to Dunlap, Burke & Smith-Crowe (2003) critical values of the  $r_{wg}$  statistic considering the group size and the number of categories; results in our sample suggest acceptable homogeneity, i.e., median  $r_{wg} = .71$  for OSC,  $.51$  for SSC,  $.63$  for CSC,  $.68$  for diversity climate,  $.85$  for inclusion climate and  $.55$  for communication climate. Moreover,  $ICC(1) = .08$ , and  $ICC(2) = .63$  for OSC,  $ICC(1) = .10$ , and  $ICC(2) = .69$  for SSC,  $ICC(1) = .05$ , and  $ICC(2) = .54$  for CSC,  $ICC(1) = .05$ , and  $ICC(2) = .50$  for diversity climate,  $ICC(1) = .11$ , and  $ICC(2) = .73$  for inclusion climate,  $ICC(1) = .06$ , and  $ICC(2) = .55$  for communication climate. Together, the results indicate that there was sufficiently high within-groups homogeneity and between-groups variance to warrant group-level analysis.

Descriptive statistics and correlations among the aggregated data are presented in Table 3.2.

*Table 3.2. Descriptive and correlations among the aggregated data*

Variables	M	SD	1	2	3	4	5	6	7
1. Organizational Safety Climate	4,70	1,38	1						
2. Supervisor's Safety Climate	4,58	1,13	,70**	1					
3. Coworkers' Safety Climate	4,37	1,23	,47**	,39*	1				
4. Diversity Climate	3,96	3,26	,52**	,46**	,41**	1			
5. Inclusion Climate	2,94	3,24	,46**	,55**	,44**	,55**	1		
6. Communication Climate	2,98	2,95	,55**	,57**	,48**	,52**	,56**	1	
7. Injury rate	2,41	0,09	,16	,06	,05	,19	-,05	,15	1

\*\*  $p < .01$ ; \*  $p < .05$

The first aim was to identify profiles in employees' perception of different facet-specific climates. Table 3.3 shows the discrimination measures and contributions of each variable; two dimensions (structuring axes of that space of perceptions) were identified through the MCA (the closer to 1, the better the value), accounting respectively for 29.4% and 14.51% of the total variance. For each dimension, only values above inertia (variance mean value) were considered, which are set in boldface in Table 3.3.

It is possible to conclude that variables involving the relational climates (inclusion and communication climates) contribute decisively to the structuring of both dimensions (Table 3.3).

Then, Fig. 3.1 presents the topological configuration of climates' perceptions.

As can be seen, Dimension 1 differentiates between low "relational" climates (Inclusion and Communication) associated with low organizational/supervisor's safety climate and the opposite trend (high relational climates associated with high organizational and supervisor's safety climate), so it seems to be more

focused on the organizational level (in particular the role of leadership in inclusion, communication and safety climates). Dimension 2 differentiates between higher perceptions of relational climates together with medium perceptions of coworkers' safety climate and the opposite trend (higher coworkers' safety climate and medium relational climates), so it appears more focused on the role of colleagues (intended as the coworkers' effect on inclusion, communication and safety perceptions).

