

The affect heuristic in occupational safety¹

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KEY WORDS

Affect heuristic; occupational safety; safety costs

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Euristica affettiva; sicurezza lavorativa; costi di sicurezza

SUMMARY

Background: *The affect heuristic is a rule of thumb according to which, in the process of making a judgment or decision, people use affect as a cue. If a stimulus elicits positive affect then risks associated to that stimulus are viewed as low and benefits as high; conversely, if the stimulus elicits negative affect, then risks are perceived as high and benefits as low.* **Objectives:** *The basic tenet of this study is that affect heuristic guides worker's judgment and decision making in a risk situation. The more the worker likes her/his organization the less she/he will perceive the risks as high.* **Method:** *A sample of 115 employers and 65 employees working in small family agricultural businesses completed a questionnaire measuring perceived safety costs, psychological safety climate, affective commitment and safety compliance.* **Results:** *A multi-sample structural analysis supported the thesis that safety compliance can be explained through an affect-based heuristic reasoning, but only for employers.* **Conclusions:** *Positive affective commitment towards their family business reduced employers' compliance with safety procedures by increasing the perceived cost of implementing them.*

RIASSUNTO

«L'euristica affettiva nella sicurezza lavorativa». **Introduzione:** *L'euristica affettiva è una scorciatoia di pensiero in base alla quale le persone usano i sentimenti come indizio quando devono dare un giudizio o prendere una decisione. Se uno stimolo suscita un sentimento positivo, allora i rischi associati a quello stimolo sono percepiti bassi ed i benefici alti, viceversa, se uno stimolo elicit un sentimento negativo, i rischi associati sono percepiti alti ed i benefici bassi.* **Obiettivi:** *L'ipotesi di questo studio è che i giudizi e le decisioni dei lavoratori riguardo al rischio siano guidati dall'euristica affettiva: maggiore è l'attaccamento affettivo verso l'azienda, minore sarà la percezione del rischio lavorativo.* **Metodo:** *Un campione di 115 datori e 65 rispettivi dipendenti, impiegati in aziende agricole di piccole dimensioni hanno compilato un questionario che misurava la percezione del costo di implementazione delle procedure di sicurezza, il clima di sicurezza psicologico, l'attaccamento affettivo, e la compliance con le misure di sicurezza.* **Risultati:** *Un'analisi strutturale multicampione ha confermato la nostra ipotesi che la compliance con le*

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misure di sicurezza può essere spiegata tramite un ragionamento euristico di tipo affettivo, ma solo per i datori di lavoro. Conclusioni: Nei datori di lavoro, l'attaccamento affettivo verso la propria azienda di famiglia ha ridotto la compliance con le procedure di sicurezza incrementando la percezione del costo che comporta implementare tali procedure.

The affect heuristic is a rule of thumb according to which, people use affect as a cue for many important judgments (34). The heuristic implies that if people like a job, they are motivated to judge the risks as low and the benefits as high; if they dislike it, they tend to judge the opposite - high risk and low benefit (1). We suggest that affect heuristic applies also to occupational safety: If workers like their employer/organization they will judge the risks as low, if they do not like their employer/organization they will judge the risks as high.

The hypothesis that affect heuristic can predict judgments of risks and benefits was first proposed by Alhakami and Slovic (1) and further supported by evidence collected by Finucane, Alhakami, Slovic, and Johnson (10). Alhakami and Slovic (1) found that the inverse relationship between perceived risk and perceived benefit of a task (e.g., using pesticides) was linked to the strength of positive or negative affect associated with that task. This result implies that people base their judgments of a task or a technology not only on what they know about it but also on what they feel about it. Finucane and her colleagues (10) demonstrated that people use an affect heuristic when they are asked to make judgments of risk and benefit for a series of tasks, substances and technologies. They found support for the hypothesis that risk and benefit judgments are causally determined, at least in part, by the overall affective evaluation. The use of an affect heuristic is so automatic and pervasive that not even experts are exempted. Indeed, negative correlations were found between judgments of harm and benefit across most biotechnology applications for both experts and the public, supporting the idea that also experts make judgments using an affect heuristic (32).

The basic tenet of our study was that affect heuristic also guides judgments and decision mak-

ing in risk situations in the workplace. Specifically, it is proposed that those employers and employees who are affectively and positively attached to their firm, will judge risks as low and benefits as high; on the other hand, those employers and employees who are negatively attached to their firm will judge the risks as high and benefits as low.

We assume that representations of the firm in the workers' minds are tagged with affect in different degrees. Some workers will like their firm more, while some others will like it less. A straightforward distinction between employers and employees is evident here: Employers are usually more affectively attached to their firm than employees, because they own it. In the process of making a judgment or a decision regarding risk, workers will consult this affective tag and use an overall, readily available, affective impression to make a judgment or a decision in a risk situation.

