

ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS.

Bengt Arnetz, MD, Ph.D., Wayne State University, Detroit; David M. DeJoy, Ph.D., University of Georgia, Athens; Jennifer A. Taylor, Ph.D., Drexel University, Philadelphia; Dov Zohar, Ph.D., The Technion, Haifa; and Ted Scharf, Ph.D., NIOSH, Cincinnati.

This symposium focuses on the role and implications of safety climate and safety management systems in addressing and managing occupational health and safety risks within first responder communities. Panelists will discuss current safety climate pilot studies and research using the public safety sector (police, fire, and EMS) as the principal exemplars.

The Public Safety Sector is one of ten sub-groupings within NORA (The National Occupational Research Agenda). The sector involves approximately 3.5 million first responders, about 1.2 million of whom are fire fighters, paramedics, and emergency medical technicians (NIOSH, NORA Public Safety Sector Council, 2014 and 2013).

First responders represent some of the most dangerous professions in the United States. They are at a substantially increased risk to be exposed to trauma resulting in physical, mental, and behavioral health disorders ([Arnetz, Arble, Backman, Lynch, & Lublin, 2012](#); [Haugen, Evces, & Weiss, 2012](#); [Rutkow, Gable, & Links, 2011](#); [Vymetal et al., 2011](#)).

Due to the complexity and high risks associated with first responder operations, the need for effective frameworks to mitigate and manage risks is obvious. Safety climate (Zohar, 1980) and safety management systems ([Grote, 2012](#)) represent critical contexts in which to address and improve safety.

“Safety climate refers to shared perceptions of employees about the safety of their work environment, and provides a background against which day-to-day tasks are performed.” (Hahn & Murphy, 2008, references deleted, emphasis added).

Safety management systems typically address the following components ([Grote, 2012](#)):

- Safety policy;
- Safety resources and responsibilities;
- Risk identification and mitigation;
- Standards and procedures;
- Human factors based system design;
- Safety training;
- Safety performance monitoring;
- Incident reporting and investigation;
- Auditing;
- Continuous improvement; and
- Management of change.

The relationship between these many components of a safety management system and workers' group perceptions of safety climate will be explored with an emphasis on the hazardous work environments confronted by emergency responders, including firefighters, police, and EMS personnel. Examples from other industries will be included where appropriate.

This symposium will address 1) the alignment between organizational policies and practices with respect to professional demands on first responders, as well as workers in other hazardous environments, and 2) the role of leadership and organizational factors in guiding and supporting first responders during and following critical incidents. For example, first responders might refrain from reporting injuries and “near-misses” due to perceived lack of organizational support - an important consideration with serious systems consequences.

The symposium discussions will be anchored in a series of real-life examples in which the safety climate and safety management system(s) are either supportive of reporting risks and continuous improvement, or act as a punitive reinforcer that encourages silence. We will move the audience from a discussion of safety climate measurement (already well-established in most industries) to a vision for how interventions should be developed and sustained. Prompting questions such as “What are the requirements for the development of effective interventions?” and “What is required to implement a successful and sustainable program within the first responder community?” will be used as building blocks for a larger discussion welcoming perspectives from all industries present at the session.

Our moderator (Dr. Ted Scharf) will begin with a definition of safety climate, how it operates within organizations, and will propose two competing models for the role of safety climate in hazardous work environments. Then, the panelists will draw on their own research to convey the relevance of safety climate to emergency response. They will discuss the unique characteristics of emergency response work and expound on the similarities and differences to other occupations and work settings. They will discuss how their work is buoyed by the emergency response community's recognition of the importance of safety climate as an important predictor of near misses, injuries, and fatalities at work. The discussions will be framed within the larger safety management system framework. Specifically, Dr. Dave DeJoy will create a bridge from key questions in current research to the challenges of developing interventions for the emergency responder population. He will link developments in research to practical implications for intervention development. Dr. Bengt Arnetz will focus on the physical and mental well-being of emergency responders. He will discuss the

moderating roles of safety management systems and safety climate with respect to the complex stressors encountered during critical incidents to which responders are subject. Dr. Jennifer Taylor will discuss firefighter perceptions of safety policies as elicited through qualitative interviews and focus groups. Poor safety behavior and underreporting of injuries may be explained by the belief that policies only exist to be punitive. Interventions in development will be discussed. Dr. Dov Zohar will summarize and discuss these four presentations.

The audience will be engaged to contribute their own perspectives from the occupations and settings with which they are most familiar. Together, we will create a path to identify how safety climate and safety management systems can help us achieve safety in *all* industries through intervention development and evaluation. This path will emphasize the public health principles of stakeholder involvement and support, the necessity of process and outcome evaluation, and will culminate in a discussion of funding priorities and opportunities.

