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Safety Climate of Small-to-Medium Enterprises

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This chapter reviews safety climate in organizations, particularly small-to-medium enterprises (SMEs). Regardless of organizational size, the concepts relevant to understanding safety climate remain the same. However, the way that safety climate develops, is managed and is affected by unsafe incidents may differ depending on organizational size. This is important, because since the inception of the research field 30 years ago (Zohar, 1980, 2010), the majority of safety climate research has been conducted in and on large organizations. Nevertheless, there is an extensive body of literature from which to draw lessons learned about safety climate and apply to SMEs. Thus, in this chapter we review important concepts like organizational culture, organizational climate, safety culture and safety climate to set the context for how to understand and interpret safety climate and its effect on employee behaviour. Then, we review theory and evidence on the development of organizational climate, antecedents and consequences of safety climate, and research examining safety climate in SMEs. Finally, we describe how to assess safety climate and workplace safety interventions designed to improve safety climate. Our goals with this chapter are both to inform practitioners and researchers in environment, health and safety management about the state-of-the-science in safety climate and to encourage additional research on safety climate in SMEs, so that these important and common enterprises are a larger part of the conversation about safety and safety climate.

5.1 Organizational Culture and Organizational Climate

Organizational scientists have been studying organizational culture and climate and its influence on workplace accidents for well over a half century (e.g. Keenan, Kerr, & Sherman, 1951). **Organizational culture** has been defined as 'a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems' (Schein, 1992, p. 12). Thus, organizational culture refers to employees' normative beliefs and shared behavioural expectations within an organization (Cooke & Szumal, 1993; Glisson & James, 2002). Notably, organizational culture is layered (Hofstede, 1991; Schein, 1992), with shared behavioural expectations

and normative beliefs as an outer layer that is conscious to employees, with values and assumptions as an inner layer that is less conscious to employees (Rousseau, 1990; Schein, 1992).

Organizational climate is a related but distinct construct from organizational culture (Denison, 1996; Ostroff, Kinicki, & Muhammad, 2012; Ostroff, Kinicki, & Tamkins, 2003). **Organizational climate** is defined as employees' shared perceptions of organizational policies, procedures and practices (Reichers & Schneider, 1990; Schneider & Reichers, 1983). Organizational climate provides information regarding what behaviours are rewarded, supported and expected in the workplace (O'Reilly & Chatman, 1996; Schneider & Reichers, 1983), suggesting that climate is one layer of the broader organizational culture construct (Ostroff et al., 2003). Because different domains of organizational life have different policies, procedures and practices, organizations have numerous climates, that is, there is not a singular organizational climate, but many climates that are all 'for' something (e.g. safety, diversity, service; Schneider & Reichers, 1983). Of all the various types of organizational climates, safety climate is one of the most studied (Schneider, Ehrhart, & Macey, 2013).

Consistent with the conceptualization of culture as a layered construct differing in the extent to which employees are conscious of them, organizational scholars advocate for assessing culture and climate differently. Culture is determined phenomenologically and qualitatively through observations and interviews, whereas climate is assessed quantitatively through self-reports with a questionnaire (Guldenmund, 2000).

5.2 Safety Culture and Safety Climate

The distinction between safety culture and safety climate parallels the distinction between organizational culture and organizational climate. Here we adopt Guldenmund's (2000) definition of **safety culture**: 'those aspects of the organizational culture which will impact on attitudes and behaviour related to increasing or decreasing risk' (p. 251). Building on the general definition of organizational climate, we adopt Zohar's (2003a) definition of **safety climate** as employees' shared perceptions of policies, procedures and practices regarding workplace safety.

Although a keyword search of the research literature reveals more empirical studies of safety culture than safety climate, closer inspection reveals that questionnaires have been the predominant method for assessing 'safety culture' (Collins & Gadd, 2002; Griffin & Curcuruto, 2016; Guldenmund, 2000, 2007). This is problematic for safety culture research, because '[q]uestionnaires have not been particularly successful in exposing the core of an organizational safety culture' (Guldenmund, 2007, p. 723). Thus, the research literature conveys much more about safety climate than safety culture despite the fact that on the surface the literature appears to focus on safety culture (Griffin & Curcuruto, 2016; Guldenmund, 2007). Correspondingly, for the remainder of the chapter, we refer to safety climate when the original work used questionnaires or other quantitative assessments, even when the original authors may have referred to safety culture.