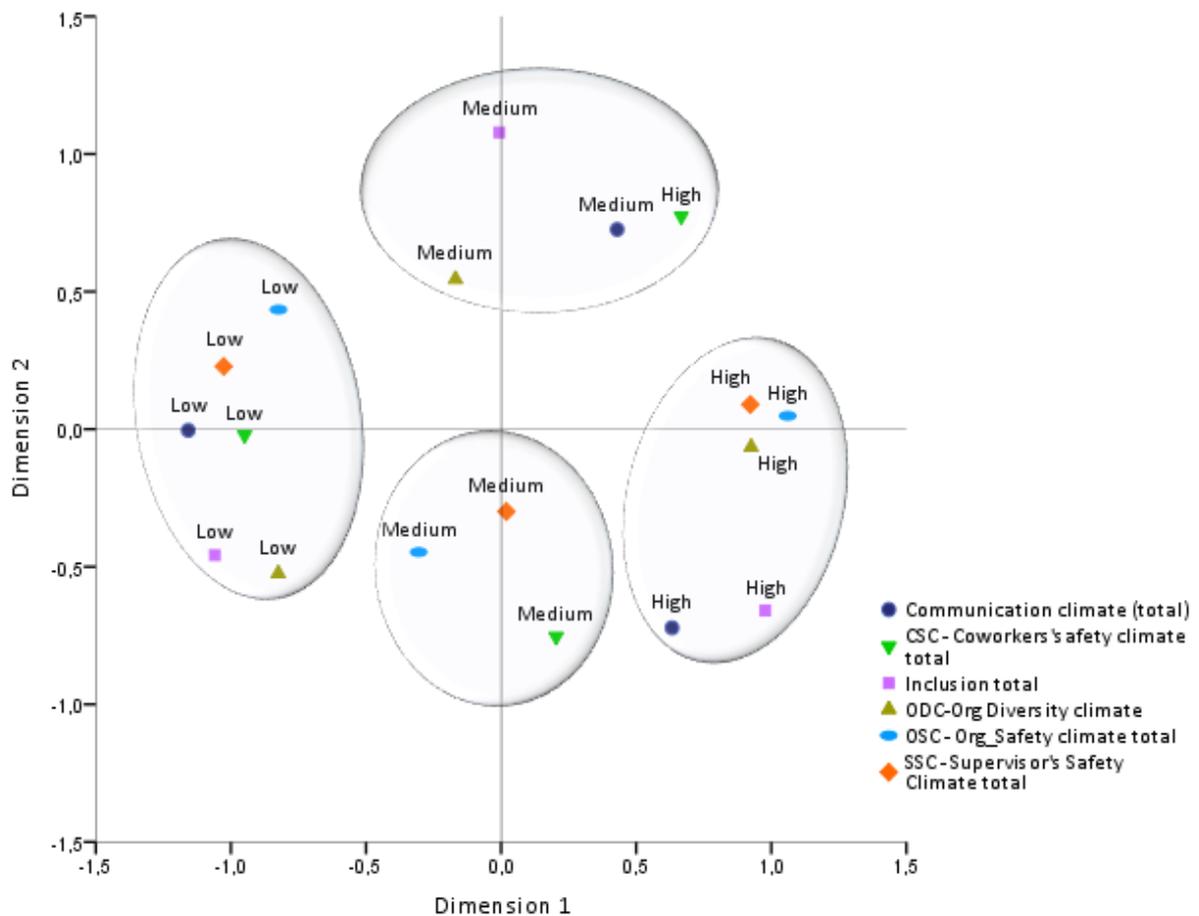
Considering our first aim, the joint analysis of the two dimensions provided an understanding of the topological configuration of the space of perceptions. Four different combinations of climates were found and consequently four different employees' profiles of climates were defined (Fig. 3.1); the left-side pattern shows an association of homogeneous low climates' perceptions at all levels, both organizational and group ones (such as low perceptions of inclusion, communication, safety and diversity climates). The right side pattern shows another homogeneous profile but with high climates' perceptions for diversity, inclusion, communication and safety climates (this last one only at organizational and supervisors' level).

Then the mid-down side pattern shows again a homogeneous profile related only to medium perceptions of safety climate at the organizational, supervisor and coworkers' levels. Finally, the mid-up side pattern represents the heterogeneous pattern, as it includes medium perceptions of inclusion, communication and diversity climates, together with high perceptions of coworkers' safety climate.