Chair: Ted Scharf, Ph.D.; **Presenters:** 1) David M. DeJoy, Ph.D., 2) Ted Scharf, Ph.D., 3) Bengt Arnetz, MD, Ph.D., 4) Jennifer A. Taylor, Ph.D.; **Discussant:** Dov Zohar, Ph.D., (prepared comments to be presented by Jennifer Taylor).

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ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS. PRESENTATION #1:

SAFETY CLIMATE AND DESIGNING INTERVENTIONS TO IMPROVE SAFETY PERFORMANCE.

David M. DeJoy, Ph.D., University of Georgia, Athens; Todd D. Smith, Ph.D., Embry-Riddle Aeronautical University, Daytona Beach, Florida; and Aimee A. Dyal, Ph.D., University of Georgia, Athens.

Problem

A growing body of research points to safety climate as an important leading indicator of safety performance in a variety of different industries and work settings. If safety climate serves as a leading indicator, it makes sense that interventions directed at improving climate perceptions should be beneficial in reducing injuries and other losses. This presentation addresses safety climate interventions with specific attention to emergency responders.

Procedures

This presentation builds upon a basic antecedents-outcomes model of safety climate and focuses on the potential drivers of safety climate perceptions (see Figure 1). Existing research is examined; particularly recent meta-analyses and research conducted in high hazard industries. For purposes of this presentation, safety climate is defined as the shared perceptions of employees about the (*relative*) importance of safety within their organization. Safety climate represents the intersection between organizational and psychological processes and their relationship to safety (Neal & Griffin, 2004).

Analysis

In the simplest sense, anything that increases the salience of safety within a work organization could potentially qualify as a safety climate intervention. Enacted safety policies and practices are the most logical antecedents of safety climate perceptions. In this respect, the extant safety management system (SMS) may be an important determinant of safety climate, but evidence is far from complete as to the key elements of an effective SMS. Actions speak louder than words, but the creation of a positive and/or strong safety climate is also a social-communicative process. These processes may be even more important in emergency response where group interdependence and cohesion are critical factors to both safety and effective performance. A small amount of intervention research has focused on the workgroup supervisor. Supervisors may be especially important in emergency response given how this type of work is often organized and conducted. Acknowledging the interplay of technical and social factors, it may be useful to view safety climate from a social-technical systems (STS) perspective. Whether from a social constructionist (e.g., Rochlin, 1999) or systems engineering (e.g., Leveson, 2012) perspective, safety is an *emergent property*, the outcome of interactions among social and technical components of the enterprise in the pursuit of some set of goal-directed activities. Safety climate may be a reflection of the extent of joint optimization; an index of an organization's temporal "state of safety" at a discrete point in time.

Safety climate scores may indicate the status or trajectory of safety, but to what extent do they provide useful information about intervention targets? Debate continues as to whether safety climate is a uni-dimensional or multi-dimensional construct and whether any given safety climate measure or questionnaire can be appropriately applied across different industries or business sectors (Zohar 2010). Although safety climate might be best conceptualized as a higher order factor, no current consensus exists about the specific first-order factors. As such, it is difficult to view safety climate measures as diagnostic or audit-type tools.

Results

In terms of moving ahead, there appear to be three main alternatives. First, safety climate can be retained as a general indicator of safety status within an organization and as one component of a multi-faceted safety program. Safety climate's value as a leading indicator would justify assigning it a sentinel function. Second, researchers can continue to develop customized multi-dimensional safety climate measures for specific jobs and industries that would better capture context specific attributes that could aid problem identification and the targeting of prevention and control strategies. The third alternative is somewhat of a compromise between the first two. This would involve drawing upon applicable theory to improve and broaden the diagnostic value of safety climate. For example, sociotechnical theory has given rise to various analytic strategies such as the MEAD process (Robertson, Kleiner, and O'Neill 2002) that builds upon the idea of joint optimization. A second theory-based approach would be to build upon existing dual process or balance models of work design. Models such as Job Demands-Resources Model (Bakker & Demerouti, 2007) or the Effort-Reward Imbalance Model (Siegrist, 1996) have been applied across a wide variety of work situations and could provide a starting point for devising an analytic framework or for constructing a more generalizable and diagnostic safety climate tool.

Practical Implications

Safety climate may be more than a transient measure safety status within a workgroup or organization. It may offer a focal point for interventions to improve safety. However, considerable additional thinking and research are needed to further our understanding of safety climate and determine promising directions for intervention-based research.



Figure 1. Safety Culture – Safety Climate Model (adapted from Ostroff et al., 2003)

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ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS. PRESENTATION #2:

COMPLEMENTARY PERSPECTIVES ON THE ROLE OF SAFETY CLIMATE IN PREVENTING WORKPLACE INJURY.