Safety climate is a robust predictor of workplace safety and employee safety behaviour (Beus, Payne, Bergman, & Arthur, 2010; Christian, Bradley, Wallace, & Burke, 2009; Griffin & Neal, 2000; Nahrgang, Morgeson, & Hofmann, 2011; Payne, Bergman, Beus, Rodríguez, & Henning, 2009; Zohar, 2003a). However, safety climate is not just a leading indicator (i.e. predictor) of unsafe events but rather is also a lagging (i.e. outcome) indicator of unsafe events (see Beus et al., 2010, for a review). Employees perceive injuries and unsafe incidents as indicators of the importance placed on safety in their organization (Schneider & Reichers, 1983), so as more unsafe incidents accumulate, safety climate is likely to deteriorate. Unsafe events may be particularly influential to the future development of safety climate in SMEs, because accidents presumably occur less often and are subsequently better known, observed and impactful.

Most safety researchers conceptualize and operationalize safety climate as a multidimensional construct; however, researchers have not come to consensus on all of the underlying factors or dimensions that constitute the construct (Guldenmund, 2000). Yet there is considerable evidence that management commitment to safety is a key, if not superordinate, component of safety climate (Beus, Muñoz, Arthur, & Payne, 2013; Flin, Mearns, O'Connor, & Bryden, 2000; Zohar, 2003a). Beus et al. (2013), for example, found that the following dimensions illuminate how management's commitment to safety is manifested

in organizations: safety communication, co-worker safety practices, safety training, employee involvement in safety, safety rewards, and safety equipment and housekeeping.

5.3 Safety Climate Level and Strength

Climate level and strength are two important properties of safety climate. Conceptually, safety climate level refers to the average employee perception of climate within the group. It can be interpreted in terms of overall 'goodness' of safety climate for the group. Operationally, safety climate level is simply the mathematical mean of individual employee responses to the climate measure within the group (Chan, 1998; Schneider, Salvaggio, & Subirats, 2002). Climate strength refers to the within-group variability of individual climate perceptions. The less within-group variability, the more the agreement among the employees within the group and the 'stronger' is the climate (Schneider et al., 2002). Climate strength is operationalized as the within-group standard deviation of all employee responses to the safety climate items (Schneider et al., 2002). Some research has shown that the relationship between climate level and organizational outcomes is stronger when climate strength is high than when climate strength is low (Schneider et al., 2002), because a stronger climate is more influential on individual's behaviours – via normative social pressures – than a weaker climate (O'Reilly & Chatman, 1996). This suggests that safety climate is more likely to reduce workplace injuries when employees perceive the organizational environment the same way.

5.4 Literature Review of Safety Climate Studies Conducted in SMEs

As noted earlier, most of the published scientific literature on safety climate was conducted in large enterprises. The majority of documentation on the assessment of safety climate in SMEs is case studies. For example, the Health and Safety Executive commissioned a report summarizing six SME case studies that demonstrate the business benefit of effective management of occupational health and safety (Antonelli, Baker, McMahon, & Wright, 2006). These companies underwent a variety of initiatives for a variety of reasons. For example, due to fairly rapid growth (acquiring approximately one employee per month,

starting with approximately 40 employees), Cougar Automation Ltd. undertook a complete overhaul and restructuring, including a comprehensive review of the health and safety systems, in an effort to change the climate within Cougar. One of the biggest changes that occurred was the Operations Director became responsible for health and safety. Across all six companies described in the report, management believed that improving health and safety was integral to business risk management. Although these companies rarely systematically or comprehensively tracked the costs and benefits of the initiatives, they reported a number of benefits including maintaining reputation, meeting client requirements, controlling insurance premium costs and reducing absenteeism. Although only one of the companies sought to explicitly change safety climate, many reported such a change as a result of their efforts.

Another notable exception is a relatively recent survey of 30 SMEs in India by Unnikrishnan, Iqbal, Singh and Nimkar (2015). They found that safety management practices (which directly contribute to safety climate) were inadequate in most SMEs. They attributed this to market competitiveness, a drive for efficiency, less risk and stringent laws. They also found financial constraints, a lack of awareness, resistance to change and a lack of training to be the main barriers to safety management practices. Interestingly, they found that the need to remain competitive with other SMEs served as a very important reason for implementing better safety practices which are likely to result in a better safety climate.

Woo (2015) described an effort to implement a risk management system in a small family-owned and operated flight school. This effort was prompted in part by the loss of a highly regarded member of the flight school community, demonstrating the potentially larger impact that traumatic events like a fatality can have on an SME. Woo notes that the successful implementation of a safety management system is contingent on the organization having a favourable safety climate (Stotlzer, Halford, & Goglia, 2008). All 18 staff members completed a survey about the need for the safety management system. Results revealed that even in an SME, there can be considerable disagreement about safety-related perceptions and needs. That said, Woo also noted that because the organization was so small, large portions, if not all, of the staff could participate in climate changing tasks.

