

Safety Psychology

P sychology has gained a major foothold within the practice of occupational safety. Due to this evolution, many safety professionals are now aware of current behavioral strategies. One can cite various other ways that safety is becoming increasingly “psychologized.”

Much more needs to be considered, however. On two separate planes, safety practitioners should be seeking ways to improve the efficiency and effectiveness of current approaches that complement safety, as well as to identify creative strategies that may impact the future. To that end, this article examines five separate arenas: 1) culture and climate; 2) leadership for the future; 3) organizational alignment and related upward feedback; 4) psychosocial factors and ergonomics; and 5) advancing current behavior-based approaches.

EVOLUTION OF SAFETY MANAGEMENT: 1900-1976

Even with the growing use of behavior-based processes, the dominant paradigm in safety has been—and continues to be—to design the safest equipment, physical work environments and protective devices possible. Secondary emphases have included educating people (about engineering interventions) and enforcing com-

pliance (with recommended procedures) through discipline or correction (Petersen 47+; Winn and Probert 40+). Although this paradigm is changing, review of the evolution in safety management helps explain the current emphasis on psychological intervention strategies.

According to Petersen, safety management has passed through several eras since the early 1900s (1975). The first was the “Inspection Era.” In these early years of the safety movement, management spent much time correcting poor physical conditions. Substantial gains were realized, as the number of fatalities dropped from as many as 21,000 in 1912 to about 14,500 in 1933—a 69-percent decrease. These efforts to improve the physical environment have been linked directly to this decrease.

The emphasis on physical conditions likely occurred first because the conditions were so obviously poor—or because they were perceived to be the actual cause of injuries. It was in this era that H.W. Heinrich published a seminal text (*Industrial Accident Prevention*) that helped move safety forward. Heinrich suggested that unsafe acts contributed to a large percentage of accidents (some 85 percent) and that unsafe conditions accounted for the remaining portion. Even though Heinrich’s specific work has not been fully val-

idated, his thoughts helped to usher in the second era of safety management.

This second era has been called the “Unsafe Act and Condition Era.” As noted, Heinrich felt that most accidents were due to the actions of people rather than conditions. This caused a departure from the sole focus on physical conditions and initiated a two-faceted approach: 1) address work conditions; and 2) train employees in “safe” working habits.

The third era focused on “Industrial Hygiene.” Even in the 1930s, it was known that certain occupations were strongly associated with particular types of disease (e.g., coal mining with black-lung disease). Legislation subsequently brought about workers’ compensation (WC) systems to cover employee illnesses in the same way that injuries were handled. Consequently, it became prudent for management to control and limit occupational illnesses. This prompted safety professionals to concentrate on three areas: 1) inspect and improve physical conditions; 2) focus on worker behavior; and 3) improve environmental conditions that led to disease.

The fourth era, the “Noise Era,” was recognized in 1951 when the first claim for hearing loss was accepted. Prior to this, hearing loss was not considered compensable. After this event and much litigation,

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most states began to reimburse employees for hearing loss. As a result, hearing conservation became yet another area of concentration for safety management.

Although the term safety management is somewhat ill-defined, the 1950s and 1960s might best be described as the era of "Real Safety Management." During the 1950s, safety professionals began to think about safety in management terms for the first time. Safety managers began to set policy and define responsibilities. They also began to use tools from other disciplines, such as statistical techniques used in quality control, so that safety sampling could be more accurately conducted, and methods to improve personnel selection, human factors and engineering techniques. The scope of safety management was widening as safety managers now also looked at fleet safety, property damage control and off-the-job safety.

Progress in safety management techniques was evident from 1931 to 1960. In 1960, frequency rates had dropped from 15.12 accidents per 1 million hours worked to 6.02 (a 40-percent reduction). Severity rates had decreased 59 percent—from

1,590 days lost per 1 million hours worked to 940 (NSC). These rates told a story of success, with results largely achieved by doing what Heinrich had suggested.

In 1961, however, the record suddenly changed. From 1961 to 1971, frequency rates increased 57 percent—jumping from 5.99 to 9.37. Severity rates improved, but at a far slower pace, dropping from 666 to 611 (an eight-percent improvement).

This is where safety stood in the early 1970s. It had evolved to the point where professionals knew what had to be improved: physical conditions, environmental conditions, and the safety-related attitudes and behaviors of workers. However, while experimenting with techniques from other disciplines, the focus had shifted from physical conditions and worker behavior, which likely gave rise to an increase in injury rates.