Ted Scharf, Ph.D., NIOSH, Cincinnati.

Abstract:

“Safety climate” and the somewhat more comprehensive term, “safety culture,” together, have captured the fascination of safety professionals and others who attempt to explain workplace disasters. The robust and extensive research connecting safety climate to safe work practices can become lost in the latest headlines. Nevertheless, Zohar’s (2010) summary of thirty years of research in safety climate demonstrates the profound and convincing role of a positive safety climate in reducing workplace injuries and illnesses. Zohar’s paper is the basis for the present discussion.

What is safety climate, and how does it relate to safety management systems in hazardous work environments? How are the work group perceptions of safety climate determined? More important, what are the mechanisms through which a good safety climate can improve safe work practices in such workplaces? This brief presentation can neither summarize thirty years of literature, nor bring together the diverse perspectives and competing ideas that have been assembled under the umbrella of safety culture and climate. Instead, this presentation will propose two complementary models of safety climate that, together, appear to encompass most of the current literature. Second, this presentation will suggest one model for the mechanism of the work group’s perception of safety climate, as a way to distinguish safety climate from safety management, and its associated safety policies and practices. (The mechanisms through which safety climate improves safe work practices remain fundamental questions.)

Definitions:

At the 2013, CPWR-NIOSH workshop: “Safety Culture and Climate in Construction: Bridging the Gap Between Research and Practice (Gillen, et al., 2014), twenty definitions were proposed for “safety culture” and for “safety climate.” For the present, we begin with the Hahn & Murphy (2008) definition of safety climate:

“Safety climate refers to shared perceptions of employees about the safety of their work environment, and provides a background against which day-to-day tasks are performed. These shared perceptions derive from several factors, including management decision making, organizational safety norms and expectations, and safety practices, policies, and procedures which together serve to communicate organizational commitment to safety.” (Hahn & Murphy, 2008, references deleted, emphasis added).

Zohar (2010) placed safety climate within the context of an entire organization:

“Organizational climate is made up of **shared perceptions among employees** concerning the procedures, practices and kinds of behaviors that get rewarded and supported with regard to a specific strategic focus. When the strategic focus involves **performance of high-risk operations, the resultant shared perceptions define safety climate.**” (Zohar, 2010, references deleted, emphasis added).

From Hahn & Murphy (2008), we see the focus on the front-line workers who must overcome or circumvent the existing workplace hazards. Zohar’s (2010) definition expands the scope of inquiry to the role of the entire organization in promoting safe work practices, including organizational productivity demands.

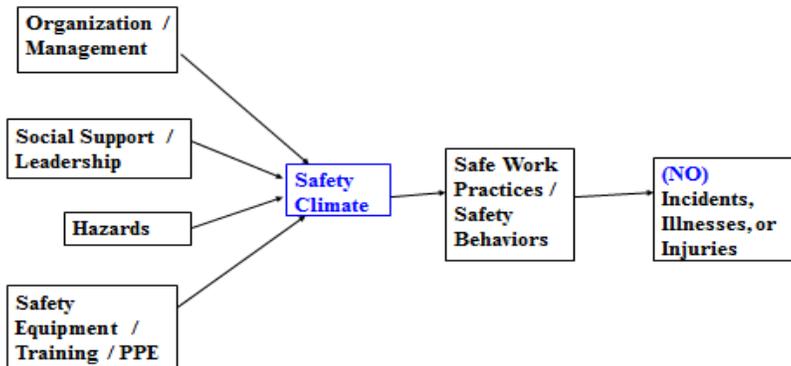
Note on terminology: culture vs. climate.

The CPWR-NIOSH workshop and report (Gillen, et al., 2014) address the competing definitions of safety culture and safety climate in detail. It is an over-generalization, but the term “safety culture” tends to be used by workers, managers and safety professionals, while “safety climate” is more common among researchers. Further, while there are some systematic measures targeting culture, the majority of the progress in research has focused on safety climate (e.g., Guldenmund, 2000). For the present purposes, we use the terms culture and climate more or less interchangeably, unless specifically noted.