Table 3.3. Discrimination measures and contributions of active variables

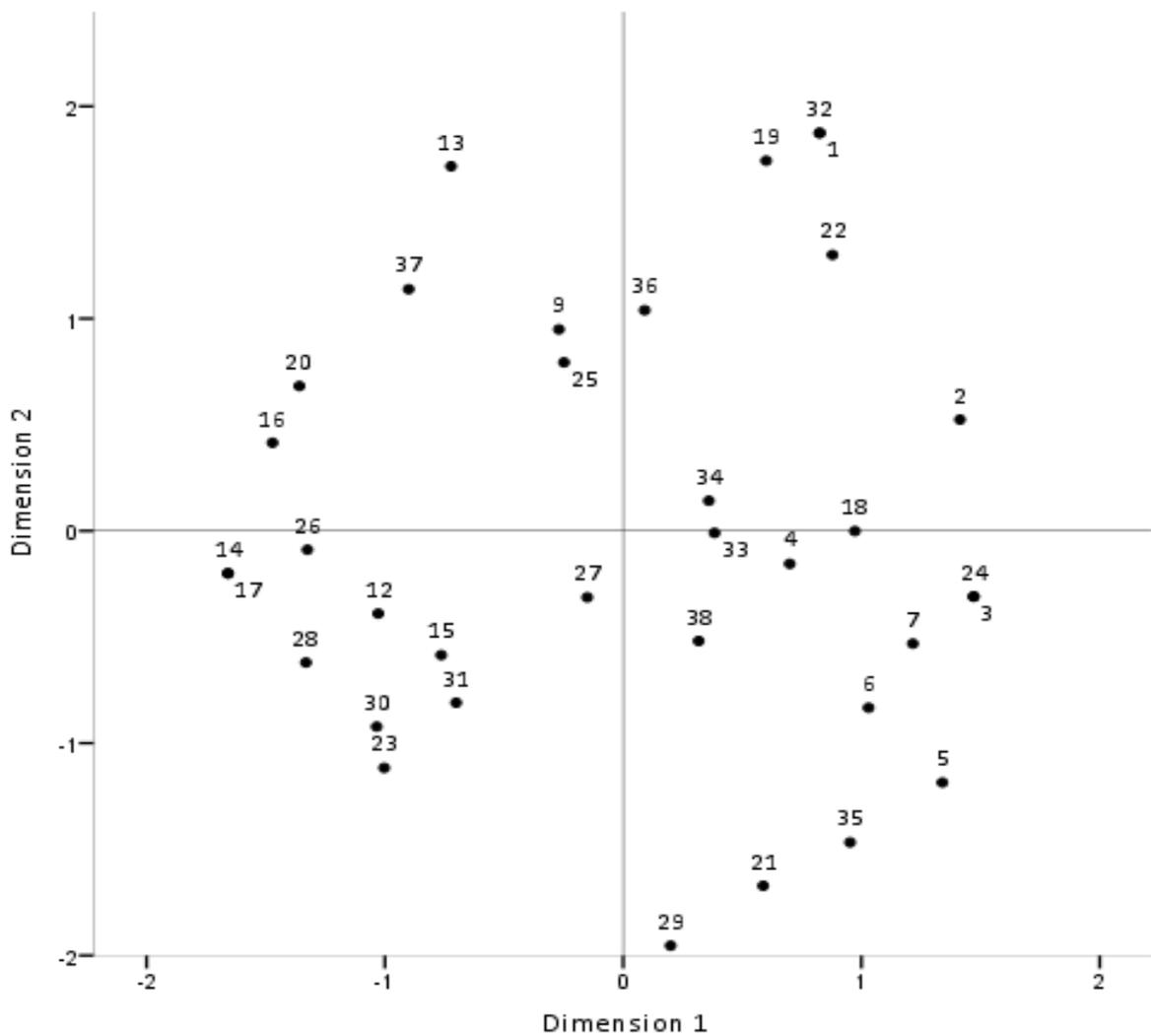
Scales	Dimensions			
	1		2	
	Discrimination	Contribution (%)	Discrimination	Contribution (%)
OSC – Organization Safety climate total	<b>.631</b>	17.91	.129	7.39
SSC - Supervisor's Safety Climate total	<b>.623</b>	17.68	.050	2.86
CSC - Co-workers' safety climate total	.450	12.77	<b>.400</b>	22.99
ODC-Org Diversity climate	.517	14.67	.190	10.89
Inclusion total	<b>.681</b>	19.33	<b>.613</b>	35.23
Communication climate (total)	<b>.622</b>	17.65	<b>.359</b>	20.64
Active Total	3.523	100.00	1.741	100.00
Inertia	0.587		0.290	