The realization that many traditional strategies and tactics used in safety management were relatively ineffective led to an era of re-examination. During this period, the safety profession stood on the threshold of a new age—the "Psychology of Safety Management Era."

This era had its foundation in Heinrich's belief that accidents involved both people and the environment, not solely conditions or things. Although the dawning of this new era might have shown promise in reversing the trend of the 1960s, another era was introduced by passage of the OSH Act in 1970. As a result, any momentum that may have begun relative to influencing people through psychological interventions came to a temporary standstill in the early 1970s.

After passage of the OSH Act, attention was again focused on documentation, inspection and control of the physical

Where Do We Go From Here?

By DAVID J. SARKUS

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work environment. In effect, this shift de-emphasized the “human approach” and returned safety management to techniques practiced during the Inspection Era. While the act’s focus on the physical environment and technological strategies were both important and meaningful, resulting activities tended to ignore the social environment and the importance of using attitudinal and behavioral interventions to enhance safety performance.

Although great progress has been made in improving the work environment since the early 1900s, the safety profession must continue to find ways to address “the human resource” by influencing people to work more safely. In the author’s opinion, this creates a dual need to re-emphasize Heinrich’s integrated approach of controlling physical and environmental conditions as well as influencing worker attitudes and actions (Petersen 1975).

With these eras in mind, the challenge to safety professionals is to maintain equal emphasis on physical conditions, and worker attitudes and actions. Meeting this charge will involve at least five major arenas within the contemporary world of safety and health.

CULTURE & CLIMATE

Many safety professionals speak about “safety culture” and their desire to impact it in a positive way. However, one could argue that the term “safety culture” is not an accurate concept (Sarkus 30); and that “safety culture” and “safety climate” should be viewed as different constructs which are subsets of an organization’s overall culture (Mearns and Flin 5+).

In general, culture is more complex than climate, and includes the underlying assumptions, values, norms and expectations within a given organization. In contrast, climate is a reflection of culture, often assessed by gathering information through questionnaires or surveys that provide a “quick picture” of worker perceptions, attitudes and beliefs regarding safety.

In the 1980s and 1990s, researchers such as Schneider, Schein, and Cooke and Rousseau explored culture in rich, yet conceptual, ways that led to an ongoing focus on organizational culture. This study has helped safety professionals better understand work environments (cultures) and the ways that performance improvements can be made.

As recognized by these researchers, the construct of “culture” is a valid meas-

ure for assessing a system of beliefs, values, norms and underlying assumptions that guide certain (safety-related) behaviors, and for making appropriate improvements (Schneider 459+, 1990; Schein 3+; Cooke and Rousseau 245+). However, one can make the argument that culture cannot be readily interpreted nor easily measured.

The distinction between “climate” and “culture” must be clear before safety professionals can begin to better utilize the best of both concepts and determine what should be assessed. Researchers have made distinctions that align “climate” with its roots in social psychology as a reflection of culture and as the interaction largely between an individual and a situation or event (Ashforth 37+; Killman, et al; Lewin; Rousseau; Schneider and Gunnarson). This view of climate and that of social psychologists stems from a focus of “individual” perceptions, cues and thoughts related to the work environment. In contrast, culture has its roots in sociology and social anthropology, with an emphasis on symbols, myths, collective values, norms and the interaction of groups (Mead).

Zohar was one of the first researchers to seek a greater understanding of the “climate for safety.” He attempted to assess the climate for safety by measuring employee perceptions based on a questionnaire completed by 400 employees. Zohar used eight dimensions to measure these perceptions; however, he did not attempt to correlate the findings with downstream safety performance measures such as incidence rates. His concern was individual performers and how their perceptions related to ratings of a safety inspector, not to actual incident rates (96+).

Later, Brown and Holmes attempted to explore the validity of Zohar’s survey, but failed to discover optimistic results (289+). Others measured employee attitudes toward safety, yet did not attempt to correlate findings with commonly used incidence rates (Alexander, et al; Coyle, et al 247+; Cox and Cox 93+; Hayes, et al 145+; Lee; Niskanen 237+; Williamson, et al 15+). Many of these studies attempted to identify workers as “accident” or “non-accident” workers in order to correlate differences related to safety climate and an employee’s prior accident or near-miss involvement.