Complementary models of safety climate and safety management systems:

Most models that include safety climate, show it to precede – in some fashion – the safety behaviors in a hazardous work environment. The embedded model (below), is a greatly simplified version of this concept:

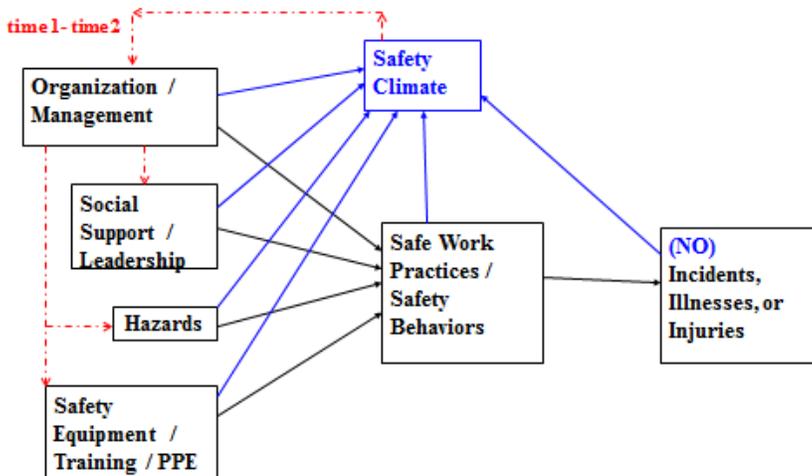
Safety Climate embedded in the causal chain:



This is a simplified but testable model of safety climate as a predictor of improved safe work practices and reduced incidents, injuries and illnesses on the job. There is good research to support this model (Zohar, 2010), albeit not the carefully controlled longitudinal data necessary to firmly establish safety climate as embedded in the causal chain.

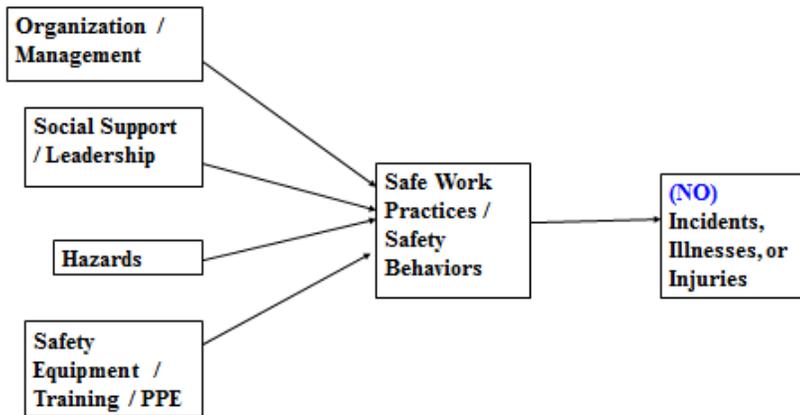
Neal and Griffin (2006) wrote about a lagged relationship between safety climate and safety behaviors with respect to both top-down (management to worker) and bottom-up (front-line worker to group) influences. Further, the overall concepts of safety climate and safety culture imply a pervasive, shared meaning among all the workers – both front-line staff and managers – in a given workplace. Such a shared meaning may not be easily influenced by small changes in the work processes, or minor adjustments to organizational policies that may impact safety. Rather, it would seem to be the entire constellation of shared assessments by all levels of employees in the organization that constitutes the safety climate/culture. The following model is closer in accord to the high-level, overall assessments of safety in a given organization. Further, this model suggests that any change in safety climate represents a reflection of specific conditions in the workplace.

Safety Climate as an indicator, but outside of the immediate causal chain:



The “indicator” approach is a competing model (also simplified) of the role of safety climate with respect to safety management. Safety climate does have an influence on safe work practices in an organization, but only over time and not directly. The research data support this interpretation equally well as the embedded model. The reason, again, is that the necessary longitudinal data are not yet available. The correlations are strong and convincing that safety climate is a valid, leading indicator of safe work practices and reduced injuries and illnesses (Zohar, 2010). (If there is a study testing these two competing models, I don’t know of it.)

Safety (and productivity) Management System:



Finally, if we remove safety climate from the model, we are left with a (simplified) model of a safety management system. This perspective is very important in demonstrating the close relationship between safety climate and safety management. To be sure, we could add the time 1 – to – time 2 arrows in the embedded, and safety management models, as well. (These details have been left out to maintain overall simplicity of presentation.)

Discussion of the competing models:

For the present discussion, it is very useful to model safety climate in both ways. Which model is more accurate, and under which circumstances, is less important than the perspective and understanding that these two models provide and the different requirements they suggest. Furthermore, it seems quite likely that both models are correct, depending on specific circumstances. Thus, we might imagine a number of hybrid variations that combine elements of both models, depending on circumstances.

Conclusion:

The indicator model is easier to support and requires somewhat less rigorous evidence. Nevertheless, both models are extremely useful for a comparative discussion. Further, with both models safety climate is shown to be an early indicator of workplace injuries and illnesses and intimately connected to safety management systems. It seems most likely that future research will identify support for both models, under different circumstances.

The connections and interactions between safety climate and safety management systems (SMS):

The preceding discussion illustrates the very close and interactive connection between safety climate and a safety management system. At the very least, a safety climate assessment tool is an early-warning indicator about problems with organizational safety. From this minimal perspective, safety climate is the principal indicator of employees' perceptions regarding safety management.