Up to date no study has examined the link between emotional attachment to the organization and safety behaviour. Moreover, emotional attachment to the organization has traditionally been considered an advantage for the worker and for the organization (35). We suggest that, while affect might produce benefits in terms of performance, it may produce a cost in terms of job safety.

To validate our hypothesis we chose to study owners of small and micro-size agricultural family enterprises and compare them to the employees of the same enterprises. We assumed that employer-owners of small family businesses would have particularly strong affective ties to their business and therefore be the preferred candidate for an affect-based heuristic reasoning. Moreover, the results of this study could have large practical implications, since more than 99% of all European businesses are SMEs. They provide two out of three of the private sector jobs and contribute to more than half of

the total added value created by businesses. In addition, nine out of ten SMEs are actually micro-enterprises with less than 10 employees (2). However, their situation with respect to health and safety is less favourable than that of larger businesses, since most accidents occur in SMEs (9). In addition, according to statistics of work-related accidents, the agricultural sector is one where most of the fatal work accidents occur (13).

AFFECT TOWARDS THE ORGANIZATION

The standard definition of affect, as used in the decision-making and risk perception literature, is the specific quality of “goodness” and “badness” (1) experienced as a feeling (with or without consciousness) and (2) demarcating a positive and negative quality of a stimulus (34). A very simple way to measure affect is to ask people to express judgments like: “Do you like your company”, focusing on the emotions that are elicited when they think about their company and using affective scales (from very positive emotions to very negative emotions) to express their answer (31). Others measures of affect make use of images that are formed in the mind and tagged with affect, that are always measured on a good-bad scale (31).

In work psychology literature there is no such measure of pure affective attachment. Nevertheless, a very similar construct is *affective commitment* (23)¹. Over the years, commitment has been conceptualized in various ways (19, 22). The major approaches, however, view commitment as “a force that binds an individual to a target (social or non-social) and to a course of action of relevance to that

target” (24). This binding force can be experienced in different ways (i.e., can be accompanied by different representations), including an affective attachment and involvement with the target, a felt obligation to the target, and an awareness of the costs associated with discontinuing involvement with the target. These representations are referred to as affective commitment (AC), normative commitment (NC), and continuance commitment (CC), respectively. Our study was focused on affective commitment, which has been defined as: “an affective attachment to the organization” (23) as this is the concept which is most similar among those surveyed to that of affect as used in the decision-making literature.

Meta-analyses and reviews have shown that members who feel committed to their organization are better members, i.e., are more motivated, satisfied and productive (21, 22). Existing research has also consistently demonstrated positive relationships between affective commitment to the organization and indices of employee well-being (25). Searching the literature on affective commitment, however, we found no evidence to suggest that strong affective commitment to the organization may have detrimental implications for the workers. The bulk of the evidence suggests that having a strong affective commitment to one’s organization will have huge benefits. In theory, therefore, more positive attachment with the organization will lead to greater motivation to behave safely. However, the prediction of affect heuristics applied to workplace safety leads exactly to the opposite conclusion. More affective commitment to the organization should lead to underestimating occupational risks and overestimating the benefits of not behaving safely.

The extent to which a worker is affectively committed to the organization may be different according to the worker’s role within the organization. Owners of small family enterprises are expected to have a stronger affective commitment towards their enterprise, compared to employees, since they own it. But affective attachment to the organization may vary even between owners. In the present research, owners of agricultural family enterprises were compared to the employees of the

¹ Other variables, besides affective commitment, measure affective attachment towards the organization, *job satisfaction* and *work engagement* are just a few examples. For an extensive review of all the variables see Fisher (11). However, most of these variables do not measure only the affective component of the relationship between the worker and the organization but include other factors as well. Meyer and Allen (22) argued, indeed, that although they are correlated, job satisfaction, job engagement, and occupational commitment all are distinguishable from affective commitment to the organization.

same enterprises. We expected to find that affective commitment was strongly related to safety compliance among employers, while we did not expect such a link to subsist in the sample of employees. We expected that employee's safety behaviour, instead, would be strongly linked to their perception of the psychological safety climate, as evidenced in most of the previous literature.