Fig. 3. 1. Topological configurations of the climates' patterns



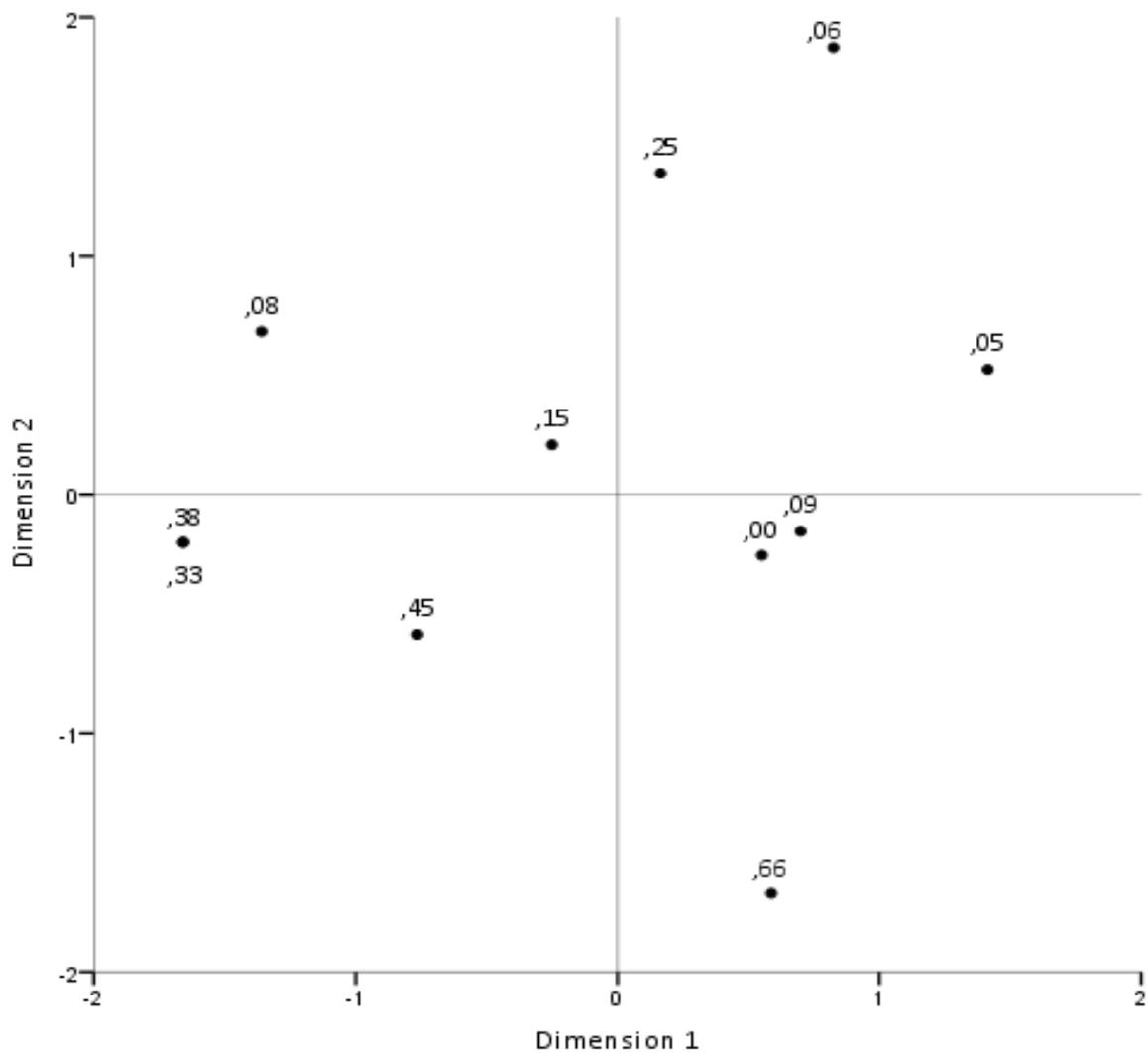
Next, a second goal was to identify possible associations between each profile mentioned above and the distribution of the companies (nested in departments). Fig. 3.2 shows the disposition of each department according to its profile; for space reasons, more information can be gained by reading the Appendix B at the end of this chapter, where a complete list of each department and its corresponding number in the figure, is given. Matching the information obtained from Fig. 3.2 with that one from the Appendix B, it is possible to recognize that there is no correspondence between each climates' profile and each specific company, since there are several departmental sub-climates, namely, different departments from the same company belong to different patterns of climates. The only thing that should be noted is that the mid-up side pattern (the most heterogeneous one) comprises both logistic departments (e.g., taking, delivery and shipping of products) positioned in the quadrant 2 and also risky departments (e.g. working on big machines and mechanic shear off and welding) mostly positioned in the quadrant 1. Next, the left-side pattern (with all low climates) includes more risky departments mainly positioned in quadrant 3 (e.g., manufacturing, painting and assembling). Finally the mid-down side pattern (with medium safety climates at all levels) and the right-side pattern (with high diversity, inclusion, communication, organizational and supervisors' safety climates) include different kinds of departments with different levels of risk (some more related to assistance and quality control, some others more related to risky activities, like generators' rolling and manufacturing).

Fig. 3. 2. Departments' position according to their climates' profile



The final aim of this study was to explore possible associations between the four patterns of climates and the distribution of injuries. Fig. 3.3 shows the results; it seemed that no identifiable distribution of injuries emerged as linked to the four climates' patterns, as the higher injury rates appeared in correspondence of quadrants 1 and 4 (those ones correspondent to medium/high climates' perceptions), followed by quadrants 3 and 2.