Among published results concerning safety and climate, the Minnesota Perception Survey and its results have been touted as an important way to measure

worker perceptions at the group or company level. Survey results gathered by questionnaire are correlated with various downstream factors such as compensation costs, incidence and frequency rates, and other relevant benchmarks. Comparisons are then drawn (in terms of safety performance) between so-called “good firms” and “poor firms.” Overall findings suggest that management actions and supervisory support may have the largest impact on positive safety performance (Bailey and Petersen 22+).

Although the literature concerning this survey provides limited empirical information regarding the reliability and validity of the instrument, the direction taken in terms of assessing group perceptions and their relation to downstream factors is a more-meaningful way to approach the use of a climate assessment for safety. Even the seminal work of Litwin and Stringer focused on the climate of the group or organization as a point of reference for future interventions.

In perspective, it would be prudent to continue the study of both culture and climate as each pertains to safety. However, since climate lends itself more readily to measurement and serves as a good reflection of culture, this construct may be more viable for practical use within safety.

Since the roots of climate relate to individual perceptions, most researchers measure factors that relate to 1) the degree of control an individual has over his/her own safety or 2) externally oriented beliefs that relate to another individual’s or the organization’s control over accidents. Thus, they focus on the individual performer and how his/her perceptions have related to “accident(s)” or lack thereof.

These concerns may be important, but assessment, study and group-related interventions to improve the safety management system through the assessment of more-practical climate dimensions seems much more relevant to the practice of good safety management. A review of the literature indicates that regardless of the ultimate findings, most researchers agree that the measure of climate, as dynamic as it may be, can prove to be a powerful tool for improving safety and related outcomes (Mearns and Flin 5+).

LEADERSHIP FOR THE FUTURE

Leadership is a broad, dynamic area of practice and thought; as such it can be difficult to fully grasp its implications on safe-

Organizational alignment and upward feedback can and will be used more effectively to improve safety performance as safety will become increasingly recognized as a critical performance indicator

ty. Virtually no empirical work addresses leadership characteristics or style as they directly relate to safety performance.

However, one can identify several starting points from which to discuss the types of leadership that may best fit within the organization of the future. Clearly, successful organizations exhibit great leadership and a depth of leadership that ensures positive results. According to Drucker, most leaders are aware of four basic elements:

1) The only definition of a leader is someone who has followers. Some people are thinkers; some are prophets. Both roles are important and badly needed. But without followers, there can be no leaders.

2) An effective leader is not someone who is loved or admired. S/he is someone whose followers do the right things.

3) Leaders are highly visible. They set examples.

4) Leadership is not rank, privileges, titles or money. It is responsibility (xii).

Safety professionals want corporate leaders to be highly concerned with safety and to support safety efforts with time, resources and a suitable degree of visibility. Responsibility is a major factor in times of global competition, and safety is increasingly being seen as a strategic advantage that impacts an organization's culture in many varied, yet positive, ways. This should compel safety professionals to continuously leverage themselves and their work as strategic business partners.

In line with this thinking, William C. Steere, chair of the board and CEO of Pfizer Inc., suggests that leaders are responsible for constructing a culture composed of several key components. Safety professionals can use these components to align safety with their organization's overall vision and mission.

Steere's principles for developing and maintaining a high-performance culture:

1) Identify and communicate core values and principles that guide organizational behavior and decision making.

2) Specify behaviors that exemplify these values/principles (and, by inference, those that do not) and lead by example.

3) Develop a method by which individuals can receive feedback on their performance in both business/financial and behavioral terms.

4) Ensure that the reward or reinforcement system, whether monetary (e.g., compensation) or less-tangible (e.g., inclusion and access), is consistent with organizational values and principles, rec-

ognizes and promotes desirable behaviors, and punishes undesirable behaviors.

5) Assume personal responsibility of championing the desired culture and recognize the need for redundancy and reinforcement regarding what is expected and what is negotiable (267).

These components provide a foundation that safety professionals can use to strategically align their efforts with those of corporate leaders. To achieve this, safety professionals must 1) identify core values related to safety and align actions in an effective manner; 2) define and measure safety-related actions of appropriate leaders so their example can be modeled throughout the organization; 3) implement systematic forms of feedback to leaders and others so that critical safety-related actions are consistently demonstrated; 4) ensure that reinforcement, reward and other complementary systems are consistent with adopted values which will help promote desired forms of safety-related actions; and 5) help to ensure personal responsibility and accountability within the natural roles of leaders throughout the depth and breadth of the organization.