Safety climate can be discussed in generic form for all industries, and additionally with reference to specific hazardous work environments. By contrast, safety management is very difficult to consider in generic form and quickly becomes so complex within each specific industry that it can be difficult to sort out all of the relevant details. This is one of the advantages of safety climate as an indicator of safety performance.

The [OSHA Safety and Health Management Systems eTool](#) provides extensive documentation to create and establish a safety management system across all industries. At the same time, the extensive nature of this web-based tool can be difficult to penetrate. One might argue that every research and intervention project at NIOSH is designed to make a contribution to some small portion of a comprehensive safety and health management system. Again we see the high degree of complexity involved in undertaking such a comprehensive task. The CPWR-NIOSH efforts in construction safety climate have recognized this problem and provide a simplified, but decidedly not simple, approach.

Espousal vs. enactment (Zohar, 2010):

Zohar's paper covers a large number of topics regarding the context in which safety climate operates. His discussion regarding the alignment between workplace policies and safe work practices concerns both the internal workings of safety climate and the work context. The CPWR-NIOSH workshop report (Gillen, et al., 2014) and accompanying worksheets (Goldenhar, 2014)

describe this alignment for managers as “walking the talk.” This is a short-hand, but extremely accurate description of the challenges in comparing espousal to enactment.

Important note, Zohar (2010) distinguishes several different types of potential non-alignment:

- 1) relative priority for safety in comparison to potentially competing organizational policies and practices,
- 2) management espousal compared to organizational practices, and
- 3) internal consistency of policies and practices, across all levels of the organizational hierarchy.

This paper subsumes all three of these elements as a single concept of the alignment between espousal vs. enactment. In this sense we treat espousal as any spoken or written policy or requirement in the organization. Similarly enactment encompasses actual workplace practices, from staffing levels to work pace, safety resources, and actual productivity.

The present hypothesis is that the primary mechanism of work group perceptions of safety climate is the comparison between espousal and enactment. The espousal vs. enactment determination will be the difference calculation between perceptions of:

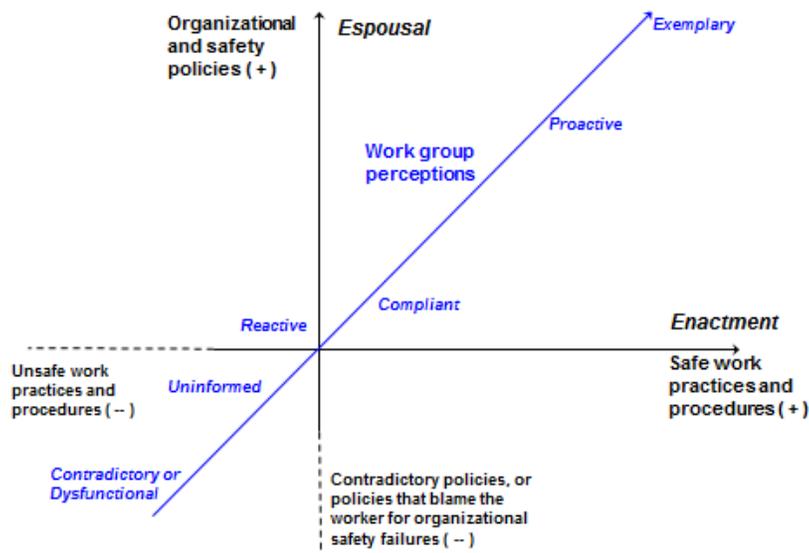
- 1) one or more specific policies and practices,
- 2) a collection of many specific policies and practices, and/or
- 3) an overall judgment about the organizational policies and practices that promote or inhibit safety in hazardous work environments.

There may be other specific mechanisms for the determination of safety climate, but espousal vs. enactment is proposed to be the primary mechanism. (If this mechanism has been proposed in this fashion elsewhere, I have not yet found the reference.) The following plot is a simplified representation of this mechanism:

The following two-dimensional plot places management policies on the Y-axis, and work practices on the X-axis. The blue, “alignment” line indicates agreement between espousal and enactment (i.e. between policies and practices). This does not mean that the policies and practices themselves are good, simply that the two are in alignment. The very best form of agreement, and presumably the best safety climate is labeled, “exemplary,” in the upper-right quadrant.