Woo concluded that collaborative, learning-oriented approaches to developing and changing a safety climate that are advocated in the literature (e.g. Wilson-Donnelly, Priest, Burke, & Salas, 2004) apply equally well to SMEs and that the implementation of a safety management system contributes to the development and maintenance of a strong safety climate.

5.5 Challenges in Predicting Unsafe Incidents

It is evident that safety climate affects workplace safety. However, whereas these general relationships found in the scientific literature provide excellent guidance for organizations as a whole, individual organizations still need to assess their own safety climate and unsafe events in order to determine their own safety status. This simple proposition is more challenging than it appears, because of several challenges to assessment and prediction – especially the assessment and prediction of unsafe events.

Fortunately, unsafe incidents are rare phenomena. Statistical analyses and prediction models tend to assume that data are normally distributed. Because unsafe incidents are relatively rare, such data are not normally distributed. The fact that these events are low base-rate phenomena complicates our ability to explain and predict them. This issue is even more challenging in an SME (compared to large organizations). First, because SMEs have fewer personnel, businesses and physical resources, there should be fewer safety-related events overall.* Second, the law of large numbers indicates that when there are fewer events, there should be greater variability in the rate of events; this makes prediction more difficult, because true changes (whether good or bad) in incident rates will be harder to detect due to the natural

* Counting events is itself complicated (Bergman, Payne, Taylor, & Beus, 2014). Here, we refer to fewer events overall (i.e. the count of events). However, rates of events can also be considered (e.g. number of car accidents per miles driven; number of product errors per 1000 products produced; number of product errors per 1000 employees). Compared to large organizations, SMEs should have a smaller total number of unsafe incidents because of their size, but they might have higher rates of unsafe incidents. Information from the European Agency for Safety and Health at Work (2003) indicates that SMEs have higher *rates* of unsafe incidents (on average), although there are multiple reasons that this occurs beyond the size of the organization.

variability in events over time. Finally, because unsafe incidents should be fewer in total numbers, bigger events will have an even greater impact on the workplace and on safety climate because they will not occur against a 'noisy' background of unsafe incidents.

Another issue that complicates the prediction of unsafe incidents is the phenomenon of under-reporting, or failure for employees to disclose unsafe events. Because under-reporting is so pervasive (Arthur et al., 2005; Probst, Brubaker, & Barsotti, 2008), organizations may need to take actions to ensure the most accurate incident data. Several studies have found that employees in smaller companies are more likely to under-report injuries than those in larger companies (e.g. Leigh, Marcin, & Miller, 2004; Oleinick, Gluck, & Guire, 1995). Under-reporting is likely to lessen the predictive validity of safety climate. To complicate things further, there is an inverse relationship between safety climate and under-reporting rates, such that higher rates of under-reporting occur in organizations with poorer safety climate (Probst et al., 2008). Some actions that can be used to remedy under-reporting include (1) allowing anonymous reports; (2) streamlining the reporting process so it is not onerous or time-consuming or otherwise unintentionally punishing to the reporter's time, effort and personal resources; (3) using cues or prompts to remind reporters of possible factors in the event (Probst, 2013).

5.6 The Development of Safety Climate

Ostroff et al. (2003) described a multi-level model of organizational culture and climate and identified five complementary (not competing) perspectives on organizational climate formation: structuralist, attraction–selection–attrition (ASA), social interaction, leadership and immediate workgroup. The structuralist perspective was founded on Lewin's (1951) field theory, which suggests that organizational characteristics lead to the development of shared perceptions such as safety climate. Consequently, characteristics of an organization (e.g. size, structure, centralization, hierarchical level) combine to influence shared perceptions. The ASA framework (Schneider, 1987) suggests that organizations are shaped by the attributes of individual employees; because people tend to like people like them (i.e. 'birds of a feather flock together'), new organizational members are selected based on

their similarity to current organizational members and those people who do not fit in tend to leave (i.e. attrition). As a result, organizations tend to become homogeneous over time. According to the social interaction approach, climate develops from social exchanges (e.g. communication and interaction) among employees. Next, the leadership perspective states that leadership behaviours communicate meaning and shared perceptions among workgroup members (e.g. Rentsch, 1990; Schein, 1992). Finally, the immediate workgroup also likely influences climate development through task characteristics, workgroup structure, and common experiences (Marks, Zaccaro, & Mathieu, 2000; Ostroff et al., 2003). The following section provides an overview and application of these theoretical descriptions of climate development, focusing on safety climate in SMEs. These descriptions are organized into individual-level, group-level and organizational-level influences on safety climate.