SAFETY CLIMATE AND SAFETY COMPLIANCE

Psychological safety climate, that is, the employee's perceptions of safety policies, procedures, and practices in the workplace (37) is usually regarded as a distal antecedent of workplace accidents (7). According to most of the meta-analytical studies safety climate informs behaviour-outcome expectancies, which subsequently influence safety behaviour, so that fewer injuries are found in those organizations in which safety behaviour is reinforced, whereas more frequent injuries are found in those organizations in which safety behaviour is not reinforced (3). A positive safety climate encourages safe action either through reward or through principles of social exchange (8, 14, 16, 36). A positive safety climate enhances safety knowledge because it reflects environments where safety information is communicated formally through training and meetings and informally through on-the-job discussion. It must be noted, however, that the safety climate-injury one-way relationship has been criticized in favour of a two-way relationship where safety climate is associated with future injuries but the converse is also true, such that individuals appear to recalibrate their perceptions of organizational safety following injuries, resulting in changes in the psychological climate (3, 37).

In the present study employees' perception of safety climate was measured and its influence on safety behaviour was considered. We expected to find that employees' safety compliance is affected by the perception of safety climate, paralleling most of the previous literature (7). We also measured employer's safety climate, but it should be noted that although we termed it "safety climate"

for comparison purposes with the same construct measured among employees, this was not a standard measure of safety climate. Employer's safety climate in this study measured the relevance that the employer gave to safety within the enterprise. Employees' safety climate, instead, measured the perception that the employee had of how much relevance the employer gave to safety in the enterprise. They are comparable concepts as they measure the same construct, but they adopt different perspectives. We expected that the employer's safety climate would be predictive of employer's safety compliance. Previous literature examining a similar construct in managers or employers, known as "safety commitment" found a relationship between safety commitment and accidents (15, 17) even if no relationship was found in another study (26). We included this measure in the model to test the relative impact of affect on safety compliance controlling for the independent contribution of the safety climate/safety commitment measure.

We used the Neal and Griffin (27) model of safety performance to choose the dependent measures for this study. The model incorporates two dimensions of safety performance: compliance and participation. Safety compliance refers to the core activities that individuals need to carry out to maintain workplace safety. This behaviour includes adhering to standard work procedures and wearing personal protective equipment. Safety participation describes behaviour that does not directly contribute to an individual's personal safety but does help to develop an environment that supports safety. Such behaviour includes activities such as participating in voluntary safety programmes, helping coworkers with safety-related issues, and attending safety meetings (28). In the present study we focussed on safety compliance since it measures worker's active and direct behaviour in risky situations.

EMPLOYER-EMPLOYEE PERSPECTIVES

The structure of a family enterprise is extremely pyramidal such that power is concentrated in a single person, the owner, who directs the enterprise

and heavily imprints the prevailing organizational culture. Organizational culture is then translated into a psychological safety climate, which in turn determines the rate of workplace accidents.

Whereas many past studies were concerned with employee's perception of safety climate as an antecedent of their safety behaviour or with leader-member relationship and employee safety behaviour (3, 4), no-one, to our knowledge, has specifically examined the antecedents of employer's safety orientation. In the present study we tried to seek an answer to the following question: What makes owners of a family enterprise more or less in favour of applying safety policies, procedures, and practices in their workplace? The question is of obvious interest, given that the owner is the first actor that shapes the organizational culture.

According to a standard utility function the resulting individual behaviour should be dictated by the costs and benefits of engaging in an action. That is, the higher the perceived costs of pursuing safety, the lower the intention of acting safely. Indeed, it has been noted that compliance often fails because shortcuts offer immediate benefits that are rarely offset by personal costs, turning such shortcuts into a utility-maximizing choice (38). In our model therefore, safety compliance is inversely related to a new construct, inspired by the conceptual work of Zohar and Erev (38) that we called "perceived safety costs", that is, the perceived costs of acting according to safety regulations. The costs of implementing a safety procedure were conceptualized here as the extent to which engaging in safety procedures is an obstacle to achieving work well done, in a short time and with the minimum effort.

Further evidence of the link between affective commitment, perceived safety costs and safety compliance for SME can be found in the economic and occupational health and safety (OHS) literature. Most of the studies show that SMEs, although they are a strong economic force, find it extremely difficult to manage occupational health and safety, and accidents occur more frequently than in other size categories (13). Different factors are responsible for this outcome. First, small firms are more fragile financially, which makes OHS in-

vestments less attractive because the financial benefits of prevention are not obvious in the short term (20). Second, SME owners tend to be personally responsible for virtually all management functions in their firms without any specific management training, including safety management (12; 20). In this respect, some authors pointed out that, since accidents are relatively infrequent due to the small number of employees, SME owners have a distorted perception of their enterprises' problems and wrongly believe that OHS is not on the top of their list of priorities (4, 6, 12). This evidence makes SMEs a fertile ground to test the affect heuristic model in occupational safety.