The labels on the alignment line derive from the CPWR-NIOSH workshop report (Gillen, et al., 2014) and the associated activity sheets (Goldenhar, 2014). The one departure from these two references is that the “uninformed/dysfunctional” category in the CPWR-NIOSH documents has been separated. In the current plot, the “contradictory/dysfunctional” category is hypothesized to indicate a situation that is more negative than one in which the policies and practices are “merely” uninformed regarding safety policy and practices. A contradictory or dysfunctional condition could exist where policies and practices are fundamentally incompatible, in conflict, and possibly dangerous for the workers. In summary, while the “exemplary” position on the alignment line establishes a goal for the best safety climate and therefore the best overall safety, the espousal vs. enactment comparison may yield plot points anywhere in this two-dimensional space. Further, the aggregation of such comparisons across an entire organization will then yield an overall perception of work group safety climate.

Principal Mechanism: *Espousal vs. Enactment* (Zohar, 2010).



This hypothesis stipulates that the espousal vs. enactment comparison is the principal mechanism for a perception of safety climate. Espousal vs. enactment is hypothesized to be both necessary and sufficient to generate a judgment regarding safety climate. However, this mechanism is decidedly not proposed as the sole mechanism of safety climate; there may be many such mechanisms.

Zohar (2010, and other papers), is clearly the principal author of this mechanism, but in at least some respects, this mechanism reflects a *judgment* about the environment (Nunnally, 1978). Further, this mechanism provides an active and useful

example of Joachim Wohlwill's (1973) paper, "The environment is not in the head." Wohlwill concluded his paper:

As psychologists, we cannot fail to deal with the mind. As environmental psychologists, however, I suggest that we at least provide our model of the mind with a window to the outside world.

Additional important note: while the espousal vs. enactment comparison is proposed as the principal mechanism for a determination of the work group's perception(s) of safety climate, this is really only the first half of the function of safety climate in the workplace. We may speculate about a number of succeeding mechanisms, but at this time we have no specific proposal for the manner in which the perceptions of safety climate actually function to improve safe work practices and reduce injuries and illnesses on the job. Certainly there are a number of explanations that readily come to mind: 1) improved attention to safe work practices, 2) improved work crew commitment to safety for the entire crew, 3) improved attitudes about work and the organization or company, 4) improved pre-task planning that emphasizes safe work practices, 5) improved front-line worker control over scheduling, order of tasks, conduct of tasks, and resources, etc.

Worker perceptions of safety climate in their work group remain the key result of the espousal vs. enactment comparison. (This discussion is not going to explore precisely how a work group perception is measured, but contextual analysis in sociology has important insights into this measurement problem. See, for example: Boyd and Iversen, 1979; Ebring and Young, 1979; Firebaugh, 1979 and 1980; Iversen, 1991; and Kenny and LaVoie, 1985.) The level of the perceptual assessments may range from one or a few specific policies and practices to an overall assessment of an entire organization in the context of its hazardous work. Finally, espousal vs. enactment as a mechanism for safety climate works quite satisfactorily in both the embedded and indicator models.

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ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS. PRESENTATION #3:

PROMOTING FIRST RESPONDERS' RESILIENCE RESOURCES THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS.

Bengt Arnetz, MD, Ph.D., Wayne State University, Detroit

Statement of the Problem

First responders (FR), e.g., law enforcement, firefighters, emergency medical responders, coast guard, and the military, represent some of the most dangerous professions. They are at a dramatically increased risk to be exposed to physical and psychological trauma and on-the-job mortality. The National Occupational Research Agenda (NORA) has a special National Public Safety Agenda, in which they highlight the sector's occupational health and safety challenges, as well as set priorities.

In many instances FR must make decisions quickly and based on limited information. At the same time, FR behavior during critical incidents is increasingly subject to scrutiny by the public and the media. The public is especially concerned about excessive use of force among law enforcement. This is not least evidenced by several cases that have made the national media within the last couple of years – most recently typified by the law enforcement officer who fatally shot an unarmed civilian to death in Ferguson, MO.

It is well known that FR are at increased risk to suffer from trauma-related mental and behavioral health disorders. In terms of risk factors for trauma disorders, individual and situational factors have received the most attention, for example how the person reacted cognitively and emotionally after a critical incident. Less attention has been directed towards the role of organizational and safety climates on FR reactions to trauma. Figure 1 depicts a model in which organizational and safety climates are integrated into an overall trauma-mental health model. The importance of a well-established safety management system and a well-integrated safety climate are of critical importance for maximum health and safety and appropriate professional performance during risky operations.

Analysis

In the current study, a random national sample of 3,700 first responders, including police, fire, coast guard, military, and customs and immigration, responded to a survey focusing on stress, risk, and resilience factors, and on health and professional performance. In addition, organizational and safety climates were assessed as was FR perception of having support from their immediate superior in terms of managing professional stressors.

Two composite measures were created. The first one, Professional stress, summed up ratings on single-items measuring stressors related to e.g., work per se, threats from the public, and organizational challenges. The second scale, Organizational Climate, aggregated questions related to organizational support, culture of safety, and strategy at work to manage stressors.