5.7 Individual-Level Influences on Safety Climate

Two main individual or person-related factors contribute to safety: personality characteristics and job attitudes (Christian et al., 2009). The most widely accepted conceptualization of personality and personality characteristics is the Big Five, which differentiates among five factors: conscientiousness (orderly, responsible, dependable), agreeableness (good-natured, cooperative, trustful), extroversion (talkative, assertive, energetic), openness to experience (intellectual, imaginative, independent-minded) and emotional stability/neuroticism (calm, not neurotic, not easily upset; John & Srivastava, 1999). Meta-analytic* evidence supports the relationship between Big Five personality traits and safety behaviour (Beus, Dhanani, & McCord, 2015). Beus et al. (2015) noted that it is not the personality traits per se, but their relationships with higher-order goals of communion, status, autonomy

* Meta-analysis is a statistical procedure that quantitatively aggregates the results of many studies on the same topic in an effort to calculate a population parameter (e.g. rho (ρ) for a correlation). It includes corrections for factors such as sample size in each study and the quality of the measures used. Meta-analytic results are widely considered to be a better estimate of the relationships between variables than the relationships reported in any individual study because meta-analysis averages out and/or corrects for errors in the individual studies (e.g. sampling) included therein.

and achievement associated with each personality trait that influence subsequent safety behaviour. Specifically, employees higher on extroversion and openness to experience seek out goals of status and autonomy, which undermine safe work behaviour. Those who are emotionally unstable should likewise perform less safely, because they are less likely to perform well under stress. However, highly conscientious and agreeable individuals are more likely to behave safely because those traits are associated with goals of harmony and getting along with others. Beus et al. (2015) found that extroversion, agreeableness, conscientiousness and neuroticism were correlates (albeit in some cases small) of unsafe behaviour (ρ = .10, –.26, –.25, .13) and unsafe events (injuries and property damage; ρ = .11, –.07, –.12, .06). Finally, Beus et al. (2015) found that agreeableness, conscientiousness and neuroticism were related to safety climate (ρ = .18, .11, –.18).

Fittingly, researchers have suggested that organizations, including SMEs, can improve safety and safety climate by focusing on safe personalities in selection (Jex, Swanson, & Grubb, 2013). The results from Beus et al. suggest that agreeableness, conscientiousness and neuroticism are particularly important to workplace safety, given their stronger relationships with unsafe behaviour, unsafe events and safety climate. Using these personality traits in selection systems is very common in large organizations with HR-managed selection processes (Jex et al., 2013). Additionally, such personality assessments are relatively common, easy to use and administer, inexpensive and familiar enough to applicants that they can complete them with little instruction.

5.7.1 Attraction/Selection/Attrition Influences

Schneider (1987) proposed that organizational founders originate the overall goals and values of the organization, which in turn create the initial organizational processes and structures. Further more, these goals and values – and processes and structures – change only very slowly over time because of the ASA processes. Briefly, ASA states that people are attracted to a particular organization because of its goals and values (as well as their skill set). Current members select applicants who match the goals and values of the organization, which reinforces their importance. People who do not fit in well – whether because of suboptimal selection or individual changes over time – will

leave the organization (either via quitting or being fired), again reinforcing the organization's goals and values.

The ASA framework suggests that organizational goals and subsequent structure and processes concerning safety affect the type of people organizations hire and the employees who stay. Consequently, the individual characteristics of employees are key to the development of safety behaviour and climate. An organizational structure that supports safe behaviour is likely to attract individuals who are safety conscious. As this process continues, individuals who have similar safety-related characteristics (e.g. conscientiousness) will likely stay with an organization that supports safety and those that have dissimilar characteristics are likely to leave. Consequently, safety climate will develop based on homogeneity in individual characteristics. However, if an organizational structure does not support safety, this will likely perpetuate the attraction and selection of individuals who are not safety conscious.

5.7.2 Group-/Organizational-Level Influences on Safety Climate

In addition to individual characteristics, researchers have identified group- and organizational-level characteristics that are important to the development of safety climate (Ostroff et al., 2003). The structuralist, social interaction, leadership and workgroup perspectives are all based on the principle that climate development takes place outside the individual employee. Empirical evidence suggests that organization and group characteristics are integral in the development of safety climate, with most research focused on leadership practices and socialization.

5.7.3 Leadership Influences

Lewin, Lippitt and White's (1939) assertion that 'leaders create climate' underscores how fundamental leadership is to climate development. Dragoni (2005) describes the influence of leadership on climate as a social learning process wherein group members observe and interact with their manager in the process of interpreting their environment. Subordinates often observe leader behaviour, which helps to inform group members about the relative priorities and values of the leader and organization (Ashforth, 1985; Zohar, 2003a,b, 2010). Safety climate

develops as employees observe and interact with their leaders; employees develop shared perceptions based on common interactions with leadership, including the messages conveyed and practices displayed (Zohar, 2010). Accordingly, numerous primary studies indicate that leadership or supervisor practices are related to safety climate and a variety of other safety-related behaviours and outcomes (e.g. Barling, Loughlin, & Kelloway, 2002; González-Romá, Peiró, & Tordera, 2002; Zohar & Luria, 2004). Meta-analytic evidence supports the positive relationship between leadership and safety climate ($\rho = .69$; Nahrgang et al., 2011).