METHOD

Participants and Data Collection

One hundred and eighty workers employed in agriculture participated in the study, all of whom were clients of *Agricoltori Verona Servizi*, AVS Srl, a service division of the Farmers Union *Confagricoltura* in Verona. AVS helps agricultural enterprises in solving particular problems or legal obligations regarding technical, economic, fiscal, and labour relations. AVS is also a society organizing safety training for agricultural workers.

Some of the participants were recruited among workers participating in safety training, some were contacted by telephone. The two recruitment methods did not lead to any difference in sampling (role, age, education, sex) hence the sample was treated as a whole.

The employers numbered 115 (64% of the sample) of whom 86.8% were men ($n=99$) and 13.2% women ($n=15$). The average age of employers was 47.2 years (ranging from 20 to 84 years). Education level: 15% had completed 5 years of education, 28% had completed 8 years of education, 35% had completed 11-13 years of education (high school) and 23% had a university degree. The specialty area of the group of employers was the following: 17% were specialized in the crop growing sector, 49% in the wine sector, 18% in the breeding sector, 42% in horticulture /fruit grow-

ing, 5% in farmhouse holiday enterprises, 6% in wineries, 4% in the tobacco sector, 6% in nurseries and 2% in other minor sectors. The total does not add up to 100% because most of the employers were specialized in more than one sector. Ninety-seven percent of the employers were owners of very small farms (from 0 to 5 employees) while 3% were owners of small farms (from 5 to 10 employees) and only 1% were owners of medium size farms (from 10 to 15 employees).

The employee group included 65 individuals (36% of the sample) of whom 83.1% were males ($n=54$) and 16.9% females ($n=11$). The average age of employees was 41.6 years (ranging from 22 to 67 years). The education level was: 6% had completed 5 years of education, 39% had completed 8 years of education, 43% had completed 11-13 years of education (high school) and 11% had a university degree. The specialty area of the group of employees was the following: 17% were specialized in the crop growing sector, 30% in the wine sector, 16% in the breeding sector, 23% in horticulture/fruit growing, 3% in farmhouse holiday enterprises, 9% in wineries, 5% in the tobacco sector, 6% in nurseries and 17% in other minor sectors. Sixty percent of the employees were hired in very small farms (from 0 to 5 employees), 16% were hired in small farms (from 5 to 10 employees), 11% were hired in medium-small size farms (from 10 to 15 employees), and 12% worked in medium size farms (more than 15 employees).

Measures

All measures were collected through a self-administered questionnaire. When needed, the items of the scales were translated into Italian using the Brislin (5) classic back-translation approach.

Perceived safety cost. This is a new measure, explicitly conceived for this study and inspired by the work of Zohar and Erev (38). Safety cost is conceptualized here as the subjective perception of the cost of complying with safety procedures. It was measured by means of 4 items. The items concerned the aspects of implementation cost related to the effort, the time and the general obstacles

generated by compliance with safety procedures. The subjects' responses were collected on a scale ranging from 1 (not at all) to 5 (definitely). An example item was "If I do not use safety protection do I work better?".

Psychological safety climate. This was assessed with items adapted from Neal and Griffin (28). The items were adapted in the sense that they were declined according to the role held by the worker in the enterprise, distinguishing between employer and employee. For example, employers were asked "how much importance do you give to safety issues in your enterprise?", while the same question framed for employees read "How much importance does your employer give to safety issues in your enterprise?". All items were measured on a 5-point rating scale ranging from 1 (not at all) to 5 (very much).

Affective Commitment. This was assessed using the affective sub-scale of the Organizational Commitment Questionnaire by Meyer, Allen and Smith (23) consisting of 18 items (6 items for each subscale, affective, normative and continuance). Responses ranged from 1 (strongly disagree) to 5 (strongly agree).

Safety compliance. This was assessed by 4 items. Three of these items, used by Parker, Axtell and Turner (30), were adapted to the agricultural context. One item "Do you always use protective devices?" was added by us. Participants responded on a five-point scale ranging from 1 (never) to 5 (always).

Additional information. The questionnaire included a final section designed to collect the following data: respondent's gender, age, level of education, working hours per day, role (employer or employee) and size of the enterprise. Participants were also asked whether they thought that they possessed all the knowledge necessary to do their work safely. Answers were given on a 5-point scale ranging from very little knowledge (1) to all the necessary knowledge (5).

RESULTS

The means, standard deviations, correlations, and reliability for employers and employees are shown in table 1.

Employers and employees differed as regards the size of the enterprise, $\chi^2(3, N=178)=40.28, p<0.001$. As it was obvious to expect, employees were found in larger enterprises, while employers were mostly present in smaller ones. Employers surveyed in this study were typically owners of businesses with 0 to 5 employees ($n=111$), while very few ($n=4$) managed businesses with more than 5 employees. Employees were mostly engaged in businesses with 0 to 5 employees ($n=38$), but also in businesses with 5 to 10 employees ($n=10$) and in businesses with more than 10 employees ($n=15$). As shown by the overall small size of the enterprises, all the workers were members of small-micro family type agricultural enterprises.