Results were compared across the 5 different professions, using student's t-test, Chi-square, and Analysis of Variance analyses. The importance of organizational and safety climate was tested using linear regression analysis.

The presentation will also demonstrate the role of safety climate and safety management systems in a real-life situation in which a law enforcement officer comes under imminent danger to his own life.

Results

One out of eight respondents felt unsafe at work. There were significant differences across FR categories, with the highest rates for the police and military, and the lowest for firefighters ($p < .001$).

Almost one in two FR stated that professionally-induced stress adversely impacted their performance. There were significant differences across FR categories ($p < .001$). Thus, 56% among the police responded affirmatively as opposed to 37% among the military.

Based on the Professional stress scale, there were significant differences across FR categories ($p < .001$). The mean Stress score was 35.11% (S.D. 9.18) on a 0-100% scale.

The mean score on the Organizational climate scale was 56.48% (11.22), which also differed across FR groups ($p < .001$).

Over 67% of the respondents stated that there was a lack of organizational strategy as to how to manage professionally-induced stress. There were significant differences across FR groups with the highest percentages within the military and the lowest in the coast guard and firefighting, ($p < .001$).

Over 50% of firefighters and customs control personnel stated they managed professional-induced stress by talking to their supervisors, while the percentages among the military and police were 40% and 35%, respectively (p , between groups, $< .001$).

Linear regression analysis revealed that apart from FR categories, existence of a safety climate created a significant contribution to lower professional stress (adjusted R-squared, 0.09, $p < .001$).

The video that will be shown demonstrates how a law enforcement officer within a brief period of time has to make critical strategic and tactical decisions when he faces a man, armed with a large knife, and who has cut the throat of three other people

already. The video also demonstrates the responses of other law enforcement officers and shines light on the importance of established safety management systems and safety climates.

Practical implications

This study points to the importance of having an accepting safety climate in terms of dealing with professional-induced stress. A supportive climate contributed to decreased professional stress.

The results also demonstrate the need to establish safety management systems and safety climates that are functional and supportive of FR health and safety, as well as professional performance, during critical incidents.

Conclusion

FR are exposed to numerous stressors that originate both from the job itself, as well as from societal and organizational changes impacting many of the fundamentals of the profession. Professional-induced stress is a major challenge to the health and well-being of FR and also adversely impacts their professional performance. This has implications also for the safety of the public and the safe practice of professions with inherent dangers.

Acknowledgement

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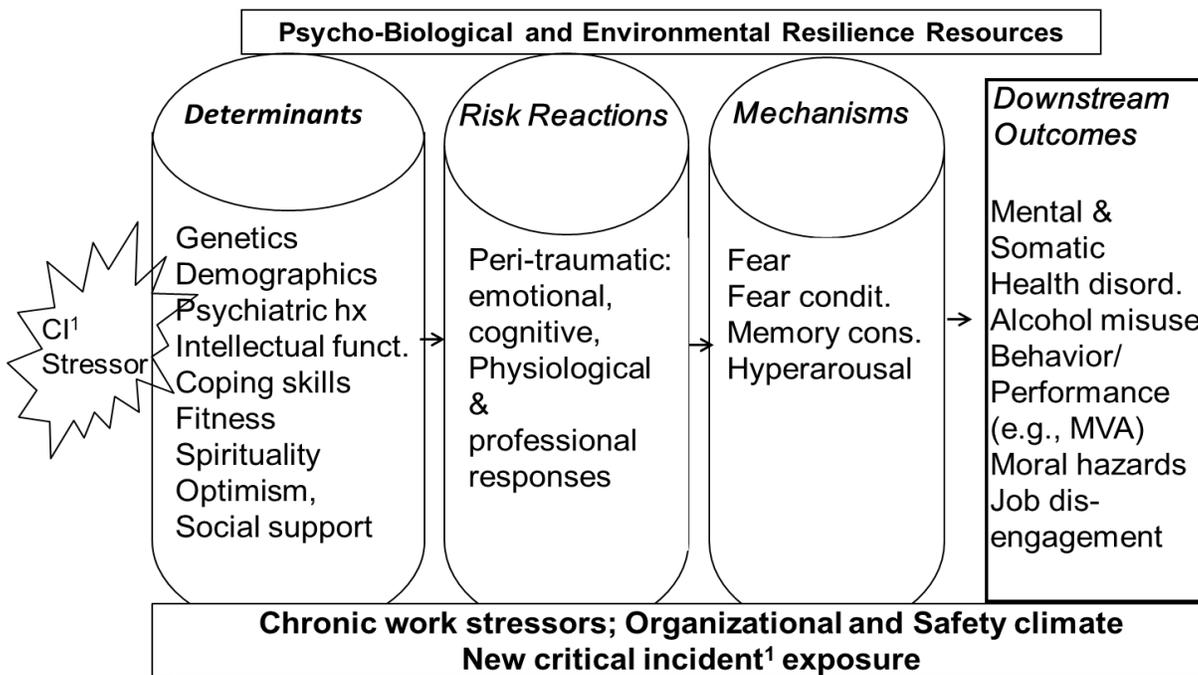


Figure 1. Stress – Safety Climate – Health and Safety Model

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ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS. PRESENTATION #4:

ASSESSING SAFETY CLIMATE IN THE U.S. FIRE SERVICE.