In SMEs, there are fewer leaders and fewer workgroups than in larger enterprises. Thus, it is essential that every formal and informal organizational leader model appropriate safety behaviours and attitudes, as well as reward and support the safety behaviours and attitudes expected among employees. There is no room in SMEs for a 'bad' group with poor safety climate to hide, and little opportunity for another group to compensate for poor groups.

5.7.4 Socialization Influences

The social interaction perspective similarly proposes that safety climate emerges from communication and interaction among employees, including managers and other workgroup members (Ostroff et al., 2003). Workgroups consist of ongoing events (i.e. social interactions), activities and interaction cycles among group members (Hofmann & Morgeson, 1999). That is, employees are inherently embedded in a social environment, which requires them to interact with fellow employees to carry out their work duties. Understandably, these common activities and interactions lead to the emergence of shared perceptions about safety among workgroup members (Ostroff et al., 2003).

A social interaction perspective proposes that interactions between employees are key determinants of shared perceptions about safety. Research generally supports the idea that communication is integral to workplace safety in general and to safety climate in particular. In fact, Neal and Griffin (2004) argued that safety climate is a function of internal group processes (i.e. perceptions of communication, cooperation and encouragement concerning safety). In their meta-analysis, Christian et al. (2009) assessed internal group processes as an aspect of safety climate and found that it was positively associated with safety

compliance (ρ = .48) and participation (ρ = .52), and negatively associated with accidents and injury rates (ρ = −.19). Another variable that is similar to social interaction is social support, which refers to safety-related advice and assistance individuals receive from their co-workers (Morgeson & Humphrey, 2006; Nahrgang et al., 2011). Nahrgang et al. (2011) found that safety climate was strongly related to social support (ρ = .80).

Researchers have also examined social interaction among group members as related to climate using social-interaction rating scales and social-network techniques (e.g. González-Romá et al., 2002; Zohar & Tenne-Gazit, 2008). Results suggest that safety climate strength is positively related to the frequency of social exchanges and communication among group members (Zohar & Tenne-Gazit, 2008). Moreover, many descriptions of leadership identify communication as a key aspect of leadership practices (Christian et al., 2009; Nahrgang et al., 2011; Neal & Griffin, 2004).

Because SMEs are relatively small, there is greater opportunity for higher density of interactions among employees (i.e. it is more likely that employees will know a higher percentage of their peers). This is an extraordinary opportunity to create a strong safety climate. However, it is essential that the level of safety climate is high/good before trying to strengthen safety climate, otherwise the climate will solidify around a sub-par level of safety expectations. SMEs could identify safety thought leaders and role models – not necessarily managers, but line workers who are looked up to – to evangelize about the importance of safety, the ways in which employees rely on each other to complete work safely, and the hazards associated with unsafe practices. It is also important to identify leaders within the organization who are not acting safely because their influences on co-workers could be hazardous. Supplying these leaders with extra training and encouraging them to be the leaders to their peers could result in new safety benefits to the workgroup and the organization.

5.8 Organizational Characteristic Influences on Safety Climate

According to the structuralist perspective, organizational characteristics (e.g. size, structure, centralization, hierarchical level) influence employees' perceptions. For safety climate, this also includes the

safety-related policies, practices and procedures that organizations implement (Jex et al., 2013). Zohar (2010) described safety climate in part based on internal consistency among policies, practices and procedures. Inconsistent or illogical policies are likely to have a negative effect on safety climate. Likewise, safety climate can be improved by ensuring that organizational policies and safety practices are consistent with one another.

Additionally, a few researchers have examined how organizational and workgroup characteristics relate to safety climate (Neal & Griffin, 2006; Wallace, Popp, & Mondore, 2006; Zohar & Luria, 2010). However, most researchers treat these variables as tertiary, rather than primary considerations to their studies. Workgroup size has received more attention than organizational size as a correlate of safety climate, but the results are mixed. Neal and Griffin (2006) used a longitudinal design and found that workgroup size was positively related to safety climate measured at the second survey administration (r = .20) and negatively related to safety climate at the fourth administration, 3 years later (r = −.07). In contrast, Wallace et al. (2006) found that safety climate was negatively related to group size (r = −.10). Zohar and Luria (2010) included both organization and workgroup size in their analyses, but they found that these variables did not exert a significant main effect or interaction in their model.