Both employers ($M=3.68, SD=0.82$) and employees ($M=3.68, SD=0.83$) declared that they possessed sufficient or almost all knowledge required to perform their work safely, $t(175)=0.01, p=0.990$. Seemingly, employers ($M=3.80, SD=0.72$) and employees ($M=3.71, SD=0.73$) stated that they complied sometimes or most of the time with the safety procedures, $t(178)=0.86, p=0.391$. However, employers perceived higher safety costs compared to employees (see table 1) although this difference was only marginally significant, $t(178)=1.88, p=0.061$. Employers also showed a higher affective commitment towards their enterprise than employees (see table 1), $t(177)=2.73, p=0.007$. Employers

also perceived a more positive safety climate compared to employees (table 1), $t(178)=3.83, p<0.001$, meaning that employers believe they give more importance to safety than their employees think they do. These data are coherent with the hypothesis that owners of agricultural family businesses are more affectively committed to the business they own and that they perceive safety procedures as a higher cost and a larger obstacle to the attainment of their goals, compared to employees. Notwithstanding they declared they gave safety greater importance than their employees thought they did.

Multi-sample structural analysis was used to compare the relationships between the variables measured in the study for employers and employees. Path analysis was performed using LISREL 8. In the analyses, the covariance matrices were used, and model robustness was estimated using the maximum likelihood method. Assessment of fit was based on several indices. Figure 1 shows the findings for employers and employees path analysis models. Standardized parameter estimates are presented for ease of interpretation. The model showed good fit indices ($\chi^2(6)=6.56, p=0.36$; RMSEA=0.03; NNFI=0.97; CFI=0.99).

An important finding of multi-sample analysis was that the relationships between some variables in the model were different between the employer and the employee groups. In particular, the relationship between *affective commitment* and perceived *safety cost* was not statistically significant in the employee group ($CR=-0.72$)², but was significant and positive in the employer group ($CR=2.22$), which is a novel result. Moreover, even

Table 1 - Means, Standard Deviations, and Correlations for employers/employees (Cronbach's alpha in brackets on the diagonal)

	<i>M</i>	<i>SD</i>	1	2	4	5
1. Safety Compliance	3.81/3.71	.72/.73	(.74/.75)			
2. Safety Cost	2.32/2.08	.83/.76	-.38**/-.25*	(.76/.76)		
3. Affective Commitment	4.41/4.12	.65/.68	-.08/.18	.20*/-.09	(.78/.76)	
4. Safety Climate	4.34/3.92	.59/.89	.32**/.33**	-.12/.19	.16/.29*	(.76/.91)

Note: $n=115$ for employer group and $n=65$ for employee group.

* $p<0.05$; ** $p<0.01$

² CR=critical ratio for two-tailed tests of significance of t-statistic ($CR\geq 1.96, p<0.05$; $CR\geq 2.58, p<0.01$; $CR\geq 3.29, p<0.001$).

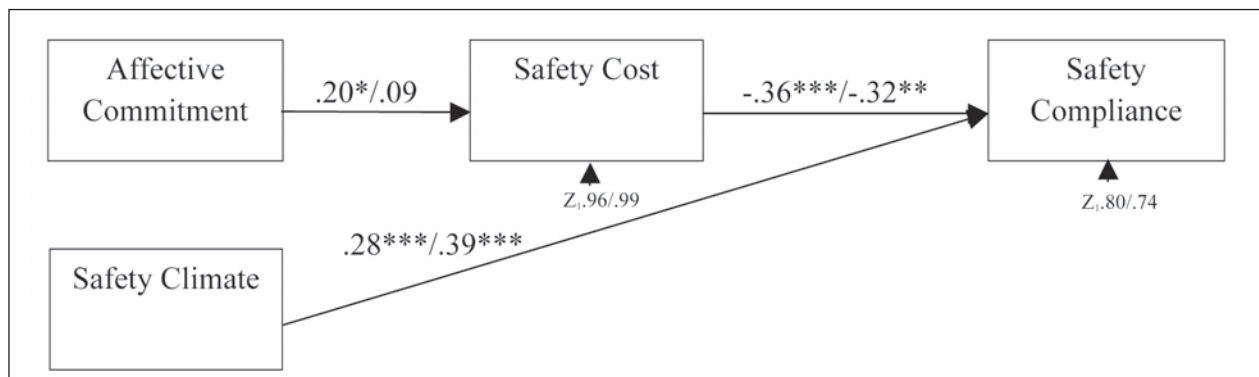


Figure 1 - Models for Employers/Employees

Note: $n=115$ for employer group and $n=65$ for employee group

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

though the paths between *safety climate* and *safety compliance* ($CR_{\text{employers/employees}}=3.32/3.56$), *safety cost* and *safety compliance* ($CR_{\text{employers/employees}}=-4.22/-2.94$) were statistically significant for both groups and in the same direction, they were different in magnitude. Perceived *safety cost* had a slightly higher impact on *safety compliance* for employers than for employees, instead *safety climate* had a greater impact on *safety compliance* for employees than for employers.