Although Komaki's continued research may be better associated with "managing" performance rather than "leading," it provides valuable insight with sound empirical findings. Her operant perspective supports the author's thoughts regarding leadership: An effective leader regularly monitors the performance of followers or subordinates and allows for discussion and a two-way exchange of the followers' performance. In turn, the leader provides more consequences for subordinates' actions, which leads to more monitoring by the leader and continued interaction between the leader and followers concerning performance.

These principles and characteristics of effective leadership reflect contemporary beliefs and behaviors based on the fact that today's leaders recognize the need to define a vision and mission for success; build trust; share power in effective ways; develop positive relationships; lead by serving first; and build a sense of community within the organizations they support (Blanchard; Lowe; Melrose; Sarkus). Achieving this requires the development and deployment of effective leadership principles and strategies at the top, middle and near-lower levels of organizations that support the vision, values and beliefs established by leaders and their followers.

ORGANIZATIONAL ALIGNMENT

Since the mid-1990s, some literature has addressed the subject of organizational alignment (George 6+; Goll and Sambharya 823+; St. Onge 5+; Smith 12+; Weiser 11+). Loosely defined, organizational alignment can be called the pattern of consistency within a company that allows its policies, procedures, decisions and daily work practices to be demonstrated in ways that are most efficient and effective, thereby fulfilling its mission and continuously moving toward its vision.

In the field of safety, alignment will begin to receive more attention. To date, the only published work associated with safety and alignment of espoused principles for guiding "right action" features the work within the mining industry (Hine, et al). These researchers interviewed various levels of personnel in order to determine how closely their comments aligned with seven recently adopted principles:

1) All injuries are preventable.

2) Employee involvement is essential.

3) Management is responsible for safety.

4) Working safely is a condition of employment.

5) All operating exposures can be safeguarded.

6) Training is essential.

7) Safety is good business.

Interviews were conducted with select workers, and responses coded and scored in order to understand how closely the responses aligned with the seven principles and job performance. Overall, senior managers responded to questions in ways that aligned better than did line employees, but discrepancies were noted between managers' "self-reporting" and how workers viewed the daily behaviors of managers. Future directions for this research, according to the researchers, would be to measure attitudes and actual behaviors with regard to the safety-related principles established.

The feedback from this study lends itself well to further study and use of upward and multi-source feedback. Some firms provide upward and multi-source feedback to supervisors from their workers to facilitate overall organizational alignment. Unlike the work conducted by Hine, et al, however, company values that relate to its vision are often used as a starting point, with supporting values written in behavioral terms (operationally defined). As a result, desired actions become more concrete and allow for more-accurate

Three Processes for Lasting,

information to be fed upward to superiors so that their behaviors can become more consistent and desirable.

A recent study conducted over a five-year period revealed several findings that pertain to upward feedback given to managers (Walker and Smither 393+). This research found that managers' performance improves through the use of upward feedback from the workforce. Managers who received poor to moderate ratings were said to have improved more than managers who initially received higher ratings. Managers who held feedback sessions with direct reports reportedly improved more than those who did not hold such sessions.

These results are meaningful because they show that upward feedback *can* improve performance of managers, especially when feedback sessions are used to discuss subordinate ratings. This type of feedback, combined with various methods of accountability to improve managerial effectiveness, holds a great deal of promise for improving organizational performance in general—and safety-related performance in particular.

ERGONOMICS & PSYCHOSOCIAL ISSUES

Psychological stress related to the workplace in a broad sense, and to ergonomics in particular, continues to be a major challenge. Like organizational climate, psychosocial issues related to ergonomics revolve around employee perceptions regarding the work environment. In this context, researchers have linked negative employee perceptions with mental tension that leads to somatic complaints which surface as physical pain, discomfort and general complaints related to physical health (Conway, et al).

Consider video display terminals (VDIs) and ergonomics. Organizations have become computer-driven in order to increase productivity and quality, and lower operating costs. However, along with these benefits come problems related to employee dissatisfaction and health. For example, research has revealed that a lack of perceived job control and low employee participation were related to increased reporting of back and hand pain. In one study, a perceived increase in workload was related to an increase in the number of employees reporting back and hand pain. In addition, concerns relating to job security were associated with increased reporting of back pain, while per-

This is the story of Willie and Joe. Willie was a "problem employee" who was transferred to a department that was effectively using a behavior-based approach to safety. His mentor was Joe, a co-worker and safety observer well-liked and respected for his skills as a machinist, and because he had strong convictions about safety.