5.9 Safety Climate Development in SMEs

There are a number of notable conclusions that can be made about safety climate development in SMEs based on the previous review. Perceptions of safety develop and are influenced by a variety of factors, including the attributes of individual employees, socialization, communication, leadership practices, organizational characteristics and accidents and injuries. Some of these factors may be more pronounced in SMEs, compared to larger organizations that span numerous worksites and employ a greater number of individuals. From a probability standpoint, the number of accidents should be fewer in SMEs simply because they employ fewer workers. As a result, when negative events do occur they may be more observable and known by most employees and consequently have a greater influence on perceptions of safety. In a similar way, the attributes of individual employees (e.g. highly conscientious

or less emotionally stable) might also have a greater impact on safety climate. In large organizations and particularly those that are multinational, the attributes of an individual employee are less influential because they only interact with a select group and are a face in the crowd. In contrast, SMEs employ fewer people, so employee attributes are likely to have a greater influence through co-worker interactions. Management practices are also likely to have a greater impact in SMEs, because they are more easily observed and leaders have a chance to interact more with lower-level employees. Top management in large organizations are frequently located at the corporate headquarters office, distal to the workers who work the closest to workplace hazards. Thus, it is clear that there is no room for missteps in safety communication, leadership, processes or behaviour in SMEs.

5.10 Assessment of Safety Climate

Assessing safety climate is an important task for every company to engage in, especially companies in which processes need to be completed with high reliability (Hofmann, Jacobs, & Landy, 1995; Roberts, 1990). Such assessments are necessary because not only can safety climate assessments predict workplace incidents (Bergman et al., 2014; Beus et al., 2010; Christian et al., 2009; Nahrgang et al., 2011), but they also provide a different view of workplace safety than safety outcomes or records, which can provide for strategic planning and management. Safety climate assessments can be used to forecast which parts of an organization are at greater risk for incident, to determine where additional training is needed and to identify where managerial messages are either misunderstood or appear to be contradictory to the conditions on the ground, among other uses.

Safety climate is usually assessed via employee questionnaires. This is done because even though safety climate is the shared perceptions of the prioritization of and support for safe operations in an organization, it is still based in individual employee perceptions. Usually, safety climate is then aggregated to a workgroup level, whether individual workgroups (e.g. first shift in west building) or worksites (e.g. chemical plants). Aggregated scores are usually computed via the average for the workgroup. However, individual-level (or psychological) safety climate data can also be used to understand individual-level needs

Table 5.1 A Brief Safety Climate Measure

1. My supervisor is committed to improving safety.
2. My supervisor places a strong emphasis on workplace safety.
3. Safety issues are openly discussed between my supervisor and my workgroup.
4. My supervisor trains employees to be safe.
5. My co-workers are committed to safety improvement.
6. Unsafe conditions are promptly corrected in my work area.
7. My supervisor encourages employees to become involved in safety matters.
8. My supervisor praises safe work behaviour.

Source: Beus, J.M. et al., A multilevel construct validation of safety climate, in: L.A. Toombs (Ed.), *Proceedings of the Seventy-Third Annual Meeting of the Academy of Management* (*CD*), Orlando, FL, ISSN: 1543-8643, 2013.

and concerns regarding workplace safety. There are numerous safety climate measures in the safety literature (e.g. Zohar, 2000; Zohar & Luria, 2005). An example measure appears in Table 5.1.

It is acceptable and often appropriate to create surveys that include additional questions beyond safety climate (e.g. safety-related topics like individual attitudes towards safety or individual risk tolerance; topics not directly related to safety, such as satisfaction with a new medical benefits programme); organizational stakeholders might determine that a survey should cover several important topics in order to minimize survey fatigue and maximize responding. However, it needs to be clear – to the survey conveners if not the respondents – what each question on the survey is supposed to represent because when the survey is completed, the stakeholders need to know which levers are important for changing the safety status of the organization. This issue becomes especially important when additional safety-related topics are included on the survey. Conflating safety climate with other safety-related topics could lead the organization to invest in the wrong resources. For example, the appropriate interventions when a workgroup indicates an overall high level of individual risk tolerance are likely to be different from the best interventions when a workgroup indicates a low level of safety climate.