Fig. 3. 3. Projection of injury rate



## Discussion

The present study aimed to analyze how different climates interact constituting patterns and these patterns relation with safety outcomes , taking into account the multilevel nature of climate (organizational, supervisor and coworkers' levels).

More specifically, we wished to analyze the link between the combinations of different levels of facet-specific climates and injuries rates, taking into account also the nested nature of the data.

The use of Multiple Correspondence Analysis (MCA) allowed us to define the topological configuration of the space of climates' perceptions about diversity, inclusion, communication and safety in the metal-mechanical sector. Our results suggested the presence of four differentiated patterns of climates. There were three homogenous patterns; a first one was made of low climates' perceptions (at all levels and domains); a second one was made only of medium climate's perceptions related to the specific domain of safety (at all levels, namely organizational, supervisors and coworkers' safety climates); a third pattern was made of high perceptions for almost all the considered climates (diversity, inclusion, communication, organizational and supervisors' safety climates). Finally a fourth pattern showed a more differentiated composition, since it was made of medium perceptions of the "relational" climates (diversity, inclusion and communication climates) and high perceptions of coworkers' safety climates.

Secondly, with regard to the distribution of injuries, it is interesting to notice that the only heterogeneous pattern showed a "splitted" distribution of injuries associated with departments' characteristics; as it comprises both the first and the second quadrant, the lowest injuries' occurrence corresponded to the low-risk departments (more related with logistic activities, quadrant 2), whereas the

highest injuries' occurrence was in correspondence of the high-risk departments (e.g. mechanic shear off, mechanic welding and manufacturing, quadrant 1). However, contrary to our expectations, it was not possible to find any pattern of safety outcomes coherent with the climates' patterns (namely, low injury rate in correspondence of higher profiles of climates and high injury rate in correspondence of lower profiles) and in particular no identifiable injuries distributions were found as associated to the most homogeneous climates' patterns. It seemed that the low, medium and high perceptions of facet-specific organizational environments did not correspond to defined injury distributions.

A possible interpretation for those results could be related to the halo effect (Asch, 1946; Wells, 1907; Thorndike, 1920); this phenomenon is defined generally as a tendency to allow the evaluation of each trait influence the evaluation of all other traits (Fisicaro & Lance, 1990); moreover it can be considered as a logical error (Newcomb, 1931) which occurs when a rater uses, as a basis for rating, 'the apparent logical coherence of various traits' (Guilford, 1954, p. 279). Thus it can be possible that, in the present study, respondents focused on the positive aspects of the organization related to some specific domains (such as medium or high relational climates) and this created a spillover effect of such positivity from one climate to other climates

One must recognize, however, that climates might also be truly related to each others, (such as diversity and inclusion climates for the issue of the integration of underrepresented employees, or some aspects of inclusion and

communication climates, pertaining to the perceptions to be included in the formal and informal communication's channels), in such a way that halo is not enough to justify the results. In fact, as stated by Oh & Ramaprasad (2003): "to the extent that intercorrelations in the evaluation of several traits represent homogeneity among traits, they do not represent halo. To the extent that they are a result of rater-perceived homogeneity where no or little homogeneity exists, they represent halo" (p. 320).

Another possible explanation could lie in the fact that the medium and high climates' profiles seem to be strongly grounded on superior humanistic/ethical values (the fair treatment of all employees, their integration in some organizational critical processes such as communication and decision making, their involvement in the informal and social networks), in such a way that it could lead to a greater employees' attitude toward reporting injuries, because they feel that there are social expectations to do so, and believe that reporting would be easy for them to do, then they would have greater intentions to actually do so (Probst & Graso, 2013, p. 582). Moreover, several research has shown that accident under-reporting is more a problem in organizations with poorer safety climates than organizations with positive safety climates and in those ones where supervisor safety enforcement was inconsistent (Probst, Brubaker, & Barsotti, 2008; Probst & Estrada, 2010). The existence of this phenomenon has been well documented in the empirical literature (Glazner et al., 1998; Leigh, Marcin, & Miller, 2004; Pransky, Snyder, Dembe &

Himmelstein, 1999; Rosenman et al., 2006) and it has been also linked to multiple factors, such as industry sector (Daniels & Marlow, 2005), perceived lack of management responsiveness (Clarke, 1998) and high levels of production pressure (Probst & Graso, 2013) for the organizational-level, whereas fear of reprisals or loss of benefits (Webb, Redman, Wilkinson, & Sanson-Fisher, 1989; Sinclair & Tetrick, 2004) and a general acceptance that injuries are a fact of life in certain lines of work (Pransky et al., 1999) for the individual-level. Hence, it is possible that a medium/high levels of safety climates, together with positive evaluation of the quality of inclusion, communication and management of diversities, simply enhanced the emergence of a “more accurate reporting climate” (Probst & Estrada, 2010, p. 1443), thus resulting in higher injury rates when compared with the low-climates profile.