Willie worked closely with Joe each day. Over the course of one year, Willie's safety-related attitudes and actions changed. At first glance, these changes seemed superficial because he acted or thought in certain ways only to gain favor with Joe. Later, he began to work safely because he knew there were mutual expectations with his new group and with Joe; he wanted to maintain good relationships with his new colleagues. In the end, through constant and persuasive feedback, Willie realized that working safely enabled him to enjoy the things he valued in life.

What is happening when people like Willie experience such positive changes? More practically speaking, how do you effect such broad changes in attitudes and actions—changes that go beyond a narrow set of targeted behaviors? How do you sus-

tain these new attitudes and behaviors without constant forms of small rewards, praise or various forms of peer pressure?

Three dynamic processes occurred in this case. The first focuses on a personal form of superficial compliance that comes from a coach's corrective and confirming feedback.

SOCIAL REWARDS

Let's go back to Willie's first few months in the new department. Initially, his attitudes and behaviors were mainly associated with social effect. Willie wanted to be rewarded by Joe—and to avoid being punished by his supervisor for non-compliant behaviors. Publicly, he looked good, but when nobody was present, Willie usually reverted back to his old "unsafe self."

Joe proved very wise here. He confirmed Willie when he was working safely through small rewards and praise, but didn't correct him nearly as much. The use of small rewards (at times a token for some food) and praise increased Joe's personal appeal. This set the stage for a somewhat deeper and more permanent form of influence identification.

ceived lack of social support was related to a higher number of employees reporting elbow pain (Conway, et al).

A summary related to VDT use and psychosocial issues led to the following general conclusions:

- 1) Lower-paid workers and those performing less-skilled job tasks have higher amounts of psychosocial stress than those in higher-paying, higher-skilled jobs.
- 2) When technology changes are made, lower-paid workers in less-skilled positions again report higher levels of psychosocial stress than those in higher-paid, higher-skilled positions.
- 3) Older employees report more stress during times of technological change than younger workers.

Specific work-related factors that produce stress vary, but several are common across a number of job categories:

- 1) work pace/increased job demands;
- 2) lack of perceived control over decisions and participation in work processes;
- 3) inadequate job skills combined with increasing job demands;
- 4) lack of job/task content or variety;
- 5) problems related to technological breakdowns or slowdowns;
- 6) poor work relations or a perceived lack of support from supervisors;
- 7) lack of job security.

Each factor should be studied with more scrutiny, but should also be viewed as a starting point for improving the overall organizational climate through an integrated system of support for ergonomics.

Within industrial ergonomic settings, some of these same factors have been studied, yet have produced mixed results and conclusions (Ingelard, et al 209+). Furthermore, the issue of work environment, psychosocial issues and perceived physical complaints is a complex subject with no definitive explanations.

BEHAVIOR-BASED SAFETY

Many safety professionals continue to look for the best approaches to managing workplace safety. Typically, they are seeking interventions that will produce the greatest magnitude of positive change for the least amount of investment.

An early 1990s study summarized the evaluation of data from 53 different research reports on safety programs such as behavior-based efforts, ergonomic interventions, engineering changes, management audits, stress management, poster campaigns and near-miss reporting. Studies reviewed had been conducted since 1977. Although the ranking should be treated with caution since it is based on a limited number of studies, it offers a relative comparison of such programs and their impact (Guastello 61+).

According to the summary, the effectiveness of behavior-based efforts ranked first, with a 59.6 percent average reduction in injury rates. These processes used various types of employee training regarding the modeling of safe and unsafe behaviors, observation and recording of targeted behaviors, and feedback to employees

Positive Change in Employee Safety Performance

RELATING TO A GROUP

After several months, Willie began to change even more, behaving safely even when others were not present. He wanted to maintain the relationships he was building within this new group, in particular his relationship with Joe. Mutual obligations had to be met, and Willie was smart enough to realize it. For Willie, the mere "psychological presence" of Joe and the others he respected was enough to keep him working safely. Not all of the time just yet, but much more than before.