Jennifer A. Taylor, Ph.D., Drexel University, Philadelphia

Safety climate has been shown to be a strong predictor of occupational near-misses, injuries, and line of duty deaths.

In 2004, the United States Fire Service convened the National Life Safety Summit generating 16 Initiatives embodying its future research agenda. Initiative #1 described the need for a cultural change within the fire service relating to safety.

We will discuss the utility of a mixed method study design to ensure accurate climate measurement and appropriate survey construction in building a Fire Service safety climate instrument.

Firefighter perceptions of safety policies as elicited through qualitative interviews and focus groups will be discussed. We will argue that poor safety behavior and underreporting of injuries may be partially explained by the belief that policies exist only to be punitive. We will discuss how paramedics and EMTs assaulted by patients in the line of duty feel unsupported by the leadership of their fire department and espouse a fatalistic view that the prosecutorial process will not bring them justice.

While the development of an instrument is critically important, the real challenge for the fire service - and all industries - is how to change the culture around safety.

We will share observations regarding potential interventions as a way to exemplify the goal of the overall panel which is to move the field of safety climate research from measurement to intervention development and evaluation.

Among all industries, there is a wealth of cultural assessment and a dearth of cultural intervention. The development of such is the next frontier in safety climate research. We will share observations regarding potential interventions as a way to exemplify the goal of the overall panel which is to move the field of safety climate research from measurement to intervention development and evaluation. We will briefly describe some of the safety climate interventions in existence, with the caveat that efficacy evaluation is variable. These can be adapted to the fire service, but must be carefully constructed and evaluated during that process. Some of the possible interventions that will be discussed include:

• **Sterile cockpit (Aviation):**

Requiring the use of checklist during take-off and landing phases of flight and discouraging extraneous conversation. Also encourage a speak up culture among all flight personnel if they see something they feel is wrong and could jeopardize flight (flattening hierarchies). This intervention has been adapted to healthcare in the case of medication administration and was shown to reduce nurse distraction (see Teresa Pape's work: Applying airline safety practices to medication administration. *MedSurg Nursing* / April, 2003).

• **Executive Walk Rounds (Healthcare):**

Hospital executive walk around on units asking providers what patient safety concerns they have and how the executives can bring resources to solve the problem (See Eric Thomas's work: The effect of executive walk rounds on nurse safety climate attitudes: A randomized trial of clinical units. *BMC Health Services Research* 2005, 5:28).

• **The Comprehensive Unit-based Safety Program (Healthcare):**

A patient safety concern is identified launching a unit-level committee that determines issue severity and applies project management tools. On a project's completion, the results are disseminated through a shared story. (see Peter Pronovost's work: A web-based tool for the Comprehensive Unit-based Safety Program (CUSP). *Jt Comm J Qual Patient Saf.* 2006 Mar;32(3):119-29).

• **After-action Review (Military):**

After-action review, a feedback procedure often used in military contexts, typically occurs soon after an incident or training exercise has concluded (regardless of whether a negative event occurred). Analysis of data from the crews suggest that after-action review frequency positively influenced both levels of safety climate. *The limitations of the study included the use of a non-industry specific safety climate instrument and a lack of exploration of the association between survey results and injuries* (see Allen, JA, BE Baran, et al. (2010). "After-action reviews: a venue for the promotion of safety climate." *Accident Analysis & Prevention* 42(2):750-7).

• **Daily Conversations (Maintenance):**

The intervention trained supervisors to communicate the priority of safety over competing goals such as speed or schedules. Safety-oriented interaction increased significantly in the experimental groups but remained unchanged in the control groups. This change in safety-oriented interaction was accompanied by significant (and stable) changes during the post intervention period in safety behaviors and outcomes such as- minor injury rate, earplug use, and safety climate scores (see Zohar, D. (2002). "Modifying

Supervisory Practices to Improve Subunit Safety: A Leadership-Based Intervention Model.” Journal of Applied Psychology 87(1): 156-163).

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ENHANCING FIRST RESPONDERS' WORK AND SAFETY THROUGH SAFETY CLIMATE AND SAFETY MANAGEMENT SYSTEMS.

DISCUSSANT

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