The role that a person plays in the enterprise structure was clearly a moderator in the model tested. The unconstrained model (i.e., parameters are free to vary between the groups, as in the model in Figure 1) was compared to the constrained model (i.e., parameters are constrained to be equal between the groups) and the chi-square difference test between the model with constrained paths and the model with free paths was significant ($\Delta\chi^2(7)=21.29, p=0.00$). Thus, the unconstrained model was preferred and employers and employees differed significantly from one another.

The variance explained by the model tested for *safety compliance* was, respectively for employers and employees, $R^2=0.20/0.26$.

DISCUSSION

Affective commitment towards the organization influences worker's safety compliance. Our data

support the idea that an affect-based reasoning can influence perception of workplace safety, in the same way as it predicts judgments of risks and benefits of substances, technologies and behaviour. Affect heuristic predicts that those who have a strong positive affective attachment towards their work organization, as is the case of owners of family businesses, will perceive safety practices as more costly than those who do not have a strong affective attachment or have a negative attachment. The data collected in the preset study supports this model. Protective safety procedures were perceived by employers as an implementation cost, thus an impediment to the attainment of individual and organizational goals (such as working faster and increasing productivity) to a greater extent when they had a positive affective attachment towards the organization, than when they did not. Our data support the idea that employers particularly attached to their organization might be especially susceptible to workplace accidents themselves but also contribute to a less positive safety climate in their business. This result is novel and of particular importance given that affective attachment has been traditionally related to positive outcomes. Perceived cost of implementing the safety procedures was strongly affected by an emotion-based reasoning for employers, whereas it was linked to a more rule-based reasoning for employees, as shown by the path between safety climate and safety compliance. Owners of small family businesses are ex-

pected to perceive safety costs as greater than employees, given that they directly translate these costs into a personal economic loss. Employees, on the other hand, will feel the cost of implementing safety procedures less burdensome, since their salary is not connected directly to production. However, our model shows that perceived safety costs is an important variable even for employees, hence, there are a number of non-economic factors that contribute to increasing the costs of implementing safety procedures and these are the strongest determinants to safety compliance, together with safety climate. This result is also new and calls for further investigations and research on these “non-economic” types of cost associated with implementing safety procedure (i.e., memory costs, physical fatigue costs, time-losing costs).

Future research should generalize the affect variable and include more outcome measures (such as work-alcoholism or job-related stress) to determine the broad range of negative consequences of affective attachment towards the organization for workplace safety. Indeed, few authors have discussed the negative implications of affective commitment. Fisher (11) and Van Dick (35) noted that increasing group salience could enhance identification which in turn leads to increased performance, but it can have negative consequences for the organization when it comes to an over-identification with the organization which results in “employees becoming ‘blind’ followers of organizational rules even if they are to some extent unethical” (35). This observation is coherent with our affect heuristics hypothesis in workplace safety. Future research should examine what other negative consequences might derive from a strong affective commitment to the organization.

Besides the main finding that affective attachment may lead to lower safety behaviour, the present study also emphasized another important and novel finding: antecedents of safety compliance seem to be different for employers and employees. Most of the literature examining workplace safety has studied employees in large firms. However, most of the fatal accidents occur in SMEs. This paradox can be explained assuming that questionnaire studies involving many respondents are easier

to conduct in large-scale firms than in small family type enterprises. Future research should expand the study of the antecedents of workplace safety, beyond affective commitment, for employers owning a small business and compare them to employers in a large-scale firm. Other variables, beyond affective commitment, might prove a valid predictor of workplace safety for employers owning a small family-type enterprise, for example, job engagement, or job satisfaction, might also prove to be important mediating variables for employers. Furthermore, our intuition is that factors such as stress induced by time pressure or economic crisis might increase the tendency to perceive safety costs as higher for owners of small-family type businesses than for other types of workers. This prediction should also be tested.