5.11 Best Practices in Safety Climate Assessment

There are a number of issues that need to be attended to in order to conduct a good safety climate assessment. First, employees must feel like the survey is important. Providing time to complete the survey during

the paid workday helps emphasize the importance of the survey and increases the likelihood that employees will participate. Second, participating employees must know that their responses will not cause employment problems if they have something negative to say; employees must be assured – and it must be true – that their individual responses will not be tracked to themselves and their supervisors will not be informed of their individual responses. Anonymous responding processes (e.g. removing tracking information in electronic surveys, using paper and pencil surveys, using external vendors or academic–industry partnerships to conduct the survey) help with this latter issue. Ensuring anonymity or confidentiality of responses becomes more difficult – and more important – as organizational size decreases or as smaller units within the organization are indicated via the survey instrument.

Additionally, the survey needs to be frequent. Our own research (Bergman et al., 2014) demonstrates that the ability of safety climate assessments to predict severe incidents (e.g. injuries meeting OSHA recordable guidelines, damage to processes or property greater than $10,000) is very high in the first month following the safety climate assessment, but by the end of that quarter the ability to predict nearly disappears. This is probably because (1) the organization responds to serious incidents, changing conditions on the ground, (2) serious incidents change individual perceptions of the climate, or (3) both. Thus, frequent assessment – probably monthly – is needed to have a strong safety climate assessment programme.

Because the assessment needs to be frequent, it also needs to be short – on the order of 5 min (or less) to complete. However, the number of questions depends on the education and reading skills of the employees being surveyed as well as the length and complexity of the questions. It is difficult to state exactly the maximum survey length, but 15 relatively short questions (e.g. How much do you agree with the statement: My supervisor disciplines people who do not wear PPE?) is a good target length. These characteristics of a good safety climate assessment programme will also help encourage a higher response rate. Although safety climate assessment needs to be frequent, having it short and allowing paid time on the job to complete the assessment should make it more likely that people will complete the assessment. Additionally, communicating the importance of the assessment will also encourage employees to complete the survey.

Further more, a climate of assessment needs to develop around the safety climate assessment programme. That is, there needs to be a sense that what the assessments are doing is important and that they are not wasting valuable work time. Some ways to develop a climate of assessment are

- Secure senior level buy-in and communication about the assessment.
- Obtain buy-in from the front-line supervision.
- Encourage workers to complete the assessment.
- Provide feedback from the assessment (e.g. report the results) as soon as possible.
- Highlight links between changes in the organization and the survey. For example, when new equipment is purchased, indicate that the investment in equipment was something that was clearly needed based on responses in the safety climate assessment.

Most of these recommendations for creating a culture of assessment focus on leadership actions in some way. The leadership of the organization needs to be clear that the safety climate assessment is an important part of the toolkit for ensuring a safely operating organization. This is done by giving support to the assessment (e.g. resources, time, communication), following through on indications, and making the results open and transparent.

5.12 Levels of Analysis

An often overlooked issue both in the safety climate research literature and in practice is the fact that safety climate is conceptualized as a group-level phenomenon (Guldenmund, 2000; Zohar, 2003a). Thus, in order to be true to theoretical conceptualization of climate as shared perceptions, individual employee perceptions must be measured and then aggregated (combined) to create a 'higher-level' construct.* Typically, the focal unit of analysis is the workgroup level which is

* Average ratings of safety climate items at the individual employee level have been referred to as psychological climate (James & Jones, 1974). This assessment can still be practically meaningful, as research has shown that this operationalization of climate has significant relationships with workplace safety behaviour and injuries (Beus et al., 2010; Nahrgang et al., 2011).

defined as a group of employees who report to the same supervisor. As a result, within one organization, multiple 'subclimates' can exist as a function of variability in how supervisors enforce formal organizational policies and procedures, as well as enact informal practices. Compared to a large organization, there are significantly fewer workgroups in an SME. In fact, for micro-enterprises consisting of fewer than 10 employees, the entire organization could be a single workgroup. As a result, there are likely to be fewer subclimates in an SME.

Practically, aggregating individual employee responses to the workgroup level requires some kind of unit-level identification information for each respondent. In an SME, employees may be particularly apprehensive about providing any kind of identification information as even one response to a demographic item (e.g. sex) could reveal their identity. Likewise, SME employees are likely to be hesitant to respond to an identified survey in which each potential respondent receives his/her own unique link.

5.13 Workplace Safety Interventions

Interventions aimed at improving workplace safety focus on both individual and situational factors. Christian et al.'s (2009) meta-analysis of workplace safety compared the effects of individual difference variables and situational predictors as related to safety outcomes. They found that those who are highly conscientious, not prone to risk taking, and emotionally stable and believe they have control over workplace outcomes (i.e. internal locus of control) are less likely to be involved in unsafe incidents. Similarly, situational considerations (e.g. safety climate, leadership) were also associated with safety outcomes. Moreover, their results suggest that situational factors are stronger predictors of outcomes compared to individual factors like personality, which is theorized to be a more distal predictor. Consequently, interventions aimed at improving situational factors may be more effective at reducing negative outcomes, compared to interventions based on individual characteristics (e.g. selection based on personality characteristics). However, the ease and relatively low cost of selection-based interventions suggest that utility and return on investment of these interventions is likely to be high. Thus, we recommend pursuing both.