A third possible explanation could rely on the influence of another variable, not considered in the study design, that is the departments’ risk level, which can be deduced to be higher for the manufacturing than for the logistic ones; this could explain the reason why higher injuries are in correspondence of the productions groups, regardless of their belonging to low, medium or high patterns of climates.

Finally, it can be also possible that the time distance between climates’ assessment and injury data collection was not enough, as climates take time to produce visible effects, and the injury recording began from the day of the questionnaires’ administration till 12 months later.

### *Limitations and Strengths*

The present study has some limitations, first of all, the use of self-report data; reliance on self-report data has received bad consideration in the literature as it increases the likelihood of social desirability and common method bias (Howard, 1994). However, several authors have noted that self report data is acceptable when it measures affective experiences or individual's self perceptions, such as the variables of interest in this study (Maurer & Tarulli, 1994; Spector, 1994; McEnrue, 1989); additionally, the use of objective measures of injuries at the department level in the present study reduced the occurrence of common method effect, as well as the aggregation at the group level reduced the likelihood of social desirability. Another possible limitation is that, further to the variables considered here, additional background variables should have been taken into account; for example, the organizational production pressure, and the accident reporting behaviors attitude (Probst & Graso, 2013) could be useful to better understand whether the positive perceptions of social climates could be associated with a need to reciprocate by putting extra effort on the productivity to the detriment of safety behaviors, or whether the measure of accidents obtained from organizational records may be subject to a reporting bias. Future research should also control for work-groups' risk level, to verify whether it can have a stronger effect on injuries, to the detriment of climates; finally it would be important that future research consider also the

organizational level of analysis, by increasing the number of companies, because of the limited number of organizations participating in the present study.

Despite those limitations, theoretical strengths and practical implications of our work should be highlighted. Firstly, a major contribution of this study - derived from the use of multiple correspondence analysis - was to highlight the complexity nature of organizational environments, as it answered to Kuenzi & Schminke (2009) call for more need of research relating multiple existing climates with specific second-level outcomes.

With regard to the issue of organizational complexity, a clear conclusion from our data is that they did not approach the classical and expected organization model for safety (where the high safety climate should be associated with lower incidents occurrence). At the same time, our findings has led us to question whether all the aspects of the theoretical template for a safe organization necessarily apply to all organizations and high-hazard domains (Jeffcott et al., 2006); in particular our results suggest that organizations should exercise caution in using safety climate as the overall key indicator of the adequacy of the safety outcomes. In line with previous literature (De Joy et al., 2004), the present findings show that several other organizational climate factors, such as fair treatment, integration and involvement in the organizational mainstream and communication within the organization – which have never been previously studied in their mutually relationships – will also be associated with safety climate at different levels, but the fact remains that employees' safety

performance extends beyond their perceptions of safety climate (De Joy, et al., 2004).

Secondly, the present research focused on the department-level (instead of the individual-level), in line with recent literature (Fugas et al. 2011) which stressed the importance of future safety intervention deviating from individualized learning to focus also on the behavior of whole team; indeed, research showed that the more ambiguous the target of perceptions and beliefs about environment is, the more individuals base their reality on group information (Fugas et al. 2011). The importance of those assumptions is demonstrated also through our findings, since they showed how the same company can have multiple different patterns of perceptions belonging to the different work-departments. Such results are consistent with the need of safety-training programs aimed at improving attitudes through actions originating laterally (e.g., mentoring from coworkers; Raabe & Beehr, 2003) and highlight the need (yet scarcely assimilated by literature) to separate the influence of leaders (top management and supervisors) from those one of peers (coworkers), as demonstrated by the different contributions given by those variables to the dimensions in MCA analysis.

Thirdly, and according to previous literature (Carr, Schmidt, Ford & Deshon, 2003; Kuenzi & Schminke, 2009), the present study suggest that much could be gained by simultaneously examining multiple climates to creating a full

understanding of how different configurations of climates are likely to influence the effectiveness of outcomes in different domains.