Some limitations of this study should be considered. This study used the standard self-report methodology (questionnaires) as used in many other similar studies and not observational measures or an experimental procedure. This limitation might cast doubt on the validity of the self-reported measure of safety compliance. An improved version of this study should use more objective measures for assessing safety compliance (observational measures, accidents rates, or laboratory behavioural measures). Moreover, the measure of affect was not a standard measure as can be found in the decision-making literature, but a measure of affective commitment, which is frequently used in work psychology literature. Future research could be conducted by measuring affect through the methodologies identified in the decision-making literature (31) and extending it to other fields, different from agriculture.

A last comment must be addressed to discuss the implication of our findings for safety training. Recent theories of decision making and risk perception assume that the mind operates in two distinct ways: an intuitive-experiential way and an analytical reason-based way (18, 33, 34). The intuitive-experiential way uses fast and automatic heuristics, such as affect, to make judgments and decisions. In contrast, the analytical way uses rules and systematic evidence, hence it is slow and serial. One negative consequence of the intuitive-ex-

periential way of processing is that it can lead to mistakes (biases, accidents) due to the fact that it uses predetermined and fixed heuristics that are not always appropriate in the specific context (i.e., pushing the brake pedal on an icy or snowy road). Several empirical data, reviewed by Kahneman (18) and Slovic et al. (33) showed that as fatigue and cognitive load increase, the reliance on intuitive-experiential processing also increases. This means that workers will use heuristic processing, such as affect heuristic to a greater extent when they have less cognitive resources available (they are tired, distracted, under time pressure, under stress).

The two-ways model also predicts that the intuitive-experiential system can be educated by experience but not by formal training. This has important implications for safety training. An unresolved aspect of this two-way model is indeed the difficulty of finding ways to train the experiential system (33). In our society most of the interventions aimed at education on the risks use verbal communications, which seems to have a limited impact on the fear learning process, whereas observational learning has much more impact (29). According to the observational learning technique, the worker can learn to behave safely automatically by observing other workers behaving in a safe manner. Observing other workers using appropriate devices is a natural way to educate the intuitive-experiential system. One reason why owners of family businesses might take more risks than other type of workers is indeed the fact that they tend to work in isolation. The efficacy of observational learning techniques is diminished when workers do not share work tasks. Other ways of communicating risk more effectively are through interventions relying on affective communication, using images of accidents, or oral reports by accident victims.

Finally, the results of this study should be taken as initial evidence of the influence of affective states on workplace safety that needs further support. Like all research using participation on a voluntary basis, the sample we used might have been subject to a self-selection bias and our results might be limited to a particular group of motivated workers. Our sample is not a representative sample

of either the agricultural worker population, or of the worker population in general, therefore it might not be possible to generalize the results to all employers and employees in agriculture.

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED

REFERENCES

1. Alhakami AS, Slovic P: A psychological study of the inverse relationship between perceived risk and perceived benefit. *Risk Anal* 1994; *14*: 1085-1096
2. Audretsch D, Van der Horst R, Kwaak T, Thurik R (2009). First Section of the Annual Report on EU Small and Medium-sized Enterprise. Zoetermeer, the Netherlands: EIM. (Project Commissioned by the European Commission, Directorate General Enterprise and Industry). Available online at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2008/annual-report_en.pdf (ultimo accesso il 01-06-2015).
3. Beus JM, Payne SC, Bergman ME, Arthur JrW: Safety climate and injuries: An examination of theoretical and empirical relationships. *J Appl Psychol* 2010; *95*: 713-727
4. Borley J: A health and safety system which works for small firms. *J Roy Soc Health* 1997; *117*: 211-215
5. Brislin RW: Back translation for cross-cultural research. *J Cross Cult Psychol* 1970; *1*: 185-216
6. Champoux D, Brun JP: Occupational health and safety management in small size enterprises: An overview of the situation and avenues for intervention and research. *Safety Sci* 2003; *41*: 301-318
7. Christian MS, Bradley JC, Wallace JC, Burke, MJ: Workplace safety: a meta-analysis of the roles of person and situation factors. *J Appl Psychol* 2009; *94*: 1103-1127
8. Clarke S: The relationship between safety climate and safety performance: A meta-analytic review. *J Occup Health Psychol* 2006; *11*: 315-327
9. EUROSTAT, European Agency for Safety and Health at Work. (2001). Work-related Accidents in the EU - the Statistical Picture (1998-1999). Fact Sheet N. 19. disponibile on line all'indirizzo: <https://osha.europa.eu/en/publications/factsheets/19> (ultimo accesso il 03.06.2015)
10. Finucane ML, Alhakami AS, Slovic P, Johnson SM: The affect heuristic in judgments of risks and benefits. *J Behav Decis Making* 2000; *13*: 1-17