Workplace safety interventions include safety promotion and training, as well as interventions aimed at improving safety motivation. Safety promotion interventions involve the use of persuasive messages (e.g. posters, coffee mugs) to remind workers about the importance of safety (Jex et al., 2013; Rosén & Jansson, 2000). However, the effectiveness of safety promotion practices is questionable when considering social psychological research concerning the importance of specificity in persuasive messages (Jex et al., 2013; Petty & Cacioppo, 2012). In other words, messages imploring people to work safely are probably not as effective as messages imploring people to wear their personal protective gear. Another type of intervention involves improvement in safety training and in turn employees' knowledge about safety. Christian et al. (2009) found that safety knowledge was a strong predictor of compliance with safety rules and expectations ($\rho = .60$) and safety participation (i.e. going above and beyond basic compliance by working to proactively improve safety and help others) ($\rho = .61$). Consequently, improvement of training practices based on greater safety knowledge may be a good avenue towards more safe behaviour. A similar intervention involves improving employees' motivation to behave safely. Knowledge is one aspect of safety behaviour; however, ultimately employees must be motivated to behave safely. Researchers have successfully applied behavioural observation, feedback and goal-setting techniques to motivate safe behaviour (Komaki, Heinzmann, & Lawson, 1980; Krause, Seymour, & Sloat, 1999).

Considering the consistent link between safety climate and behaviour as well as outcomes, DeJoy (2005) noted that safety climate interventions might be a very effective avenue at reducing accidents. However, there are only a few empirical evaluations of interventions specifically targeting safety climate. Most interventions to date consist of feedback directed towards leadership based on their interactions with subordinates (Zohar, 2002; Zohar & Luria, 2003). For example, Zohar (2002) completed semi-structured interviews with employees about safety-oriented episodes between their supervisors. Managers were then given weekly feedback based on these interviews. The feedback intervention led to a significant reduction in injury rates and improvement in safety climate, whereas the control group remained unchanged. Zohar and Luria (2003) also examined the effectiveness of a feedback intervention based on safety-oriented exchanges. However, Zohar and Luria (2003)

expanded on Zohar (2002) by including top management and using a questionnaire instead of interviews to collect feedback information. Results across three large companies indicated that the feedback intervention was effective at improving safety behaviour and safety climate. Given the importance of leadership interaction with subordinates to safety climate, a similar intervention is likely to be effective in an SME.

In 2003, the European Agency for Safety and Health at Work published a technical report entitled 'Improving Occupational Safety and Health in SMEs: Examples of Effective Assistance', in which they identified 18 actions that have been taken by SMEs to improve occupational safety and health. Among the examples provided was an effort to integrate safety climate across the Province of Lucca, a region in Italy. Within each of the approximately 80 companies, a new position of safety training/information officer was created. This person became the reference person to employees for all safety issues and was responsible for identifying risks, training workers, facilitating collaborations to resolve any safety issues and encouraging dialogue within the company about safety. One hundred and fifteen officers were trained, and 3000 sets of educational materials were distributed to businesses. Another initiative reported in this report, taking place in the United Kingdom, involved the transfer of knowledge about risks and prevention between large and small enterprises.

A variety of conclusions can be made about safety interventions in SMEs. Generally, previous research suggests that interventions involving safety training, behavioural observation, goal setting, and providing feedback to supervisors and lower-level employees are effective means of improving safety behaviour and reducing negative outcomes. In some ways, the aforementioned characteristics of SMEs are likely to make the implementation and tracking of safety interventions easier. Considering SMEs employ fewer individuals compared to larger organizations, managers can more easily observe the work of all their employees. Additionally, supervisors and subordinates presumably have a greater opportunity to interact, providing more avenues for feedback from both sides. Finally, fewer individuals need to be trained and tracking the effectiveness of safety training is likely to be easier because negative events are more likely to be known and observed. On the other hand, they are also likely to have a greater negative impact on the safety climate, employees and organization as a whole.

5.14 Conclusion

In this chapter, we have reviewed important concepts like organizational culture, organizational climate, safety culture and safety climate. We reviewed theory and evidence on the development of organizational climate, antecedents and consequences of safety climate, and research examining safety climate in SMEs. Finally, we described how to assess safety climate and some workplace safety interventions designed to improve safety climate. We hope that this chapter is a useful resource to SMEs seeking to measure and enhance their safety climate.

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