This second process draws on caring, coaching, collaborating and conciliating. Joe was seen as a credible, trustworthy co-worker who wanted to help Willie. He became a trusted friend because he cared for Willie by doing work-related favors; coached Willie by listening and setting a good example; collaborated with Willie by making him an active participant in the safety process; and resolved conflicts before bad feelings could take root.

Somewhat unknowingly, Joe was motivating Willie to maintain this ongoing relationship and meet associated expectations. If Willie wanted to keep this work relationship

positive, he knew that working safely was essential. In other words, emotional ties were developing. Willie and Joe were building a strong, positive rapport, largely because Joe was a well-respected co-worker and a trusted friend. All of this led to an even deeper phase of change-internalization.

DOING IT FOR YOURSELF

Internalization is the third process at work in the changes transpiring within Willie. Over the course of a year, Willie began to realize that safety was personally important, and he was fairly open in sharing these thoughts and feelings. This awareness and expression is the cognitive phase of the process; it is facilitated by someone who clarifies these perceptions and values.

At first, Willie spoke about how he liked being rewarded by Joe. He recalled how he also wanted to maintain a good relationship with Joe. But overall, it was Joe's positive and persuasive feedback that won him over. Joe often told Willie that sooner or later he would be injured if he did not change his habits. Willie could avoid injury, Joe explained, by realizing that he was in control and could take appropriate actions.

More importantly, Willie began to experience inconsistencies between his values and actions. He began to acknowledge that working safely meant he could continue to do what he loved to do outside of work. Throughout this process, Joe helped clarify the individual relevance of safety for Willie. As a result, Willie became a leader in his own right, no longer needing to be with or around Joe to work safely. The changes in his attitudes and behaviors were deep and lasting.

Even after downsizing and rightsizing actions, mid-level and senior managers at Willie and Joe's plant continue to realize the bottomline benefits of nurturing these three processes—based initially on compliance, then identification and finally internalization. They support this interactive and developmental method as an ingrained part of the work culture. As a result, the workforce remains committed to influencing other employees and keeping their efforts focused because they have experienced the beneficial outcomes of such actions.

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pertaining to the percentage of safe and unsafe behaviors observed and recorded. Some interventions offered incentives and/or involved goal-setting to maintain programs and influence positive changes in behaviors and attitudes.

However, many behavior-based programs in use today seemingly are not based on the kind of systematic theoretical framework that can guide organizations toward the goal of establishing and maintaining large-scale, flexible (generalizable) and durable changes in safety-related attitudes and behaviors. Many closely resemble the methodology established by Komaki, et al, in that they provide workers with models of safe and unsafe behavior; use peers and supervisors to gather performance data in a participatory manner; isolate and observe target behaviors; and provide varied forms of feedback to individuals and groups in order to positively change safety-related attitudes and behavior.

Feedback usually comes in the form of praise or recognition from peers and/or superiors. External rewards are sometimes used as part of the feedback process; punishment (correction and re-direction) is also applied, but to a lesser degree. Vivid graphical displays are also used to provide feedback about workers' observed levels of performance relative to certain clearly stated goals (Geller; Chhokar and Wallin 141+; Krause, et al; Sulzer-Azaroff, et al).

As noted, many behavior-based processes lack the structured theoretical basis

that may hold the key to further enhancement. With this in mind, this portion of the article examines basic components of a theoretical and applied model of social influence that can be used to establish and maintain positive safety-related attitudes and behaviors. This process can be used to improve current behavior-based intervention strategies by augmenting them with complementary (i.e., affective or emotional, and cognitive or thinking) strategies in a multi-dimensional model.

Good theory should be viewed as a critical component of improving and advancing such interventions. In this context, Temple suggests that "a good theory is one which can adequately explain, accurately predict, and effectively promote the adoption, development and maintenance of specific attitudes and behaviors" (7-8). This research emphasizes the fact that "different processes of social influence" underlie different types of intervention strategies, each of which has a consistent and meaningful pattern of effects.

According to Temple, a "good theory" of social influence should be able to: a) describe these different "elemental" processes; b) describe and explain the general motivational antecedents of each process; c) describe and explain the general behavioral consequences following from the use of each process—i.e., changes in attitudes and actions; d) account for the "interactive effects" of combining elemental processes; e) explain the relative effectiveness of previous intervention pro-

grams and policies via post-hoc analyses; f) predict the relative effectiveness of new intervention programs and policies.