11. Fisher CD: Happiness at work. *Int J Manag Rev* 2010; 12: 384-412
12. Gardner D, Carlopio J, Fonteyn PN, Cross, JA: Mechanical equipment injuries in small manufacturing businesses: Knowledge, behavioural, and management issues. *Int J Occup Saf Ergon* 1999; 5: 59-71
13. EU-OSHA, European Agency for Safety and Health at Work. (2009). Occupational safety and health and economic performance in small and medium-sized enterprises: a review. Working Environment Information Working Paper n.9. disponibile online all'indirizzo: https://osha.europa.eu/en/publications/reports/TE-80-09-640-EN-N_occupational_safety_health_economic_performance_small_medium_sized_enterprises_review (ultimo access oil 03.06.2015).
14. Griffin MA, Neal A: Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *J Occup Health Psychol* 2000; 5: 347-358
15. Hofmann DA, Morgeson FP: Safety-related behavior as a social exchange: The role of perceived organizational support and leader-member exchange. *J Appl Psychol* 1999; 84: 286-296
16. Hofmann DA, Morgeson FP, Gerras SJ: Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. *J Appl Psychol* 2003; 8: 170-178
17. Hofmann DA, Stetzer A: A cross-level investigation of factors influencing unsafe behaviors and accidents. *Pers Psychol* 1996; 49: 307-339
18. Kahneman D: A perspective on judgment and choice: mapping bounded rationality. *Am Psychol* 2003; 58: 697-720
19. Klein HJ, Molloy JC, Cooper JT. Conceptual foundations: Construct definitions and theoretical representations of workplace commitments. In Klein HJ, Becker TE, Meyer JP (eds): *Commitment in organizations: Accumulated wisdom and new directions*. New York: Routledge/Taylor & Francis Group, 2009: 3-36
20. Lamm F: Small businesses and OH&S advisors. *Safety Sci* 1997; 25: 153-161
21. Mathieu JE, Zajac DM: A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin* 1990; 108: 171-194
22. Meyer JP, Allen NJ: *Commitment in the workplace: Theory, research, and application*. Thousand Oaks (CA): Sage Publications Inc 1997
23. Meyer JP, Allen NJ, Smith CA: Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization. *J Appl Psychol* 1993; 78: 538-551
24. Meyer JP, Becker TE, Van Dick R: Social Identities and Commitments at Work: Toward an Integrative Model. *J Organ Behav* 2006; 27: 665-683
25. Meyer JP, Maltin ER: Employee commitment and well-being: A critical review, theoretical framework and research agenda. *J Vocat Behav* 2010; 77: 323-337
26. Mohamed S: Empirical investigation of construction safety management activities and performance in Australia. *Safety Sci* 1999; 33: 129-142
27. Neal A, Griffin MA: Safety climate and safety at work. In Barling J, Frone MR (eds): *The psychology of workplace safety*. Washington (US): American Psychological Association, 2004: 15-34
28. Neal A, Griffin MA: A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *J Appl Psychol*, 2006; 91: 946-953
29. Olsson A, Phelps EA: Social learning of fear. *Nat Neurosci* 2007; 10: 1095-1102
30. Parker SK, Axtell CM, Turner N: Designing a safer workplace: importance of job autonomy, communication quality, and supportive supervisors. *J Occup Health Psychol*, 2001; 6: 211-228
31. Peters EM, Slovic P: Affective asynchrony and the measurement of the affective attitude component. *Cogn Emot* 2007; 21: 300-329
32. Savadori L, Savio S, Nicotra E, Rumiati R, et al: Expert and public perception of risk from biotechnology. *Risk Anal* 2004; 24: 1289-1299
33. Slovic P, Finucane ML, Peters EM, MacGregor DG: Risk as analysis and risk as feelings: some thoughts about affect, reason, risk, and rationality. *Risk Anal* 2004; 24: 311-322
34. Slovic P, Finucane ML, Peters EM, MacGregor DG: The affect heuristic. *Eur J Oper Res*, 2007; 177: 1333-1352
35. Van Dick R: Identification in organizational contexts: Linking theory and research from social and organizational psychology. *Int J Manag Rev* 2001; 3: 265-283
36. Zohar D: A group-level model of safety climate: Testing the effect of group climate on microaccidents in manufacturing jobs. *J Appl Psychol* 2000; 85: 587-596
37. Zohar D: Safety climate: Conceptual and measurement issues. In Quick JC, Tetrick LE (eds): *Handbook of occupational health psychology*. Washington(US): American Psychological Association, 2003: 123-142
38. Zohar D, Erev I: On the difficulty of promoting workers' safety behaviour: Overcoming the under-weighting of routine risks. *Int J Risk Assessment and Management* 2007; 7: 122-136