The present research represents the first exploratory study in this field, and despite caution should be used in the interpretation of our preliminary findings, some important implication for practice can be suggested. In particular we would recommend that safety practitioners engage in more systematic organizational diagnosis, using a “broader safety-oriented organizational diagnosis” (Hoffmann & Stetzer, 1996, p. 333); a crucial factor seems to be the possibility to focus on broader organizational factors which can affect accidents occurrence. Management cannot presuppose that different departments from the same company automatically agree with one another on their experiences of climates; in order to improve those climates, managers therefore have to understand which factors cause differences in perceptions. Such factors are, for example, the position of an employee in the communication network and the quality of his/her relationship with the direct supervisor and the other colleagues of the same department (Smidts et al., 2001). Finally, the possibility to have and give feedback, to get involved, be fairly treated and actively participate to formal and informal organizational activities could help in creating a more reporting climate, such that it is more likely for employees to communicate accidents and errors.

In conclusion, considering the exploratory nature of the present study and its preliminary findings, the present study represents an innovative contribution to

the organizational climate literature, and in particular to the field of safety; some focused interventions of empowerment, integration and communication within work-groups should be promoted and enforced.

## Appendix B

Table with correspondences between work-departments and numbers in Fig. 3.2.

	<i>Departments</i>	<i>Corresponding number</i>
<i>Company 1</i>	Big Machines Welding	22
	Big Machines Rolling	23
	Big Machines Polar Wheel	24
	Big Machines Assembling	25
	Big Machines Painting	26
	Medium Generators Rolling	27
	Medium Generators Assembling	28
	Medium motors	29
	Small motors	30
	Mechanic Manufacturing	31
	Mechanic Shear-off	32
	Mechanic Maintenance	33
	Logistic Packaging & Shipping	34
	Logistic Storage	35
	Rehearsal Room	36
	Quality Control	37
	Technical assistance	38
	<i>Company 2</i>	Machines
Fixing		2
Manufacturing Welding		3
Manufacturing Boilers		4
Manufacturing Painting		5
Quality Control		6
Maintenance		7
Logistic Shipping		9
<i>Company 3</i>	Painting	12
	Reception Taking & Delivering	13
	General Manufacturing	14
	Manufacturing Lines	15
	Preparation & Loading	16
	Cases	17
<i>Company 4</i>	Press	18
	Painting	19
	Assembling	20
	Other	21

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## CONCLUSIONS

The general aim of the present dissertation was to explore possible influences of different specific climates on workers' safety performance which could be explained by going beyond their perceptions of safety climate.

A particular attention was given to the fact that in this specific historical moment several transformations of the social and economic context occurred, in particular the recent economic crisis and the changes in the labor market, which increased the workforce diversity, throwing new challenges for organizational psychologists and human resources managers; indeed, if companies are to flourish in today's ever-diversifying markets, they will have to attract, develop, coordinate, and retain a much broader base of human resources than in previous years (Avery, 2011). Therefore, much research has focused on determining the nature of diversity's effect on individual, team and organizational level outcomes (including safety). Specifically, all the previous research about diversity and safety had focused on the link between objective kinds of diversity and safety behaviors, furthermore showing ambiguous and contradictory results (e.g. Clarke, 2006; Ucho & Gbande, 2012).

From the moment that objective differences among individuals exist, and that it is not possible neither useful to reduce them, we preferred to focus on the analyses of mutual perceptions and interactions about diversity management, because we agreed with Hertel, Van der Heijden, de Lange & Deller (2013) that

organizations can benefit much more from diversity if they focus on the accurate analysis of such mutual perceptions. Moreover, we decided to apply this reasoning to the field of safety, as the particular context of research (the Italian manufacturing sector) is still one of the highest for accidents and fatalities occurrence in the national work context.

Therefore, the first aim of the present dissertation has been to develop an Italian validation of a useful instrument to measure Diversity Climate, by adapting the Mor Barak, Cherin and Berkman (1998) Diversity Perceptions Scale, the most widely used questionnaire to assess diversity climate, considering the lack of any validated measure of diversity climate in the European context. The originality of that study relies on the qualitative (Judges Content Validity and Cognitive Interview) and quantitative (Multigroup Confirmative Factor Analyses) procedures used to test its psychometric properties. Results interestingly showed that a three-factor solution best fit the data for the Italian sample using a shorter version than the original scale; moreover the scale seemed to be invariant for both men and women and to show good discriminant and criterion validities. Therefore, this first study allowed us to make this instrument suitable for the Italian context, in order to use it for evaluating whether diversity climate could specifically affect some safety outcomes in the subsequent studies.