To the extent these requirements are met, the theory should be able to guide the construction of new intervention programs and policies that more-effectively promote or facilitate adoption, development and maintenance of specifically targeted attitudes and behaviors (9).

Kelman's three-part model of social influence may be a good place to begin efforts to develop a general theoretical model that can more fully utilize behavioral, affective and cognitive domains to increase the magnitude, flexibility and durability of methods now in use (Temple; Sarkus; Kelman 185+, 51+, 1960, 57+, 125+).

According to Kelman, attitudinal and behavioral changes may occur on three different levels. *Compliance* takes place on a superficial level of public agreement. Thus, individual changes in attitudes and behavior occur in order to gain a favorable response (reward) or to avoid an unfavorable reaction (punishment). *Identification* occurs when an individual accepts a given position because a change in attitude or behavior helps establish or maintain a satisfying, self-defining relationship with an admired or respected individual. *Internalization* occurs when an individual adopts an attitude or behavior because it is congruent with his/her own values (Eagley and Chaiken; Kelman; Kelman and Eagley 63+). See the sidebar above for an example of this model at work.

Many are now acknowledging that safety is largely about social interactions. Thus, the safety profession should have a sense of urgency to continuously enhance behavior-based safety.

Some might question the usefulness of theory for advancing interventions in occupational safety; however, contemporary scholars have observed an increasing appreciation for the "practical value" of good theory.

It is one of those periods when things are happening at such a rapid pace that the distinction between practice and theory is blurred. But along with this excitement comes apprehension. This point is where our predecessors were in 1945, but 20 years passed before real theoretical and practical progress began (Landy, et al 253).

Related to the importance of theory, Geller recalls Deming's thoughts on the value of theory: "Experience teaches us nothing; that's why American business is in such a mess" (14).

Without question, the future will hold many challenges for safety professionals and those who support the advancement of safety-related issues and interventions—challenges that could include justifying one's role and position. Still, the usefulness of good theory for enhancing behavior-based interventions may unlock opportunities that move the profession to another level. Opportunities for improving current interventions may not be discovered without the thoughtful development of a more-robust model for influencing safety-related attitudes and behaviors.

Many are now acknowledging that safety is largely about social interactions. Yet, nearly 70 years have passed since Heinrich's thoughts were acted upon. Moreover, this model provides the means to limit undesirable actions, while improving social interactions in ways that will positively influence their outcomes—interactions and outcomes that need to be more fully understood.

Coming full circle, the safety profession should have a sense of urgency to continuously enhance behavior-based safety. Lewin once said that "there is nothing so practical as a good theory" to guide in the analysis and application of social interactions and interventions (169). With this in mind, it is time to move ahead.

For example, the area of attention control may be a valid tactic to augment current behavior-based approaches. The work of Nideffer and Pratt—who have worked with attention models and interventions over the last 25 years—may be valuable for safety professionals. Nideffer's research with elite athletes/Olympians has shown that to be success-

ful at home, work, in school or on the playing field, people must pay attention to the right information so that work can be done effectively, and without errors and accidents (Nideffer).

Pratt's work, which is moving along in the industrial safety arena, has a substantial empirical basis with the beginnings of important findings in safety. Pratt's model allows for the development and use of behaviorally defined "concentration channels" and "concentration distractions" so that workers can become safer performers on a regular basis (Pratt and Nideffer). Attention control may become one of the next frontiers for advancing safety performance; it may also be a desirable method that the "great companies" are seeking in order to achieve excellence in safety.

CONCLUSION

Various schools and aspects of psychology will continue to impact the future of safety in several ways. For one, the continued study of organizational culture and climate is essential. Reliability and validity of "practical climate surveys" across a range of industries with distinct risks, and within varied cultures (domestically and internationally) will become part of this process. Leadership at various levels within all organizations will change, which will require safety professionals to optimize and complement the overall leadership that drives organizational performance.

Related to leadership, organizational alignment and upward feedback can and will be used more effectively to improve safety performance, as safety will become increasingly recognized as a critical performance indicator. Psychosocial factors pertaining to ergonomics will have to become more-clearly defined and more-fully utilized as an important element of overall climate improvements. Finally, breakthroughs in behavior-based safety must become more efficient and effective, particularly with regard to their magnitude and flexibility, as well as with respect to the durability of positive change they produce. ■

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