In the second study the diversity climate measure was used together with a measure of climate for inclusion (Mor Barak, 2005) to test their impact on safety

participative behaviors at the individual level and for the first time (Neal & Griffin, 1997; Neal, Griffin & Hart, 2000), hypothesizing a mediating role performed by the motivation to actively promote safety at work (Griffin & Neal, 2000). Results showed that diversity climate and climate for inclusion are different constructs which have different and important impacts on safety; specifically climate for inclusion appeared to have a stronger, direct relationship with safety participation behaviors than diversity climate, whereas this latter has a greater motivational influence on such behaviors, in the sense that its influence performs completely through a motivating effect to go beyond mere compliance and voluntarily participate in safety enhancing behaviors.

The third aim of the present dissertation was to enlarge the effort of investigating the impact of distinct facet-specific climates on specific safety behaviors, by exploring the possible influence of multiple existing climates on injury rates at the unit-level and with multi-correspondence analysis; that technique allowed us to identify patterns of specific climates and then to associated those patterns with low/high rates of injuries. In addition to diversity climate and inclusion climate, safety climate (e.g., Zohar, 1980; 2000) and communication climate (Smidts, Pruyn & van Riel, 2001) measures were also used for this purpose; in particular, the role of coworkers (together with the top management and supervisor) was taken into account when exploring safety perceptions, as most of the safety research usually lacked of considering it (Chiaburu & Harrison, 2008). Moreover, communication climate was also

considered as an important safety predictor, as previous research stressed how safety performance is strictly dependent on the supervisors' and coworkers' communication and quality of social exchange (Zohar & Luria 2005; Wallace, Popp & Mondore, 2006).

Results showed the presence of four differentiated patterns of climates, three homogeneous in the levels of perceptions, one more heterogeneous; then, they were linked to the safety outcomes and no injury's distribution was found to be coherently associated with the climates' patterns. References to the halo effect (Wells, 1907; Thorndike, 1920) and to the injury "reporting climate" (Probst & Estrada, 2010, p. 1443) have been made to explain those findings.

Summarizing the results of the three studies, it is possible to conclude that they represents very innovative contributions to the organizational climate literature, and with regard to the safety area, they explore research avenues not addressed before.

In details, those specific climates have not been previously considered as possible antecedents for safety variables, especially in their mutual and reciprocal influences. Furthermore, the use of multivariate analysis with MCA and at the department level of analysis is something original for the research in the organizational climate area and in safety field. Of course the studies presented above have some limitations; first of all, the very specific organizational contexts in which the studies were developed (mainly the metal and mechanical sector); secondly, the cross-sectionality for most of the data

collection (in particular for study 1 and 2), thus increasing the likelihood of social desirability and common method bias (Howard, 1994). Nevertheless, some methodological and statistical devices - such as the use of structural equation modeling, together with the Harman's single factor test and the moderate correlations' values between different constructs/variables - reduced their occurrence. Other possible limitations are that, further to the variables considered in the present work, additional background variables should have been taken into account; specifically for study 3, the organizational production pressure, and the accident reporting behaviors attitude (Probst & Graso, 2013).

Future research should also consider also the organizational level of analysis, by increasing the number of companies, because of the limited number of organizations participating in the present work, and they should replicate those studies in different sectors.

Despite those limitations, the present work welcomed the challenges made by Kuenzi and Schminke (2009), about their proposal of a research agenda for the work and organizational climate research, and it showed (even if only preliminary) that several other organizational climates, extending to domains broader than safety, accounted for safety performance; moreover it stressed the role performed by the social and relational perceived environment beyond the perceptions about safety itself.

Moreover those findings give important suggestions for practitioners, as they show the need to engage in more systematic organizational diagnosis and

interventions; specifically they stress the importance of giving attention on the way policies are translated in procedures and become well-established practices of preferential/discriminative treatment, communication, and inclusion (or exclusion) from the informational and decisional processes and how this can impact the developing of a participative organizational culture for safety. It is suggested that a company, who gives its employees the possibility to communicate own ideas, supporting and valuing the differences, treating them with fairness, investing in a real integration and empowering its workers, can reach new, improved and innovative way of working in a safe manner.

This dissertation represents only a first, exploratory work, suggesting the need of further research to confirm those preliminary findings.

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